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EDUCATORS TACKLING CLIMATE CHANGE

Perceptions and practices from Fiji

Master's Thesis in Education

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ABSTRACT

This Master's Thesis was conducted to learn about the ways in which educators address climate change in Fiji. Recent research in environmental education has focused on students' conceptions on global warming, climate change and environmental crisis. This Master's Thesis studied climate change and adaptation from the perspective of educators. The aim of the Thesis was to provide theoretical and practical insight about climate change adaptation for educators and to investigate educational initiatives which raise awareness and build communities' capacity to undertake adaptations.

The main research question asked how educators in Fiji perceive and address climate change. The study attempted to investigate what kind of risks and causes of vulnerability educators identify, what kinds of perceptions educators have about the current adaptive capacity and in what ways climate change has been addressed through education.

This qualitative research applied elements from ethnographic research tradition and was inspired by the methodology of community-based vulnerability assessment. The empirical data collection was conducted in Viti Levu, Fiji, during June 2010. The data consists of eight semi-structured interviews and of additional data from the Ministry of Environment and the Ministry of Education. The interviewed educators represent formal, informal and non-formal sectors of educational field. The method applied for analysing the data was qualitative content analysis.

The results reveal that the risks the educators identified were diverse and multi-faceted. They acknowledged that the risks related to climate change have environmental, cultural, psychological and economic dimensions. Their statements were often aligned with the research literature and showed great knowledge and understanding of the issue. According to the results, the causes of vulnerability were perceived to be human-induced. Unsustainable use of resources and contemporary lifestyle were perceived to be the reasons causing climate change.

The responses from the interviews reflected different conceptions related to current adaptive capacity. On one hand a great need for national and international plans was recognised. On the other, current procedures were identified that enhance the adaptive capacity of Fijians. In addition, relying on traditional knowledge and values was understood to determine how Fijians adapt to climate change.

The study reveals that the most important ways to address climate change through education in Fiji were by raising awareness, empowering teachers, mobilising people to take action and emphasising value education. In addition, the study presents that implementing a multi-sectoral approach to respond to climate change is necessary: initiatives must arise from the administrative level to each individual. This implies that educators from any field and in whatever position should consider how they can best support climate adaptation in their local contexts as education can play a key role in enhancing the adaptive capacity of a society.

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ABBREVIATIONS

ENSO	El Niño Southern Oscillation
ESD	Education for Sustainable Development
IOM	Intergovernmental Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-Governmental Organisation
NOAA	National Oceanic and Atmospheric Administration
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

The climate has been changing throughout the history of the Earth and its atmosphere. Several forces have had an impact on the climate and contributed to its change. Also the magnitude of the greenhouse effect has varied naturally. Since the beginning of industrialism, however, human activity has contributed to the natural greenhouse effect with so-called greenhouse gases. It is now generally acknowledged that this contribution has had a warming impact on the climate. At first this phenomenon, known as climate change or global warming, was slow but since the second half of the 20th century the average temperature of the Earth has risen at an accelerating speed. (See e.g. Ilmatieteenlaitos.)

The term 'climate change' has become widely used in public discourse for describing many different changes occurring in the environment while leading to a vague understanding of the phenomenon. Science, on the other hand, has encouraged a fragmented image of nature since it studies the details of subjects, leaving no scope for a holistic view that would help us understand the problems of the Earth as a whole (Bowler 1992, p. 1). In addition, the current climate change has mainly been regarded as an environmental issue. Climate change is a cross-disciplinary phenomenon and should be approached taking into account a scale of perspectives (Tompkins and Adger 2005, p.563). The impacts of climate change are not dependent on the environment alone; rather they depend on the capacity of a system to confront these impacts.

My personal starting point for the study was an interest towards adaptation to climate change as a multilevel process. I studied international environmental politics during my bachelor's studies with a special interest in issues related to climate change. Even though climate change is an extremely alarming issue, I have tried to approach it from the point of view that all crises can lead to undiscovered resolutions and opportunities. My belief is that "the human being possesses still untapped resources of vision and creativity as well as moral energies which can be mobilized to bail humankind out of its predicament" (Peccei 1979, p. xiii). Deriving from this, a fundamental and necessary starting point for climate change adaptation is discovering and utilising these latent intellectual,

creative and moral capacities of people. I believe that we all need to learn how to stir up our dormant potential and use it from now on purposefully and intelligently (ibid.).

Due to the multifaceted reasons behind environmental crises, attention has to be given for many other drawbacks in the world; when seeking a solution for global warming; the world has to solve several injustices related to inequity. I support Aurelio Peccei's (1979, p. xiii) opinion that the solution for global crises can be sought nowhere else but within ourselves. The responsibility to manage the consequences is ours as the "global problems are first and foremost human problems. They are only secondarily attributable to natural causes." (Botkin, Elmandrja and Malitza 1979, p. 7.) Furthermore, Bowers (1995, p. 2) notes that ecological crisis is, in part, a crisis in cultural beliefs and values.

For too long, people have had a misconception that climate change can be stopped by controlling emissions. However, according to several climate change scientists (see e.g. Bowler 1992; Parry, Palutikof, Hanson and Lowe 2008; Kanninen 2011) it is now time to face the fact that the impacts of climate change cannot be avoided. Parry et al. (2008, p. 68) reveal the urgency of actions needed; they state clearly that both emissions reduction and adaptation will need to be made much stronger than currently planned if dangerous impacts of climate change are to be avoided. They remark that the figures in the 2007 Intergovernmental Panel on Climate Change (IPCC) assessment report speak for themselves: 50 % reduction of global emissions below 1990 levels by 2050 will not avoid major global impacts. At this level of emissions, there is a good chance in 2050 of avoiding a temperature rise of 2° C above pre-industrial levels which misleadingly appears to be a satisfactory outcome. It omits the fact that we would be locked into a warming trend until at least 2100. Even with an 80 % cut in emissions damages will be large. Any impact that occurs below a temperature rise of 1° C is likely to be unavoidable. Therefore, residual damage will be great unless we invest in adaptation now. (Ibid.)

The purpose of climate change adaptation research has been to estimate impacts of climate change and what difference adaptation could make (Smit and Wandel

2006, p. 284). Research on adaptation has focused mainly on material interventions, leaving gaps in the social aspects of adaptation (Pelling and High 2005, p. 312). Climate change adaptation researchers (e.g. Pelling and High 2005; Smit and Wandel 2006) have stated that research is needed in identifying the practical adaptation initiatives that enhance the adaptive capacity of societies. To fill that gap, this study aims to investigate educational initiatives that raise awareness of climate change and build communities' capacity to undertake adaptations.

In order for educators to support climate change adaptation they must address learning beyond what conventional terms like education and schooling imply (Botkin et al. 1979: p. 8). What kind of learning is needed in the field of climate change education? In my view, when adapting to climate change we are challenged to see learning as an approach to knowledge and life that emphasises human initiative (ibid.). This kind of learning encompasses the acquisition and practice of new methodologies, new skills, new attitudes and new values necessary to live in a world of change. Learning in the context of climate change adaptation, is the process of preparing ourselves to deal with new situations. (Ibid.)

Environmental education has been acknowledged as one mechanism to build the adaptive capacity of societies (Hay, Warrick, Cheatham, Manarangi-Trott, Konno and Hartley 2007, p. 92; Mimura, Nurse, McLean, Agard, Briguglio, Lefale, Payet, and Sem. 2007, p. 706). This study relates to the field of environmental education but it does not directly follow the traditions of the research done in the discipline. Research in environmental education has focused on investigating students' factual knowledge about climate change and identifying their environmental attitudes and behaviours (Shepardson, Niyogi, Soyoung and Charusombat 2011, p. 482). These studies often show that learning, which requires changes in students' concepts about scientific issues, is very difficult to accomplish (Palmer 1997, p. 5). Such studies give recommendations to curriculum development and instructional strategies that will help rectify students' misconceptions. This implies that environmental education has succeeded if high school graduates are able to engage in informed debate about environmental issues with a sound, accurate

knowledge of the subject base. (Ibid). In my view, this is not sufficient. Certainly environmental education can do more to develop the skills and attitudes necessary to understand and appreciate the interrelatedness of man, his culture, and his biophysical surroundings (IUCN as cited in Palmer 1997, pp. 3-4). Therefore, a shift in emphasis for research in environmental education is needed (Palmer 1997, p. 6).

1.1 Research aims and questions

Education plays a key role in shaping the knowledge, attitudes, values and behaviour which determine the position people take towards climate change. As stated above, recent studies in environmental education research have focused on students' conceptions on global warming, climate change and environmental crisis (Shepardson et al. 2011, p. 482). This study is interested in the process of adaptation to climate change from the perspective of educators.

One aim of the study is to give theoretical and practical insight about climate change adaptation for educators. Secondly, as stated above, this study aims to investigate educational initiatives that raise awareness of climate change and build communities' capacity to undertake adaptations. Hopefully, the reader is open to consider how the issue relates to their personal contexts. At its best, it can be a source of inspiration for creative implementations of new educational practices. The aim of the empirical part of the research is to investigate:

How do educators in Fiji perceive and address climate change?

The main research question is pursued further through the following sub-questions:

Q1: What kind of risks and causes of vulnerability do educators identify?

Q2: What kind of perceptions do educators have about current adaptive capacity?

The aim of the first two research questions is to build a foundation for the practical part of the data, describing the educators' conceptual environment regarding climate change and adaptation.

Q3: In what ways has climate change been addressed through education?

The third research question aims to identify educational practices that the research informants are involved with to give examples how climate change can be tackled through education.

The research interest was approached by theoretical familiarization of climate adaptation literature, followed by conducting interviews with educators in Fiji. Fiji was chosen as the research context in order to offer a distinct perspective for the research done around education and climate change. I suspected there were obvious impacts of climate change in the Pacific and I wanted to conduct the study in a context where the environmental conditions already demand a change in education. I presumed that in such a context education can no longer be merely teaching natural sciences but it has to attend to the diverse needs of students or even address the needs of the whole community. Fiji provided me with the opportunity to study climate change as today's problem, not the problem of future generations. Thus, a study in this context can serve as a catalyst to educational systems that do not yet offer environmental education or where it is only knowledge-based. This said presuming that eventually educational systems everywhere have to adapt to climate change and acknowledge this not only in the curriculum development but in the educational practices.

This thesis begins with defining the key concepts related to climate change adaptation (Chapter 1.2) and introducing the research context (Chapter 2). Next, the theoretical framework for the study is discussed in Chapter 3, followed by describing the research process in Chapter 4. Chapter 5 illustrates the key findings of the empirical part of the research that are further discussed in Chapter 7.

1.2 Definitions of the key concepts

Climate change in IPCC's usage refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that of the United Nations Framework Convention on Climate Change (UNFCCC) where the term refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods. UNFCCC thus makes a distinction between "climate change" attributable to human activities altering the atmospheric composition and "climate variability" attributable to natural causes (Hay et al. 2005, p. xii). In this study the terms are used in the latter way.

A *risk* is a combination of the consequence of an event and its likelihood. The full extent of a risk is evident only when both the likelihood and consequence components are considered together. (Hay et al. 2005, p. 13.) While the consequence component of a risk is site or sector specific, the likelihood component is applicable both over a large area and to many sectors. Thus the likelihood of a risk is usually evaluated for a country, state, island or similar geographical unit. (Ibid., p. 14.)

Vulnerability describes the extent to which a natural or human system is susceptible to sustaining damage resulting from climate change. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. (Hay et al. 2005, p. xiv.)

Adaptive capacity means a system's potential to adjust to climate changes and prevent damage from climate change impacts. Depending on its capacity the society survives the damage, alleviates damage, moderates the potential for damage or takes advantage of opportunities. (See e.g. Hay et al. 2005, p. xii.)

Adaptation processes can be divided into natural and human systems. For the purposes of this study, however, only the human systems of adaptation will be discussed. Adaptation in the context of the human dimensions of global change usually refers to a process, action or outcome in a system (household, community, country) that helps the system to better cope with, manage or adjust to some changing condition. Simply put, adaptation means all actions taken to reduce society's vulnerability (Smit and Wandel 2006, p. 282). Adaptive actions are framed by accumulated social resources and the maintained cultures (Pelling and High 2005, p. 309). Hay et al. (2005, pp. 7-9) in turn define adaptation to climate change as an on-going and flexible process designed to reduce society's exposure to risks arising from climate change. As such, it involves

- assessing the risks to human and natural systems;
- quantifying the consequence component of risk in social, environmental, and economic terms;
- assessing adaptation options in terms of their costs and benefits in reducing unacceptable risks;
- identifying the most effective adaptation option(s);
- developing policies and action plans to reduce risks to acceptable levels; and
- identifying the most effective mechanisms to mainstream adaptation programmes into development decision making and economic planning. (Ibid.)

Mainstreaming adaptation refers to the integration of climate change adaptation into ongoing and new development policies, plans and strategies, including laws and regulations. Mainstreaming aims at enhancing the effectiveness, efficiency and longevity of initiatives, contributing to sustainable development and improved quality of life. (Hay et al. 2005, p. 2.)

Mitigation of climate change can be defined as policies, actions and other initiatives that reduce the net emissions of greenhouse gases that cause climate change through global warming (Hay et al. 2005, p. xiii). However, several studies suggest (see e.g. Hay et al. 2005; Parry et al. 2008) that even if global emissions were to be stabilized near their current levels, atmospheric concentrations would increase throughout the 21st century and might continue to increase slowly for several hundreds of years. Mitigation can reduce climate-related risks only in the

longer term. In the meantime, unacceptable risks impacting natural and human systems will have to be managed through adaptation. In short, adaptation aims to reduce climate-related risks while mitigation aims to reduce the rate at which climate change occurs. (Hay et al. 2005, pp. 7-8.)

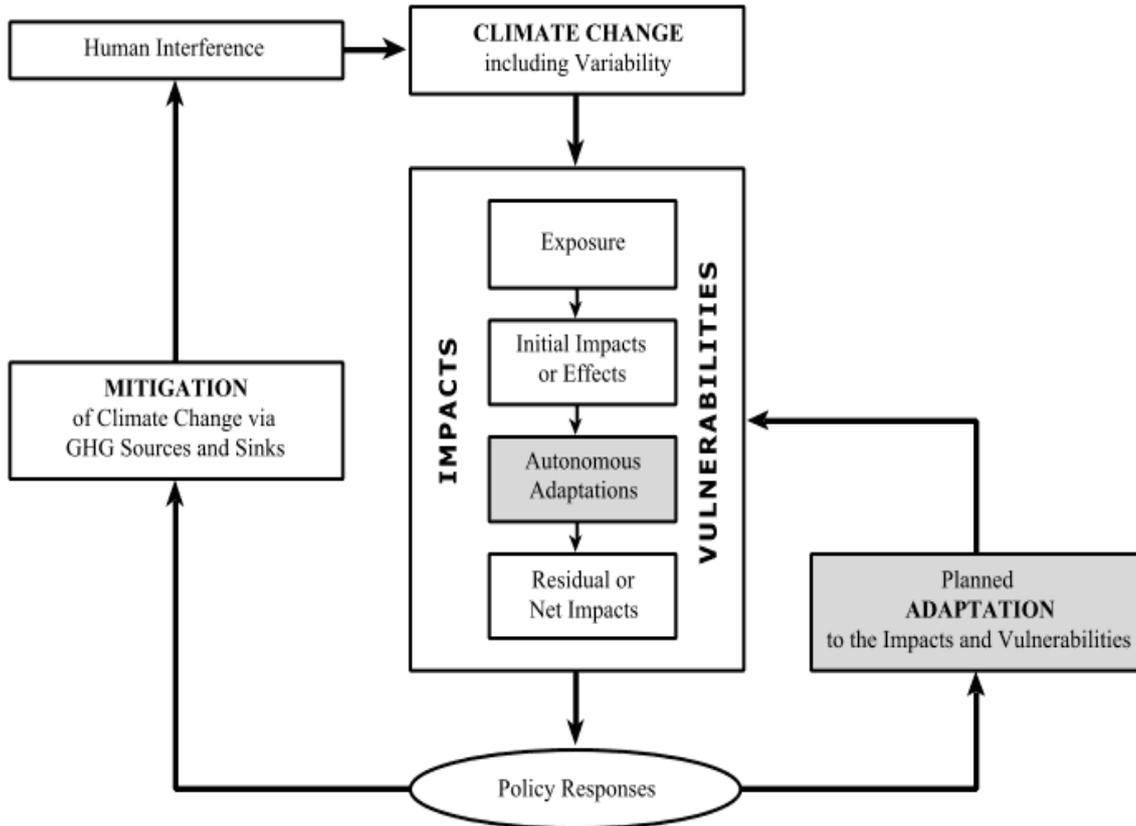


Figure 1. Adaptation and Mitigation responses to climate change (American Planning Association, Washington Chapters).

2 Background of the research context - Fiji



Figure 2. A map of the Fiji islands. (Travelwizard).

The general introduction to Fiji is written based on information common to Central Intelligence Agency, Fiji Government Online Portal, Encyclopedia.com and Go-Fiji Travel Guide. Specific references are not added to individual sentences to avoid a repetition of multiple sources. Chapters 2.1 and 2.2, in turn, show the references in a detailed manner as they illustrate the risks and adaptations in the Pacific published by individual studies.

The Republic of the Fiji Islands, situated in the South Pacific Ocean, comprises some 850 islands, of which about 100 are inhabited. Fiji is located between Hawaii and New Zealand with a total land mass of 18,270 sq. km. The terrain of the larger islands is volcanic in origin, providing a rich soil for agriculture. The islands are surrounded by sandy beaches and coral reefs while the island centres are mostly covered by mountains. The climate is tropical marine.

The main challenges to the environment in Fiji are deforestation, soil erosion, and pollution. Approximately 30% of Fiji's forests have been eliminated by commercial interests. The rainfall pattern, the location of agricultural areas, and inadequate

agricultural methods contribute to the loss of valuable soils. Fiji's natural environment is protected by the National Trust, which established national parks to conserve the island's unspoiled landscape, reefs, and waters, as well as indigenous flora and fauna. Fiji is endowed with forest, mineral and marine resources. Agriculture, mining and fishing have dominated the economy in the past. Presently Fiji is one of the most developed economies in the Pacific though still with a large subsistence sector. Sugar exports, remittances from Fijians working abroad and tourism are the main sources of income.

The indigenous Fijian population is predominantly Melanesian, with a Polynesian admixture. The estimated population of Fiji is about 850 000 out of which 70% live on the main islands of Viti Levu and Vanua Levu. The capital city, Suva, has a population of 210,000. Fiji is becoming increasingly urbanized. The UN estimated in 2005 that 46% of the population lives in urban areas. The population is currently estimated to be 54% indigenous Fijian and 40% Indian. European, other Pacific Islanders, and Chinese are minority groups. English is the official language of the country.

The structure of the Fijian educational system is divided into primary school, secondary school, and higher education. Schooling is free and provided by both public and church-run schools. Altogether there are approximately 700 primary schools and 150 secondary schools. Although education is not compulsory, more than 85 % of children attend primary school. The language of instruction is English, although, Fijian and Hindi are also taught as part of the school curriculum. The primary school system consists of 8 years of schooling and is attended by children from ages 6 to 14.

In 1874 the Council of Chiefs handed the administrative power of the country to Great Britain. The British then transported about 50,000 Indian labourers to work on sugar plantations. Fiji became independent in 1970. By then the Indian population had already exceeded the Fijians. The democratic rule was interrupted by two military coups in 1987 caused by concern over a government that was dominated by the Indians. A new post-coup constitution was promulgated in 1990, guaranteeing native Fijians a control in the Parliament. A new constitution enacted

in 1997 was made more equitable and elections in 1999 resulted in an Indo-Fijian Prime Minister. However, a civilian-led coup took over the Parliament in May 2000. In 2007 Bainimarama, having led a military coup, became interim prime minister. Since taking power Bainimarama has neutralized his opponents, crippled Fiji's democratic institutions and refused to hold elections. The coup has created a difficult climate for the country. For instance, the EU has suspended all aid until the interim government takes steps toward new elections. This has an influence on the development planning of the country.

2.1 Climate change risks of the Pacific

Small islands such as Fiji are especially vulnerable to the effects of climate change due to their small size, proneness to natural hazards and considerably low adaptive capacity (Mimura et. al 2007, p. 689). Small islands are prone to a large range of potential impacts from climate change, particularly sea level rise as much of their land is less than four metres above present sea level. Many island states tend to have high levels of development and high density of population along the coast. (Brown 2008, p. 31). Extreme weather events coupled with projected sea-level rise and flooding will render coastal infrastructure at great risk, affecting health and social services, airports, port facilities, roads, power and water stations, coastal protection structures and tourism facilities (Hay et al. 2005, p. 7). Increasing population numbers combined with climate change impacts will threaten food security in the Pacific region where most good quality land is already under intense cultivation. Simultaneously, increasing reliance on imported food will be vulnerable to short term breaks in supply and world food shortages due to climate events. (Ibid., p. 6.)

Despite the many uncertainties as to the nature and consequences of global warming, the climate of the Pacific Islands Region will continue to be dominated by the trade winds and convergence zones, and by the inter-annual variability associated with the El Niño Southern Oscillation (ENSO) (Hay et al. 2005, p. 5). While local sea levels change in response to many factors, such as local uplift or sinking of the Earth's crust, it is expected that even those areas in the Pacific currently experiencing a relative fall in sea level, will experience a rise in sea level

by the end of this century. Inter-annual variations in sea level associated with ENSO, and storm surges associated with cyclones, are likely to be of greater significance in the coming decades. (Ibid. 6.)

Many countries in the Pacific Islands Region are already experiencing disruptive climatic changes, including coastal erosion, floods, droughts, storm surges, groundwater degradation, salinization, coral bleaching, vector-borne diseases and periods of exceptionally high sea level. These and other changes constitute the climate-related risks that require responses. (Hay et al. 2005, p. 7.)

2.2 Adaptation in the Pacific

A high level of concern about climate change has been made very apparent in the Pacific since 2000 when the Pacific Islands Framework for Action on Climate Change, Climate Variability and Sea-level Rise clearly recognized the need to reduce vulnerability to the increasing risks (Hay et al. 2005. p. 1). It was agreed that reducing vulnerability was to be accomplished through adaptation processes, while also strengthening the human and institutional capacities needed to assess, plan and respond to the challenges. Climate was acknowledged as a priority issue. However, key ministries have been concerned largely with matters of socioeconomic development, based on the belief that climate is an environmental, not a developmental, issue. (Ibid.)

A number of projects for adaptation on small islands have been initiated since the urgency of adaptation has been highlighted. These projects aim to build the capacities of individuals, communities and governments so that they are more able to make informed decisions on basis of adaptation to climate change. (Mimura et al. 2007, p. 705.) The projects to enhance the adaptation of natural ecosystems in island environments have focused on protecting the ecosystems that are projected to suffer and rehabilitating degraded or destroyed ecosystems. The potential impact of global warming and sea-level rise on natural coastal systems is now reasonably well known and several adaptation measures have been identified. (Ibid., p. 706.)

Natural ecosystems and the people of the Pacific have had to develop mechanisms to cope with the past changes in natural, social and economic conditions which, over time, has developed their resilience (Hay et al. 2005, p. 6). There is no doubt that this will be of value in dealing with inter-annual variability and extremes in climate and sea conditions (Mimura et al. 2007, p. 703). However, there are indications that current and expected changes in the climatic conditions coupled with unsustainable use of resources will render these societies and ecosystems vulnerable in a scale never experienced before. According to Barnett's study (as cited in Mimura et al. 2007, p. 707) the resilience of the Pacific people comprises of opportunities for migration and subsequent remittances, traditional knowledge, institutions and technologies, land and shore tenure regimes, the subsistence economy and linkages between formal state and customary decision-making processes. However, this resilience may be undermined as the small island states become increasingly integrated into the world economy (Mimura et al. 2007, p. 707).

The impacts of global climate change on coastal zones and marine ecosystems are already familiar to island populations. Some have developed expertise in managing the changes whereas some cope with the impacts by migrating. The increasing urbanization and centralization of Pacific island populations is, however, further increasing the risks arising from climate change, and even bringing new challenges. (Hay et al. 2005, p. 6.)

The adaptive capacity of small island states will need to be built up in several important areas including human resource development, institutional strengthening, technology development and public awareness. (Mimura et al. 2007, p. 706.) IPCC's (ibid., pp. 708-711) suggestion to strengthen the adaptive capacity of small islands is through the application of traditional knowledge and past experiences, capacity building, community activities and environmental education which all have to be integrated into other policies and national plans.

3 Theoretical departure

The following section introduces the theoretical background of this study. Literature about climate adaptation was studied to lay ground for understanding the phenomenon as such. Educational background for this study is built on the field of environmental education, with a special focus on the traditional model of education *about, in* and *for* environment. Hopefully, the illustration of these theoretical viewpoints will serve as an enlightening departure for this study.

3.1 Approaches to adaptation

The concept of adaptation was first applied to human systems by an anthropologist and cultural ecologist Julian Steward. He used the term *cultural adaptation* to describe the adjustment of cultural cores to the natural environment in his theory of culture change. (Smit and Wandel 2006, p. 283.) Since then ecological adaptation has been studied as a factor shaping cultures and social systems (Keesing 1998, p. 104).

Throughout the history societies have lived in a constant state of change, maintaining an adaptive relationship with their ecosystems in order to survive (Botkin et al. 1979, p. 9; Keesing 1998, p. 105). According to the theory of cultural ecology (as outlined in Steward 1955, pp. 30-42) no culture is static because it has not achieved perfect adjustment to its environment. When adjusting to environmental changes, a society depends on its capacity to face new situations (Botkin et al. 1979, pp. 24-25). By calling this capacity *anticipation*, Botkin et al. refer to an ability to foresee coming events as well as to evaluate the consequences of current decisions and actions. Anticipation is not limited to choosing desirable trends and averting potentially catastrophic ones: it is also about inventing new alternatives. (Ibid.) Adaptation to climate change in this sense prepares people to use techniques such as forecasting, simulations, scenarios, and models. It encourages them to consider trends, to make plans, to evaluate future consequences and possible side-effects of present decisions, and to recognise the global implications of local, national and regional actions. (Ibid., pp.

12-13) Similarly, Steward (1955, p. 34) stated that cultural and ecological adaptations constitute creative processes, always bringing change to a culture. If we are to agree with the statements we can infer from this that also the processes of adaptation to climate change can take a society to a new level of development if they have the capacity to invent new alternatives to deal with the current and future changes in the environment.

Since the beginning of the new millennium adaptation has become a growing issue in climate change research (Kanninen 2011). There are a number of contemporary authors who have contributed to the climate adaptation discourse each with a slightly different approach. Hay et al. (2005, pp. 8-9) opine that people will, as a result of their own resourcefulness or out of necessity, adapt to climate change based on their understanding and assessment of the anticipated or observed effects. For many circumstances, however, such adaptations may not be satisfactory or successful. An administrative body, such as central or local government, is needed in most cases to facilitate the adaptation processes of societies. Furthermore, while many climate-related risks and losses are manifested locally, measures to alleviate them have important national and international dimensions. (Ibid.)

Significantly so, Hay et al. (2005, pp. 8) suggest that adaptation strategies should be planned so that they are beneficial even if no climate change occurs. Climate change response strategies should be the same as those that contribute in a positive manner to present-day efforts to implement sustainable development, including strengthening of social equity, sound environmental management, and wise resource use (ibid.). Also Tompkins and Adger (2005, p. 563) argue for finding holistic responses to climate change. By holistic responses they mean actions and decisions that consider sustainability, that are dynamic and learning based, that build on strengths rather than needs and that set human well-being to the centre (ibid.).

Most countries already have policies and plans to manage risks with finances, human health, bio and chemical security, agriculture, transport sector and energy supply. Responses to risks arising from climate change should be likewise

addressed and included in the national risk management. (Hay et al. 2005, p. 7.) Hay et al. (2005) introduce a risk-based approach for societies that are facing severe climate changes to manage both the current and the future risks associated with natural hazards. They believe this is best undertaken in a holistic manner as an integral part of sustainable development planning. This is possible through implementing long-lasting and environmentally sound, economically viable and socially acceptable changes. The changes must be implemented at one or more of the stages in the adaptation cycle: planning, design, construction, operation and decommissioning. (Ibid.)

Ecosystem-based adaptation (as described in Vignola, Locatelli, Martinez and Imbach 2009 and UNEP) is a relatively new approach to adaptation. However, it is introduced by the United Nations Environment Programme (UNEP) as a valuable approach for climate change adaptation which can complement traditional actions such as infrastructure development (see more from UNEP). Ecosystem-based approach focuses on the roles of biodiversity and ecosystem services in increasing the resilience of a society. It considers the vulnerability and livelihoods of ecosystems, taking into account that ecosystems' capacity to provide services for societies is pressured by land use change, over-harvesting and climate change. Ecosystem-based adaptation pays attention to the complex interactions between human and environmental systems, especially regarding the conservation and management of ecosystem services. (Vignola et al. 2009.) Vignola et al. (2009, p. 696) state that in order to promote the role of ecosystem services in adaptation, it is necessary that a variety of actors, such as policy-makers, scientists and civilians, are all actively involved in the process. These actors should make, in cooperation, a community risk assessment, participatory vulnerability mapping and adaptation planning (Kanninen 2011).

Pelling and High (2005) introduce institutional and social capital-based approach to the discussion of adaptive actions and capacity. Pelling and High (ibid.) propose that more attention needs to be paid to social capital in building and facilitating adaptation and adaptive capacity. Social capital consists of features of social life, such as networks, norms and trust, which enable participants to act together more effectively to pursue shared objectives (Putnam 1995 as cited in Pelling and High

2005, p. 310). As such, social capital includes diverse interpersonal relationships and reciprocity but it can also be understood as informal social relations and values of a society (ibid.). In climate change policy this would imply to mobilising social capital to implement adaptations (ibid., p. 312). Pelling and High present a mapping of adaptive capacity broken down to four realms of social actions. One of these realms comprises social capital that is used to generate material interventions that respond to background stress, for example investing in children's education to increase their resiliency for future socio-economic risk. (Ibid.)

Consideration of current and future vulnerabilities of communities and employing methodologies from climate and social sciences can provide the basis for building adaptive capacity. Community Vulnerability and Adaptation Assessment Action approach requires community members to identify climate conditions relevant to them and assess present and potential adaptive strategies (Mimura et al. 2007, pp. 708-710.) This community approach for capacity building and development of adaptation measures has been used in Pacific island countries. The approach is participatory, aims to understand community vulnerability and identifies ways to strengthen the adaptive capacity of communities. It seeks to promote a combination of bottom-up and top-down mechanisms and supports the engagement of local stakeholders at each stage of the assessment process. When successful, this approach enables integration or mainstreaming of adaptation into national development planning and local decision-making processes. (Ibid.)

Tompkins and Adger (2005) recognise two main factors that delineate responses to climate change: first, the availability and penetration of new technology and second, the social willingness to change. They underline that the policy responses to climate impacts will be influenced by the capacity of different societies to change. Laws or regulations imposed on people will have little or no effect if it is done without behavioural change (Tompkins and Adger 2005, p. 567). The solutions imposed will, to a certain degree at least, depend on how societies and individuals in the present day are willing to trade-off their consumption habits and lifestyle (ibid., p. 562). Similarly, Bowers (1995, pp. 2-3) states that creating

ecologically sustainable culture depends on how we change ecologically destructive economic values and practices.

3.2 Environmental education

Building adaptive capacity is one of the key elements of a society's adaptation processes (Hay et al. 2005, p. 9; Mimura et al. 2007, pp. 708-709). Education and raising public awareness are among the important mechanisms that can achieve this (Mimura et al. 2007, p. 706). In this Chapter it is illustrated that educators can play a significant role in enhancing society's adaptive capacity by raising public awareness about risks related to climate change and by promoting sustainable actions. To do this, local resources, for instance funding and teacher training, will need to be provided for the schools and educators (Hay et al. 2005, p. 92). Hay et al. (ibid.) recommend promotion of environmental education and more specifically, climate change as a context for learning in natural and social science classes.

The purpose of environmental education has been to recognise values and clarify concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture, and his biophysical surroundings (IUCN as cited in Palmer 1997, pp. 3-4). The significance of environmental education has been widely recognised, debated and promoted since the late 1960s. Developments in the philosophy, policies and practice of environmental education have transformed the dominant view of the field from teaching about nature in the 1970s to teaching through experiential fieldwork and values education in the 1980s and, further, to carrying action research and student-led problem-solving fieldwork in the 1990s. (Ibid., p. 4.)

Global acknowledgement of the importance of education for sustainable development (Palmer 1997, p. 4.) has been regarded as a fulfilment or progress of environmental education (Lindroos and Cantell 2007, p. 92). Education for Sustainable Development (ESD) should address questions on wise and sustainable use of resources, threats toward biodiversity, the value basis of sustainability and critical thinking. Additionally, ESD should tackle related questions of participation and democracy, the economic dimension of

sustainability and communication of uncertainty and risks. (Lindroos and Cantell 2007, p. 92.) Although there are a diversity of definitions about both environmental education and education for sustainable development (see e.g. Thompson 1997; Benedict 1991), for the purposes of this study I will merely introduce some views by Palmer (1997) as it offers a meaningful starting point for the research task.

The traditional model of environmental education comprises

- education *about* the environment (i.e. the transmission of knowledge);
- education *in* the environment (e.g. experiential fieldwork aimed at interpreting and appreciating the environment); and
- education *for* the environment aimed at challenging harmful exploitation of the environment and promoting a caretaker ethic (Palmer 1997, pp. 6-7).

According to Palmer (ibid.) education *about* and *in* environment has tended to be predominant around the world. However, attempts to enact forms of education *for* the environment are being promoted increasingly. Such activities are characterised by personal involvement of students; interdisciplinary learning and research; reflective action to improve environmental conditions; and involvement of students in decision making, in procedures and in monitoring their work. (Ibid.) High-quality and effective environmental education requires much attention to reflection, evaluation and planning. A successful environmental education model expands on the threefold framework. Tasks should be planned that educate *about* the environment, *for* the environment, and are accomplished *in* the environment. Within this framework it is crucial for the students to have personal experience in the environment, develop personal concern for the environment and take personal action on behalf of the environment. (Ibid., p. 7.)

In education, environmental crisis should not be treated merely as a series of ecological issues (ibid., p. 8). Due to the multifaceted reasons behind environmental crisis, the attention has to be given to many other drawbacks in the world; when seeking a solution for global warming, the world has to solve several injustices related to inequity. Environmental problems involve ethical dilemmas for future generations that go well beyond scientific domain (ibid.). Additionally, Bowers (1995) emphasises that consideration of ethics and morals is crucial in the

development of education for ecologically sustainable culture. Therefore, there is a need for education to place emphasis on the human dimension of environmental change. Environmental education needs to address the interactions between human life and the environment and possibilities of overcoming and preventing detrimental environmental impacts in the future. (Palmer 1997, pp. 8-9.) Furthermore, Palmer (ibid.) suggests that environmental education needs to promote the ideas of empowerment and capacity building in order to embrace the significance of students' personal involvement, action and decision making with respect to socio-ecological issues in their own communities.

It is essential that the importance of environmental education is recognised at all levels in society – within formal education, non-governmental organisations (NGOs) and local and national government policy frameworks (ibid., p. 9). This cross-sector kind of education in my opinion supports society's adaptation processes in any location. Another way in which education can support climate adaptation processes is to include climate change in the curriculum (Hay et al. 2005, p. 92) as a context for learning.

According to National Oceanic and Atmospheric Administration (NOAA) (as cited in Shepardson et al. 2011, p. 499) climate is an ideal interdisciplinary theme for education. Teaching of climate change could begin with simple concepts and observations of weather and water, then gradually introducing increasingly complex inquiries and investigation into physical, chemical, biological, geographical, social, historical and even technological dimensions of climate. Using an interdisciplinary approach in teaching climate, students have a better opportunity to comprehend the interconnectedness of the topic and make use of this knowledge in their lives and communities. (see Shepardson et al. 2011, p. 499.)

To support educators in their teaching of climate change, NOAA has designed a conceptual framework *Climate Literacy: The Essential Principles of Climate Sciences*. Many scientists and educators collaborated in producing the guidebook to identify the principles and concepts that should be included in the curriculum. The practical resource aims to promote greater climate science literacy amongst

learners of all ages. According to NOAA, people are climate literate once they understand the influence of climate on themselves and society and their own influence on climate. (see more from NOAA Ocean Service Education.)

Although these are great suggestions, in my view, the question is no longer how environmental education can be included in the curriculum and whose responsibility it is to teach it, but rather how each educator should attend to the needs of the students in an environment where climate change is topical. I thereby decided to focus on individual educators as possible agents of change rather than curriculum reviews.

3.3 Educators on the front line

Classroom teachers, in some cases even entire schools, are increasingly attempting to make the issue of ecological sustainability a more central aspect of education (Bowers 1995, p. 183). According to Bowers (*ibid.*, p. 184) these educators are beginning to grasp what should be the fundamental priorities in making curricular decisions.

Palmer (1997, pp. 9-10) suggests that educators need to engage in encompassing all aspects of sustainable living both in their vision and practice. They should reflect this vision in policy frameworks, research, and curriculum-development and, ultimately, be at the forefront of the empowering process that enable all of us to appreciate, and be engaged with, the true complexity of environmental interactions of the time. (*Ibid.*).

Similarly, Cherry (2011) sets educators on the front line of finding creative ways to teach students about climate change without scaring them. As an educator herself, she has initiated several projects to address climate change together with the youth. Her *Young Voices on Climate Change* project has produced a series of films which aim to inspire and empower youth to tackle climate change by focusing on solutions and citizen engagement. The films show young people from across the ethnic, geographic and socio-economic spectrum reducing the carbon footprint of their homes, schools, communities and countries. Cherry rejoices that the youth

in her films have become peer role models who share the skills, motivation and confidence to take action in the fight against climate change. Each short film has additionally its own accompanying online “how-to”- page which makes the projects and actions from the movies replicable. *Young Voices on Climate Change*- films are free online to use in science centres, film festivals, conferences, schools and in after-school clubs. (Ibid., p. 213.)

Understanding the influence that teachers have on their students’ conceptual knowledge, Grima, Filho and Pace (2010, pp. 44-45) argue that teacher education is one of the most effective resolutions to improve public awareness on climate change. In their view, all teachers must gain a sound background about issues concerning sustainable development and recommend that teachers undergo an appraisal in this area. During environmental workshops, that are part of their pre/in-service training, teachers could eradicate any misconceptions they hold and ensure they introduce correct information on their lessons. This would provide them with first-hand experience, familiarity and confidence (Grima et al. 2010, p. 44).

One example about teaching climate literacy comes from a teacher Bertha Vazquez (as illustrated in Cherry 2011) who gave a research project to her middle school students. She asked each student to find ten scientific papers either supporting or refuting climate change. She asked them to find out about the scientists who did the study, what institutions they were affiliated with, whether the papers were peer-reviewed and if they were published in a scientific journal and who funded the studies. The students had been astonished about their findings which revealed that the papers supporting climate change were written by scientists with many published papers in respected journals. In contrast, the papers refuting climate change were published by institutes, often written by non-scientists, not peer-reviewed and funded by special interests. It had been a powerful lesson for the students to develop climate literacy through their own research. (Cherry 2011.)

Furthermore, Cherry (2011) argues that public awareness of climate change can be tackled through young people who can change the society from the roots up

because once children understand something, they often teach their parents. Cherry claims that even environmentally-minded citizens receive most of their green information from educational materials that their children bring home from school and it is their children who put pressure on them to act responsibly toward the environment. (Ibid.) In addition, Cherry has co-authored a book called *How We Know What We Know About Our Changing Climate: Scientists and Kids Explore Global Warming* together with a renowned photojournalist Gary Braasch. The book documents the scientific studies used in IPCC reports on a 5th-8th grade reading level, making climate science accessible to kids, their parents and the public. (Ibid.)

4 Research process

The main research question for this thesis concerns with *how do educators in Fiji perceive and address climate change*. A qualitative research approach was adopted in order to investigate what kind of perceptions the research informants have about climate change and adaptation. Additionally, the study aimed to research how these conceptions are applied in practice. This Chapter describes the research method used in the empirical part of the study. It also serves as a basis for Chapter 5 which familiarizes the reader with the findings of the empirical research.

4.1 Qualitative research approach

The methodological choices are based on the research questions. Given that the main research questions for this study are asking *how* and *what kind* (see Chapter 1.1), a qualitative rather than quantitative methodology seemed appropriate. The data collected for this research is rich in description and could not easily be handled by statistical procedures (Bogdan and Biklen 1982, p. 2). Qualitative research itself is an umbrella term that is applied to describe several research strategies. What the strategies share in common is an approach where the research questions are formulated to investigate the context in all its complexity. Even though people conducting a qualitative research have a focus when collecting the data, they do not approach it with specific questions to answer or hypotheses to test. Rather, they are concerned with understanding the questions from the participants' point of view. (Ibid., p. 29.) Often the aim of a qualitative research is to describe the perspectives of the research informants. In qualitative research the focus is usually on a rather small amount of informants when profound analysis of the responses is possible. (Hakala 2001, pp. 17-20.)

After choosing the research approach and defining the research task, theoretical familiarization was conducted. Theory is an integral part of the research process (Ahonen 1994, p. 123). As Bogdan and Biklen (1982, p. 30) point out, all research is guided by some theoretical orientation. When researchers are aware of their

theoretical base, it can help the researcher to ask advanced questions and to find distinct elements from the responses of the research informants. (Ibid.; see also Ahonen 1994, pp. 123-124.) I studied diverse approaches to climate change and projected impacts both in the Pacific and worldwide. The theory of cultural ecology originally by Julian Steward (1955) captured my interest as I was figuring out the constant interconnectedness between the nature and the society.

Next, the research context was selected and preparations were made for the field work. After gathering the data, the process of analysing it and reflecting it to the theoretical framework began. The final analysis of the data was written as a descriptive report with a purpose to answer the research questions. Finally, the findings were discussed in a large scale with recommendations for further research. The overall design of this research is illustrated in Figure 3.

Literature review on research interest: <i>Climate change, adaptation, Pacific islands</i>
Definition of the research questions and the context: <i>The role of education in climate adaptation in Fiji</i>
Selection of the research approach and methods: <i>Qualitative methodology, thematic interviews</i>
Preparation of fieldwork: <i>Ethical considerations and practical arrangements</i>
Data collection: <i>8 interviews in Fiji</i>
Data analysis: <i>Categorization of the data</i>
Writing of the research report: <i>Presentation of key findings and further discussion</i>
Conclusions: <i>Evaluation of the study and reliability, recommendations for further research</i>

Figure 3. Research design.

4.2 Ethnographic elements in the study

This study has applied elements from ethnographic research tradition which has been likened to a science of describing societies or cultures in a holistic, detailed and reflexive manner (see e.g. Hammersley and Atkinson 1983, pp. ix-x, 1). It would be incorrect to call this study ethnography because it is a description of a phenomenon rather than a society or culture and because the time spent conducting the fieldwork was relatively short. However, the characteristics of this study are similar to doing ethnographic research.

Having studied cultural anthropology as a major in my bachelor's degree, my ontological and epistemic assumptions are heavily influenced by the ethnographic way of approaching knowledge. For an ethnographer, reality always presents itself in a context specific manner: coloured by culture, people, traditions, time and environment. When doing research, an ethnographer attempts to comprehend how others perceive reality. The only possible way to acquire an understanding of other people's conceptions is by being a part of their reality for a long period of time and experiencing it for oneself. In ethnography this method has been called an attempt to see the world from the native's point of view, which implies understanding the society from the inside. (see e.g. Eriksen 2004, pp. 20, 43-48.)

Ethnographic researcher studies human life through conducting fieldwork in the research context. Punch (1998, p. 158) calls fieldwork "a solo enterprise" that consists of relatively unstructured observations, deep involvement in the setting, strong identification with the researched, vulnerability of the researcher and a high element of uncertainty of the success of the study. While doing the field research moral and ethical dilemmas may be encountered that often have to be resolved at the site. This demands high level of social and moral conduct of the researcher (ibid., p. 159) and balancing between attachment and detachment with the informants (see e.g. Gothóni 1997). Thence, writing a field diary was of great significance during the research process. It helped me to reflect the position I had in the field and the process of the research:

I still can't believe my luck with this research how everything has gone so smoothly. Perhaps I just came to the right place, perhaps these people just are so open and

receptive. One said they appreciate it a lot when people travel here from a far. Perhaps my own attitude has an influence on it too, the way I approach people. One should be direct but not too pushy and of course be genuinely interested in their perceptions. I have told people here I chose this context exactly because it can make people see how real climate change is and in how different ways schools can influence it. I also noticed a correct way is to go directly to the office of the school, present myself and respectfully ask to meet the principal. The permission from the principal to use the experiences from the school is the first step. Even though I got an official permission from the Ministry of Environment I still want the approval from every school.

Wow.. I have had amazing discussions today. I learn so much about this topic and I met people who are extremely intelligent, emancipatory and spiritual. The principals I have met have been so humble and intellectual. I was told they spend all their time for reading. It is impressive and admirable. I love this work. (Field diary notes on June 3, 2010.)

There are several aspects that have an impact on the process of the field research. The awareness of the influence of my age, gender, appearance, race, institutional background, my personality, the confidence and command of language and choice of words has been important throughout the study. More implicit aspects, that nevertheless have influenced the research, are my personal contacts and networks, my own decisions that are influenced by my moral and social obligations, and also luck. (Punch 2008, pp. 165-166.)

This research has been inspired by the methodology of community-based vulnerability assessment as described by Smit and Wandel (2006). Over the past decades participatory, bottom-up and experience-based assessments of community's vulnerability have been employed in many fields including sociology, anthropology and rural development. (Smit and Wandel 2006, pp. 288-289.) This time, the methodology has been applied for the educational field, aiming to contribute to the research about practical adaptation initiatives and to recognise the sources of exposures, sensitivities and adaptive capacities of education. When assessing vulnerability, the researcher does not presume to know the exposure and sensitivities of the community. Secondly, the research does not specify *a priori* determinants of adaptive capacity in the community. Rather, in this approach these are identified by the community itself. (Ibid.) The aim of applying this research approach was to attain and produce information on the nature of

community's vulnerability and to identify the capacity and educational measures that can be utilised to reduce the vulnerabilities. (Ibid.) The key findings of the educators' responses are described in Chapter 5.

4.3 Data collection

Community-based vulnerability research begins with an assessment of current exposures and sensitivities by employing ethnographic methods (Smit and Wandel 2006, p. 289). For this study the conduction of semi-structured interviews was considered the most appropriate research method because of the limited timeframe available for conducting the field study. When interviewing the research informants, they were first asked to identify the impacts of climate change in their respective communities and reflect how the impacts influence the education system (see Appendix 1 for interview questions). This was done in order to attain information about the conditions or risks that the educators have to deal with and the causes of vulnerability to build foundation for the rest of the assessment. Once the relevant conditions have been identified, community-based vulnerability assessment aims to identify the perceptions of current adaptive capacity of the community. (Smit and Wandel 2006, p. 289.) The research informants were then asked to elaborate on how they perceive adaptation in Fiji and especially the role of education in this process. The final step of the assessment is to seek opportunities to reduce future vulnerabilities (ibid.). For the final step of this study, however, the educators were asked to describe the educational practices that they are carrying out.

To begin the process of data collection I went to the western division of the island, interviewing principals and teachers in Lautoka and Nadi. There I also met the Senior Officer of the Department of Environment who gave me an official permission for the study and provided me with information and encouragement that would take me far with the research. I then headed east to the capital, Suva, to conduct more interviews and consult with the Ministry of Education. I finished the data collection in Nadroga Navosa province where I conducted the last two interviews and was privileged to spend time with a coral reef scientist Austin Bowden-Kerby who deepened my understanding of climate change impacts.

The recorded interviews took place in the offices of the interviewees, or outside of them, and did not always offer the most peaceful surrounding. However, it did not make me frustrated. Rather I feel it was definitely the contact I made and the discussions we had that fulfilled my desire to learn more about the topic. Aware of the importance of the researcher's sensitivity toward research subjects' thinking (Ahonen 1994, p. 115) I tried to make the interviews open interactions where both participants can acquire understanding of the phenomenon. The interviews were semi-structured, allowing the discussions to go to the sidelines but nevertheless taking care of covering the essential points for the study. I indeed felt that the interviews I held were interactive by nature and that both participants of the interview had a chance to learn about the topics under study. I recognised this especially during the discussions after the recorded interviews: having answered the questions and verbalised their conceptions the informants had processed their knowledge and would always come back to it while showing me around the school or seeing me off. Based on those recorded interviews and the discussions around them I certainly gained new perspectives on how climate change can be tackled through education.

All in all, the data consists of eight semi-structured interviews held in Viti Levu in June 2010 and of additional data from the Ministry of Environment and the Ministry of Education. It was my intention and wish to include educators from various sections of educational field. I managed to include formal education sector (two principals, one vice principal and one teacher), informal education sector (two educators from local organisations) and non-formal education sector (a representative of a parent community and a voluntary teacher). Even though I stayed in the main island all the time, I was lucky to study the research question more broadly: knowledge, perspective, experiences and stories were heard from Rotuma, Rabi, Kiribati and Tuvalu. Even though many of the research informants were currently working in an institution of higher education, they were all very familiar with education of all levels. In this study, the research informants are quoted in the following way:

E1: Vice principal of a college, female.

E2: Principal of a high school, male.

E3: Teacher in a high school, female.

E4: Principal in a high school, male.

E5: Teacher and a representative of parent association, male, from Rabi island.

E6: Community worker in an organization for environmental education, male.

E7: Principal in a high school, male.

E8: Teacher in a high school and a co-founder of an organization, male.

4.4 Data analysis

The method for data analysis when doing ethnographic research is usually qualitative content analysis. The aim is to seek meanings from the data and make a description of the phenomenon under study of a condensed and general form (Tuomi and Sarajärvi 2009, pp. 103-104). Qualitative content analysis is done through systematic classification process of coding and identifying themes from the data (see Hsieh and Shannon 2005). When doing data-driven analysis the researcher is not supposed to have prior knowledge about the subject to avoid preconceptions determining classification of the data. Rather, the classification is done based on the data (Tuomi and Sarajärvi 2009, pp. 95-97).

The success of the analysis and reliability of the results are depended on the researcher's familiarity with her data and the theoretical literature. (Syrjäläinen 1994, p. 89.) In ethnography the analysis of data is not a distinct stage of the research (Hammersley and Atkinson 1983, p. 174). Researcher has to discuss with the data when she is interpreting the meanings, categorising the data and writing the report (Ahonen 1994, p. 124). Interpretation of someone's perception is always a reconstruction of the research subject's intention. The success of the reconstruction depends on the background information and expertise of the researcher (ibid.). The following process of data analysis details the analytical and systematic procedure I followed.

Analysing the data began in the fieldwork phase. I started to form a theory on how education supports adaptation and kept reflecting on the theory of cultural ecology.

During and after the fieldwork I continually studied literature of adaptation and clarified the research problems. The final analysis required that all data was transcribed (Syrjäläinen 1994, p. 89). Transcription itself included some interpretation as parts of the recordings were of bad quality. The notes from my field diary were of great contribution to the transcripts. Occasionally I had to rely on the internet to ensure the information was correct. The next step in the process of analysis was a careful reading of the data in order to gain a thorough familiarity with it (Hammersley and Atkinson 1983, p. 178). I searched regularities and patterns that could make categories. A rough categorisation of the data was done based on the research problems, following the process of community-based vulnerability assessment (see Chapter 4.3). The data was colour coded based on three elements rising from the research questions: I sorted educators' perceptions about climate change- related risks into one category, views about adaptation into another and finally, the educational responses were grouped together.

Having categorised the data into main meaning units, I began a new cycle of analysis dividing each main category into sub-categories. I looked into the separated responses trying to find the concepts they represented. At this stage I compared the responses in the sub-categories: I tried to realise how certain responses were connected or in conflict with each other. I questioned the sub-categorisation I had done and decided to do it again. This stage of the analysis is called cross-validation which is supposed to confirm the decisions made and sub-categories formed. (Syrjäläinen 1994, p. 89.) As this process of systematic sifting and comparison developed, the emerging model of building theory was clarified (Hammersley and Atkinson 1983, p. 180). The final analysis required that I had the mutual relationships and internal structures of categories clearly displayed (Syrjäläinen 1994, p. 90; Hammersley and Atkinson 1983, p. 180). Drawing a concept map helped me in writing up the research report and linking it to previous studies. Categorisation of the data is illustrated in the Figure 4.

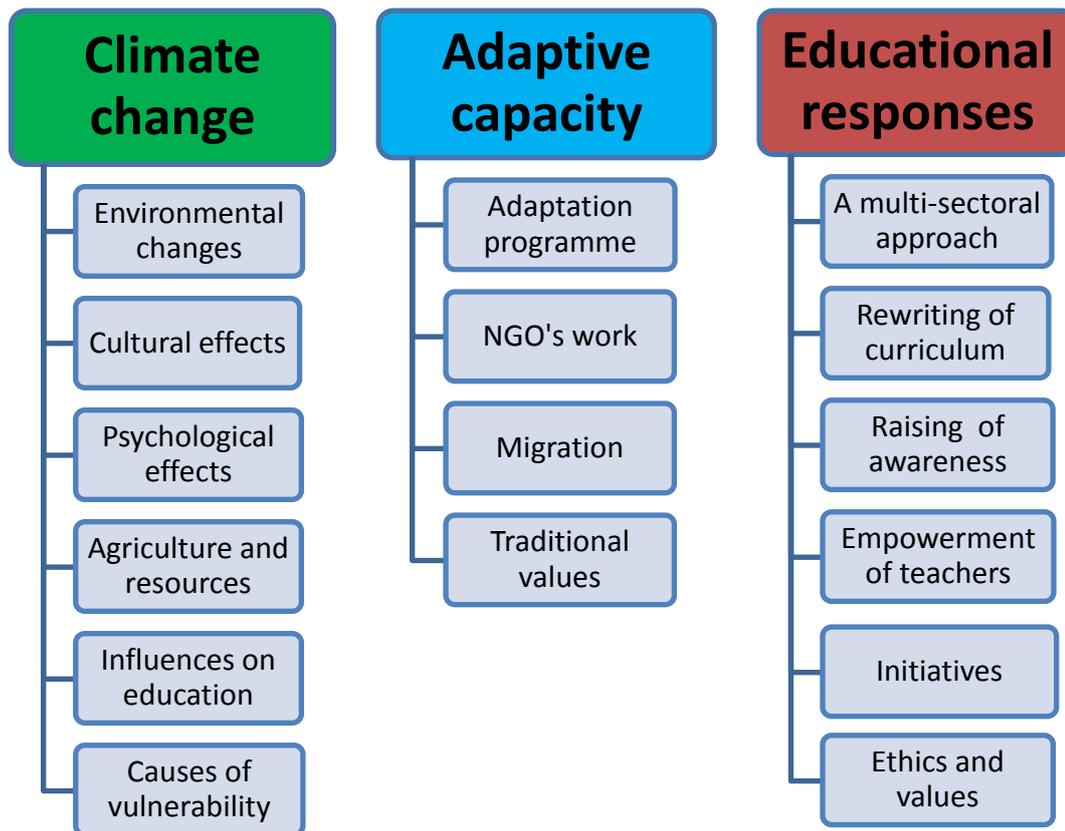


Figure 4. Framework of the main and sub-categories of the data.

Even though this presentation of the findings as categorised meaning units may seem multidimensional, hardly any interviews touched upon all of the categories. Thus, the illustration of results in this study may give the impression that generally the Fijian educators' views are similar to the aggregated report of the responses. This is not the case. Most people's approach to climate change is relatively selective, stressing certain aspects. However, I was interested in investigating the kinds of approaches people have and ended up illustrating the collected views as a unified report.

5 Results of the empirical data

This Chapter presents the empirical research data results, following the community vulnerability assessment order. First, the risks and the causes of vulnerability that the educators identified are presented. Second, the current adaptive capacity of Fiji is discussed based on the data and the literature studied. Finally, educational practices that have been taken to address climate change are presented. The data has been interpreted using the method of qualitative content analysis and categorised based on theoretical corresponding to the responses. Hence, this Chapter continues the discussion presented in Chapter 3. The key findings are further discussed in context with literature in Chapter 7.

5.1 Identifying risks and causes of vulnerability

The interview process started with educators elaborating on their understanding of climate change and how it has affected the area. The identification of the conditions and causes of vulnerability was done to build foundation for the rest of the assessment.

Identified risks

The risks the educators identified are diverse and multi-faceted. They acknowledged that the risks related to climate change have environmental, cultural, psychological and economic dimensions. All dimensions were perceived closely intertwined, influencing one another.

The environmental conditions that the educators identified covered numerous risks of climate change such as warming of the temperature, acid rains, high level of pollution and effects on vegetation such as the drying up of land and infertility of soil. Floods, storms and tsunamis have increased in number; soil erosion, coral bleaching and heat in severity. They identified a change in seasons, reduction of biodiversity, and evidence of coastal erosion.

The most obvious evidence (of climate change) is coastal erosion; we have frequent storm surges and big winds, which further contribute to the coastal erosion. (E8)

Many statements made by the educators are in line with the IPCC 2007 assessment report on small island states (see Chapter 2.1). Closely related to flooding and soil erosion is the recognition of sea level rise. Many educators associated climate change primarily with sea level rise which did not surprise me. Sea level rise/fall refers to an increase/decrease in the mean sea level of the ocean, persisting for an extended period of time. Eustatic sea-level rise is a change in global average sea level caused by an alteration to the volume of the world's oceans. Relative sea-level rise occurs where there is a net increase in the level of the ocean relative to local land movements. (Hay et al. 2005, p. xiv.) Sea level rise brings floods, storms, erosion and other coastal hazards that threaten infrastructure, settlements and all the facilities on the coast. This has a huge impact on the islands since more than 50 % of the population and infrastructure is located within 1.5 km of the shore. Some studies suggest that sea level rise leads to reduction in island size whereas other studies show that a few islands are resilient. (Mimura et al. 2007, p. 689.) One informant elaborated on the condition in Kiribati:

We can notice that the sea level is coming up because the line where we used to hanging our clothes is (in the water). (E5)

An often discussed theme around climate change was climate-induced migration. Educators expressed their concern over the people residing in low-lying areas and islands who have to face migration if the risks of climate change cannot be reduced. They worried that losing their connection to the land will lead to losing their culture.

Relocation would be psychologically terrible because the islanders have always lived by the water. -- We have to look into that, not only that there is a place in some country and just put them there. People who have to relocate will die (if they) won't have the connection to the culture and old wisdom. (Relocation would mean) complete changes of the way of life. All these people are very attached to the land. (If they have to move) they will be more than homeless. (E4)

Other psychological meanings that were given to climate change rose from confusion and fear among students related to their own experiences and to several predictions about climate change.

(Tsunamis have) quite some psychological effect on the children because of the recent one that took place in Tonga and Samoa where they destroyed many homes. There is (fear) especially with tsunami because that is something that we had actually come across with in terms of villagers coming up finding some refuge in the school. (E7)

A change in weather conditions inevitably has an impact on agriculture and subsistence. Small islands have traditionally depended upon subsistence agriculture and cash crops for survival and economic development. Subsistence farming provides local food security and, when exported, financial income. (Mimura et al. 2007, p. 698). I recorded several conceptions related to economic risks while discussing climate change with the educators. They elaborated on the decrease of resources.

If we were to look at the resources, the land now is not producing as it used to be, and the production is very low from the land, so there is resource scarcity. And when there is resource scarcity the families are going to be infected. (E2)

Fisheries contribute significantly to the GDP of Pacific islands and climate change is likely to impact coral reefs, fisheries and marine based resources (Mimura et al. 2007, p. 700). One of the educators remarked that

River plains are beginning to dry up. There used to be certain ponds and the ponds are gone, like lakes where we use to have some fish, they are no more now. (E2)

Decrease in resources would lead to reduced income. One educator raised concerns it would make it very difficult for people to make ends meet about the and that this could lead to increase in criminal offending. According to Food and Agriculture Organization (as cited in Mimura et al. 2007, p. 698) many island states have experienced a decrease in GDP, partly due to the drop in competitiveness of cash crops, cheaper imports from larger countries and increased costs of maintaining soil fertility. All these factors were also mentioned by the research informants: they talked a lot about the excessive agriculture that farmers practice in order to remain competitive. On the other hand, people were

said to “go to foreign so quickly at expense of their own” (E2), supposedly referring to people choosing cheaper imported products over locally produced.

Climate change particularly affects the water resources of small islands. Some educators talked about periods of droughts and the impact it has had on education. Many wells were said to have dried up and students had come to school with empty water bottles. IPCC (Mimura et al. 2007, pp. 695-697) remarks that scarcity of fresh water is often a limiting factor for social and economic development in small islands.

I asked the educators how climate change influences education. They had experienced a disruptive effect by climate change. One school had operated as a water supply station during droughts and another as an evacuation centre in natural disasters. The schools had people coming over for water or refuge. Relocating the schools in low-lying areas was said to be difficult as the schools are already located in the flood prone areas. One example given was related to students missing out due to heavy rains and floods:

I taught at the one of the high schools in the delta for four years. I came across a big flooding there so the water went through one third of the classrooms and after the flood I remember we had to clean up the mud which came up as far as the ankle. So we had to close the school for one week to try and clean up. See, these are the effects. (E7)

This, and the tsunami warnings, were said to disrupt the school system leaving both students and teachers stressed trying to keep up with the curriculum. In addition to this, one educator had noticed as well that climate change has had an effect on health which also disrupted their education:

We are having a lot of epidemics, one after the other, because students come to me in this school to give them leave and they are having a lot of fever, upset stomach, headache and so forth, and they are missing out. (When) it is more hot, they are getting sick. (E1)

IPCC recognizes that climate change is expected to have a negative impact on health. Many small island states currently suffer severe health burdens from climate-sensitive diseases such as malaria, dengue, filariasis, schistosomiasis, food- and water-borne diseases, diarrhoeal diseases, heat stress, skin diseases, acute respiratory infections and asthma. (Mimura et al. 2007, pp. 689, 701.)

Causes of vulnerability

According to IPCC's Third Assessment Report (as cited in Mimura et al. 2007) the overall vulnerability of small island states is primarily a function of four interrelated factors: the degree of exposure to climate change, their limited capacity to adapt to projected impacts, the fact that adaptation to climate change is not a high priority, given the more pressing problems that small islands have to face and the uncertainty associated with global climate change projections and their local validity.

The educators interviewed for this study, in turn, identified unsustainable use of resources as the reason behind their increased vulnerability. The practice of excessive agriculture, which was said to have risen from economical desires, was also mentioned as a cause of vulnerability. They all spoke of the human impact on climate change and mentioned deforestation, industrialism, materialism and greed as the main contributing factors.

(people contribute to climate change) by burning, cutting down trees and planting ginger and it's all year round, they don't seem to give chances to the re-growth due to the desire to grow more and become more commercial. So I see that is the impact of human activity and trying to get themselves more income. (E7)

This is men's own creation. because the Creator has given us all in perfection, in excellence, and with all this new changes happening, as I said it's all man's creation, and it is all because of quick-fix-development. When I say quick-fix, you know there hasn't been any proper consolidation, analysis carried out, it is because of them wanting to have more money but at the expense of the environment. (E2)

The following examples from the interviews show the educators' overall assessment of their vulnerability:

People have to do something about it now to make sure that we can reduce the effects of climate change through other human development. (E6)

We haven't reached that critical stage like many of the Pacific (islands), but we are mobilizing our community now, to be more aware, and to be more prepared, before... (E8)

5.2 Assessing current adaptive capacity

In the second part of the interview process, the research informants were asked to assess the current adaptive capacity of the community. In contrast to the ease with which they identified the risks, the educators talked about climate adaptation with a slight confusion, most likely because the government had not addressed adaptation to date. It was projected that adaptation will take time even though it is an urgent issue.

It won't happen overnight. It will take some time to react to those risks, but the problems are there and we have to adapt. It will take some time to eradicate those risks for example for the companies and factories to reduce emission of fuels. (E1)

For the research informants adaptation to climate change meant coping with the changes, protection of biodiversity, wise management of resources and, eventually, an overall change in the way of life. They identified both weaknesses and strengths in the current adaptive capacity of Fijians. In light of Barnett's study (as cited in Mimura et al. 2007, p. 707) and the data collected, I propose that the current adaptive capacity of Fijians is determined by five factors. These are: implementation of adaptation policy, conservation work of non-governmental organisations, opportunities to migrate, application of traditional knowledge and values and finally, application of environmental education. In the following, the first four factors will be illustrated whereas application of environmental education will be discussed in Chapter 5.3.

Implementation of adaptation policy

When assessing the current adaptive capacity, the informants elaborated repeatedly on the need of both international and national guidelines for adaptation. Many of the educators stated that although people help nature adapt by building sea walls, planting trees and enriching infertility of soil with fertilizers, the adaptation of societies had hardly started. Many stated that there is a lack of knowledge among people; they do not know how to adapt.

How are we going to adapt and change our life style? Is there a program that we should now be telling our villages on coastline to start thinking of relocating? (E1)

We have to learn how to adapt and that is difficult cause there has to be a global link with the countries and the strong organizations like the United Nations. (E4)

A request for a program or policy of adaptation was frequently brought up. Like Hay et al. (2005, pp. 8-9) opined, in most cases there is need for an administrative body to facilitate the adaptation processes (see Chapter 3.1). The government of Fiji had changed their environmental policy to a decentralised system. The Department of Environment (under the Ministry of Local Government, Urban Development, Housing and Environment) now has regional offices to better support the societies that are facing environmental challenges. This was regarded as good progress by many educators. The regional offices offer permissions and licenses for environmental acts that the people want to implement. Also schools get visitors from the office and support is given for the activities they initiate. One educator noted that still the government has not distributed much information about adaptation. Rather, their policy has focused on raising awareness about risks and giving information on weather exceptions.

The educators also identified other opportunities to facilitate adaptation programs. One informant explained that this could be done through the Ministry of Fijian Affairs and Provincial Development that had already developed a system to raise discussion over certain issues throughout the country. Some respondents supported a top-down approach to build adaptive capacity whereas others favoured village-based activity as the best way to reduce vulnerability.

Getting right to the roots on village level is one of the most effective ways, getting village based environmental group to actually looking at the environment and resources that they have and talk about it. So I believe awareness, community activity, we create things from the families within the village instead of perhaps coming from the top. (E7)

I learned about such community consultation being carried out on the island of Rotuma. Community consultation workshops are held to find out how much people know about climate change and biodiversity and also to identify the problems they face that might be related to climate change. This method of addressing climate adaptation follows the guidelines of the Community Vulnerability and Adaptation Assessment Action approach (as discussed in Chapter 3.1) which supports the

engagement of local stakeholders in identifying ways to strengthen adaptive capacity.

Conservation work of non-governmental organisations

The non-governmental organisations (NOGs) have a crucial role to play in addressing climate adaptation in Fiji. Supporting the government initiatives, NGOs are closely networked in order to make their work as effective as possible and not contradictory. There has been a coordinated effort by NGOs and the government called "Integrated approach program for rural development" to strengthen the network. Most of the NGOs involved with environmental programs get together and share the lessons learned. The consultation is organised to help the government better supervise the NGOs and influence through them. In this manner, the government as well as all community workers are aware of what has been planned and implemented nationally.

Surely, the EU's suspension of all aid for development projects (as discussed in Chapter 2) has an influence on the work of development organisations. Nevertheless, there are numerous organisations in Fiji working for conservation. JICA (Japan International Cooperation Agency) is a strong component in reforestation programs, for instance in the re-plantation of mangroves. They also put strongly emphasis on education by training and planting with groups of students. Other organizations working for conservation are WCS (Wild Conservation Society), Conservation International and PCDF (Partnership Community Development in Fiji). Also IES (Illuminating Engineering Society) and Institute of Applied Sciences were mentioned among the organizations who contribute to the conservation work of the island. There is a lot of exchange of ideas between the NGOs with the intention to work together effectively. In my view, this work represents exactly the kind of community activity that directly increases the adaptive capacity of a society.

One is called Janda wash, water sanitation and hygiene, and a focus on gender, equality and empowerment. Another one is called Building Grassroots Democracy. There are other small projects, people are running around. Most of these are linked to climate change, for example these water safety things, is more like adaptation to climate change. (E6)

Opportunities to migrate

As Barnett stated, the resilience of Pacific people comprises opportunities for migration (see Chapter 2.2). Besides acknowledging the possibility of people relocating to other islands, countries or continents, also within-country migration in Fiji was discussed as a solution for people who now reside on the coastline or on low-lying islands. One observation was that the young generation should be encouraged to return inland where Fijians used to live:

Many of us have our farms inland. So with climate change and many environmental related changes that are coming I believe that with our new generation that are coming now who may have to, we have to encourage them to return to our land because now the infrastructural development is ok, we have roads that lead to those places, so many things are much better now compared to those 100 years ago (for our) forefathers. (E7)

Migration is typically not the first adaptive response; rather, it is considered when other means of adaptation are insufficient and often when communities or governments have proven incapable of providing assistance (Brown 2008, p. 22). IPCC refers to emigration and resettlement as a potentially effective adaptive strategy, particularly in the context of out-migrants moving overseas and becoming able to support their families financially on their home island (Mimura et al. 2007, p. 708). IPCC confirms, however, that within-country migration has been a common trend over the last decades in many Pacific islands (Connell as cited in Mimura et al. 2007, p. 708).

Migration is, and always has been, an important mechanism in dealing with climate stress (Brown 2008, p. 21). It is now becoming apparent, however, that migration as a response to the current environmental changes is quite different by nature. Shoreline erosion, coastal flooding and agricultural disruption are the main reasons pushing millions of people to leave their homes. (Brown 2008, pp. 9, 11.) Various predictions have been given about the total number of future climate migrants, but an estimate of 200 million people by year 2050 has become widely accepted (Brown 2008, p. 11). The consequences of such flow of human migration are unclear and unpredictable. According to Intergovernmental Organization of

Migration (IOM), forced migration hinders development in at least four ways: increasing pressure on urban infrastructure and services, by undermining economic growth, by increasing the risk of conflict and by leading to worse health, educational and social indicators among migrants themselves (Brown 2008, p. 10). Undoubtedly, climate change-induced migration has diverse impacts on the adaptive capacity of Fijians and social capital will be of great value when arranging relocation.

Application of traditional knowledge and values

As pointed out by Mimura et al. (2007, pp. 708-710), application of traditional knowledge and experiences from past practices can serve as significant factors on those small islands that still have some traditional foundations. Likewise, the educators interviewed for the study acknowledged the importance of traditional values when assessing the current adaptive capacity of Fiji.

Experience with *i qoliqoli* in Fiji serves as a great example of utilizing traditional knowledge when protecting biodiversity. In a traditional Fijian village, the chief was greatly honoured after his death by setting aside a part of the village's fishing ground as a 'tabu'. No one was allowed to go near it or take anything from it. After a hundred days of honouring the chief like this, there was an abundance of sea life to catch. With the industrialization of fishing the villagers have seen a decline in the numbers and size of their reef fish. Leaving a part of a fishing pond as a no-take-zone has been re-introduced as a solution. Now communities who have applied this method in their reefs are reaping the benefits from the management of their marine areas. The non-tabu fishing grounds are now more productive because fish from the tabu areas are moving out into the other waters. In addition, the communities are seeing species that had disappeared for many years. (field notes)

By using a traditional boat 'waca' as an example one educator explained how traditional things help protecting biodiversity:

At the moment on the island there are only a couple of carvers that carve traditional canoes for fishing, cause nowadays people prefer the auto models. So when we talk about

climate change we talk about clean energy, and with auto models it's petrol which is not clean energy. At the same time if you go out for (fishing) you can catch more fish when using a waca. Waca we use as the example of clean energy. And because the trees to carve the waca from, are traditional native trees, and if you continue to carve waca that means you have to plant these trees. And these are native trees, so the native flora on the island depends on these native trees, so there's like a whole chain reaction that goes on. (E8)

It was noticed that the value of natural resources had decreased which has resulted in damage of biodiversity. This kind of ecosystem-based approach to assessing adaptive capacity focuses on the role of biodiversity in increasing the resilience of a society (see Chapter 3.1).

The biggest problems with us is losing our biodiversity on the island and the change in resource use. Our traditional way of living requires that we use the natural resources from our environment. Because we use the natural resources from our environment, our resources such as trees, animals and plants, they have very high value. Because they have a very high value we tend to look after them. Now we don't use them but we are using things that you have to buy from the shop so the value of natural resources has decreased. And because it has decreased we have not bothered about protecting them. (E8)

Some of the educators talked about adaptation as living a sustainable life. One spoke about the urgency "to stop that slash and burn" way of life where people try to get the most out with the least effort. He continued that we need to prefer sustainable ways of agriculture, for example by using animals when ploughing the fields and taking breaks in cultivation:

I have been telling them that you are not being fair for the Mother Nature. Burning is an impulse to the land. I have three fields, by using animals my production has risen. People need to be educated about this. (E2)

Traditional ways of living are examples of leaning for sustainable development options, because you take what you need and that's it. (E8)

5.3 Educational responses to climate change

In the view of the educators interviewed for the study, education was perceived as an extremely significant component in the efforts to lessen the effects of climate

change and to promote sustainability. It was considered important to raise awareness on sustainable management and use of resources, as the students were seen as future landowners and leaders. Educating people at the community level was understood to contribute to national development. This is achieved through acquiring a sense of responsibility and commitment to make sustainable choices. Similar to Cherry's perception (2011) that young people are the ones who can change the society from the roots up (see Chapter 3.3), it was recognized in Fiji that awareness of climate change spreads from children to wider community.

(The role of education is to) instil some maturity, instil some sense of responsibility and then to really see the risk of climate change, and they can pass this message on. The awareness will come slowly but at least we should educate the students. And this information will go out to the families, to their friends they meet. (E1)

Based on the data collected and the literature studied for this research I identified six ways educators have addressed climate change in Fiji. These are: implementing a multi-sectoral approach, rewriting the national curriculum, raising awareness, empowering teachers, taking initiative at a local level and placing emphasis on ethics and values.

Implementing a multi-sectoral approach

As discussed in Chapter 3.2, it is essential that the importance of environmental education is recognised at all levels of a society. In Fiji, there is a strong intention to establish multi-sectoral engagement in raising environmental awareness. The Ministry of Environment is working in cooperation with the Ministry of Education to emphasise environmental education in schools. Environmental education in Fiji has been strengthened through new laws and legislation. It was often stated that change must begin from the formal sector and then spread nationwide. Frequently the educators interviewed for the study expressed a need for the Ministry of Education to establish a national environmental education programme that could be run in schools. One interviewee justified why the Ministry of Education is the best channel to implement new initiatives:

So far the Ministry of Education has been doing well with how they have created a new curriculum, so that children learn and get adapted to the new changes that are coming. For

example we have family life education now, because of the many sexual related problems and diseases (that were observed). They decided to have family life education to address these issues. So in the same way, the Ministry of Education will be the best department (to address environmental issues). (E3)

In tandem with the formal sector, the non-governmental organisations have a significant role in raising awareness and promoting action through education. Organisations such as Läge Rotuma Initiative and Live & Learn Environmental Education provide diverse programs for schools, supplementing the initiated environmental education in several ways. Many NGOs involved with conservation work (see Chapter 5.2) also place emphasis on education, for instance taking a school class to assist in replanting mangrove trees.

I think the other NGOs that very much strongly put emphasis on education. we got a Doctor Bria.. of Fiji, we also have WCS Wild Conservation Society, we got Marine (Conservation Science Institute), and then we also have PCDF Partnership Community Development Fiji, who are doing a lot of conservation, also IES successful for new universities in Fiji, ... of applied science. Conservation International they have offices in Fiji also .. very strong on conservation with education. There is a lot of exchange between these NGOs in terms of programs, we have like networked and we work together, so there is a lot of exchange of ideas. (E6)

It was recognised, however, that even though NGOs contribute a lot, they cannot bring change alone as they are missing an official push and funding. Overall, the school system was seen as the most efficient and widespread way to educate the community and get people adapted to climate change.

Rewriting the national curriculum

One of the biggest ways in which we can tackle (climate change) worldwide is through education for sustainable development. Most education systems now should rewrite the curriculum so that it will provide education for sustainable development. (E8)

It has been realised in Fiji that there is a need to re-align the education system to better address environmental education. Climate change has been introduced in the curriculum as one topic to be emphasised. In the understanding of the educators interviewed, climate change transcends all other topics but is not

exclusive to environmental education. Just as the research informants recognised several dimensions of risks (economic, cultural, social etc.), they also determined that education about climate change is to extend beyond natural sciences. Climate change has been chosen as a topic of discussion and study in several subject lessons, thus encouraging the students to develop a multi-faceted understanding of the issue.

It is part of the other subjects, they can use environmental topics and subjects for maths, for all subjects, so it's more like a cross, rather than a subjects on its own. (E6)

As discussed in Chapter 3.2 Palmer (1997, p. 8) argues that the environmental crisis should not merely be treated as an ecological issue. Hence, Fiji's cross-disciplinary approach to teaching climate change is a suitable starting point for the implementation of environmental education. According to NOAA (as discussed in Chapter 3.2) by using an interdisciplinary approach to the teaching of climate change, students are more likely to understand the interconnectedness of the topic.

Curriculum Development Union of Fiji, in collaboration with Live & Learn Environmental Education, is assessing whether the teaching of environmental topics is consistent with the curriculum being developed. Many educators interviewed for the study agreed that climate change needs to be included in the curriculum and should be initiated from the primary level. The question that arises in current international discussions, including Fiji, is whether environmental studies should be a subject in its own right or whether it should be integrated into the whole curriculum as a cross-cutting theme. One of the educators suggested that subject teachers should consider teaching environmental topics in all classes. In the view of another educator, teachers should have the possibility not only to teach but to learn together with the students. According to the informants, not only people from a certain field should develop an understanding of the issue. Rather, climate change should be in every teacher's curriculum because it is impacting the whole society.

I believe that they (environmental issues) should not only be discussed in the subjects that have environment (as a part of their studies) and topics related to climate change in the syllabus. Like math's teachers should also have the opportunity to talk about it. (E7)

Raising awareness

According to the research subjects, the role of education is to bring awareness about climate change and mobilize people to take action. It was often felt that education is the key agent in bringing awareness about climate change. Awareness education about climate change has been implemented in various ways in Fiji. One way to address environmental issues is through discussions in school assemblies. School assemblies are usually held weekly for all the students in the school. Teachers take turns in preparing a topic for the assembly and occasionally students get an opportunity to contribute to the presentation. Lately, environmental issues, and climate change specifically, have often been chosen as topics.

I remember one of our school assembly. I tried to make them understand what causes tsunami to come, (it is) earthquake. (E7)

During my initial week in Fiji I was able to witness a community engaged in activities related to National Environment week, which was in progress at the time. The programme for the Environment week had been introduced by the Ministry of Environment to emphasise environmental issues in schools and empower students to take initiative. During the week the students looked after the school gardens, did beautification, planted trees and spread information about environmental issues. Some schools dedicated the Environment week to addressing sea level rise, the low-lying islands and tsunamis. Activities during the Environment week demonstrate the level of awareness and involvement of the community and their willingness to participate in activities that address the issues related to climate change.

According to one informant, the students wish to receive guest speakers to the school and share their experiences and expertise on a given topic. She had observed that her students are more motivated to learn about climate change when the phenomena are given a human face instead of reading about them on the internet. Through different stories from all corners of the world they learn about the different kinds of impacts that climate change has on people and nature.

People who are experts in those fields could come and talk to the whole school about that environmental issue, about pollution, climate change. (E3)

Together with raising awareness of climate change, it was perceived important to offer training of so-called life-skills. These skills were considered necessary if the students were to become change-makers in their communities. I was introduced to skills such as

creativity which develops critical thinking and “how to think outside the box”,
teamwork which helps people learn “how to interact with other members of their team”,

confidence which helps people connect with others and “come out of their shells and interact with other students” and

public speaking skill which develops their capacity “to do a presentation in front of everybody”. (E8)

Empowering teachers

As Grima et al. (2010, p. 44) suggested, education of teachers is one of the most effective ways to tackle public awareness. In Fiji, training programs for teachers are organized all year round as an on-going process. Teachers from all regions of the islands are invited to participate in educational workshops to investigate and discuss environmental issues. Workshops are facilitated by Live & Learn which is an environmentally orientated organisation focusing on community education. They have run projects called "Imagine tomorrow" and "Hope for Peace" both of which have focused on consulting on how a peaceful environment can be assured in the future. Live & Learn aim at “empowering the teachers so they can be able to pass on these topics or lessons for students or even for fellow teachers” (E6).

I attended one environmental workshop organized by Live and Learn, that was passing along the message of how you can help to adapt, how you can minimize the problem individually. (E1)

Teachers who have participated in the environmental education programs by Live & Learn have established a network in order to maintain a forum for discussion and for sharing ideas and experiences. Additionally, the forum serves as an

information channel to advertise new projects. During the programs educational materials on environmental issues are being developed because of a scarcity of existing literature in the field of environmental education. Everyone in the network has an access to give comments and contribute to the materials which are later distributed to schools and communities.

I learned that many teachers include climate change in their education despite their area of expertise. Several informants agreed that all teachers should include climate change in their teaching and have the opportunity to study it together with the students. For instance, in one of schools I visited climate change is studied in the social science class where the students choose a current issue from around the world, study the case and present the consequences to the class. This method of students giving presentations on case studies has helped them sympathize with people who are affected by climate change.

I really started to teach my students (about climate change) cause we talked about controversial, contemporary issues and one of the things we talk about so often is the climate change. We have our group presentation and we talk about climate change, expected changes happening. (E1)

As brought up in Chapter 3.3, Cherry (2011) encouraged teachers to find creative ways to teach students about climate change without frightening them. One of the research informants had noticed that the way most organisations address climate change is threatening which in fact discourages students from seeking more information. In his view, education about climate change should be made fun so that students find the subject approachable. It was inspiring to hear that the educators implement diverse ways to teach climate literacy in Fiji:

Most activities are very hands-on, very participative, most of them are fun. (Then) the message goes in very quickly. (E6)

Make it very interesting. And not just through the education but through the arts. Through using media and creative visual arts, or performing arts like song and dance. (E8)

Taking initiative at a local level

Probably the most intriguing outcome of the interviews for me was to hear about

the initiatives that have been taken on a local level to address environmental issues. Many educators elaborated on different kinds of environment clubs and committees that have been established in schools. One club is planting trees and flowers, talking about environmental issues and consulting with the regional Department of Environment. Another club started a recycling project in the school: they arranged a truck to collect the recycled rubbish and paper from the school on a monthly basis. Recycling has also encouraged them to reuse materials instead of disposing of them. Generally, the activities carried out by the club members have encouraged people to appreciate a clean environment and take initiative in their nearby communities. It was realised that when students are involved in environmental activities, the message of caring about the environment is more effective than the teachers merely passing on information. Additionally, when other students see that their peers are active and taking a stance on something, they are eager to join the group and give their own contribution.

So this Green Club would find things that they can improve, beautifying action, clear up the rubbish or trash pile from here, taken an initiative to go outside to old people's home, went to clean their compound. (E3)

Läje Rotuma Initiative, a non-governmental organisation run by six volunteers originally from the island of Rotuma, started their work with primary school students, launching a program called Adopt a Habitat. Each of the four primary schools on the island adopted an ecosystem relevant to biodiversity such as a forest, a beach, a coral reef, and a sea ecosystem. Each group researched the state of the habitat, looking after the well-being of the ecosystem. The schools then gathered at an eco camp, facilitated by the NGO, to share what they had learned about the habitat under their responsibility. Through interacting with one another they learned about all other types of ecosystems on the island. The program continues to be an annual activity while new aspects to the activities are regularly introduced.

In addition to this, Läje Rotuma has created other experiential methods for climate change education. The key activities they use are forest walks, bird watching, sea monitoring and coral reefs snorkelling. Forms of art are combined with the

activities to make them more appealing for the participants. The students are not usually offered these activities in their own schools due to lack of resources.

In our eco camps we divide the campers into groups, and they (are given a task to) go and compose a song about what you find most exciting about your environment. So they go and they write songs about the biodiversity. If they have gone snorkelling, we ask the campers to report what they have experienced in the reef either in a form of a painting or drawing or you can report to the rest of the eco campers by using a song or dance or a drama. (E8)

Läje Rotuma Initiative also trains the locals in basic scientific research and supports their environmental activities. Doing this, they reach out to the wider community, encouraging them to take ownership of their own environment.

Our volunteers are from the island, when they decide they sign up we bring them to here (Viti Levu, the main island of Fiji), we train them on basic scientific research, and we have them attached to some national parks here. When they come they learn how to do bird surveys, sea cross surveys, coral reef monitoring, and then afterwards we send them back to the island (Rotuma), we help them design the activities, plan the activities and when they go back they do the research. Then come back, we sit with them we analyse the results, then write up the reports. Since 2002 we have assisted communities to start their own environmental initiatives. (E8)

Educational Foundation for Children in Fiji is in a process of building a self-sustaining school campus for 1000 students. The school campus will be a green construction, generating its own electricity through wind and solar power. Thus, the students in the school will learn about environmental-friendly options for power generation. The developers of the school are planning how to maintain the existing ecosystem of the area. The school is designed to serve a wide range of students, including education for the parents of the students and other adults of the community. The education at the school campus is envisioned to be as holistic as possible, including a thorough studying of environmentally related issues. The Foundation has been working on the initiative since 2004 with the assistance of their US team.

Placing emphasis on values and ethics

Based on the discussions I had in Fiji one of the fundamental reasons behind the environmental crisis appears to be indifference towards values that would sustain our balanced relationship with nature. The educators agreed that we need to question our current values and reflect whether they are sustainable. Apparently, in their view, many of the values that are currently upheld do not support sustainable development. However, as Botkin et al. (1979, p. 11) encourage, traditional values must be questioned but without undermining the vital diversity of cultures and their corresponding value system. Therefore, in order to find global solutions for climate change we should try to find a common value base but not at the expense of losing what is constructive in a given/certain culture.

Educators interviewed for this study relatively strongly believed that climate change is human induced. Therefore, the educators often brought up the need for modification of value system and reconsideration of ethical questions. Some of the causes of current vulnerability (see Chapter 5.1) that were identified, such as deforestation, industrialism, materialism and greediness, were understood to be direct consequences of a change in value system. I assume that due to this reason they felt an urgent need for education to address the human dimension of environmental change. Likewise, Bowers (1995) stresses the importance of placing emphasis on ethics and morals in the development of education for ecologically sustainable culture. Also in the words of Botkin et al. (1979, p. 39) values are enzymes of innovative learning.

It's a matter of educating people that the resources belong to everybody, when you die you don't take the plain with you, you don't take this with you, it is left behind. (Adaptation is possible through) managing the resources, bearing in mind the changes that are taking place, and using democracy values. (E6)

I have been telling them there is a need to modify our value system and prioritize education, that's a mean to survive. (E2)

Virtues Project Fiji, an NGO, launched a national programme to help children develop virtues such as excellence, respect, compassion, justice and cooperation. Additionally, the programme aims to empower children to make moral choices, deal with grief and loss, and resolve problems with their own inner strength. The

programme has been introduced by the Ministry of Education as a way of promoting positive values in the country. Furthermore, Virtues Project Fiji has conducted workshops for teachers, scholars and parents in selected schools. Teachers who actively participated in the workshops engaged themselves in duplicating the knowledge they acquired, building the same sense of virtues in their own schools. Schools have been provided with the Education Guide developed by the organization. The project outcomes have revealed that just one teacher in the school, working intensively on one of the virtues, can bring change in the school community.

6 Reliability and ethical considerations

The evaluation of the reliability of the research was done based on criteria presented by Eskola and Suoranta (1998, p. 209-213). Acknowledging the subjectivity of the researcher is the principal criterion in qualitative research (ibid., p. 211). The impact of the researcher when collecting data has been discussed in Chapter 4.2 when introducing the elements of field work. As stated in Chapter 4.2, from the perspective of an ethnographer, an understanding of other people's reality can only be acquired through living with them for a long period of time and capturing the native's point of view. I am well aware that my short visit to Fiji was insufficient for this. Occasionally I had to base the interpretation and analysis of the responses on disappointingly sparse data. It was only afterwards when more specific questions came to mind. That said, although the aim of this study has been to illustrate the perceptions of Fijian educators, it is a subjective analysis, strongly coloured by the researcher.

As Eskola and Suoranta write (1998, p. 19-20, 212-213) it is important to remember that our observations are always coloured by previous experiences. However, those experiences should not become limitations to research procedures. Rather, in qualitative research the researcher should be open to surprises and learning while conducting the study. This requires that the preconceptions that are formed about the research subject are acknowledged and taken into consideration. (Ibid.) In fact, my own preconceptions turned out to be very different from the research findings. I assumed adaptation to climate change had progressed further on a national level in Fiji. I was specifically interested in the role of education in adaptation. However, I had to realise that also Fiji was at a loss regarding measures related to adaptation. Therefore, it was not meaningful to study how education enhances adaptive capacity, which was my original research question. I have tried to set aside my own conceptions about the subject under study and report only those aspects that came out of the interviews. Attaching excerpts from the interviews to the report on the findings justifies the interpretations made (see Hirsjärvi, Remes and Sajavaara 1997, p. 228).

Furthermore, credibility as a criterion of reliability implies that the concepts and interpretations of the study correspond to the conceptions of the research subjects (Eskola and Suoranta 1998, p. 212-213). Concepts, such as climate change and adaptation, are not the most unambiguous and demand a high level of consideration. At no point did I define these concepts to the interviewees as I understand them. I just asked them how they understood the concepts and continued the discussion with deeper and more focused questions. Although I have tried to interpret their responses from their own point of view, I am aware that it has been impossible for me to become detached from my own conceptual framework.

The research process has been explained in detail (see Chapter 4), so the study could be repeated in an identical manner, but similar results cannot be guaranteed. Additionally, the findings cannot be generalised outside Fiji, although the study can give some implications on the subject. I also believe that people's perceptions of climate change are in a strong process of transformation. Including climate change in the curriculum forces educators develop their own understanding and knowledge. Furthermore, interaction between educators has an additional influence on the conceptions of educators. Therefore, I believe that if the study was redone, the experiences and awareness of the educators would have already changed.

Ethical considerations and reliability of the study are closely intertwined and follow good scientific practice (Tuomi and Sarajärvi 2009, pp. 132-133). Accordingly, this study has valued honesty and integrity, meticulousness and accuracy in all stages of the research. An official permission for the study was given by the Deputy Secretary for Primary and Secondary Schools of Fiji from the Ministry of Education. Previous studies and publications have been treated with respect and in an appropriate manner, for instance by the faithful use of references. (Suomen Akatemia, as cited in Tuomi and Sarajärvi 2009, pp. 132-133).

Collecting the theoretical framework for the study was challenging, as the research theory relating to adaptation alone covers vast amounts of different views and concepts. The theoretical research concerning environmental education could

have been more comprehensive, which would have allowed me to build a more comparative theory section on the field. On the other hand, the amount of background information to include in the study required much thought and was the result of many changes. Despite the challenges, I believe I have succeeded in structuring the theoretical framework into a logical entity.

The choice of method for data collection was, in turn, easy. The empirical part of the study was conducted in Fiji over two weeks. Due to the limited amount of time, the interviews were the best possible way to collect data on location, although the understanding developed during the long term stay characteristic to ethnography would have added depth to the study.

I strived to encounter the research subjects in an ethically correct manner (see also field notes in Chapter 4.2). Careful consideration on how to present the research to the research subjects was invaluable. Having agreed to participate in the study, the research subjects were informed about the nature of the study and they were given the right to withdraw from the research at any time (see Appendix 2). After getting the permission to use the data, a question of loyalty to the participants remained. In my opinion it is just toward the participants if they can benefit from the study. At its best, this study can be an opportunity for them to get their voices heard and so I chose to share the findings with them.

I believe that talking with the interviewees was the best solution, also due to the ambiguous concepts surrounding the research topic. Interviews, in contrast to surveys, allowed me to apply the pre-made frame of questions and make decisions based on the situation. My own preconceptions on the subject turned out to be so different from the views and experiences of the research subjects that it was important to be able to change the focus. I was extremely lucky in finding the research subjects but the recording of data could have gone better. I faced many challenges related to data collection, such as the partial destruction and poor quality of recordings, which added to the work of transcribing the material.

This data was analysed using a method of qualitative content analysis to find answers to the research questions. Analysing the material was extremely time-

consuming because my original research question led the analysis to a dead end. After changing the research questions, everything fell into place. Reflecting the empirical data against theory was easy, because the same points of view could be found in the material that were brought up in literature, offering however a new perspective.

Answering the first and third research questions turned out to be less difficult than answering the second one. I often noticed that it was difficult for the interviewees to discuss adaptation, possibly due to the vagueness of the concept, but I attempted to shift the discussion back to it. Again, it was my original research question that made me stay on the topic of adaptive capacity. I pondered several times whether the other research question should be left out, but felt however that it was important to include it in the work.

The choice of a research task was successful at least from my own perspective. I never lost my interest or thirst of knowledge towards the subject during the process. I also believe that this research can be a useful tool in developing environmental education, and useful to every educator interested in climate change. The benefit of the research can also be evaluated in view of the professional development of the interviewees and my own. I have a strong belief that despite the occasionally imprecise outcomes of the discussions, they were valuable for both parties of the interview.

Had I known more about the topic in advance, I would have been better able to set a focus for the study. For this study I accepted educators with any background for the interviews, which led me to examine their approaches in a general manner. It could have been potentially more fruitful to only choose geography teachers and concentrate studying how environmental education has been implemented in Fiji. The benefit of a cross-educational study was, however, that it allowed me to collect perceptions and practices from different levels of educational field. My personal interest in climate change and adaptation made me broaden the research interest which can understandably be confusing to the reader.

As a whole, conducting this study has been a constantly changing process which is typical to qualitative research. It can be clearly seen in this study that the perspectives and interpretations related to the data have developed throughout the research. To my great relief, research does not need to follow an existing formula, but choices should be made according to the direction the study takes. Therefore, I am satisfied that I was finally able to accept the feeling of uncertainty brought about by research of this type, and develop it further into its final form.

7 Discussion and conclusions

The purpose of this study was two-fold: to provide theoretical and practical insight about climate change adaptation for educators and to investigate educational initiatives which raise awareness and build communities' capacity to undertake adaptations. This study consists of both theoretical and empirical parts. The theoretical section discusses different approaches to adaptation and presents views and initiatives in the field of environmental education, building a departure for the conducted research. The empirical section presents the research data results, continuing the discussion started in the first part of the thesis.

The main research question driving this study asked how educators in Fiji perceive and address climate change. Furthermore, the study attempted to investigate what kind of risks and causes of vulnerability educators identify, what kinds of perceptions educators have about the current adaptive capacity and in what ways climate change has been addressed through education.

The study reveals that the educators identified diverse and multi-dimensional risks related to climate change. Many of the identified risks were local, and experienced or witnessed by the educators themselves. Not only did they discuss environmental changes but often referred to social, economic and psychological dimensions of the issues. Their statements were often aligned with the research literature and showed great knowledge and understanding of the issue.

According to the results, the causes of vulnerability were perceived to be human-induced. Unsustainable use of resources and contemporary lifestyle were perceived to be the reasons behind climate change. They talked about this issue as well on a local level, without blaming countries with the highest carbon dioxide emissions. At least I found this somewhat surprising. Because climate change, in their opinion, is caused by human activity, I sensed an urgent desire to take action.

The responses from the interviews reflected different conceptions related to current adaptive capacity. On one hand a great need for national and international plans was recognised. On the other, current procedures were identified that

enhance the adaptive capacity of Fijians. In addition, relying on traditional knowledge and values has an influence on how Fijians adapt to climate change.

The results showed clearly that the formal sector of education in Fiji has a major responsibility in responding to social changes; for example, schools have adopted a family life education program to address teenage pregnancies. To date, however, a similar education program for climate change adaptation has not been created. Secondly, the informal sector of education in Fiji is seen as a significant agent in adaptation to climate change; educational organizations, such as Lāje Rotuma Initiative and Live & Learn Environmental Education, support and initiate several environmental and societal projects. Thirdly, research informants acknowledged how the non-formal sector of education played a significant role through value transmission in the decision-making of Fijians. This research has presented that the most important ways to address climate change through education are by raising awareness, empowering teachers, mobilizing people to take action and emphasizing value education.

There are several approaches that educators can take in regards to climate change. Utilising the traditional model of environmental education, as illustrated in Chapter 3.2, I recognise three approaches that the educators in Fiji take:

Education about climate change

Educators taking this approach are concerned with how climate change is studied in schools and other educational institutions. This approach is focused on raising awareness on risks related to climate change. Teaching and studying can take place in school assemblies, classes, workshops and so forth. An additional way to raise awareness is to have guest speakers come to school and share their expertise on issues related to climate change.

Education in climate change

Educators implement practices that aim at interpreting and appreciating the environment. Experiential activities, such as forest walks, bird surveys, sea-cross monitoring and replanting trees, promote understanding and appreciation of the

ecosystems. Research projects and activities in nature carried out by educators contribute to students taking ownership of their own environment.

Education for adaptation to climate change

Educators are aware of the challenges climate change brings to schools and educational systems, and are concerned about the capacity of people to handle the consequences. Educators have a holistic approach to climate change and try to influence communities rather than just students of a particular institution. This approach attempts to empower people to be responsible, and skilled to take initiative in regards to the present and the future. Empowering children to make moral choices through developing their virtues and the training of life-skills are among a few educational actions that have been taken to promote a caretaker ethic.

Many of the educators I discussed the environmental crisis with in Fiji shared an understanding that a holistic and sustainable approach is needed when we educate ourselves and others about climate change. Presumably, the educators interviewed for the study had not intentionally chosen an established approach to take; rather they were in a state of pedagogical transition, exploring new methods through trial and error. When we are in a mode of learning new directions can be found through analysis and reflection and even if, or precisely because, we make mistakes, we indeed learn by doing.

Even though there are several international, national, regional and local strategies for climate change adaptation, in practice, we are still in the stage of learning to adapt to climate change. According to Botkin et al. (1979, p. 10) societies have traditionally adopted a pattern of continuous *maintenance learning* which refers to the acquisition of fixed outlooks, methods, and rules for dealing with known and recurring situations. It is the type of learning that maintains an existing system or an established way of life. Maintenance learning is, and will continue to be, indispensable to the functioning and stability of every society (ibid.), undoubtedly so also in the case of climate change. However, unfortunate events (e.g. sudden scarcity, emergency or catastrophe) stimulate *learning by shock* (ibid.) Learning by shock is a formula for disaster in the case of climate change, and can cause long-

term trauma for a society, even though at the end of the day learning happens. In contrast, *innovative learning* brings sustainable change, renewal, restructuring, and problem reformulation (ibid.). The main attributes of innovative learning are “integration, synthesis, and the broadening of horizons. It operates in open situations or open systems. Its meaning derives from dissonance among contexts. It leads to critical questioning of conventional assumptions behind traditional thoughts and actions, focusing on necessary changes. Its values are not constant, but rather shifting. Innovative learning advances our thinking by reconstructing wholes, not by fragmenting realities.”(Ibid.) As I see it, this type of learning is preferable for everyone in the case of climate change. Educators everywhere should consider how they can support this learning process in their local contexts.

As the educational structures themselves are still in the early stages of addressing climate change, initiatives of promoting the issue in schools are greatly dependant on the interest of individual people. A point of interest is that these initiatives rise not only from teachers of natural sciences, but teachers of any fields. Educators who have interest and who consider climate change as an important issue, should be able to include the topic in their curriculum. I have come to realise that the initiatives to address climate change come from educators who have not only understood the severity of the issue but also the role that education can play when societies are adapting to the impacts of climate change.

In general, this study is related to the role of education in climate change adaptation. Based on the research literature and the collected data, I propose that the role of education in climate change adaptation is to enhance the adaptive capacity of a society by raising awareness and promoting sustainable action. However, educators must be aware of what they want to influence in their students: their knowledge, opinions, values or behaviour. Changing people’s attitudes and behaviour is a more difficult task than transmitting factual knowledge. Information alone will raise awareness about climate change and may lead to a change in opinions and attitudes. However, by allowing students to experience the issue directly and take action, a personal ethic of commitment and responsibility can be formed. (Benedict 1991, p. 28.) In a related manner to Kortelainen (1994, as cited in Järviöskö 2001 p. 7), this study concludes with noticing that when we

receive new information, it first influences our opinions, then our attitudes and finally, if we let it pass through our cognitive filters, our values. All these affect our behaviour and decision making, but most significantly our values (Palviainen 2004, p. 33). Therefore, education that puts emphasis on values can help students and teachers become the agents of change in their society which, in no doubt, enhances adaptation to climate change.

TO CONCLUDE

This research was conducted to learn about the ways in which educators address climate change in Fiji. Fiji provided a research context where climate change is discussed as today's problem, and the environmental conditions have already demanded a change in education. It was meaningful to study the issue from the perspective of educators as they strive to attend to the needs of their students in an environment where climate change is topical.

The study revealed that the most important ways to address climate change through education in Fiji are by raising awareness, empowering teachers, mobilising people to take action and emphasising value education. In addition, the study presented that implementing a multi-sectoral approach to respond to climate change is necessary: initiatives must arise from the administrative level to each individual. This implies that educators from any field and in whatever position should consider how they can best support climate adaptation in their local contexts as education can play a key role in enhancing the adaptive capacity of a society.

Research that focuses on the implementation processes for adaptation is still not common (Smit and Wandel 2006, p. 285). Hence, as further research it would be interesting and meaningful to conduct a community-based vulnerability research with all its stages. The participants of the assessment would be community members from diverse fields, including representatives of the educational system. The aim of such participatory assessment is to attain information on the nature of vulnerability and identify ways in which the adaptive capacity can be increased and exposure-sensitivities decreased in a given community (ibid., 289).

Specifically important would be to investigate the contribution that the educators give to a local or national adaptation planning.

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Appendices

Appendix 1 INTERVIEW QUESTIONS

1. Could you please tell me first a little bit about yourself, and about your background (educational, professional, environmental)
2. What is your understanding about climate change?
3. How does climate change affect this area?
4. How do you understand adaptation?
5. What does adaptation to climate change mean in this area?
6. How does climate change affect education here?
7. What challenges it brings to education?
8. What actions have been taken in this school/ institution/ organization to address these challenges? / What preparations have been/ will be made?
9. What is the role that education has in the process of adaptation to climate change?
10. How can and could education support Fiji's adaptation to the impacts, on-going and ahead?

Appendix 2 CONSENT FOR INTERVIEW

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Roles of Education in Adapting to Climate Change

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I am a student at the University of Oulu in the master's degree programme *Education and Globalisation*, and I am conducting interviews for my master's thesis. I am studying the views and conceptions that teachers and other educational specialists have concerning adaptation to climate change and the roles of education in that process.

During this study, You will be asked to answer some questions as to what is Your understanding about climate change, adaptation and the impact climate change has on education in Your area. This interview was designed to be approximately one hour in length. However, please feel free to expand on the topic or talk about related ideas. Also, if there are any questions You would rather not answer or that You do not feel comfortable answering, please say so and we will stop the interview or move on to the next question, whichever You prefer.

All the information will be kept confidential. I will keep the data in a secure place. Only myself and the supervisor mentioned above will have access to this information. Upon completion of this project, all data will be destroyed or stored in a secure location. A copy of the finished research will be sent to all research participants.

Participant's Agreement:

I am aware that my participation in this interview is voluntary. I understand the intent and purpose of this research. If, for any reason, at any time, I wish to stop the interview, I may do so without having to give an explanation.

I am aware the data will be used in a Master's Thesis that will be publicly available at the Library on the Oulu University Campus. I have the right to review, comment on, and/or withdraw information prior to the Master's Thesis' submission. The data gathered in this study are confidential with respect to my personal identity unless I specify otherwise. Nothing I have said shall be used to harm my privacy. I understand if I say anything that I believe may incriminate myself, the interviewer

will immediately rewind the tape and record over the potentially incriminating information.

If I have any questions about this study, I am free to contact the student researcher or the faculty adviser (contact information given above).

I have been offered a copy of this consent form that I may keep for my own reference.

I have read the above form and, with the understanding that I can withdraw at any time and for whatever reason, I consent to participate in today's interview.

Participant's signature

Date

Interviewer's signature