

PROVISION AND PRACTICES OF MAKING STUDENTS AWARE ON CLIMATE
CHANGE

Shiba Bagale

A Dissertation

Submitted to
School of Education

in the partial fulfillment of the requirements for the degree of
Masters in Environment Education and Sustainable Development

Kathmandu University

Dhulikhel, Nepal

2013

© Copyright by Shiba Bagale

2013

All rights reserved

DECLARATION

I hereby declare that this dissertation has not been submitted for candidature for any other degree.

Shiba Bagale

Degree Candidate

DEDICATION

This dissertation is dedicated to my parents (Ram Chandra/Satya Devi Bagale) who taught and inspired me to walk on the path of educational journey. My father, you are a great teacher of my life and source of inspiration. To my sisters (Bindu and Anupama Bagale) and my husband (Shree Prasad Devkota), who supported me in every step.

APPROVAL

This dissertation of Master of Education in Environment Education and Sustainable Development entitled “Provision and Practices of Making Students Aware On Climate Change” presented by Mrs. Shiba Bagale on 24 November, 2013 has been approved by

24 November, 2013

Asst. Prof. Megh Raj Dangal, PhD

Dissertation Supervisor

24 November, 2013

Dr. Usha Bhandari

External

24 November, 2013

Prof. Mahesh Nath Parajuli, PhD

Head of Department, School of Education

24 November, 2013

Prof. Tanka Nath Sharma, PhD

Dean, School of Education

I understand that my thesis will become part of the permanent collection of Kathmandu University Library. My signature underneath authorizes release of my thesis to any reader upon request for scholarly purposes.

Shiba Bagale, Degree Candidate

AN ABSTRACT OF THE DISSERTATION OF
Shiba Bagale for the degree of *Master in Environment Education and Sustainable
Development* presented on

Title: Provision and Practices of Making Students Aware On Climate Change

Abstract approved _____

Dr. Megh Raj Dangal

Dissertation Supervisor

This research study has attempted to explore the provision and practices of making students aware on Climate Change in the context of Nepal. More specifically, this study has tried to explore the student's process and sources of getting information on climate change, climate change curriculum and transfer of knowledge in students. Particularly, this has coupled the learning environment of the school. This study has tried to explore the impact of teacher and school environment in response to get information about climate change by the students.

The research was conducted among the secondary level students and the teachers of respective subject to grasp the information about perceiving and delivering the knowledge of climate change respectively. To ensure equal representation of genders, I have chosen 3 boys and 3 girls. But regarding the teachers there were no female teachers to teach the respected subject. I have used in depth interview as the main tool of generating information in my query. The interviews are taken in a non- structured format, i.e. the interviews are more like conversation and sharing of experience.

This study finds that the students of secondary level students are not made aware about climate change through the school curriculum, teachers and by participating in those programs. The only source of getting information is through textbook where there is no adequate information about climate change and only general information are provided which can't provide the information even of national level. The teachers are also not trained about the issues of climate change and the transfer of knowledge is only through the means of lecture and teacher centered method. The student's awareness on climate change is not seen as the necessity. The only means is textbook and the knowledge gained by the teachers. So the students are back warded in the recent issues of climate change.

Shiba Bagale

Date: 24 November, 2013

Degree Candidate

ACKNOWLEDEMENTS

This research has arisen as a byproduct of my study as a student of Environment Education and Sustainable Development of Kathmandu University, School of Education. For this, there are direct and indirect help and support. It is a pleasure to convey my gratitude to them all as in my humble acknowledgement.

I would like to extend my gratitude Dr. Megh Raj Dangal for the supervision, advice and guidance from the early stage of this research. I am indebted for his unflinching encouragement and support in various ways for filtering all the irrelevant matters from a huge platform of my research where I was wondering within myself.

I also gratefully appreciate the support rendered by Dr. Tanka Nath Sharma, Dean, School of Education, Kathmandu University. I am indebted to all my teachers who taught me in my master's degree. In addition, I never forget my teachers, Parbat Dhungana, Dr. Bal Chandra Luitel, Prof. Dr. Mahesh Nath Parajuli for their help and continuous support.

Many thanks go in particular to my friends who had supported me in the research work. I am also grateful to the head teachers, teachers and the students of the schools that are taken as the research site. I am grateful for Ms Tara Budha for the English correction.

I acknowledge for the dedication, love and persistent support from my parents, family, sisters and husband.

ABBREVIATIONS

CCNN	Climate Change Network Nepal
ESD	Education for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
LAPA	Local Adaptation Plan of Action
MDG	Millennium Development Goal
Mt.	Mount
NAPA	National Adaptation Program of Action
UN	United Nations
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

TABLE OF CONTENTS

AN ABSTRACT OF THE DISSERTATION OF.....	iii
ACKNOWLEDEMENTS.....	v
ABBREVIATIONS	vi
TABLE OF CONTENTS.....	vii
CHAPTER I.....	1
INTRODUCTION.....	1
Chapter Overview	1
Background.....	1
Problem Statement	3
Purpose of the Study	5
Research Questions.....	5
Significance of the Study	5
Chapter Summary	6
CHAPTER II.....	7
LITERATURE REVIEW	7
Chapter Overview	7
Thematic Review	7
The role of environment education	7
Climate Change.....	9
Awareness on Climate Change.....	12
Education for Sustainable Development.....	13
Policy Review	15
Review of Previous Literature.....	16
Research Gap.....	20
Theoretical Connection	21
Constructivism	21
Transformative Learning Theory	22
Conceptual Framework of the Study	23

Chapter Summary	24
CHAPTER III.....	25
METHODOLOGY	25
Chapter Overview	25
Philosophical Approach of the Study	25
Epistemology	26
Ontology	27
Methodological Approach of the Study	28
Interpretive Inquiry.....	29
Procedural Approach of the Study.....	31
Study Site and Location.....	31
Tools of data collection	31
Interview	32
Data Sources	33
Selection of the research participants	34
Data Analysis and Interpretation.....	34
Addressing trustworthiness of the study	36
Credibility	36
Transferability	36
Dependability	37
Conformability	37
Ethical Considerations	38
Chapter Summary	39
CHAPTER IV	40
DATA ANALYSIS AND INTERPRETATION	40
Chapter Overview	40
Environmental knowledge.....	40
Transfer of climate change knowledge	41
Process of transfer of knowledge.....	43
Training of the teachers.....	49

Climate change curriculum in national context.....	50
Teachers Perspectives on Curriculum.....	57
Sources and process of getting information	58
Climate change awareness on students	60
Climate and weather	64
Consequences of climate change	65
Causes of climate change	67
Student’s participation	69
Misconceptions of climate change.....	70
Chapter Summary	71
CHAPTER V.....	72
SUMMARY, CONCLUSION AND IMPLICATIONS.....	72
Chapter Overview	72
Findings and Discussions	72
Conclusions	74
Implications	76
REFERENCES.....	78
APPENDIX.....	89

CHAPTER I

INTRODUCTION

Chapter Overview

This chapter portrays the premises of my research agenda and articulates my interest as a researcher. Student's awareness on climate change is the main issue of the research. It deals with the process of getting information by student's as well as the transfer of learning of climate change and the content of climate change in the school curriculum. So this chapter discusses the student's knowledge and experiences part while reading climate change in the secondary level. Further, it elaborates on the ideas why I choose the topic for my research. Furthermore, it includes problems statement and research questions to address the problems of this research.

Background

Nepal is a landlocked country, situated in South Asia between India and southwest China. It is the place of eight of the world's ten highest peaks, the Himalas define much of existence in Nepal, human habitation, weather patterns, the paths of political history. Savada(1993) and Shrestha(2002) say that from the world's highest peak(Mt. Everest, 8,8848 m) and some of the world's steepest mountains, the landscape also quickly gives way to foothills and the lowland Terai(flat plain area) at 300 m elevation, all within 100 miles. Department of water induced disaster prevention (2011) mentions that, "the high mountains are warming faster (0.08°C per year) than lower hills and plains (0.04° per year)" (p.1).

Fast receding glaciers and growing number and size of glacial lakes in the Himalaya provide strong visual evidence of global warming effects at local level. Nepal, being a country with diverse features in climate and geography is highly vulnerable to the adverse impacts of climate changes. Climate change scenarios for Nepal showed considerable convergence on continued warming, with the country average mean temperature increases

of 1.2° C and 3° C projected by 2050 and 2100(Shrestha *et. al.* 1999, as cited in Bhusal,2009). The changing climate has delayed the monsoon rendering the thousands of hectares of farm land fallow and reducing the productivity of the land due to lack of rain (Regmi & Adhikari, 2007). Kumar (2006) says about climate change as, “the term climate refers to the average weather in terms of the mean and its variability over a certain time span and a certain area” (p.85). Thus, climate change is the change in the weather pattern, rise in temperature and other activities that changes the climate of the country and the world. Khan (2010) states that, “climate change refers to the variation in the Earths global climate or in regional climate over time” (p. 258).

It is one of the United Nations (UN) agenda in Millennium Development Goal (MDG). It is kept as a part of “Ensure Environmental Sustainability” under the seventh MDG goal as Climate Change and Green House Emissions (UN, n.d.). It is one of the threatening problems to the developing countries like Nepal. The World Bank (2003) also mentions that all countries are vulnerable to climate change but the poorest countries and the poorest people within them are most vulnerable.

Koirala and Bhatta (2010) stated that,

“climate change in Intergovernmental Panel on Climate Change(IPCC) usage refers to a change in the state of climate change that can be identified(e.g. statistical tests) by changes in the mean and /or the variability of its properties and that persists for an extended period, typically decades or longer” (p.12)

Climate change has negative impacts on environment as well as human. It has caused several problems in different countries. Raj (2004) states, “The main cause of the recent increases in global temperature is green house gases, especially carbon dioxide, released by coal and oil fired power stations, factories, automobiles, trucks, offices and private homes” (p. 82).

Nepal has many more consequences of climate change. According to Agrawal, Raksakulthai, Aalst, Larsen, Smith and Reynolds (2003), “The most critical impacts of climate change in Nepal are related to its water resources and hydropower generation, stemming from glacier retreat, extension of glacial lakes, and changes in seasonally and intensity of precipitation”(p. 28). Although Nepal has not done any such things to address the Climate Change issue but it is facing different problems like melting of ice, change in rainfall pattern, and rise in temperature and so on. Nepal’s share in climate change is negligibly small; it is responsible for only about 0.025% of annual green house gases emissions (Karki, 2005).

Shrestha *et al* (1999) states that, “Climate Change scenario for Nepal showed considerable convergence on continued warming, with country averaged mean temperature increases of 1.2°C and 3°C projected by 2050 and 2100” (as cited in Bhusal , 2009, p.11). So Climate Change has greater impacts not only in Nepal but in the world environment. Climate Change has been a big issue in the developing countries like Nepal because these countries have no modern tools and technologies to solve the consequences of Climate Change and the vulnerability. It not only disturbs the weather pattern but also deals with the natural phenomenon and the natural system different from the usual pattern.

Problem Statement

Climate change has become one of the most serious problems as there is increase in temperature. Simpson, Gossling, Scott, Hall, and Gladin (2008) states that, “The IPCC concluded that most of the observed increase in global average temperatures since the mid-20th century is ‘very likely’ (> 90% probability) the result of human activities” (p. 25). So the most important solution for making pupil known to Climate Change is by awareness.

Nepal Climate Change Policy and Plans: Local Communities’ perspectives (2011) published by Ministry of Environment have also listed to create awareness of the concept

of climate justice as the provisions to be done in local communities (p. 7). It also gives a clear concept that awareness is the main source to know about the climate change and its affects.

Climate Change has several consequences like biodiversity risk, threatened water supplies, food security, threat to health, rising sea level, cities at risk, cultural loses etc. Combating global climate change is one of the most challenging and important problems that this generation faces (Apple, 2007, p. 1). Climate Change is one of the most noteworthy environmental challenges with profound implications for several different sectors such as producing food, natural ecosystems, fresh water, supply and health. Watershed Planning, (2008) states , Even greater changes are expected in the future, including a continued increase in temperatures, shifts in rainfall patterns, and increases in certain varieties of hazardous weather, such as heavy spring rains and heat waves (as quoted in He,2012).

Something relatively simple at a regional level quickly become complex on a global scale. So in the context of Nepal we have lots of biodiversity, rich in natural resources, has highest peak Mt. Everest, and so on. Climate Change is taken as a global problem but the awareness is not done accordingly. Research on environmental education has shown that positive environmental voting, consumption, and behavior patterns are largely determined by how much a person knows about a topic (Roper iPOLL, 2002; Patchen, 2006 as cited on Apple, 2007).

In a study conducted by Ho (2009) on Children's ideas about climate change, 16% of the respondents illustrated some ideas or concepts related to what the scientific community would refer to as "climate change". It seems that less student were aware about the scientific definition of climate change. It also signifies that there is lack of awareness on students about climate change.

So the following research question was made to get the solutions on the necessity of climate literacy and education of climate change regarding climate and the awareness on students: What is the provision and practices of making students aware on climate change?

Purpose of the Study

My experience and different literature's have expected the need of education to solve the problems of climate change. Awareness is considered as one of the significant predictor of the behaviors. Thus, the purpose of this study is to explore student's perspectives and awareness on climate change in the context. More specifically, it signifies the provision and practices to make students aware.

Research Questions

1. What are the different sources of information to make students aware of Climate Change?
2. What is the understanding and practices of students about Climate Change? How do they receive?
3. What are the barriers in making students aware on climate change?

Significance of the Study

Climate change as the issue was carried on for getting the awareness pattern of secondary level students. It is not only the environmental problem but also the concern of all the people to get awareness.

1. This study would be helpful to the organizations, curriculum developers who are working in the field of environment.
2. In order to get the clear picture of awareness of Climate Change in the study area, this research would be helpful.
3. The study will be useful for other researchers in the similar field.

4. For the policy makers, this study will be useful to implement a viable policy for awareness of Climate Change in the area under consideration and reach the goals of MDG.

Chapter Summary

This chapter is indeed a reflection of my whole thesis. I focused on the overall setting of climate change and its provision, practices in the lower secondary level schools. I have tried to reflect in every way possible on the various steps in how the issue of climate change has been one of the emerging issues in the field of education. I have focused on how the climate change has been the issue along with the provisions and practices seen in the schools of Nepal linking it with the issue worldwide. I have centered significance of the research, its purpose with the research questions in this chapter.

CHAPTER II

LITERATURE REVIEW

Chapter Overview

This chapter includes, thematic review, policy review, theoretical review that the researcher had reviewed in course of carrying out this research. In this chapter, the literature review tries to develop a clear understanding about the existing situation of students' awareness on climate change. It also tries to explore the problems related to climate change. Further, the literature provides the background and contexts for the search problems. It establishes the need for the research and indicates that the researcher is knowledgeable about the area.

Thematic Review

Thematic review is one of the essential aspects of my study. Thematic review in a research study helps to share with readers the results of other studies that are closely related to the study being reported. Review related to the study helps to fill the gaps and extends the prior knowledge. The thematic review contains the literature related to the research topic and questions regarding it.

Jadhav and Purohit (2007) say, "To create awareness as well as to find solutions, the First International Conference on Human Environment, under the aegis of United Nations was held in Stockholm from 5th to 6th June 1972" (p.1). Different countries are increasing the concept that awareness can lead to minimize the vulnerable effects of climate change. The issues of climate change are limited within conference and other programs but they are not widened as the awareness program so that everyone can be informed and have some effort for the vulnerability of climate change.

The role of environment education

Environment education is one of the best tools for the awareness of the students by addressing the environmental crisis. Several researchers believe that the strategy to combat

environmental degradation is through the Environment Education, it is one of the most important approaches (Albert, 2000 as cited in Shakya, 2009). It signifies that the students can achieve the knowledge regarding climate change mainly by the course book. The only adequate means of getting information of climate change can be delivered through the medium of school and the textbook. There are so many organizations working in the field of environmental education and climate change but most of them are working in surface level and the real victims who need the education regarding climate change are still the victims. Some of the organizations have worked to provide education to the students but they are lacking to provide education to all. Millennium Development Goals also has the provision to provide the education and awareness to the students.

Environment education encourages the learners awareness of their environmental surrounding, as well as active participation in solving local problems, it is concerned with “developing peoples” awareness, values, attitudes, thus allowing them to be involved effectively in sustainable development”(Palmer, 1998, p. 7). It is obvious that environment education plays a vital role. Fronter (2001) has also said that educational strategies are best designed when they are based on knowledge of the learner’s level of knowledge and preconceptions. Information can be chosen and experiences are organized to fill knowledge gaps, enhance understanding of relationships, and re mediate misconceptions. The main source of getting education in Nepal is the textbook.

Since environment is a cross cutting subject touching everyone’s life, environmental education should not be left as a single sector. We have lots of problems within Nepal itself. Pollution, uncontrolled population growth, deforestation, urbanization, etc are some of the problems related to environment. Nepal is country of villages, so it is necessary to pay special attention to the rural areas where problem like flood, landslide, loss of forest cover etc are becoming serious day by day. Climate change will be the

biggest issue facing children as they grow up. Failing to teach the students about this issue will be a dereliction of duty to the next generation. It's important to clarify exactly how global phenomenon relates to personal responsibility.

Apple (2007) also concludes that, "Education can illuminate incentives, showing people both how they could personally benefit from changing their behavior, and how they would suffer from a lack of change" (p.2). Momentous lifestyle changes will need a certain amount of direct financial and lifestyle sacrifice from individuals. So the personal understanding on how climate change will affect individuals and communities is essential for positive environmental policy implementation. And climate change education along with environmental education is necessary. Even education can also fuel a change in attitudes that are fundamental for new policy success.

Education is critical for achieving environmental and moral awareness, values and attitudes, skills and behaviors consistent with sustainable development and effective public participation (UNCED, 1992). Knowledge, awareness, skills, morals, and attitudes obtained through education help person to lead a desired quality of life. Larijani and Yeshodhara (2008) termed education as a catalyst for social improvement and other significant aspects of human life.

Climate Change

Intergovernmental Panel for Climate Change (IPCC) report says that unless steps are taken to prevent further global warming, the average temperature on Earth will rise by about 1 to 3 degree Centigrade by the year 2100(as cited in Raj, 2004, p. 81). It is said that this prediction change is larger than any Climate Change the Earth has experienced in the past 10,000 years. So it is a matter of issue and the steps should be taken as fast as possible. This indicates that climate is changing day by day and it will reach on the point

of 3 degree centigrade. So the further steps should be taken to reduce the vulnerable effects of Climate Change.

UN(2007) states, in a declaration at the high –level meeting on Climate Change held in New York, on September 2007, United Nations Secretary Ban Ki-Moon has stated that,

“Climate Change is a serious threat to development everywhere. Indeed, the unfavorable impacts of climate change could undo much of the investment made to achieve the Millennium Development Goals. But it is not a zero-sum match. By being creative, we can reduce emissions while promoting economic growth. This is our opportunity to move forward sustainable development, encourage new kinds of cleaner technologies, industries and jobs, and integrate climate change risks into national policies and practices”.

The above statement clarifies that climate change has been a great issue. The adverse impact may harm to the developing countries as developing countries can't apply all the cleaner technologies. Thus, the countries like Nepal should do action on time to get less consequences of climate change.

Khan (2010) says, “In some cases, the term Climate Change is also used with a presumption of human causation, as in the United Nations Framework Convention on Climate Change (UNFCCC) uses climate variability for non-human caused variations” (p.258). Climate Science Report 2006; IPCC 2001 says , “It is clear that this conception of climate change based on scientific studies of the present and perhaps the immediate past has been accepted as a very likely scenario for the future(as cited in Dasgupta,2009,p.41).

The UNFCCC has also defined climate change in its Article 1 as, “a change of climate which is attributed directly or indirectly on human activity that changes the composition of the global atmosphere and which is in addition to natural climate

variability observed over comparable time periods”. Climate Change has direct and indirect impact on human beings and the whole environment.

Kumar (2009) describes Climate Change as, “any long-term significant change in the expected patterns of average weather of a specific region (or, more relevantly to contemporary socio-political concerns, of the Earth as a whole) over an appropriately significant period of time” (p. 110). So Climate Change is the consequence of a great many factors including the dynamic processes of the Earths itself.

Climate change can be thought in two ways. The first is an environmental issue and the second is as a scientific field of study. Here the study is about climate change as an environmental issue. Harvey(2000) has said that “Climate change as an environmental issue refers to regional and global scale changes in climate due to human activities, in particular the emission of green house gases, which cause changes in the heat balance of our climate”(as cited in Ho,2009 p.1).

Karki (n.d.) in a paper of National Adaptation Program of Action (NAPA) also includes about climate change as, “Climate change can be seen as a multidimensional topic that interacts in various ways with other significant environmental issues such as stratospheric ozone depletion, desertification and land degradation, freshwater decline, and loss of biodiversity”(p.1). Although the eminence of public knowledge is slowly improving because of various impacts like media and so on but what actually the knowledge level of secondary level students in Nepal is the main issue of this research. Education at a young age is the best way to instill an appreciation for the environment, nature of science and an individual’s responsibility for a global problem. Also combating global climate change is one of the most challenging and important problems that this generation faces.

McSweeney et al (2008) has predicted that the average temperature of Nepal is to rise significantly by 0.5°C to 2.0°C by 2030(NCVST 2009), 1.3°C to 3.8°C by 2060, and by 1.8 to 5.8 °C by 2090 and mainly the temperature is rising at the night time (as cited in Bartlett, Bharati, Pant, Hosteman & McCornick, 2010, p. 16). These predictions have shown great consequences in the country like Nepal. There may be many problems in different natural resources as well as direct impact on human beings.

Awareness on Climate Change

The term climate change is directly linked with the environment issues. It is one among the many. Thus it is taken as a part of environment education. Designer (1997) argued that, “A continuing dilemma for those concerned with environmental education lies in the matter of definition”. Environmental education has diverse meanings for the people at different position on continuum of understanding and from different schools of thoughts, their experiences, professional and social background, academic levels and learning achievement (Daudi & Heimlich, 1997).

People are responding to the impacts of climate change, without taking account of climate change as the cause of their problems, which makes the existing technologies, skills and resources inadequate to address the growing problems. It has been recognized that the root cause of environmental problems is human behaviors. Only changes in human behaviors can reduce those environmental problems (Marten et al., 1998). Also human behavior can be changed through effective education measures to the students and the community. It is very necessary to make people aware of the environmental issues and of the means of protection of the environment (Shakya, 2009).

Children are the best medium to transfer the knowledge regarding climate change and the adaptation mechanism. If the children are made aware then, it would be more helpful to transfer the knowledge to the family members and the community as the whole. With the awareness we hope to put life into literary and artistic creation for children to

respect the environment (Zuazo, 1999 as cited in Shakya, 2009). Practical Action (2008) also states, “Awareness of climate change is a key pillar of community based adaptation”. This all signifies the significance of awareness of climate change on human beings and specially students who can transfer the knowledge in wide range.

In most developing countries, rural people are very close to the nature and they are more aware about the environmental changes. A small change in the global will impact high on local level. Khan (2010) states, “Climate Change is an emerging problem of global scale having deep impacts at local scale and it refers to the variation in the Earth’s global climate or in regional climates over time” (p. 258). Moreover children can play the important function adapting to the environmental changes like climate change as they can spread the knowledge in wide area. By raising their awareness of risk factors, strengthening the capabilities and giving them opportunities to engage, children and young can develop positive attributes and skills that will help safeguard both the environment and their own health and livelihood (Iltus, 2007).

Education for Sustainable Development

The Australian Research Institute in Education for Sustainability (2009) also states that, “Education has been recognized internationally as fundamentally important to addressing the critical global challenges we all face” (p.2). UNESCO (2009) states that the creation of Decade of Education for Sustainable Development means to re-emphasize the overarching goals of sustainable development by emphasizing the role of education and learning process. Education for Sustainable Development(ESD) processes accentuate the need for inspiring a holistic, incorporated and interdisciplinary approach to developing the knowledge and skills needed for a sustainable future as well as changes in values, behavior and lifestyles. Thus sustainable development in education also helps for the climate change education which helps to lead sustainable future.

UNESCO (2009a) also states that climate change has become one of the most urgent challenges of sustainable development and one of the key action themes of the UN Decade for Sustainable Development (DESD, 2005-2014). In the same paper, it includes, ESD seeks to enable individuals to make informed and responsible decisions and actions, now and in the future. Sustainable development is one of the agenda of the Agenda 21 and also MDG has also great role for the sustainable development. There are various sectors for the sustainable development. Basically in the infrastructures of development sustainability is necessary. Similarly, in the field of education too, sustainability is important and has great significance for the sustainable future.

The United Nations has also declared from 2005 to 2014 as the Decade of Education for Sustainable Development. In the article 'Education for Sustainability: The role of education in engaging and equipping people for change' (2009) published by The Australian Research Institute in Education for Sustainability also states, "The founding value of Education for Sustainable Development (ESD) is respect : respect for others, both present and future generations and respect for the planet and what it provides to us(eg. Resources, fauna and flora)"(p. 3). Thus, we can declare that ESD challenges us to adopt new behavior and practices to secure our future.

In the same article it is said that there are several components of education for sustainability. The mechanisms are:

- a) Envisioning a better future
- b) Critical thinking and reflection
- c) Participation
- d) Partnerships for change
- e) Systematic thinking

Regarding the components of education, we can say that students should be made aware about the changes that are going on the world. Sustainable education helps to achieve the change and challenges. It also challenges the students to examine and question the underlying assumptions that shape the world, knowledge and opinions of unsustainable practices. Sustainable development also helps to strengthen the ownership and commitments to sustainability actions through formal and informal opportunities for learning. It helps to build the vision among the diverse range of the stakeholders.

Creating a sustainable community requires that individuals and organizations have the knowledge, skills, ethics, capability and inspiration to respond to the complex sustainability issues they encounter in their personal and working lives. The environmental, social, cultural and economic implications are enormous and touch many aspects of life of the world's population. People are responding to the impacts of climate change, without taking account of climate change as the cause of their problems, which makes the existing technologies, skills and resources inadequate to address the growing problems (Parajuli, 2010 p . 25). It also signifies that the knowledge of Climate Change will lead for sustainable future.

Policy Review

The word climate change has been used everywhere in terms of environmental issue. The potential problem of global warming was officially recognized in 1988 when the World Metrological Organization (WMO) and United Nations Environmental Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC). On the formation of IPCC, Climate Change for Better or Worse, also states that, "The IPCC was created with the intention of being an objective assessor of peer reviewed published scientific literature. Its fundamental objective to provide a comprehensive and impartial view, regarding the science the potential impact of climate change due to

anthropogenic factors, then to use this information to appear at options for potential adaptation and mitigation. This guide to the creation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, a product of the first IPCC Assessment Report, which was accomplished in 1990.

Regarding climate change most of the countries have their own policies as it has become a global issue. Nepal has also signed and ratified different plans and policies, protocols regarding climate change. As Nepal hasn't contributed a lot to raise temperature and climate change but it has several consequences. So there are plans and policies by Nepal government and different nongovernmental organizations. The Government of Nepal showed its commitment to address climate change by becoming party to the Framework Convention on climate change in 1994. Since then, some initiatives were conducted by Climate Change Network Nepal (CCNN).

In the context of Nepal there are National Adaptation Programme of Action (NAPA) and Local Adaptation Plan of Action (LAPA). NAPA is a strategic tool to assess climatic vulnerability, and systematically take action to climate change adaptation issues by developing appropriate adaptation measures (MOE, 2010, p.7).

Review of Previous Literature

In this part, I have reviewed different research papers and journal articles on climate change.

In a research done by Gowda, Fox and Magelky (1997), there are some misconceptions of the students regarding the terms and issues of climate change (as cited in Fortner, 2001). Such as: i) Inflated estimates of temperature change (11°F decade, compared to estimates of 0.5°F by the Intergovernmental Panel on Climate Change), ii) Confusion between CFCs, ozone hole, and climate change (ozone layer depletion causes climate change; stop using aerosols to prevent global warming), iii) Perceived evidence-warmer weather (reportedly they could individually sense rising climatic temperatures or

changes in long-term weather), iv) All environmental problems cause climate change(aerosols, acid rain, even solid waste disposal), and v) Confusing weather and climate. This misconception also proves that children do not have adequate knowledge on climate change. They are lacking the knowledge about climate change and they are not made aware.

In a survey done by Curry, Ansolabehere and Herzog (2007) on United States about public attitudes towards climate change and climate change mitigation technologies in the United State, states that in the view of scientific consequences about global warming, 45 percent of the respondents chose a lot of disagreements about climate change and global warming. It signifies that there are contradiction on the reality of climate change and global warming. It implies that all the people of the world don't accept that climate change is real.

In a study report of European parliament and European Commissions (2009) on the topic, European attitudes towards climate change, there are three most serious problems faced by the Earth. They are poverty, a global economic downturn and global climate change. In the same report, at the country level "climate change" is seen as a serious problem especially by citizens of Sweden (82%), Cyprus (76%) and Greece (71%). Similarly, in the report, only 56% European people were well informed about the causes and consequences of climate change. It implies that the awareness level is not in all in those developed countries as well. This study revealed that the awareness level of developed countries is also not in proper way.

In a survey conducted by Lesley and Dupigny (2010), on May 2008 for 11th grade environmental high school students visiting the University of Vermont, it is found that the source of knowledge of climate change is class. Out of the respondents 57% told that the knowledge is gained from the class of schools and colleges. Similarly the survey

conducted on May 2009 also claims that 56% of the respondents got the knowledge about climate change from the class. It signifies that there is no specific change on sources to get information about climate change. Secondly, the knowledge is gained from newspaper i.e. 11% in 2008 and 22% in 2009. This signifies that the respondents were aware through the medium of newspaper too about climate change in a year. These data's implies that the awareness is gained from school level and with the education about classroom teaching procedures.

In a research conducted by Shepardson, Niyogi, Choi and Charusombat (2011) on topic "Student Conceptions about Global Warming and Climate Change", he has chosen teachers as well as students both as the respondents. In the report, the students have said that the increasing temperature is caused by carbon dioxide. The study shows that, 88% of the students thought that weather would get warmer and this would have an impact on perception, with the warmer weather causing less snow and rain, more rain, more humidity, and more evaporation. In the study most of the students did not link the ozone layer to global warming and climate change. This also shows that students have the idea of carbon dioxide only as a major cause of global warming and climate change.

In a study conducted by Ho (2009) on Children's ideas about climate change, he has only taken seventh grade students from age 11-12. In this study, 16% of the respondents illustrated some ideas or concepts related to what the scientific community would refer to as "climate change". It seems that less student were aware about climate change. Some of the concepts of the students included increased green house gases, melting ice, polar habitats, increased global temperatures, changes in disease patterns, sea level rise or ozone depletion.

Kempton's (1991 as cited in Ho,2009), in an early study of lay perceptions of climate change hypothesized that public conceptions of climate change tend to be shaped

by previous knowledge and concepts, which include stratospheric ozone depletion, tropospheric air contamination, plant photosynthesis and seasonal and geographic temperature variation. It seems that the prior knowledge also helps to understand about climate change.

Smith (2005, as cited in Ho, 2009) also suggests that much of the public's polarization in climate change views is due to a mix of messages and narratives that are being presented by the media. It signifies that media also doesn't play important position to provide proper information about climate change.

In a study conducted by Apple (2007) on, "How we learn about climate change" includes that the quality of public knowledge is slowly improving due to media influences; the status quo of science literacy is insufficient to understand the complexities of climate change. The study says that there is enormous disconnect between what science knows about global warming and what the public knows about how their lives might be quickly changed in the futures. This shows that there is gap between the knowledge provided by the scientists and the knowledge perceived by the public. So there is lack of awareness.

In a study of Shobeiri, Omidvar and Prahallada (2007) entitles that, "A comprehensive study of environmental awareness among secondary school students in Iran and India", it has focused on the noteworthy differences between Indian and Iranian students in their level of environmental awareness. It was also done on gender perspectives but there were no any significant differences. The study found that the number of Indian students with normal level of environmental awareness i.e. 44% is more than their counterparts in Iran i.e. 14.9%. It also added that the types of school management have impact on environmental awareness. It signifies that school management also plays an important role to make the students educated and aware about the subject matter.

Research Gap

There are so many researches done in the field of Climate Change. Though there are contradictions and arguments on why actually Climate Change is being a global issue. Some of the scientists claim that Climate Change is real and natural and some of them claim that Climate Change is due to anthropogenic causes. But linking with the educational system there are not any significant researches done till the date.

Some researches are done on the misconceptions of the students regarding the issue of Climate Change. Some researches are done on how the students learn and adapt the environment. In a survey conducted by Lesley and Dupigny (2010), 57% of the students told that the knowledge regarding climate change is gained from the school. This research is only about the sources of getting information about Climate Change by the students. More or less most of the researches are done on the base of adaptation and mitigation process on the changing environment.

Similarly, the research conducted by Gowda, Fox and Magelky (1997), also shows some misconceptions of the students regarding the terms and issues of climate change (as cited in Fortner, 2001, p.21). The students don't know what actually Climate Change is and what are the factors affecting. So this research regarding the student's perspectives on Climate Change will have its own feature in the field of research study.

The main research gap is what I am going to address through my research which is on how the students perceive and get knowledge and the barriers to be aware of Climate Change. My research has basically focused on the student's perspectives and the process of getting information on the school environment including the sources of getting knowledge by the students. It has also discussed the issue on how the students explain the meaning of Climate Change; how the students get the information about the impact of Climate Change is the research issue which has not been done by any researchers.

Theoretical Connection

In this section, I have described the theories that play an important role to make the students aware about climate change. For this, constructivism and transformative learning theories are described.

Constructivism

Constructivism is the major learning theory in the education. Constructivism is also known as learning theory. Taber (2011) says that constructivism is a major referent in education, even if it has been understood in diverse ways, including as a learning theory, a philosophical attitude on human knowledge and an approach to social inquiry.

Constructivism is a school of thought that emphasizes on the pedagogical importance and focuses on the learner's cognitive and social meaning making process (Kincheloe, 1991).

Being the researcher of climate change education, my orientation is on climate change knowledge construction process, strategies for the learners and teachers alike.

Constructivism emphasis on the active role of the learners. According to Brooks & Brooks, 1993 as cited in Jones 2002) "constructivism is not a theory about teaching...it is a theory about knowledge and learning... the theory defines knowledge and temporary, development, socially and culturally mediated, and as a result, non objective". It signifies that constructivism emphasizes self- directed learning. Constructivists believe in experiential education, where learners expand their individual knowledge through active participation, who adopts the educative event to fit and expand their individual worldview (Randolph, 1996). Thus I believe that climate change learning should provide ample opportunities to interact with environment through the practical learning with active participation of the learners.

Transformative Learning Theory

Transformative learning reflects a particular vision for adult education and a conceptual framework for understanding how adults study. Dirkx (1998) has furthermore said that, “transformative learning emerges within the field of adult education as a powerful image for understanding how adults learn” (p.1). In agreement with this statement, my research helped to find out the understanding of how students learn about climate change. Also in Daszko & Sheinberg (2005) states that the transformation is derived from understanding the system of profound knowledge: this knowledge can be obtained through the leaders of new knowledge and vision to challenge beliefs, assumptions and patterns” (p.1). It indicates that the teacher of environment education should play a role as a transformative leader to challenge the existing environmental crisis.

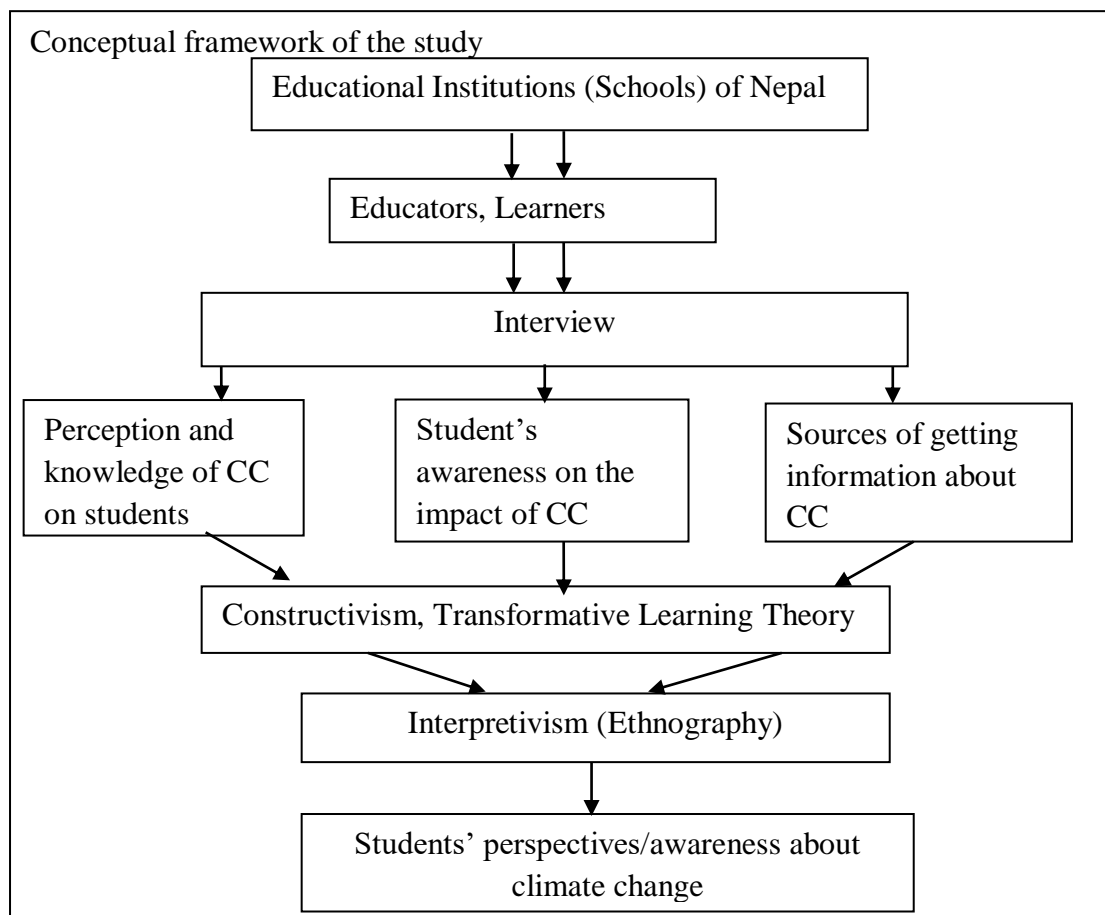
Sandell, Ohman and Ostman (2005) say: Environmental education should be characterized by pluralism, which implies that each student will have his or her own opinion on an environmental issue and should, therefore, contain the opportunity to learn about issues from more than one perspective; and when learning occurs in democratic classrooms where debate is encouraged, students will adopt critical perspectives to environmental and developmental issues (p. 202). This view articulates a transformative understanding of environmental education with the issues of climate change, which helps students create a critical perspective to environment.

Transformation is not for others to do, but for every individual to take personal responsibility to help create new future, to ask question, to take risks and to make a difference (Sharma, 2012). Thus, I believe the goal of climate change is inclined towards transformative perspective of learning. This emerges when students internalize the value of environmental protection and their role in it. Furthermore, internalization is

conceptualized as the process of transforming external regulations into internal regulations.

Students are the base of education. The main source of getting education is through educational intuitions. Not only this, children gets education through observations and sensual experiences. In my research issue also I have tried to get the students learning process. From where and how they perceive the knowledge regarding Climate Change and what are the provisions and practices are explored and analyzed. In this regard, I believe that environment education should focus on transformation. It should provide a critical understanding of environmental problems so that students focus on changing the present situation through their better actions.

Conceptual Framework of the Study



Conceptual framework shows the overall plan of the research. The research was conducted within the educational institutions. Basically, the students are taken as the participants. The research tools are interview and focus group discussions.

Perception and knowledge of students on Climate Change, student's awareness on the impact on Climate Change, sources of getting information about Climate Change are analyzed and the data are interpreted. The research is based on the paradigm of interpretivism. The students' awareness and perspectives are interpreted. Linking with the transformative learning theory, the collected data's are analyzed.

Chapter Summary

The examination of the literature on ethnography, climate change and the provisions and practices in the school has been the primary focus of my literature review. In this chapter I have included the literature part of my research. I have divided the literature part in different sub divisions. The thematic review of the research is included on it. Similarly to boost it, the policy on climate change and the review of the previous literature are included along with the research gap of the study. Further, the theoretical connection is also included along with the conceptual framework of the overall study.

CHAPTER III

METHODOLOGY

Chapter Overview

This chapter gives a detail about the methodology used in this study. The purpose of this chapter is to describe the research methodology used while collecting and analyzing data. With the philosophical approaches, I have introduced about the epistemological and ontological stance, methodological issues and within the procedural approaches the study location and site, tools of data collection, selection of the research participants are presented. Finally the trustworthiness of the study and ethical considerations are presented.

Philosophical Approach of the Study

A philosophical consideration, as a tool, provides us the fundamental beliefs about the world, encourages and delves a deeper understanding of the nature of the inquiry itself. Budha (2011) says that philosophical approach provides idea to the researcher to maintain his position in the research study (p.64). It helps to determine the appropriate methodology and design tools. Talking about the philosophical consideration different researchers have different point of view to get the information for the research.

It is not necessary that every person should have the same understanding and vision about the particular subject matter. Keeping this in mind, I have tried to understand the student's perspectives. The subject matter may differ from the philosophical consideration and also the purpose or the objectives that guides a researcher to choose the philosophies on which base the research is held.

Paradigm is a comprehensive belief system, worldwide, or framework that guides research and practice in a field (Willis, 2007, p. 8). It refers to the ways of structuring (methodology), ways of legitimating (standards), ways of expressing (representation) and ways of thinking (logic). In the same way, Budha (2011) has mentioned that philosophical consideration provides idea to the researchers to maintain his or her stances in the research

study (p. 64). Therefore, it is very important in of research to decide a proper methodology and design tools because selection of appropriate research design and the whole methodology process are greatly affected by philosophical views of the research.

Epistemology

Epistemology is the relationship of the researcher to reality and the road that s/he will follow in the search of truth. There are basically two kinds of assumptions in epistemology. They are whether it is possible to identify and communicate the nature of knowledge as being hard, real and proficient of being transmitted in the tangible form or whether knowledge is of a softer, additional subjective, spiritual or even transcendental type, based on experience and insight of unique and essentially personal nature(Richards, 2003, as cited in Poudel,2010).

In qualitative research paradigm, knowledge is accepted as being contextual with multiple meanings, subjective and personally experienced. Geren (2009) also says that reality is socially constructed by and between the persons who experience the world. Epistemology is by nature self referential, recursive. Epistemology is concerned with the nature of knowledge and how it can be acquired. According to Richards (2003 as cited in Poudel, 2010), Epistemology is the science or the study of knowledge refers to the nature of knowledge and the relationship between the knower and known (p.35). It is the theory of how we know that which we know.

As a researcher, I believe that knowledge is subjective and context oriented. The knowing process is fallible and the perception is that people create their own understanding about each phenomenon from the result of their prior experiences in the existing socio- cultural context. Thus, regarding the topics, I believe that knowledge is relative and it depends on the learner's perception. It may differ from person to person. It

helped me in finding the ways of how the students know the subject matter and the ways of teachers teaching process.

Ontology

Ontology regards how the philosophy defines the nature and form of reality. Each philosophy, paradigm and approach defines the reality differently. Ontology is concerned with nature of being. It explains about the form and nature of the reality or society. It is concerned with the questions like “What?” and “How?” Willis (2007) emphasizes that ontology is concerned with the nature of the reality and various ontological positions reflect different perceptions of what can be real and what cannot be (p.9). Realities can be grasped through intangible mental constructs and depends on the individual or group holding the constructs (Lincoln & Guba, 1989).

Ontological assumptions about the world can be described as non-realist and reality depends upon the view of different persons. We, research team, believe that knowledge is tied to cultural, political, social, economic conditions of that society and the meanings are constructed by human beings as they engage with the world, they are interpreting. Moreover, the basic generation of meaning is always social, arising in and out of the interaction with the human community. Thus my ontological assumption is constructivism. For me, there are students and teachers with their different perceptions and attitudes towards climate change. Accordingly, the responses gave different from each other. I believed that ontology in my research can be defined “as the study of what we know rather what we think we know” (Freinmuth, 2009, as cited in Dangal, 2010, p. 57) of students awareness on climate change. Thus, the study was intended to find out the distinction on the reality, however, they were brought into a place for the sake of this study. My ontological assumptions helped me to find out how the students are getting information about climate change and what may be the reasons behind the change.

Methodological Approach of the Study

A researcher can employ one of the three methods of inquiry, namely, qualitative method, quantitative method and mixed method. There are distinct in nature, each consisting of unique assumptions, but due to the requirement of the study, this research intends to qualitative research approach. Research is any inquires performed or work done to solve the problem or enrich our understanding. Kumar (2006a) says, “Research is one of the ways to find out answer to your question” (p. 6). I have become conscious that qualitative method is more appropriate than quantitative in my research. Qualitative method is more engaging research. It probes for deeper understanding rather than examining surface features (Hoepfl, 1997, as cited in Dangal, 2010, p. 59). A researcher, who employs a qualitative approach, is interested in making meaning of a situation by observing or becoming part of the research environment as it exists naturally and learning about what happens in the environment from her/his subjective points of view (Creswell, 1998).

However, any jumbled work or inquires cannot be an academic research, rather it is the systematic and objective analysis and recording of controlled observations that may be generalized, or it explores new principles and theories, resulting in prediction and possibility ultimate control of events(Best & Khan, 1999, as cited in Belbase, 2006, p. 4). The qualitative researcher seeks to understand a view that is holistic in nature (Denzin & Lincoln, 2000). It tells not only persons, stories and behaviors but also about organizational functioning, social moments or interactional relationships (Strauss & Corbin 1990 as cited in Poudel, 2011). The qualitative description includes studies related to culture, patterns or process of social structure and organization or patterns of human behavior. Qualitative research takes place in natural setting (Denzin & Linclon 2000 as cited in Devkota, 2012). It is especially effective in obtaining values, opinions, behaviors and social content of particular population.

Interpretive Inquiry

In keeping with the interpretive paradigm, ethnography helps to see the reality having multiple perspectives as on one absolute truth exists. Within the qualitative research, I followed ethnographic study of two schools of Bhaktapur district. The simple literal meaning of ethnography is the description of peoples or culture. According to Whyte (1981 as cited in Denscombe, 1998), the researcher requires to spend considerable time in the field among the people whose lives and culture are being studied. Following this notion, I have spent appropriate time in the real field.

The ethnography is generally concerned to find out the members of the group/ cultures being studied understand things, the meaning they attach to happenings, and the way they perceive their reality. Qualitative Research(n.d.) states, the roots of ethnography are grounded in the field of anthropology and the practice of in situ research, where a researcher is immersed within the community he/she is studying for extended periods of time. I have adapted holistic outlook as ethnographers assume a holistic outlook in research to gain a comprehensive and complete picture of a social group (Given, 2008). I have used the following characteristics of ethnography in my study as stated by (Hammersley, 1990, as cited in Genzuk n.d.):

- a) Peoples behavior is studied in everyday contexts, rather than under experimental conditions created by the researcher
- b) Data are gathered from a range of sources, but observation and/or relatively informal conversations are usually the main ones
- c) The approach to data collection is “unstructured in the sense that it does not involve following through a detailed plan set up at the beginning; nor are the categories used for interpreting what people say and do pre-given or fixed. This

does not mean that the research is unsystematic; simply that initially the data are collected in as raw a form, and as wide a front, as feasible

- d) The focus is usually a single setting or group, or relatively small scale, in life history research the focus may even be a single individual
- e) The analysis of the data involves interpretation of the meanings and functions of human actions and mainly takes the form of verbal descriptions and explanations, with quantification and statistical analysis playing a subordinate role at most.

In this research study the student's behavior are studied in terms of interview about awareness on climate change. Data's are also gathered through interview where the unstructured questions were mentioned.

LeComte and Preissle (1993) suggest that ethnographic approaches are concerned more than with description rather than prediction, induction rather than deduction, generation rather than verification of theory, construction rather than enumeration, and subjective rather than objectives knowledge (as cited in, Manion & Morrison, 2008). Thus my research is based on the ethnographic study which focuses on the constructivism approach with the subjective reality. As climate change knowledge is the generation of the information on students.

The key elements of ethnographic research design are cultural observations. The inclusion of ideas from diverse cultures can make understanding and recognizes different practices of a nature in varied cultural procedural contexts. If student experiences from their cultures can be linked to academic knowledge, it will construct a student's life related curriculum of formal knowledge. Thus, culture is to apply to all features of life, the totality of meanings, thoughts, and attitude shared by individuals within a group of people. For this, case study has been carried.

A case study is, “a research strategy which focuses on understanding the dynamics present within single settings” (Eisenhardt, 1989 as cited in Alaranta, 2006). Moreover, Gerring (2007) puts his ideas about case study as the intensive study of a single case where the purpose of the study is – at least in part – to shed light in a larger class of cases (a population).

I chose the case study for the research as – “case may be considered a methodology, or ‘the case’ may be considered an object of the study” (Creswell, 1998 & Stake 1995, as cited in Alaranta, 2006). Furthermore, it can establish cause and effect relationship with analytical generalization (Robson, 2002, as cited in Cohen et al 2008). Here, in my study, the case study refers to single case studies as Yin (2003) states, “the term case study can refer to either single or multiple case studies”.

Procedural Approach of the Study

Study Site and Location

The study site is two government schools of Bhaktapur district. For this purpose the schools of Bhaktapur districts were selected. Ministry of Environment (2010), in a report, climate change vulnerability mapping for Nepal has said that Bhaktapur is the district with very high human sensitivity. Also in the same report it is said that Bhaktapur is more sensitive on temperature and rainfall risk. Also according to the ecological risk Bhaktapur is on very high rank on the vulnerability of climate change.

Tools of data collection

In each and every research there are some specific tools to be used according to the need and subject matter. The process of data collection is an act performed by the educational researcher that provides a deeper understanding and exploration of live experiences and reality from the research participants (Strauss & Corbin, 1998, as cited in Dangal, 2010, p.

67). Thus, for the deeper understanding, I have applied the following tools for my research.

Interview

There is no right way of interviewing, no any single and correct format that is appropriate for all situations, and no single method of wording questions that will always work (Genzuk, n.d). In qualitative research, in depth interview is done to reveal people's perception, knowledge and experiences on certain theme or phenomenon. The interview was taken several times. At first, I have visited the head teachers for the interview process. Some of the teachers and head teachers denied for it but later on when I requested and said the purpose, they finally provided me the chance and allowed me to conduct interview.

I had asked the teachers and head teachers to choose the participants purposively. The informal interview was done as the students hesitate to share their knowledge. I had build rapport for the interview. At first the students were afraid and couldn't say about the issue on climate. Later on, while I talked with them about my purpose in a family manner the participants then started to speak frankly with me. Then I conducted the interview one by one with the participants. I had asked and inquired the students, teachers and officers on the research questions many times and have got the same answer in each time. The researcher herself has tried to be a research instrument.

I had employed in depth interview to generate data for this study. Regarding the in-depth interview as interview is the best fitted techniques for educational researcher, to capture all relevant and necessary information needed to fulfill the objectives of the research (Patton, 1990). For this, I have taken 1/1 teachers from each schools and 2 students from one school and 4 from another school. Also the interview was taken with two officers of Curriculum Development Center (CDC), Bhaktapur. Interview is one of the major forms of data collection in qualitative research (Creswell, 2003).

The open ended interviews were conducted in the process of research. The open ended interviews revealed many important issues and concepts regarding student's awareness about climate change. Rye's (1997, as cited in Ho, 2009) states, use of open ended interviews allowed for more elaboration and conversation between researcher and research participant.

The face to face, personal in-depth interview was used as the interview mode in this study. The advantage of such interview is that it empowers the researcher with the freedom of questioning (Babbie, 1986; Gravetter & Forzano, 2006; Schall, Ospina, Godsoe, & Dodge, n.d. as cited in Dangal, 2010, p. 68). Open ended questions were developed and interviews were acquired from the students to know the awareness level, and to find out the sources and transfer of knowledge along with the school curriculum. Some interviews were audio recorded and later on transcribed.

Data Sources

There are different sources of data's to be collected. Basically in my research study the data's are collected from field notes, memos and recordings of the interview. Richards (2003) emphasizes that analysis is neither a distinct stage nor a discrete process; it is something that is happening, in one form from another, through the whole research process (p.268). Thus, primary and secondary are used on the base of the purpose.

I have visited the study area from the very beginning of the starting phase of the research. I have visited the research participants, have seen the secondary level course books of science, social studies and health and physical education and designed the research questions. Then the prolonged engagement in the field was the most which took me almost one year to get the data as per the research questions for the findings of the study. Primary data includes the data's collected from the field by interview with the respondents. Primary data in this research are collected through the first hand experiences.

Secondary data includes the data's obtained from other research journal articles, dissertation, and books.

Selection of the research participants

The participant for the data collection is very difficult task. It would be really important to select the participants from where rich information and relevant data would be provided. Keeping this in mind, the participants are selected decisively as per the nature of the study & research questions. Patton (1990) says, "Sample size depends on what you want to know, the rationale of the inquiry, what's at stake, what will be helpful, what will have credibility and what can be done with available time and resources (p.184)."

My focus was on the perception and belief of the students. Thus, students of secondary level were chosen. Here, secondary level signifies the student of class 9 and 10. Creswell (2003) says, "The small size is useful for analyzing the data properly" (p.185). For this study the research participants were the teachers and the students of the school. In total there were 2 teachers on the related topics of teaching (science, social studies and health and physical education), 6 students from two selected schools (3 boys and 3 girls) and 2 officers from Curriculum Development Center (CDC). The students were chosen by consulting the teachers and the teachers are chosen on the base of the teaching subjects. Similarly, the officers of CDC are chosen on the base of their work as they have worked on the subjects like science, social studies.

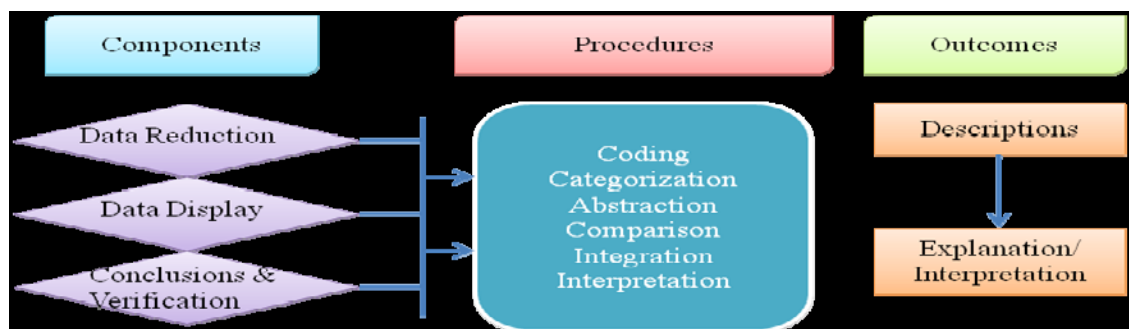
Data Analysis and Interpretation

Data analysis in any research is most precarious where researcher requires analyzing the raw data assimilated from the field to a precise understandable dialectal to the readers. Thus, the collected data through interviews are organized and transcribed with the relevant ways. It is a way of utilizing descriptions and a reflection in arriving at an

understanding of what it is (Creswell, 2003; Scarbrough & Tanenbaum, 1998, as cited in Dangal, 2010).

Presenting data in the right way will be the main interpretation in a meaningful way. Creswell (2003) says, “Data analysis is an ongoing process continual reflection about the data, inquiring analytical questions and writing memos throughout the study” (p.190). It assists to strengthen the authenticity of my study. At first, the data’s were collected through interview. Both the formal and informal interview was done with the participants. The relevance of the research questions was made.

The Qualitative Analytical Process



(Adapted from: Brennan 2005, as cited in Dangal 2010, p. 74)

I have noticed the valuable information through the literatures. Then I have gathered the available data. The interview was recorded and also it was written on field notes. After this the theme of the data’s are identified, organized, transcribed and meanings are made in a meaningful way. Then the conclusions were drawn with the help of literature. Also in ethnographic analysis uses an iterative process in which cultural ideas that arise during active involvement in the field are transformed, translated, or represented in a written document (Parajuli, 2010, p. 47) These helps to strengthen the real sources of data and the field data’s are arranged in meaningful way so that the meaning of the information are not twisted.

Addressing trustworthiness of the study

There are no any statistical tests for significance in qualitative studies. According to Gay and Airasian (2000) cited in Koul (2008) education research is conducted to provide trustworthy information regarding educational problems and their solution .There are many approaches to education research shaped by different research paradigm. Regarding the trustworthiness criteria used in this research are as follows:

Credibility

It is defined as the extent to which the data and data analysis are believable and trustworthy. According to Merriam (1989) multiple methods and perspectives, and member checking are applied for improving credibility. These perspectives' are useful for maintaining credibility. Maxwell (1996), states that qualitative research is valid to the researcher not necessarily to others due to the possibility of multiple realities since each individual construct a personal reality.

In my study, credibility was built up through extended engagement in the field. Thus, credibility demonstrates truth value of my research. I try to draw an authentic description and interpretation from the participants' original data. For this, I have used direct interview as my prime tool of data generation. Credibility in my research demonstrates the truth value of my research. I have tried to draw an authentic description to get their awareness on climate change. I have spent enough time in the good relationship with the participants so that they feel comfortable and reveal the information what I need during the interview.

Transferability

Transferability is one of the quality standards of study. In this quality standard, the readers may attempt to find similarity between the researcher's individual experiences and

their own. Guba and Lincoln (1989) describe transferability as a term that refers to the generalization of research findings which can be applicable in different contexts.

Bryman, (2008) states that, “transferability is how the research findings are applicable and similar to others across educational settings”. So this research deals with the authentic experiences of the students and their knowledge regarding climate change. And the research findings of my study are transferable or generalizable into new contexts and outside the actual study contexts. Thus, I am conscious that my findings would be meaningful and applicable for societies and should have applicability in another context. For this, I have provided the detail description of data and field experiences.

Dependability

Guba and Lincoln (1989) states dependability as the standard which is parallel to reliability in post/positivism paradigm is dependability which concerns the stability of data over time. Reliability is problematic and is practically impossible as human behavior is not static, is highly contextual and changes continuously with the various factors.

According to Marriam (1998), it refers to extent to which research findings can be replicated (p. 205). In my study dependability was confirmed by developing interview schedule with reference to research questions, questions were made understood to the participants as I intended. Thus, in my study the procedure within the study was reported in detail by enabling the future researchers to repeat the work, if not necessarily to gain the same result. Hence, in my study, in depth methodological description was allowed.

Conformability

Guba & Lincoln (1989) states that, Conformability is the standard which parallel to objectivity criteria in post/positivist paradigm. Also he added that the process of assuring the data, interpretation and outcomes are rooted from the contexts and persons. Seale (1999) argues that auditing could also be used to established conformability in which the

researcher makes the provision of methodological self- critical account of how the research was done (p. 45).

In my research, in order to make audit possible all the collected data's are in well organized, retrievable form so that it can be made available to them if the findings are challenged. Conformability is achieved by maintaining an audit trail consisting of transcripts on how categories or code that are derived and the decisions are made from the inquiry.

Ethical Considerations

All the research study should have ethical consideration. The necessity of ethical and legal responsibilities of conducting research must be overtly explicated primarily by the individual researcher (Devkota, 2012). Research ethics deals primarily with the interaction between researchers and the people they study (Family Health International (FHI), 2005). Social researchers must take into account the effects of the research on the participants, and perform in such a way as to conserve their dignity as human beings: responsibility to participant (Cohen et al.2008). Thus ethics helps ensure that as researchers we explicitly consider the needs and concerns of the people we study.

Anderson (1998) emphasize that all studies which involve people should consider ethical issues and responsibility of the individual researcher to see to it that any risk which may affect the community or the individual involved in the study is minimized. It is believed that research design always needs to reflect careful attention to the issue embodied in research. According to Macmilsn and Schumacher (2001), ethical guidelines include informed consent, deception, confidentiality, anonymity, harm, privacy and others (p.240). Keeping this in mind, I have tried to negotiate consent with all my participants to voluntary participate in the research.

I have visited my research participants several times with prolonged engagement. There were direct and indirect interviews with the participants. I have visited the field

from the beginning of my research which has helped me for mind making. At first it was a bit difficult to interact with each other as the participants were hesitating to share their ideas. Later on after rapport building, the interview was done. This research is purely academic and consists of questions about teachers and students perceptions about climate change. To evade annoyance in the participants, I have shared the study to the participants in a personal manner and convinced them that the data gather would be highly confidential.

Regarding this study, every participant was provided an opportunity to decide whether or not to participate in the interview. While conducting my research, I was humble towards the respondents, and took their consent for the research describing the objectives of my research clearly for the voluntary participation of the respondents. Hence, the involvements in this study were voluntary and the anonymity of the participants was protected by assigning pen name to individuals. Their anonymity was not only pertaining to writing but also to any verbal reporting of information.

Chapter Summary

In this chapter the total methodology part of how the research was conducted is included. In this, it is divided in different parts as philosophical approach, methodological approach, and procedural approach of the study as well as the quality standards which strengthen the research and the ethical consideration. I believe in the pragmatic philosophy which believes that knowledge exists within individuals as subjective truth and the knowledge is constructed by the participants of the research in this study. I have applied qualitative research method along with the ethnographic research for this.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

Chapter Overview

In this section, I have narrated the information that I had collected from interviewing the participants in their places. The research in this thesis examines the structure of environmental education specially climate change and its knowledge on secondary level students. This study seeks to find out the situation of students awareness on climate change. The data analysis procedure is qualitative method. In this chapter, I try to elaborate the ideas on existing policies and practices on the secondary level students regarding climate change and its awareness. Further, I talk about to answer to my research questions on how the knowledge is transferred, what are the existing content on textbook and the process of getting information. In responding to the questions, I have organized thus chapter in the following subsections.

Environmental knowledge

Environmental knowledge refers to the terms and definition about the environment and what the knowledge the students have in the study area. Student Bishnu of School Surodaya Secondary School (Pseudonym) said that, “*environment means the surrounding*”. This is the narrow meaning of environment. Definition of environment (n.d) has also defined environment as, “environment literally means surrounding and everything that affect an organism during its lifetime is collectively known as its environment” (p.1). It shows that the students meaning is literally the surrounding. He further added that the atmosphere and the human environment are changing day by day. While asking to elaborate environment, he said the things that we see around us is the environment. He said that many plants and animals are in the process of extinction. Similarly Anu of the same school said that, “*human beings are deteriorating the environment*”. She again added that environment is very important for us and we cannot live without environment so

environment knowledge is important. It is also further proved by the statement of Rio Declaration, as it states, “environmental issues are best handled with the participation of all concerned citizens at the national level each individuals shall have appropriate access to information concerning the environment and the opportunity to participate in the decision making processes” (Speth,2004 as cited in Apple,2007).

Regarding the environmental knowledge, Anup of School Mahendra Higher Secondary School (Pseudonym) has also said that environment is very necessary in our daily life. He said that environment is the things that we get in the surrounding. Likewise Bigyan of same school has said that there is no existence of life without environment. He added that environment is of two types they are manmade and artificial. To prove he said that the zoo are the man made environment and the nature is natural environment. Bigyan of the same school has added that environment education is the education based on the environment that they are living.

The students in the study area have said that environment is basically the surrounding that they have seen around them. It shows that the meaning and terms of environment are defined in terms of the students perspectives what they have learnt from the school and their teachers. It shows that they have just the general information about environment and even they don't know why environment is given more priority. Students have understood that the meaning in general context as provided in the textbook.

Transfer of climate change knowledge

Transfer of knowledge refers to how the children perceive the knowledge through the teachers. The informal interview was done with the teachers to find out what is the process and sources of providing information regarding climate change and other similar issues that are taken as the problems while teaching. Roshan of School Surodaya Secondary School (Pseudonym) who has been teaching social studies course from last 20 years said that there is not exact teaching method for those issues and also the teacher don't teach

those issues separately. He further added that there are so many chapters and issues that need to be taught within a year. Also in a year there are different holidays and the teaching days are less.

Ragav of School Mahendra Higher Secondary School (Pseudonym) said that there is not enough time to finish the course book also how could those topics be taught separately. Adding support with the argument he added that “*the teaching days are less in government schools and we need to finish the course in time, sometimes it becomes difficult to finish the course too, so teaching climate change and other issues apart from the course book is not possible*”. There is also a topic on global warming with only general information but the teachers do not provide the latest information about those topics. They teach only what is included in the course. This signifies that the teachers are forced to teach only from the course book so that they can finish the course in time.

Regarding the context in the book of secondary level, the Roshan view was that there is no sufficient course for the climate change and other current issues. Sometimes the factual data's are also not amended; they are kept what they were in previous years. So this also makes difficult for the teaching learning process. The teachers have no specific framework for teaching climate change. And also the annual plan or the weekly plan also doesn't include such issues. Only the tasks that are included in the task are taught. He said that they are not responsible to teach such issues. He further added that the teachers are just the medium to provide information to the students from the textbook. The students themselves need to explore and gain the knowledge. It is similar to constructivism. Constructivism also focuses on the active role and pedagogical importance of the students. Constructivism is a school of thoughts that emphasizes on the pedagogical importance and focuses on the learner's cognitive and social meaning making process (Kincheloe, 1991).

Unwillingly, Roshan said that, “*the teachers are not responsible for the students to make aware about climate change*”. It seems that the teachers are teaching just to insure their job but not to provide the fact information in this changing world. Both, the students have said that the students need to read to pass the exam and there is no time for the students to read other relevant course. Climate change is given in terms of global warming, green house gases, ozone layer etc. and isn't it the course related to climate change. For this, Roshan said that we teach only the textbook and apart from the textbook we have no time. So the teachers don't provide more information. The students who have interest in such matter they will read themselves said the teacher.

There are several organizations doing their work on climate change education but the teachers have no collaboration with the organization. Ragav said that it's not that they are not interested but because of time limitation and the pressure to finish the course in time the teachers are unable to do such task. Also regarding the issues that Bhaktapur is one of districts with more vulnerability of climate change in Nepal, there were no such tasks. No any relevant task has been done by the school administration and neither by the district education office. Both the teachers said that there must be some effort to provide some additional class or courses which helps the students to know more about climate change. Bhaktapur is more vulnerable and students aren't taught the adaptation and mitigation strategies but Roshan was unable to give the answer and to get rid of this, they show the school administration and district education office for the implementation of the task. Regarding the responsibility of the teachers to teach such issues, Roshan said that teachers are responsible but because of time limitation and pressure of the course we are unable.

Process of transfer of knowledge

Transfer of knowledge is a process in education. It depends upon the acquisition of the student, the exposure and many more activities. Lakatos and Borsos (2011) have

categorized the transfer of knowledge by different means and methods in educational process. They are:

- i) Dialogue culture in teaching processes & public appearances
- ii) E-learning
- iii) Distance learning
- iv) Individual work
- v) Teamwork
- vi) Multimedia.

Roshan of School Surodaya Secondary School (pseudonym) said that the teaching process of climate change is not different from other topics taught in the classroom. The argument he gave as the first reason is to finish the course book within the time, the second is there are no such infrastructure and teaching materials to teach climate change, and the third is the teachers themselves don't have more information about climate change. He added that, "*I have taught the terms of climate change that are included in the course book, before some years, I was not known what actually it is*". In this regard, Richardson (2003) outlines that teacher's knowledge helps understand how students understand, how to support the students understanding, guide them for discussion and correct misconception.

He further elaborates that teachers in depth knowledge about the subject matter relies on his major area and experience. This creates doubt on the teachers expertise area, on probing it was found that he was the principal of the school too and don't have enough time for the preparation of the course content. Therefore, it can be concluded that one of the reasons why schools fail to provide the concrete knowledge is they lack proper subject matter.

He added that they do not have such provision of e- learning though we have computer lab. He again added that group work and team work are not possible as there is no time to do such activities. Ragav of School Mahendra Higher Secondary School (Pseudonym) said that, *“the transfer of knowledge is only through the textbooks”*. He also added, *“The time limitation to finish the course book is very tight and the teachers of social studies, science are unable to do teach the students other relevant courses rather than the textbook”*. He was more concerned about the climate change issues and said that he used to teach the issues of climate change in the form of discussions. He said, *“Other resources of teaching are not easy and in most of the government school we face lack of teaching materials”*. These all signifies that the school curriculum and the course content are heavy to teach and the teachers couldn't teach other supplementary materials apart from the courses.

The scoping assessment on climate change knowledge platform in Nepal conducted on 2010 has categorized the knowledge of climate change in three different ways. They are:

- i. Regional knowledge sharing system
- ii. Generation of new knowledge
- iii. Application of existing and new knowledge

Regional knowledge sharing system improves the exchange of knowledge, information and methods within the countries about climate change. Similarly, generation of new knowledge deals with the promoting understanding and providing guidance relevant to the development and implementation of national and regional climate change adaptation policy plans and so on. Likewise, application of existing and new knowledge deals with the application of sustainable development practices at local and regional levels.

In the context of Nepal, climate change has more importance than other countries. Nepal is rich in natural resources and the vulnerability is rising day by day. In the context of school level students the knowledge is provided only in the terms of green house gases, ozone layer depletion and so on. While talking about the school children they used to say that the sea level is rising so there is a climate change. This knowledge is gained through the newspapers and elders. It signifies that the proper knowledge is not provided in such issues. Because of the extreme variations in altitude and perception there are diverse climatic conditions. But still the students are unknown about the simple content. The scoping assessment on climate change knowledge platform in Nepal (2010) also proves that because of the regular and frequent occurrence of different natural hazards and the vulnerability of the population, Nepal is a catastrophe hot spot.

Roshan of School Surodaya Secondary School (pseudonym) said that, "*we are not provided the trainings regarding climate change and how to teach such issues*". He further added that, "*we used to instruct on traditional way and used to provide the knowledge what we have on our mind*". From this also we can say that the teachers are also not active in such information. It signifies that Nepal government, ministry of education, ministry of environment is more responsible but they are not doing such tasks for the information part. The teachers also were not provided any trainings and information about climate change from any institutions. Also while giving the teachers training courses they should be given the present changing scenario of the environment issues and basically climate change as Bhaktapur is one of the more vulnerable districts of climate change in Nepal. It seems that there must be the amendment of the course and the teachers should be provided some supplementary courses and trainings to provide information. There are so many trainings in the name of teachers but the general information is also not provided to the teachers regarding climate change.

The school administration is also unknown about such types of issues. According to the teachers in the discussions, Ragav said that first the national policy and implementation of the policy should be done in practice. Also he said that the curriculum development center must be more responsible to update the latest issues and scenario on such issues. Rather less, district education offices also have responsible to implement such courses. Roshan said that, "*there must be some budget for such program to organize*". He supplementary added that district education office announces annual calendar with the annual work plan and the teachers should do accordingly. In that calendar there is no such extra activity that helps the students to know more about climate change and other environmental issues.

Also both Roshan and Ragav said that students are much more interested in reading the textbooks to get good marks in the examinations rather than getting information. So that the education has been exam centered. The teachers agree in this statement and also they are teaching in the same process. The education system seems only exam centered. The subjects like science which should be taught practically also couldn't be done. They are focusing more on knowledge part rather than focusing on skills and practices. It shows that still the education is teacher centered and students are the passive learners. They grasp the knowledge what is in the textbook and what the teachers says. It seems that the awareness level is narrow.

In the informal discussions with the teachers Roshan and Ragav have said that climate change is not the main issue to teach for the students though it's a problem. National wise the task should be made so that the teachers will be able to learn and teach such courses added Roshan. The teaching materials are also not separate to teach environmental issues. Literacy Watch Bulletin (2001) has also included that inadequate

supply of teaching learning materials is one of the problem of getting information on environment education.

Similarly, Ragav who has been teaching social studies said that the textbook doesn't have separate topic regarding climate change. He said that in the course science, social studies and health, population and physical education, the terms of climate change are included. In the course of social studies the terms of global warming is included and only surface knowledge is provided there. He added that "*students sometimes used to share how they have known about climate change in Nepalese context*". This is comparable to transformative learning theory on how they gain information about climate change. Drikz (1998) in the same issue has said that, transformative learning emerges within the field of adult education as a powerful image for understanding how adults learn.

While teaching, the teachers shared that they used to teach by giving the examples. For this he has said that, Nepal hasn't done such task so that there must be warming in Nepal but because of industrialized countries the problem has been created and Nepal has to face such consequences. Thus the problems are created in least developed countries. He also said that the consequences are melting of ice, flood, landslide, rise in temperature. So the task should be started from society and overall the nation said the teacher. In his sense, over crowd, pollution of vehicles and industries are also some effects of climate change.

In the information of the teacher also he said that according to weather, climate is determined. He also said that the issue of climate change was introduced by United Nations and then it is taken worldwide as an issue. He further added Nepal hasn't done such task but it is also affected by climate change. It is similar to Karki (2005), as he states that, Nepal's share in climate change is negligibly little, it is responsible for only about 0.025% of annual green house gases emissions. But climate change is global problem affecting the whole world so local initiatives are important.

Regarding the teaching materials, he said that they don't use the teaching materials separate from other content. The teaching materials are only maps, newspaper. The lecture method is the only means of way of teaching and sometimes discussions are done of the life related and daily experiences of students while teaching climate change. Also in the textbook, only general knowledge of climate change are included and it is integrated on other contents. He said that there are no misconceptions on students as only general information is provided. This clearly signifies that the students are lacking to get adequate information that they should get. We can see the textbook that other relevant and latest information are provided in sufficient amount but the terms of climate change are not included which is seen as the demand of the present curriculum.

Training of the teachers

Regarding the training, Roshan said that, *"I have been participated some of the trainings on how the content of climate change can be qualified"*. But it was not given by the government of Nepal. He said that it was provided by his own linkage with some of his friends who are working in the field of climate change. It also seems that the information of climate change is not provided to the teachers who are teaching the same subject. Thus there is lack of information and transfer of information is also not in proper way. It seems that what the information teacher do exist that information is provided to the students. It lacks the existing information. He said that, *"the majority of the teachers are not getting such trainings and they lack the current change in the global arena"*. Thus students are also lacking the rights to information. The course book doesn't provide the current information as there is lack of such provision too. In addition, the understanding of the students is mainly affected by the teachers command over the subject matter in his/her education.

From this also it signifies that the trainings and seminars are lacking the information. There is a clear reason on this that, the teachers are not provided any latest

information regarding the latest issue. Not only in the content of climate change and other environmental issues, there are also not such trainings. The teachers are provided trainings but not in the present context. Also the teachers are lacking the information. Literacy Watch Bulletin (2001) has also included that lack of qualified and trained teachers are the problem issues to provide environment education. What they have learnt has been changed in the present context and the existing knowledge doesn't help the teachers. Also most of the teachers of government schools are teaching from more than 10-15 years and the knowledge has been changing which the teachers are not known overall the content.

Climate change curriculum in national context

Climate change education is one of the latest issues of Nepal. The knowledge is gained by the students in the context of Nepal is mainly by the education. In the context of education, the knowledge of climate change as an environmental issue is provided by the school curriculum. For this purpose the interview was taken with the curriculum experts of Curriculum Development Center (CDC). The curriculum of every country should focus and provide at least general knowledge on the context of the country. Thus, CDC plays a vital role.

The interview was conducted with Hari (pseudonym), Curriculum expert of Curriculum Development Center, Sanothimi, Bhaktapur. In the interview he said that, "*the latest amendment of secondary level textbooks was done on 2056*". CDC has the provision of new textbook with new framework in every 10 years. Also they have provision of minor revision in every 5 years and small changes according to need every year. He said that it has been already time to change the framework of secondary level textbook on 2066/67 but it has been late because of different reasons. He further added, "*One of the major reasons is, Nepal government, ministry of education is planning to manage the level of education and secondary level is planned to make from class 9-12 changing the existing level of 9-10*". He said that it is the foremost issue for not changing the course book. He

added that if the framework of 9-12 is implemented in this year then the textbook will be amended accordingly if it is not implemented there may be no change. Also he said that unstable government. Policies and constitution are also some obstacles for this.

Regarding the constitution, he said that what plans and policies will be included in the constitution, course book also will be according to it. And also the government is changing in short span so the textbook of one year need to be changed in next year but it is a difficult process and the resources will be not sufficient for this. In addition, he said that CDC is also planning to change the total framework but because of the national context it has been difficult and the implementation process is not perfect.

From this, it is clear that the textbook are not up to date so that students can get the proper knowledge of the current issues. The textbooks from last 14 years are not changed and students are compelled to read the same content. It doesn't provide the fresh knowledge to the students and students are backward to get the latest information from the textbook. It clearly shows that the teachers are also teaching the same textbook with their pre existing knowledge and students are deprived of right to information. In a query, why it is not done as per the rule of revision, he said that CDC is compelled because of various problems. It is not an independent part of Nepal government so we need to accordingly.

Regarding the concern of climate change in the curriculum of secondary level, he further added that in secondary level curriculum, only in three subjects the content of climate change are included. They are science, social studies and health, population and physical education. In those subjects, he also proved that there is no separate topic regarding climate change. They are integrated in different topics. He said that in science there is no separate topic of climate change. It is integrated on green house gases. Also in environment education, there is also no separate topic. On it there is a topic named environmental health, within it on the topic care of the earth the terms of climate change

are included. Sustainable development, biodiversity and other related topics are included in the textbook. Similarly in social studies, there is also no separate topic. He said that there was a joint work of WWF and CDC where they thought to revise the textbook of social studies and some content of climate change are incorporated.

From the above saying we can say that it is clear that there are no such relevant topics on climate change. It is taken as one of the major challenging issue in the world but still in the textbook of secondary level of Nepal such common topics are not included. Also there is concern on climate change within SAARC countries. In a SAARC workshop Climate Change and Disasters Emerging trends and future strategies (2008, Aug 21-22) held in Kathmandu the heads of state or government also expressed deep concern over global climate change and its impacts on the lives and livelihoods in the region. They endorsed the convergence of per capita emissions of developing and developed countries on an equitable basis for tackling climate change. This also shows that SAARC countries are also working to tackle the problem together so that all the countries have equal concern.

Again he elaborated that the students and the teachers should themselves be aware in these types of issue. To make all the students aware, he said it is not possible for the individual treatment. So school teachers are responsible for this. In a query most of the school teachers are old enough to be updated for this type of current issue, he agreed and said that most of the teachers of Nepal government have experience but low quality. Only experience doesn't provide quality in education. In addition, he said teachers themselves should be up to date on these kinds of issues. He said that, "*still the teachers in a good number of the school have chalk and talk method of teaching*". Only lecture method is the method of delivering, so for the issues like climate change it would not suit. He blamed

the teachers and said that teachers should use new techniques and methodology for teaching.

Climate change is a major issue but he denied that only climate change is not the issue. He said that there are many more national and international issues that should be incorporated in the textbook of secondary level. If all the issues are taken seriously climate change would have only 1-2% of weight age in overall the textbook. But it doesn't mean that it should not be included. He has categorized climate change as one of the issues. He also gave some examples like HIV, pollution and so on is also some of the emerging issues and the knowledge should be provided to the students. And the curriculum of Nepal is national wide same so all the issues of the nation should be addressed and incorporated.

Bhaktapur is one of the more vulnerable district of Nepal regarding climate change. Regarding this, the officer has explored that Nepal has centralized curriculum for secondary level so curriculum doesn't focus on every issues of every districts. There is only one curriculum which exists nationwide. Thus there is no extra provision for the more vulnerable districts. Also it doesn't include only separate issues. But sometimes when the issues of one place should be informed nationwide in that time only the local content is included in the course. But Nepal government, ministry of education doesn't have such relevant course plan for the affected districts of any issues. But there is provision in primary level curriculum. The local course content can be included as other relevant subjects. What is necessary in the local level that can be taught and learnt in primary level. He have added some instances like, if the school wants to provide the course of climate change they can add it in primary level and also they can add some optional subjects like environment education and so on. Literacy Watch Bulletin (2001) has also included that environmental education has also been offered as an elective course for grades 9 and 10 which is of 100 marks and students have the opportunity to acquire extended knowledge

and insight not offered by the compulsory course on health, population and environment education.

He said that there are several projects and programs regarding climate change. For this school, teachers even district education office can include and can organize joint program to provide information about climate change. CDC is also working for this. They are working to provide some relevant materials regarding climate change. The work is in process and within one month it will be published in the form of book which would be reference material. It can be a good guide for both the teachers and students. Currently CDC cannot make a new textbook with the incorporation of current issues like climate change it will take time and it is not possible but the workout has been done.

In Nepal, there are several teachers' trainings done by different NGO's and INGO's, but the trainings are not incorporated with CDC. He said that there are several NGO's and INGO's working in the field of climate change and climate education but he has strong disagreement in this. There are several works done but they are done by themselves, there is no any incorporation with the CDC and other office. The programs were conducted in school level and mainly for the students. But if the programs are conducted from the policy makers and planners then it would be more beneficial. He also advised that only providing information to the students of some places is not the solution. If the same program is conducted through the central level it would be more beneficial. There are misconceptions on teachers and students too. In a research conducted by Fox and Magelky (1997), it is said that there is confusion on weather and climate (as cited in Fornter, 2001, p. 21).

He added that while teaching ozone layer depletion and green house gases, most of the teachers used to integrate climate change and global warming within it. He said that there are no such awareness programs on more vulnerable districts and also the training

capacity of CDC is less. There are no other such special programs on climate change. CDC is only the authorized place to implement the programs through curriculum worldwide but it seems that there is no relevant programs' regarding such issues. Not only climate change, there are no such programs in other issues too.

Also in an interview with Bikash (pseudonym), Curriculum officer at CDC also said that, "*there are no sufficient materials on the current issues in the textbook*". CDC is also doing some task for those but it insufficient. He said that because of lack of resources, it has been difficult to provide the information in all level of school education. He added the knowledge of climate change can be given to all the levels of the school children but because of lack of manpower and time limitation also they are facing the problems.

He further added that, "*the teachers of secondary level are unable to finish the course of the textbook and they do not have enough time to discuss on other extracurricular activities*". He added that most of the teachers of secondary level say that the course content is very tight and it is difficult to finish within the time framework. Mostly science teachers used to say that the course is very tight and is difficult to finish within the year. Also there is practical education on science but because of the time limitation, some of the teachers used to say that they were unable to conduct practical and used to put the marks on the base of class performance. So he said that there is no space for other appropriate courses and discussions.

Regarding the trainings also he said that, "*there is no time for the teachers to participate. But most of the teachers of the government schools are taking part in other different types of teacher's trainings so in that trainings, the content of climate change can be included*". The teachers were not provided the trainings regarding climate change but it has been seen that some of the organizations were providing trainings which is not in collaboration with CDC. He also argued on the statement of Hari (pseudonym) that if there

is collaboration of organization with CDC then it would be more beneficial. He added that there are some projects with the collaboration on WWF, IUCN. With the collaboration, they are organizing programs and if some issues are needed to be included in the course book CDC used to include it every year. Also last year some of the issues of climate change were included in the secondary level textbook.

From the above sayings also we can say that if there is discussions program then there could space for the current issue. The discussions need to be conducted and it should be informed to the teachers too. It seems that the teachers also can participate oneself in such activities. Some of the local level organizations are conducting programs but it still seems that there is lack of other materials while teaching the subjects like climate change. It needs some other materials, documentary so that the students can understand how climate change is affecting day by day and how can we adapt and mitigate it. But still there is only lecture method and CDC has no other alternative ways for this purpose. The officer used to say that the teachers need to use modern techniques and methodology. Though there is included that the teachers can teach in this and that way in the teachers guide but the relevant materials are not available in the local level. For example, in teachers guide there may be using the audio visual materials but in Nepal we do not have electricity in all parts of country and if there is facility there is load shedding problem. Thus we can say that the slow motion of development, unstable government and the process of constitution are also hindering the success in the field of education.

CDC is unable to change the total framework of the course book within the time limitation. The students are studying the course book which was revised on 2056/57. This show how up to date is the secondary level curriculum. Some of the parts of the textbook have been amended but most of the parts are the same. It always puts the education system back in terms of recent issues.

Teachers Perspectives on Curriculum

Regarding the school curriculum of secondary level students for the purpose that if the course content of climate change is included or not in the textbook, informal discussions were made with the teachers. For this purpose the teachers of related subject, basically science, social studies and population studies were chosen. Roshan of School Surodaya Secondary School (pseudonym) said that, *“there is no exact topic in the course book of secondary level”*. He blamed CDC and said curriculum development center is not responsible for this purpose. In the same context, Ragav of School Mahendra Higher Secondary School (Pseudonym) has said that, *“the curriculum of Nepal doesn’t match the global curriculum”*. He added that most of the recent data’s and changes have not included in the course book. He said that students are not clear about global warming and climate change, also they are confused on weather and climate. Not only in Nepal, have students of other countries also had misconceptions on this matter. In a research conducted by Fox and Magelky (1997), it is said that there is confusion on weather and climate (as cited in Fornter, 2001, p.21).

Similarly Roshan said that, *“the course like science, social studies etc have not included the exact content of the climate change”*. He said, *“Climate change is one of the world’s largest problem and it has several effect on other different purpose but we don’t have even simple information in the course book”*. This also signifies that there is need of climate change course content in the textbook. Ragav has said, *“Students of secondary level students even don’t know the current rise of global warming and temperature rise”*. It signifies that very simple information is also not included in the textbook.

Roshan added that the, *“course book doesn’t provide the adequate information about climate change and the teachers are also unable to teach extra courses apart from the textbook, so the students lack the information about climate change”*. It also signifies that curriculum should be amended to provide relevant information about climate change.

Curriculum has lacked the necessary information about climate change. Ragav also focused on the lack of subject matter in the school curriculum.

Sources and process of getting information

There are various ways of getting information regarding the latest issues and problems of the world. In the same way climate change is also one of the emerging issues. For this there are several ways of providing information. Regarding the sources and process of getting information there is mixed response. Bishnu of School Surodaya Secondary School (pseudonym) said that, *“there is no exact source rather than textbook”* and he further added that school provides available information regarding it. Bishnu said that school doesn't provide relevant information rather than textbook. He said that, *“even the concept and terms related to climate change are difficult to understand for us”*. This refers that climate change is not taken as an issue. In a question, Bishnu answered that he had heard Bhaktapur is one of the more vulnerable district for the first time through the question. He inquired the meaning of vulnerable and how Bhaktapur is more vulnerable. It gave space for several questions to the secondary level students.

Students are obviously curious. I remember, when I was in secondary level there were some scientific process that we need to study in science, evaporation and so on. I was also curious that hot water vapor reaches to the sky and so on. There used to be so many questions and no any solutions. I used to think on myself and sometimes ask to the teacher. Now I am thinking the same that there must be so many queries in the mind of the students. They also have to study to pass the examination and also may think many things and try to find the solutions. While I was asking the question to Anu about climate change, at first she was so anxious to give the answer to my questions. Probing the question, I have asked have you heard about climate change and other related issues. She was confident and said that it is one of the issue which is seen everywhere. But later on

when I asked have you heard it on your school, on your area, and so on she said, *“it is national issue but not taken seriously in our area”*.

Similarly, I was asking the process how the school teachers teach; Anup of School Mahendra Higher Secondary School (Pseudonym) said that, *“school teachers don’t provide extra materials for such issues”*. He said that sometime he used to see newspaper and watch television while the news regarding climate change were given but it would be difficult to understand as the words were not familiar to him. He said that some of the words and sentences were very vague and they can’t understand while looking newspaper. It also shows that they are not familiar to the current issues.

Students are the pillars to convey a message in large group. A single student can convey the message to many people. Thus it has been one of the essential ways to provide information to the students. But in the context of Nepal it is not seen in such a way. The process of providing information is only through the textbook. Bigyan of School Mahendra Higher Secondary School (Pseudonym) also said the same thing that, *“the only process of getting information is through the lecture method and sources is through textbook”*. Some of the schools were seen that they are taking active participation for the issue of climate change but the schools of study area are passive. The student is also not happy on the information provided by the school.

Radha of School Mahendra Higher Secondary School (Pseudonym) has said that, *“I have not faced more consequences of climate change but she wants to know more about it which I am lacking”*. There is not enough course content in the textbook and even in those textbooks the teachers don’t provide sufficient information. She added that, *“the teachers only teach the textbook, they don’t provide other relevant information regarding the latest issue and teachers are old enough to be aware on the latest and emerging issues”*. They teach what they have known and learnt in their period, relevant information

is not provided. It seems that there is lack of trainings and seminars on the current issues to the teachers.

Nepal government and many other organizations are also conducting trainings on school teachers regarding climate change. Friends of Nature, (2005) have also conducted climate change training for school teacher of Dhading district. In that training, 52% of the trainees said that the subject matter of the training were very much relevant, appropriate and useful to the school level teachers to work at local level for the reduction of climate change impacts and adopt preventive mechanisms. It also shows that there has been some training in Nepal in the context of climate change.

The main source of getting information is through textbook. There are no other alternative ways of getting information about climate change. The teachers also said that there is no alternative way of teaching. It seems that they do not have the knowledge how students learn. Textbook is the only reliable source of teaching and lecture method is the best way among the teachers. The teaching method that the teachers used to teach through the lecture method and sometimes discussions method is used. But regarding the issues of climate change some of the teachers used to show the charts and maps to show the affected areas of climate change and also sometimes newspapers are also the sources to provide the information. But these sources are not sufficient to provide the information. Nepal government has also stated that Education for All slogan. In a report, National Framework of Child friendly school for quality education published by Nepal government ministry of education (2010) has also included that the teaching learning process to bring out the inherent potentials should not be limited to classroom. Most of the schools do not have audio visual materials to show the documentary and to do power point presentations.

Climate change awareness on students

Climate change is taken as one of the major issue in the world. In the context also it is taken as one of the most important issues. Most of the programs, projects and other

conference are based on the climate change and many more funds is invested on it, but how the awareness program is taken by the school teachers, students and experts is the main issue here. Schools are the major institutions in Nepal to provide information in wide range. If the school children are provided information about climate change, its ultimate effect and ongoing effect in overall the environment it would be beneficial.

Students are the future of the country that can change the country. They can transfer the information to many people. Regarding climate change the participants are the students and they have shared the information that they have got in climate change. The information was gained through interview. There was no gender biasness; both boys and girls were taken as the participants.

Bishnu of School Surodaya Secondary School (pseudonym) said that, "*climate change is change in climate pattern*". He also added that climate is changing nowadays but they don't know what the process of changing is and how it is changed. Also he added that, "*There is not such event of climate change as we have not faced the problems*". It seems that students who have not known the consequences said that climate change is not as a problem. It signifies that climate change causes are not known to the students but knows that climate change is changing.

Anu of same school said, "*Climate change is something different form previous*". Also she added, if something is changed from the earlier years that are climate change. She gave an example that the change of weather pattern. Rain fall is not occurring in the time which used to occur in the previous years. She said that farmers are doing work in the field and hoping for rainfall in the time of plantation but it doesn't happen and also in the time of harvesting rain falls and farmers are the victims of this. Maharjan, Joshi and Piya (2011) as cited on Shrestha (2011) have also said that the effect of climate change in

agriculture will mostly be adverse as it is highly dependent on weather condition due to extreme rainfall.

Similarly, Anup of “*The temperature of Nepal is from 37-45° C and global warming is change of seasons and change in rainfall pattern and creates problems in different area*”. It signifies that the students are only saying that global warming is not more than change in seasons, rainfall. IPCC (2001) has also said that future change in weather patterns will affect different regions in different ways (as cited on Shrestha, 2011). It also signifies that the knowledge of climate change is limited within the change in season and rainfall pattern.

Furthermore Radha said, “*Climate change is the change in the weather pattern*”. It also signifies that the student’s awareness is limited within the rainfall pattern. There is high rainfall, flood, and drought and so on as the students have experienced in their daily life. Sharma and Shakya (2006) has also proved that the change in water availability in the monsoon, pre monsoon and post monsoon season and shifting of the hydrograph have a direct impact on Nepalese agriculture (as cited on Shrestha, 2011). This signifies that the students are somehow aware on other issues of climate change.

She said that “*climate is like a season and climate change is the change that we are facing in the environment*”. It also shows that the students are taking climate change in terms of change of the seasons. She further added that that climate change and global warming are the terms which mean the change of climatic condition and weather pattern which was not before. It also signifies the general knowledge of climate change. For the instance she added that pollution is the problem caused by climate change. It shows that the students are lacking the factual information on climate change. Khan (2010) states, “Climate Change refers to the variation in the Earth’s global climate or in regional

climates over time” (p.258). It signifies the students of secondary level even don't have the actual ideas about climate change.

Also she added that that global warming is the change in water and air condition. It seems that the course book doesn't have more information and the teachers are also not fully aware about this as there are no such trainings on them. Thus the student seems backward in terms of getting information. The change in the climate and weather which has been occurring from the years is the climate change. It is similar to the study of Shepardson, Niyogi, Choi and Charusombat (2011) which has concluded that the students thought that global warming and climate change would only affect temperature and precipitation.

Keeping this in mind, the research is done with the responsible people of the academic institutions. Regarding the issue of climate change, Bishnu of School Surodaya Secondary School (pseudonym) said that, *“if the knowledge of climate change is provided then the students will be able to do what they can do in locally available materials”*. He added that, *“the changing temperature is the symptom of climate change”*. It seems that the change of temperature is only climate change.

Answering the question on importance of climate change knowledge, Anu of School Surodaya Secondary School (Pseudonym) said that, *“If they are made aware they can explore the knowledge to other”*. Also Anup of School Mahendra Higher Secondary School (Pseudonym) has said that *the knowledge of climate change is important*”. But he was unable to say why actually is important. Likewise Bigyan also said that, *“we need to get information about climate change as it is one of the important issues, climate change is one of the important issues but the information is not provided in the course book”*. He further added that, *“climate change courses should be included in the course book”*. The

definition given by the student about climate change is totally different from the scientific definition

The students are not known on the exact issues of climate change and also they are not provided the adequate information that is needed to the secondary level students. The students have said themselves that the teachers only provide the information that are in the course book. Only in some rare topics the teachers used to give relevant information.

Climate and weather

Bishnu of School Surodaya Secondary School (Pseudonym) said that, “*climate and weather are same, climate is change in the environment and weather is change in the season*”. But he also added that climate and weather are same. In a research conducted by Fox and Magelky (1997), it is said that there is confusion on weather and climate (as cited in Fornter, 2001, p.21). It also refers that the students have misconceptions on climate change as she has said that climate and weather are change in the environment and season respectively. He added that there are no such differences on climate and weather.

Anu of the same school said that weather and climate are similar but they are not same. She added that, “*climate is determined by the weather*”. Climate Discovery Teachers Guide (2005), defines, “weather is the current atmospheric conditions, including temperature, rainfall, wind and humidity while climate is the general weather conditions”. It shows that the definition of the student on weather and climate change is not proper. The students are not clear on the difference of climate and weather. They have said that they are same. Anu said that they are different not the same but don’t know what are the differences and why they are not same but similar. This signifies that there is also lack of knowledge in the simple terms.

Anup of School Mahendra Higher Secondary School (Pseudonym) said that, “*weather changes daily but climate change in fix time*”. He added that climate is changed in fixed time and it is changing at present. Huber, (2011) has said, Climate is the average

of many weather events over of a span of years. Thus, the meaning of the students is almost similar to the definition. The students understanding of climate and weather are not as the exact definition. The information about these simple topics is also included in the course book but still they are lacking the information.

Consequences of climate change

Regarding the effects of climate change, Bishnu said that, *“there is no rainfall in needed time”*. Also he added that, *“there is no rainfall in the time of planting crops which is necessary but there is rainfall in other time, so extreme events is happening”*. One of the respondents in a survey done by Maibach, Bloodhart & Zhao (2013) has also said that the extreme weather events are becoming more frequent, a largely majority believes that climate change is the major cause (28%), or one of many causes (51%). It also concludes that students have known that climate change has several effects.

Likewise Anu of same school said that because of change in climate unseasonal vegetables are grown up. Also he added that the *“temperature is minus in the winter season which was not in past years”*. Watershed Planning, 2008 states that, “Even greater changes are expected in the future, including a continued rise in temperatures, shifts in rainfall patterns, and increases in certain types of hazardous weather, such as heavy spring rains and heat waves” (as cited in He, 2012). It signifies that climate change will have an extreme consequence in the near future. He further added that because of climate change the temperature of the earth is rising and effects human health. Miabach, Nisbet and Weathers (2011) have also said that Climate change harms human health, both directly and indirectly in a variety of important ways. Indirectly climate change brings innovative challenges to the control of many infectious diseases.

Anup of School Mahendra Higher Secondary School (Pseudonym) said that, *“because of climate change there is drought, high rainfall, and increase in new diseases”*. He added that that there is rise on temperature, pollution, rainfall not occurring on time.

The changing climate has delayed the monsoon making the thousands of farm land fallow and increasing the productivity of land due to lack of rain (Regmi & Adhikari, 2007). It signifies that the consequences of climate change by Anup are seen on the change of environment.

Radha said that, “ *in the rural areas, the people who are planting crops are facing the problems in various ways like lacking adequate rain on necessary time and heavy rainfall in unnecessary time*”. She added that ozone layer is also cause to increase such events but it is not climate change. In a study of Shepardson, Niyogi, Choi and Charusombat (2011) has concluded that most of the students did not link the ozone hole to global warming and climate change, suggesting that students are becoming more knowledgeable about the difference between global warming and stratospheric ozone depletion but still the students of the study area have misconceptions.

Binu also said that, “ *there is increase in diseases, rise in temperature, and effect in agriculture and water crisis as the effects of climate change*”. Climate change will affect crop yield directly because of alterations in temperature, indirectly through changes in soil quality, pest and diseases (Agbola & Ojeleye, 2007). This signifies that they are unknown about the effects of climate change in other aspects. Also she added that at first human beings are affected by climate change. And later on climate change affects all the life of the plants and animals too. It is similar to the study of Shepardson, Niyogi, Choi and Charusombat (2011) which has concluded that the students expect that global warming would impact plants and animals, causing plants and animals to die or decrease in number as a result of warmer weather or less perception.

Education Sector responses to climate change (2012) have also included that climate change is a key priority for international development as its impact is likely to be disproportionately felt in developing countries. But the information that have seen and

known about climate change and its consequence but the information is not in proper amount.

Causes of climate change

Climate change is not itself a problem, the causes are the main problems on it. Bishnu said that, *“because of rise in carbon monoxide and super dioxide there is depletion of ozone layer and there is rise in temperature and it causes climate change”*. This saying is related with Raj (2004) as, *“The main cause of the recent increases in global temperature is green house gases, especially carbon dioxide, released by coal and oil fired power stations, factories, automobiles, trucks, offices and private homes”*(p. 82). It signifies that the knowledge on students about climate change is because of the minor terms like carbon monoxide which has direct impact on ozone layer. It explores that the student’s knowledge on climate change is by the human effect and its ultimate effect is on human beings with the rise in temperature.

Anu said that, *“main cause is human beings”*. Also she added that climate change is because of pollution. Upreti (1999 as cited in Malla, 2008) refers that climate change is a phenomenon due to emissions of green house gases from fuel combustion, deforestation, urbanization and industrialization resulting variations in solar energy, temperature and precipitation. It refers that the students used to generalize the term climate change as one of the environmental effects. She further added, *“Deforestation, natural disaster, floods and landslide causes climate change”*. Regmi and Adhikari (2007) has also focused that, the system is threatened through anthropogenic activities such as farming practices and natural resource consumption patterns. It also provides a clear picture that the student is aware on the cause of climate change is the people itself. This can be a great impact on the students. The student at least have known that human is the main cause and if he/she get the information, human can themselves reduce the problems of the cause, students can share the information. Thus awareness on student is mandatory.

Bigyan of School Mahendra Higher Secondary School (Pseudonym) has also said that, *“the causes of climate change are human activities, lack of awareness on people and the artificial things that can't adjust on the earth's environment”*. The UNESCO climate change initiative (2010) has also categorized climate change as one of the cross-cutting issues. In it, climate knowledge: science, assessment, monitoring and early warning, supporting global, local and national action, climate neutral and public awareness are listed as the cross-cutting areas. Also, he added, *“the causes are because of increase in Green House Gases which gives rise to the ozone layer and the earth's temperature is increasing”*. Cruz(2007) as cited in Lian and Bhullar(2010), said that “The observed climate change trends in Southeast Asia include increase in temperature, decrease in rainfall, sea level rise, increased frequency, duration and intensity of extreme weather events, such as droughts, storms, floods and typhoons, and heat waves, significant increase in heavy perception events and more tropical cyclones”(p.4).

Binu of same school has also said the similar types of causes like population growth, pollution, deforestation in the environment which gives rise in temperature. It signifies that most of the students have similar types of answers on the causes of climate change. Shrestha (1999) states that, “Climate Change scenario for Nepal showed considerable convergence on continued warming, with country averaged mean temperature increases of 1.2°C and 3°C projected by 2050 and 2100” (as cited in Bhusal ,2009 ,p.11). It seems that the student's knowledge on climate change is as per their school environment. There are no enough tasks in the textbook and also the teachers are not teaching as per the global context as climate change is happening but the students are able to say some things about climate change and its consequences.

Student's participation

There are so many organizations working in the field of climate change. Most of the organizations have the mission and objectives that has priority to climate change. Also many organizations are working in the field of education and awareness

Bishnu of School Surodaya Secondary School (Pseudonym) has said that, "*I have not participated in the programs regarding climate change*". He also added that he has participated only in the programs that are organized in the school premises. He also added that she has participated in a program organized by the community and it was on environmental issue. Anup of School Mahendra Higher Secondary School (Pseudonym) has also said that, "*I have not participated in any programs and trainings related to climate change*". It also refers that students are lacking the awareness and information from relevant sources. The students are lacking the extra activities in terms of climate change. Oliver (1995 as cited in Dewajani, n.d.) also says that individuals participation in extracurricular activities can build young persons' interest in school, strengthen their sense of identity and allow them greater exposure and self satisfaction from service". It concludes that extracurricular activities help the students to increase the interest.

Bigyan of School Mahendra Higher Secondary School (Pseudonym) has said that, "*the trainings and awareness program are not provided to them*". He added that he has not participated in the programs of climate change. But he said that he was the president of sanitation committee that was formed in the school. He also added that he have participated some of the programs like sanitation around the school which is conducted by the school and some of the clubs that are on the school. He had attended a training to make money from the waste. He further added that he used to teach the knowledge to other students at school as he has participated in the sanitation program at the school premises. Clark (2011) has also focused on extracurricular activities. He has focused on involvement

in extracurricular activities provides students with a way to practice social skills and establish positive, supportive social relationships.

Regarding the terms of climate change, the students were not informed about climate change adaptation and mitigation. They have only known that climate change should be controlled and the earth's environment should be in balance. The participants of the study area said that they do not have the information about climate change. Students are not provided regional knowledge. Even they don't have information on what is happening in their own districts. The information is not adequate from the school level and from the government of Nepal. But also there is Nepal Climate Change Knowledge Management Center (NCCCKMC) which is to provide the information but it also lacks the implementation. It seems that the students are lacking the information not only from the textbook but there are no other relevant materials.

Misconceptions of climate change

There are misconceptions on students about climate change. Not all the students but some of the students have misconceptions. Nepal is ranked more vulnerable among various developing countries. International Federation of Red Cross and Red Crescent Society (IFRC) (2007) has ranked Nepal in 23rd position of the world in terms of the total of natural hazard related deaths from 1988 to 2007 with more than 7,000 deaths reported. But still there are misconceptions.

Regarding the experience of climate change event, Bishnu has said that, “the *glacier outburst of Pokhara that had occurred on 2012 was because of climate change*”. But it was noted that the event was not because of climate change. Anu has also said that the cause of climate change is pollution. She was unknown about the unknown to adaptive and mitigating measures. In the present world mitigation is taken as response to climate change. Anup said that GHGs and ozone layer as the main cause of climate change. One of the students said that because of carbon emission climate is changing and we need to

stop as mitigation and adaption process. In a convention of fifth national communication on climate change (2009), they have categorized Climate change in fifth place of environmental problems and scores lower than air and water pollution. Thus realizing the importance they have launched several programs and also announced Belgian Energy and Environment Awards. This also signifies that other developed countries are serious in this matter and they are planning programs. But in the content of Nepal, there are no such clear projects. It also seems that Nepal is back in those activities and awareness level is still in initial stage.

Bigyan has also said that the environment has changed totally from that was in the past. He has misconceptions on climate and weather as he said that they are same. While conducting the interview, students ideas on climate change was because of chemical fertilizers climate has been changing. The students even suggested that the use of local fertilizers will help to combat climate change. The main misconception is on weather and climate. Regarding global warming, she said that the earth has been change with the change in the seasons and there is rise in temperature. The student's perspective on climate change is similar to the environmental issues as they have said that pollution, deforestation and so on as the terms on climate change but are not aware on climate change adaptation and mitigation.

Chapter Summary

In this chapter, I have interpreted the data that are collected and analyzed through qualitative method which I got from the participants interacting with literatures which I found from different sources.. It is basically on the provisions and practices of making students aware on climate change. It includes their knowledge on the climate change, causes of climate change, misconceptions in it, process of getting information, how the knowledge is transferred to the students, and barriers of it and also the coverage of the curriculum. Thus, this chapter has tried to answer my research question.

CHAPTER V

SUMMARY, CONCLUSION AND IMPLICATIONS

Chapter Overview

This chapter summarizes the whole study findings and concludes with the importance of sharing climate change knowledge and the process of acquiring the information to deal with the environmental problems. It also signifies that not only the knowledge of the students, the role of the teacher, the curriculum and school environment, the practices and experiences of the students inside the school are the major determinants in shaping the awareness of climate change of students. This chapter also acknowledges how the study can be useful for different instructions, individuals, society, and the whole globe. This chapter mainly focuses in the findings, conclusions and implications of the research. Mainly the findings are based on the primary data collection. Summary of the findings of the study has been discussed as conclusion has drawn. Finally, the experience, knowledge and reflection on the entire process of this study have been highlighted as implications.

Findings and Discussions

The issue of climate change has been emerging day by day and it has been one of the popular issues which have several consequences in global world. From the analysis and interpretation of the data that were collected with the interviews noted from the study area, the following findings were derived.

The students are curious to get information regarding the environmental issues. Mainly, they are curious on climate change and its effects on the environment. They are lacking the information as the main source of getting information about climate change is through the textbook. Shakya (2009) also says that it is necessary to make people aware of the environmental issues and of the means of protection of the environment. The information of climate change is included in three books of secondary level. They are

social studies, science and health and physical education. There is no separate topic for climate change and the topic is integrated in other topics.

Only general information is included in the course book, though course book is the main source. It is similar to the findings of Lesley and Dupigney (2010) which includes, 57 % of the knowledge about climate change is gained from the class of schools and colleges. Apart from the textbook, the students themselves used to gain information from newspapers, media, from friends, elders, and internet. It is similar to constructivism school of thought which emphasizes on the pedagogical importance and focuses on the learner's cognitive and social meaning making process (Kincheloe, 1991).

The knowledge that the students get about climate change is not sufficient in the present context. Thus the students are lacking the awareness on climate change. In a study report of European parliament and European Commissions (2009) on the topic, European attitudes towards climate change has also included that only 56% European are aware about climate change.

The transfer of knowledge is by means of lecture method. Apart from the lecture method, classroom discussions and the related news in newspaper are provided to the students. The teachers are not provided the trainings on climate change and other environmental issues. Thus, students are compelled to gain latest information by themselves about climate change. It signifies the transformation of learning, which includes that transformation, is not for others to do, but for every individual to take personal responsibility to help ne w future, to ask question, to take risk to make a difference (Sharma, 2012).

The students who are more curious to know about climate change used to search the information from internet and newspapers. Zuazo (1999 as cited in Shakya, 2009) also says that with the awareness we hope to put life into literary and artistic creation for

children to respect the environment. The students are not taken to field visits and other environment related programs. Some programs are organized in the school premises like plantation, sanitation.

There are no more contextual topics in the textbook and only general information is provided in the textbook. Mainly the students said that the consequences are seen on rise in temperature, rainfall pattern and agriculture. Also causes of climate change was carbon dioxide, carbon monoxide, pollution and mainly by human beings. But the findings of a research conducted by Shepardson, Niyogi, Choi and Charusombat (2011) on the students have said that the increasing temperature is caused by carbon dioxide.

The textbook has not been totally amended from last 12 years. The students even don't know the temperature of Nepal and the proper definition of climate change. There are misconceptions on the students in different terms. For instance there is a misconception on climate and weather. Gowda, Fox and Magelky (1997, as cited in Fronter, 2001) have also found that there are misconceptions on climate and weather. The school also doesn't have such programs. All the schools don't have eco clubs. The schools that have eco clubs and other clubs also haven't organized program on climate change.

From the findings, we can say that there is lack of climate change education and climate change awareness on secondary level students. The CDC has also not amended the course on time and the students are not getting the current information not only in climate change but in all the latest issues. It has been 12 years that the course has not been totally amended which signifies the status of Nepalese curriculum.

Conclusions

In conclusion, although the findings for this research were unsurprising, they illustrate that there is general lack of understanding among the students in school and the teachers. This research focuses on the existing situation of climate change in the secondary level students of Bhaktapur district. The main problem seen on the students is that they are

willing to learn but there is no sufficient topics regarding climate change. Teachers also said that only general information is provided in the textbook and they are not provided the trainings on the recent issues so the students are lacking the information. The only means of transfer of knowledge is through the teacher centered lecture method and textbook.

The study also identifies the demand for the knowledge of climate change to the willing students, and the fact is that all the students are willing to get the latest information about climate change and its consequences. Realizing the importance of the situation, this research has been done with the expectation that this would help to prepare an effective and sustainable plan through formulating appropriate policy measure to deal with the problems encountered by the students and the teachers. This study also finds that there is an urgent need and scope to improve awareness program to the student because they can spread and implement the knowledge towards the society and be capable to make a change.

In terms of opinions about Global Climate Change (GCC), all the students believe it is happening. A large majority believes that global warming and climate change will change their lives, although to different degrees. From the analysis and interpretation, it is stated that the situation of student's awareness level is not satisfactory. Finally regarding the research about climate change awareness, it can be concluded that:

1. There is insufficient information about climate change in the course book of secondary level.
2. It is a great challenge to the teachers to provide the information as the teachers do not have adequate information and no such trainings.
3. The transfer of knowledge is through the textbook and lecture method.
Because of time limitation to finish the course book, students are deprived from relevant courses.

The present study also focuses to find out the way out to their status from their own perspective. From the sustainable and effective development viewpoints, this study tries to highlight the necessity for improvement and awareness of climate change from the school level.

Implications

The findings of the study can be useful for different individuals, society, policy makers and the whole globe in the present environmental crisis. It has added a brick of a new research on the environment education for the global society to learn about the awareness of climate change of the students, how they gain the information about it and the issues on the content of climate change in school curriculum in the context of Nepal. The challenge for the environmental communicators is to teach about global climate change in ways that allow students to become environmentally literate and encourages them to lead more sustainable lives. Because both children and teachers are frequently either not receiving basic information about Global Climate Change or the information is fragmented, this is a critical moment for other environmental educators to step in.

As per the implications for the individual, the research has become a primary guide for me to enrich my understanding about the climate change. I knew that simply understanding climate change is far different from its content. The implications of this research are as follows:

The research can be helpful for the current teachers of environment whose slight change in their teaching strategy would help bring about the greatest effects on the students understanding. The school authority can utilize the conclusion of the study that application of local curriculum has enhanced the knowledge and understanding of the students. The school can enrich the teacher's knowledge about the subject matter and search for the expert in the subject matter for equipping the students with effective content

knowledge. The research can be helpful for the teachers so that they can change the way of teaching rather than lecture method.

Furthermore, the research has revealed that the teachers instructions , plans and teaching strategies plays a major role to make students aware on the subject matter, the upcoming researcher can evaluate how the methods can be made more effective. The policy makers and curriculum designers can develop activity based and current information about climate change and school settings to enrich the student's climate change understanding to obtain the goal of Millennium Development Goal.

It would be helpful for the students too so that they would be more concern on protecting the environment. It would be helpful for the designers of the educational resources like class curricula should be aware of the role of prior knowledge, and also make sure their lessons complement what students are getting from other aspects of their education. The research would be helpful for the organizations working in the field of climate change and climate literacy to make the vision and implementation.

REFERENCES

- Agbola, T. & Ojeleye, D. (2007). Climate change and food crop production in Ibadan Nigeria. *African crop science conference*: Vol. (8), 1423-1433.
- Agrawal, S., Raksakulthai, V., Aalst, M. N, Larsen, P., Smith. J. & Reynolds, J. (2003). *Development and climate change in Nepal: Focus on water resources and hydropower*. Kathmandu Nepal: Organization for Economic Co-operation and Development.
- Alaranta, M. (2006). Combining theory-testing and theory-building analyses of case study data. *ECIS 2006 Proceedings Paper 175*. Retrieved from <http://aisel.aisnet.org/ecis2006/175>.
- Apple, C. (2007). *How we learn about climate change: Environmental education in North Carolina*. A master's thesis. University of North Carolina. Retrieved on August 15, 2013 from https://cdr.lib.unc.edu/indexablecontent?id=uuid:2b5313fe-55d5-45c7-8ef5-bdd5a1a7a8fc&ds=DATA_FILE
- Bartlett, R., Bharati, L., Pant, D., Hosterman, H., & McCornick, P. (2010). *Climate change impacts and adaptation in Nepal*. Colombo, Sri Lanka: International Water Management Institute.
- Belbase, S. (2006). *My journey of learning and teaching mathematics from traditionalism to constructivism: A portrayal of pedagogical metamorphosis*. (Unpublished M Phil Dissertation), Kathmandu University.
- Belgium's fifth national communication on climate change*. (2009). Retrieved on date July 19, 2013 from http://unfccc.int/resource/docs/natc/bel_nc5_en_final.pdf
- Bhusal, Y.R. (2009). *Locals peoples' perceptions on Climate Change, its impacts on adaptation measures in mid-mountain region of Nepal n Kaski district*. Unpublished thesis: Tribhuvan University. Institute of Forestry. Nepal

- retrieved from http://www.forestrynepal.org/images/thesis/Bsc_YBhusal.pdf on 16th April, 2012.
- Bryman, A. (2008). *Social research method* (3rd Ed.). New York: Oxford University Press.
- Budha, T.K. (2011). *Classroom strategies for improving secondary level student's performance in communicative skills*. An unpublished masters dissertation, Kathmandu University: Kathmandu.
- Clark, S.L. (2011). *Factors related to school violence victimization: the role of extracurricular activities*. A PhD dissertation. University of Iowa. Retrieved from <http://ir.uiowa.edu/cgi/viewcontent.cgi?article=2768&context=etd>
- Climate change better or worse?* (n.d.). retrieved from http://www.climate-change.me.uk/html/what_is_climate_change.html
- Climate Discovery Teachers Guide. (2005). *Differences between climate and weather*. Retrieved from http://eo.ucar.edu/educators/ClimateDiscovery/LIA_lesson1_9.28.05.pdf
- Cohen, L., Manion, L. & Morrison, K. (2008). *Research Methods in education*. (6th ed.). India:Routledge.
- Cresswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. New Delhi: Sage Publication.
- Creswell, J. W. (2003). *Research design: qualitative, quantitative & mixed methods approach*. India: Sage Publication.
- Curry, T.E, Ansolabehere, S. & Herzog H.(2007). *Laboratory for the energy and the environment*. Cambridge: Massachusetts Institute of Technology.
- Dangal, M.R. (2010). *Aid effectiveness in basic and primary education in Nepal*. (Unpublished PhD Dissertation), Kathmandu University.

- Dasgupta, S. (2009). *Understanding the global environment*. New Delhi: Dorling Kindersley.
- Daszko, M., & Sheinberg, S. (2005) Survival Is Optional: Only Leaders With New Knowledge Can Lead The Transformation. *Theory of transformation Final To Short Article*. Retrieved from: www.mdaszko.com/theoryoftransformation_final_to_short_article_apr05.pdf on June 15, 2013.
- Daudi, S.S & Heimlich, J.E. (1997). Environmental education: Can it be defined? *Environment Education & Training Partnership*, 14. Retrieved from <http://eelink.net/eetap/info14.pdf>
- Definition of environment*. (n.d). retrieved on August 15, 2013 from <http://www.newagepublishers.com/samplechapter/001773.pdf>
- Denscombe, M. (1998). *The good research guide for small scale research projects*. Philadelphia:Open University Press. Retrieved from http://iwansuharyanto.files.wordpress.com/2013/04/martyn_denscombe_the_good_research_guidebookfi-org.pdf
- Denzin,N., & Lincoln, Y. (2000). *Handbook of qualitative research*. Oaks,CA: Sage Publication.
- Department of Water Induced Disaster Prevention (2011). *Report of monthly dialogue of DRR policy and practices on climate change and DRR aspects in Nepal*. Lalitpur: Author retrieved from <http://www.dpnet.org.np/docs/reportManagement/deee8ee7b46755ff6d92b455dc732a88.pdf>
- Devkota, S.P. (2012). *The myth of teaching Mathematics in the Nepalese context: teachers lived experiences and my own reflective practices about contextualized mathematics*. Germany: Lambert Academic Publishing.

- Dewajan, S. (n.d). *The role of extracurricular activities in developing students self concept*. Gadjah Mada University. Retrieved from http://psikologi.ugm.ac.id/uploads/resources/File/Database%20Penelitian%20Dosen/Self_Concept.pdf
- Dirkx, J.M. (1998). Transformative learning theory in practice of adult education: an overview. *PAACE Journal of life learning*. Vol.7, 1-14. Retrieved on 7th May from <http://www.iup.edu/assets/0/347/349/4951/4977/10251/af0eab12-c2ce-4d2c-b1a0-59b795415437.pdf>
- Disinger, J.F. (1997). Environmental Educations definitional problem. *Essential Readings in Environmental Education*. Pp17-31: NAAEE.
- Europeans attitudes towards climate change*. (2009). retrieved from http://ec.europa.eu/public_opinion/archives/ebs/ebs_313_en.pdf on 22nd April, 2012.
- Family Health International. (2005). *Qualitative research methods: A data collector's field guide*. North Carolina: Author.
- Fortner, R.W. (2001). *Climate Change in School: Where Does It Fit and How Ready Are We?* School of Natural resources. USA: The Ohio State University retrieved from <http://cjee.lakeheadu.ca/index.php/cjee/article/view/File285188> on 25th Sept, 2012.
- Friends of Nature. (2005). *Climate change trainings for schools teacher, Dhading district, Nepal* retrieved from <http://www.fonnepal.org/Downloads/Climate%20Change%20Training%20in%20Dhading%20District.pdf>
- Genzuk, M. (n.d.). *A synthesis of ethnographic research*. Retrieved from http://www-bcf.usc.edu/~genzuk/Ethnographic_Research.pdf
- Geren, K. J. (2009). *An invitation to social construction* (2nd ed.). London: Sage publication.

- Gerring, J. (2007). *Case study research: Principles and practices* (2nd ed.) New York, United State of America: Cambridge University Press.
- Guba, E.G & Lincoln, Y. S. (1989). *Fourth Generation Evaluation*. Thousand Oaks, CA: Sage Publication.
- He, W. (2012). *An Evaluation of prairie producer attitudes towards Climate Change*. Unpublished Master's Thesis. University of Saskatchewan. Retrieved from <http://commons.usask.ca/mlu/bitstream/handle/10388/ETD-2011-12-381HE-THESIS.pdf?sequence=3> on 13th June 2012.
- Ho, E. (2009). *Children's ideas about climate change*. A PhD thesis. Toronto: University of Toronto. Retrieved from http://space.library.utoronto.ca/bitstream/1807/17465/1/Ho_Elise_200903_PhD_thesis.pdf on 2012 October 10.
- Howitt, C. (2007). *Quality Standards associated with the post positivist and interpretative research paradigms*. SMEC, Curtin University of Technology, Perth.
- Huber, D.G. (2011). *Extreme weather & climate change: Understanding the link and managing the risk*. Retrieved from <http://www.c2es.org/docUploads/white-paper-extreme-weather-climate-change-understanding-link-managing-risk.pdf>
- Iltus, S. (2007). *Community based research and participatory planning with children and communities in the villages of Rembek*. South Sudan: Save the children, Sweden.
- International Federation of Red Cross and Red Crescent Society (IFRC). (2007). *World disaster report, focus in discrimination*. Geneva, Switzerland: Author.
- Jadhav, H.V. & Purohit, S.H. (2007). *Global warming and environmental laws*. New Delhi: Himalaya Publishing House.
- Jones, M.G. (2002). *The impact of constructivism on education: language, discourse, and meaning*. Retrieved from <http://ac-journal.org/journal/vol5/iss3/special/jones.pdf>

- Karki, G. (n.d.). *NAPA way forward: climate change adaptation project prioritization in Nepal*. Nepal: National Adaptation Programme for Action.
- Karki, U. (2005). Status report: Nepal in Bhandari, B. & Abe, O. (2000). *Environment education in Asia pacific region: state, issues & practices*: IUCN: IGES. Kathmandu.
- Khan, S. A. (2010). *Global warming and climate change*. New Delhi: RVS Books.
- Kincheloe, J. L. (1991). *Teacher as researcher: Qualitative inquiry as path to empowerment*. London: The Falmer Press.
- Koirala, M. & Bhatta, P. (2010). *Communities challenging climate change*. Kathmandu, Nepal: Community Radio Support Center (CRSC)/ Nepal Forum of Environmental Journalists (NEFEJ) with Support from Free Voice, THE NETHERLANDS.
- Koul, R.B. (2008). Educational research ensuring quality standards. *E-journal of all india association for educational research (EJAIAER)*. Vol(20). Retrieved from <http://www.aiaer.net/ejournal/vol20208/5.htm>
- Kumar, A. (2009). *Global warming: An overview*. New Delhi: Mohit Publications.
- Kumar, H. D. (2006). *Global Climate Change*. New Delhi: Vista Publishing Pvt. Ltd.
- Kumar, R. (2006a). *Research methodology: A step- by- step guide for beginners* (2nd ed.). New Delhi: Dorling Kindersley Pvt Ltd.
- Lakatos, A. & Boros, A. (2011). Effective teaching methods for knowledge transfer improvement. *Management Knowledge and Learning*. Retrieved on July 15,2013 from <http://www.issbs.si/press/ISBN/978-961-92486-3-8/papers/ML11-50.pdf>.
- Larijani, M., & Yeshodhara, K. (2008). An empirical study of environmental attitude among primary level school teachers of India and Iran. *Journal of Human Ecology*, 24(3), pp.195-200.

- Lesley, A.L. and Dupigny, G. (2011). *Exploring the challenges of climate science literacy: lessons from students, teachers and lifelong learners*. Retrieved from http://www.uvm.edu/~vtstclim/Documents/pdfs/GeoCompass_literacy_article.pdf
- Lian, K.K & Bhullar, L. (2010). *Adaptation to climate change in the ASEAN region*. Retrieved on August 8 from [http://www.ucl.ac.uk/laws/environment/docs/hong-kong/Adaptation%20to%20CC%20ASEAN%20\(KL%20Koh%20AND%20Lovleen%20Bhullar\).pdf](http://www.ucl.ac.uk/laws/environment/docs/hong-kong/Adaptation%20to%20CC%20ASEAN%20(KL%20Koh%20AND%20Lovleen%20Bhullar).pdf)
- Literacy Watch Bulletin (2001). *Environment Education and Sustainable Development*. Retrieved from http://www.accu.or.jp/litdbase/literacy/nrc_nfe/eng_bul/BUL19.pdf on 2013.
- Macmillan, J.H. & Schumacher, S. (2001). *Research in education*. New York: Harper Publisher.
- Maibach, E., Bloodhart, B., and Zhao, X. (2013). *Perceptions of extreme weather and climate change in Virginia*. Retrieved from <http://www.climatechangecommunication.org/sites/default/files/reports/Perceptions%20of%20Weather%20and%20Climate%20Change%20in%20Virginia,%20Spring%202013.pdf>
- Malla, G. (2008). Climate change and its impacts in nepales agriculture. *The journal of Agriculture and environment*. Vol. (9). Retrieved from <http://www.nepjol.info/index.php/AEJ/article/view/File21191952> .
- Marten, T et al., (1998). *Motives for responsible environmental behavior: environmental threats and social needs*. Germany: Institute for science and education.
- Maxwell, J.A. (1996). *Qualitative research design: an interactive approach*. Thousand Oaks, CA: Sage Publications.

- Merriam, S.B. (1989). *Qualitative research and case study applications in education*. San Francisco: Jossey- Bass Publishers.
- Miabach,E. Nisbet, M. and Weathers, M. (2011). *Conveying the human implications of climate change: a climate change communication primer for public health professionals*.Fairfaz, VA: George Mason University center for climate change communication. Retrieved from <http://www.climatechangecommunication.org/images/files/4C%20Communication%20Primer%20%20Conveying%20the%20Human%20Implications%20of%20Climate%20Change.pdf>
- Ministry of Education. (2010). *National framework of child-friendly school for quality education*. Retrieved from http://stepsinnepal.files.wordpress.com/2011/01/approved_cfs_framework-2010.pdf
- Ministry of Environment (MoE) (2010). *National Adaptation Programme of Action*. Kathmandu, Nepal.
- Nepal climate change policies and plans: Local communities' perspectives* (2011). Dhobighat, Lalitpur, Nepal: HELVETAS Swiss Incorporation.
- Palmer, J.A. (1998). *Environment education in the twenty-first century: Theory, practice, progress and promises*. London: Rutledge.
- Parajuli, D.R. (2010). *Knowledge and Adaptative strategies in response to climate change*. Germany: VDM Publishing.
- Patton, M. (1990). *Qualitative evaluation and research method* (2nd ed.). London: Sage Publication.
- Poudel, T. N. (2011). *Campus climate for female students in Nepal*. Germany: Lambert Academic Publishing.

- Practical Action, (2008). *Promoting adaptation to climate change in Nepal. Policy briefing paper*. Kathmandu: Author.
- Qualitative Research*. (n.d.). retrieved from http://www.sagepub.com/upm-data/48453_ch_1.pdf
- Raj, S. (2004). *Teaching of Environmental Education*. New Delhi: IVY Publishing House.
- Raldolph, D. (1996). Forming knowledge: Constructivist learning and experiential education. *Journal of Experiential Education*, 19(2), 76-81.
- Regmi, B.R. & Adhikari, A. (2007). *Fighting climate change: Human solidarity in a divided world*. Kathmandu: Human Development Report.
- Richardson, V. (2003). Constructivist pedagogy. *Teachers College Record*, 105(9), pp. 1623-1640.
- SAARC. (2007). *SAARC action plan on climate change*. Retrieved from <http://saarc-sdmc.nic.in/pdf/publications/climate/chapter-2.pdf>
- Sandell, K., Ohman, J., & Ostman, L. (2005). Education for sustainable development: Nature, school and democracy. *Canadian Journal of Environment and Education*, Retrieved from: <http://cjee.lakeheadu.ca/index.php/cjee/article/viewFile/897/560>.
- Savada, A.M., (1993) (Ed.). *Nepal and Bhutan: country studies*. 3rd edition. Library of Congress, Research Division: Washington D.C.
- Scoping assessment on climate change knowledge platform in Nepal*. (2010). Retrieved from http://www.climateadapt.asia/upload/publications/files/4d415f41a406dScoping_Report_Nepal.pdf
- Seale, C. (1999). *Research methodology and design*. Retrieved from http://uir.unisa.ac.za/bitstream/handle/10500/4245/05Chap%204_Research%20methodology%20and%20design.pdf

- Shakya, A. (2009). *Understanding the motives for responsible environmental behavior & its education implication: A qualitative study*. An unpublished PHD dissertation. School of Education: Kathmandu University.
- Sharma, T (2012). *Becoming a 'good' mathematics teacher: An epic journey through different mathematical terrains* (Unpublished dissertation).Kathmandu University, Kathmandu.
- Shepardson,D.P., Niyogi,D., Choi, S., & Charusombat, U.(2011). *Student's conceptions about global warming and climate change*. North University Street: National Science Foundation. Retrieved on 7 July from <http://iclimate.org/ccc/Files/A3.pdf>
- Shobeiri,S.M., Omidvar, B. & Prahallada, N.N. (2007). A comprehensive study of environmental awareness among secondary school students in Iran and India. *International Journal of Environmental Research* 1(1), pp.28-34. Retrieved from <http://www.bioline.org.br/request?er07005>
- Shrestha, N.R. (2002). *Nepal and Bangladesh: A global studies handbook*. ABC-CLIO, Santa Barbara: California.
- Shrestha, S.L. (2011). *Effect of climate change on socio-economy and vulnerability of farmers in Nepal*. Retrieved from http://pir.lib.hiroshima-u.ac.jp/metadbupdissH23M_SumanLalShrestha.pdf on date 12th July 2013.
- Simpson, M.C., Gossling, S., Scott, D., Hall, C. M. & Gladin, E. (2008). *Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices*. Paris, France: UNEP, University of Oxford, UNWTO, WMO.
- Taber,K.S. (2011). Constructivism as education: Contingency in learning, and optimally guided instruction. *Educational Theory*. Retrieved from <https://camtools.cam.ac.uk/access/content/group/cbe67867-b999-4f62-8eb7->

58696f3cedf7/Educational%20Theory/Constructivism%20as%20Educational%20Theory.pdf

The UNESCO climate change initiatives (2010). France: Decade of Education for sustainable Development, UNESCO.

UN. (2007). *Climate change threatens investment in Millennium Development Goals*.

Retrieved from <http://www.un.org/News/Press/docs/2007/sgsm11175.doc.htm>

UN. (n.d). *we can end poverty*. Retrieved from

<http://www.un.org/millenniumgoals/envIRON.shtml>

UNESCO. (2009). *Education for sustainable development*. Retrieved from

http://www.unesco.org/education/justpublished_desd2009.pdf

UNESCO. (2009a). *Education for sustainable development, United Nations Decade 2005-2014*. Retrieved from <http://www.unesco.org/education/DESDquarterlyDEC09.pdf>

UNESCO. (2012). *Education sector responses to climate change*. Bangkok: Asia and pacific regional bureau for education, UNESCO

United Nations Conference on Environment & Development (UNCED). (1992). *Report on Sustainable Development*. Hague: Author.

Willis, J. W. (2007). *Foundations of Qualitative Research: Interpretive and critical approaches*. Thousand Oaks, CA: Sage.

World Bank. (2003). *Sustainable development in a dynamic model*. New York: Oxford University Press.

Yin, R.K. (2003). *Case study research* (3rd ed.). United States of America: Sage Publications.

APPENDIX

Research questions to the teachers

Name:

School:

Year of experience:

Qualification:

Date:

Subject:

What subject do you teach? How long has it been?

- Is this related to your study?

What are the topics related to environment?

- Are there any topics related to climate change?
- Is it a new topic?

Is there any topic related to climate change in secondary level course?

What is the understanding of the students in climate change?

- How the students are facilitated in these topics?

What are the procedures related to climate change while teaching?

- What teaching materials do you use while teaching climate change?
- Is the book only the source of climate change?
- Is the course sufficient to give the knowledge about climate change?
- Are there any other sources to give knowledge about climate change?

What knowledge do the students have about climate change before knowing in the class?

What problems do the students face while learning climate change?

What problems have you faced while teaching climate change?

Have you got any training regarding climate change and its procedures to teach?

Research questions to the students

Name: _____ class: _____

School: _____

What topics are related to environment?

- Is there any topics related to climate change in your course book?

What information do student have about CC, its causes and consequences?

- What is climate?
- What is climate change?
- What is weather?
- Are climate and weather same, or do they have differences, explain.
- What are its causes?
- What is the problem created by climate change?

What are the sources of getting information about climate change?

- Does the teacher provide any more information?
- What are the extracurricular activities regarding climate change?
- Have you participated in such activities regarding environmental issues and climate change?

What is the status about awareness on adapting CC (adaptation, mitigation)?

- How can climate change be reduced?
- What is adaptation in climate change?
- What is mitigation?(action to reduce the effects of CC)
- What are the adaptation and mitigation strategies?

- How climate change can be controlled in Nepal?

What are the problems/challenges of CC identified by students?

- How is climate change a problem?
- What are the problems that you faced regarding climate change in the school?
- What are the problems of climate change in local level?
- What are the problems in national and global level?

Do you have idea about the vulnerable districts of climate change in Nepal? What about Bhaktapur?

Research questions for members of CDC

Name:

Date:

Year of experience:

What is the provision of CDC to amend the course?

In which course book of secondary level, the content of climate change is included?

Is it sufficient in the present context?

What are the relevant materials to teach climate change?

Are the teachers provided trainings about the ways of teaching the latest topics like climate change?

Isn't CDC responsible for these types of problems? Are there any extra provision?

What is the future plan to include the latest topics?