Impact of Climate Change in Rural Livelihood :

A Case Study of Guras Rural Municipalitya Ward No-4, Dhilekh

A Thesis

Submitted to

Mid-West University

Graduate School of Humanities and Social Sciences,

Central Department of Rural Development, Development Economics and Mathematics in Partial Fulfillment of the Requirements for the Master's Degree in Rural Development

Submitted By

Khagendra Upadhayaya

Exam Roll No.: 2330040010

M.U. Redg.No.2015-69-2-1003-0091

2024

DECLARATION

I hereby declare that the work reported in this thesis entitled **Impact of Climate Change in Rural Livelihood: A Case Study of Guras Rural Municipalitya Ward No-4, Dhilekh** submitted to Research Committee under Graduate School of Humanities and Social Sciences, Central Department of Rural Development, Development Economic and Mathematics Mid-West University Surkhet, is my original work done in the form of partial fulfillment of the requirement for the Master's Degree in Rural Development.

……..

Khagendra Upadhyaya

RECOMMENDATION LETTER

This thesis entitled "**Impact of Climate Change in Rural Livelihood: A Case Study of Guras Rural Municipalitya Ward No-4, Dhilekh"** by Khagendra Upadhyaya is prepared under my supervision for the partial fulfillment of the requirements of Master's Degree in Development Economics. I recommend it to the Research Committee of Graduate School of Humanities and Social Sciences, Central Department of Rural Development, Development Economic and Mathematics Mid-West University, Surkhet for its final evaluation.

Date: 2081-09-11

.....

Mr. Lal Krishna B.C

Internal Supervisor

083-520309

Mid-West University

Graduate school of Humanities and Social Sciences,

Central Department of Rural Development, Development Economics and Mathematics

Birendranagar, Surkhet

F/Y:

Ref No. :

APPROVAL LETTER

This thesis entitled **Impact of Climate Change in Rural Livelihood: A Case Study of Guras Rural Municipalitya Ward No-4, Dhilekh** prepared and submitted by Khagendra Upadhyaya in Central Department of Rural Development, Development Economic and Mathematics in partial fulfillment of the requirements of Master's Degree in Rural Development has been accepted.

Evaluation Committee

Mrs. Bipana Devkota ……..

Head of the Department

Mr. Lal Krishna B.C …….……

Internal Supervisor

Mrs. Bipana Devkota …….……

External Supervisor

Dr. Aishwarya Prasad Dhakal ……..

Internal Observer

Date: 2081 / 10 /06

ABSTRACT

The study entitled ***Impact of Climate Change in Rural Livelihood: A Case Study of Guras Rural Municipalitya Ward No-4, Dhilekh*** *was carried out objectives are the back bone of the research. Present situation and practices of semi-urbanization in study area. The general objectives of find out the socio-economic characteristics in study area, to find out the impact of Climate change in rural livelihood of Dailekh. Agriculture in the dominant play Important role in providing problems of Gurans Rural Municipality of Dailekh t opportunity for people and to solve t However, there cases expected to be positive climate change induced effects on the health status of certain population in Gurans Rural Municipality. The sample are 25 households are select by purpose sampling method.*

While assessing the impacts of climate change experienced by the people, results shows that the climate change had several impacts on the rural livelihoods. More than 97% people are agreed with the observed impacts were decreasing in agriculture production, loss in biodiversity. Only 2% respondents are not agreed with decreasing in water resources, and increase in health hazards. It has shifted the cropping pattern, changing the ripening time of various local fruits, different flora and fauna are going to endangered. The third research question was how the people were adapting to the changing climate. It was found that people applied some adaptation strategies such as changing cropping time, crop type and rain water harvesting, installing improved cooking stoves, plantation of plants, soil conservation. In the research area only 12% respondents have planted cash crops because of decreasing the productivity of traditional crops, Though they did not have enough knowledge about the mitigation measures, they were protecting forests, and maintaining home gardens that could reduce the rate and volume of greenhouse gas emissions. There is an urgent need to formulate adaptive strategies for changing climate in the agricultural field, health, water resources and biodiversity sector from concerned authorities. Awareness, capacity building, and knowledge could be extended at local level. Policy has to be developed at national level for managing future risks and for integrating climate risk management into development strategies.

Key Words: occupation, income, facilities, infrastructure, climate change

ACKNOWLEDGEMENTS

First of all, I would like to express my supervisor Ram Kumar Pant, Lecturer of Department of RD, DE and Mathematics, Graduate School of Humanities and Social Sciences, Mid-West University, Surkhet for his continued guidance, encouragement, motivation and support at each steps of the study. His regular and extensive guidance and encouragement were main sources of inspiration accomplish this study successfully.

I would like to express my hearty gratitude to Mrs. Bipana Devkota, Department Head of Rural Development, Development Economics and Mathematics for her support and encouragement during the work. Similarly, I would like to express my gratitude to respected Associate Assistant Prof. Lal Krishna B.C., Professor Mr. Bhupendra Shahi of Mid-West University for providing me opportunity to conduct this study as a requirement for partial fulfillment of the Master's Degree in Rural Development.

My special thanks goes to my family members for their encouragement while conducting the work. Similarly, I want to thanks respondents for providing me time and information in the process of data collection. I would like to thanks Manaraj Devkota for typing, setting and printing of this thesis.

Khagendra Upadhyaya

TABLE OF CONTENTS

CHAPTER – FOUR

RESULT AND DISCUSSION

CHAPTER: FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

List of Table

List of Figure

ABBREVIATIONS/ACRONYMS

BASE	:	Backward Education Society
BS	:	Bikram Sambat
CA	:	Chartered Accountant
CBS	:	Central Bureau of Statistics
CBS	:	Central Bureau of Statistics
CF	:	Collection Frequency
CWIN	:	Child Workers Center In Nepal
DDC	:	District Development Committee
DMP	:	Birendranagar Municipality
DoF	:	Depth Of Field
FEDO	:	Female Development Organization
HDI	:	Human Development Index
HHs	:	Households
HMG	:	His Majesty Government
HOF	:	Head of the Family
INGO	:	International Non-Government Organization
NGO	:	Non Government Organization
NLSS	:	National Learner Satisfaction Survey
NNDSWO	:	Nepal National Dalit Society Welfare Organization
ODF	:	Outside Diameter Female
PHD	:	Psychology and Human Development
POP	:	Population
UN	:	United Nation
UNICEF	:	United Nation International Children Emergency Fund
UNICEF	:	United Nations International Children's Emergency Fund
VDC	:	Village Development Committee
WEF	:	World Economic Fund

CHAPTER-ONE
INTRODUCTION

1.1 Background of Study

Climate change issues are being globally prioritized agendas of development. It is affecting both developed and developing countries. Developed countries are more responsible for Greenhouse Gas (GHG) emission due to industrialization and other factors. The major GHGs are carbon dioxide, methane, nitrous oxide, per fluorocarbons, hydro fluorocarbons and sulphur hexafluoride (IPCC, 2007). The IPCC's fifth assessment report clearly indicates that anthropogenic activities have increased the processes of global climate change with 95-100% confident level. Increasing GHGs emission has contributed to increase atmospheric temperature. The available data shows that atmospheric air temperature has increased by 0.85 degree Celsius from 1880 to 2012. It has been estimated that it could be increased as much as 6.4 degrees Celsius on average during the 21st century (IPCC, 2013).

Climate change is being a more debated issue in the twenty first century, which is considered as one of the consequences of recent anthropogenic activities. Irrespective of the release of these GHGsby different nations, the effects of climate change are being observed in many such nations which have contributed very less. Himalayan countries including Nepal is regarded as one of the highly sensitive countries in terms of climate change vulnerability (Immerzeel et. al., 2010). The main adverse impacts of climate change in Nepal have been noticed in agriculture and food security, water resources, forest and biodiversity, health, tourism, and infrastructures (MoE, 2011). However, the impacts of climate change on livelihoods in Nepal differ in different parts due to variability in local environmental conditions. Agriculture is the main impacted sector (for livelihood) in Nepal that depends on climatic factors (Manandhar et. al., 2011). This has created a necessity to response and to develop adaptation strategies at the community levels as also indicated by Pickettset. al. (2013) for Canadian communities.

Mitigation and adaptation measures against the adverse impacts of climate change are being practiced all over the globe. Nepal is also doing some awareness activities, mitigation and adaptation measures at national, regional and local level (MoE, 2011). It has now been understood that the adaptation strategies neglecting

participation of local people is incomplete and the initiation and participation of local people is equally important for the successful planning and execution (Chaudhary and Bawa, 2011). A community level adaptation capacity can be a good option for minimizing the climate change impacts at local level. It also helps to identify the implication of climate change for livelihoods of poor rural people (Bishwakarma, 2010). It is also suggested that the success of adaptive strategies against the climate change impacts would benefit from synergies among the policy makers, researchers, and practitioners (Bryan et. al., 2013). Nevertheless, adaptation should not be seen in isolation and it should be incorporated in every level of planning and decision making through research and sustainable development (Parry, 2009).

Nepal is a multi-lingual, multi-ethnic, multi religious and multi- cultural Asian Landlocked democratic country, where as multi- geographical structure, Socio-cultural diversity and natural beauty. It has expanded in 147,181 sq. kilometre area, which is 0.03% of the world and 0.3% part of Asia. It is situated between two larger countries India and China. Geographically Nepal has divided in three parts Himal (Mountain) -15%, Pa had (Hill) 68 % and Teal 17% regions. According to out of total covering area mountain covers 35%, the hill corer 42% and the Terra cover 23% of the land area. According to administrative view it has divided in fifth development regions, 14 zones and 75 Districts. In present constitution Nepal has divided into 7 federal states remaining implementation.

Most parts of area have situated in rural or villages in Nepal and 83% people are in the rural area. Economically, Nepal in developing and agricultural country. Agriculture is main occupation of Nepalese people. Most of the Nepalese people involved in agricultural sector. They depend on agriculture. The development of agriculture is development of Nation But it is effected by climate change. Climate change has become the main subject in the world nowadays. Climate change has become the challenging effect for the human civilization. The condition of atmosphere which is for a long period in the earth it is called climate. So climate is changing every period which can't be same ratio, it is called climate change. As a result, air condition, water condition and temperature condition is changing in the earth. By human activities green house gasses are increasing now. As a result the temperature of the atmosphere is unbalance. For energy more use of coal and deforestation is increasing the carbon dioxide.

Climate change is the changing after a long time the average condition of the monsoon. Climate change is the changing for the ancient time. But it's more effects is applying in human well being. Nepal has already encountered same of the negative effects of global climate change. According to the national communication report prepared by the government of Nepal, net emission of Co, was about 9,747 tones and the net emission of methane was estimated to be 0948 tons in 1997. Studies done by Department of Hydrology and etymology show that average temperature in Nepal is increasing at a rate of approximately 0.06 degrees Celsius per year. Climate is commonly defined as the average weather for a long period of time for the given region. Climate encompasses different components like temperature, precipitation, wind etc. Climate change is a statistically significant change in measurement of either theme an state or variability or as a result of human interventions (Prevention consortium, 2007).

This is resulting in increase in the emission of green house gases reflecting variation in the climate statistics like temperature, precipitation and wind. (Orin and Eriksson, 2005).

Greenhouse gases are present naturally in the atmosphere, where as few green house gases a consequence of human activity. The green hi-use gases that are present in the atmosphere naturally include water vapour, carbon dioxide, nitres oxide, methane and ozone. There are few human activities and massive industrialization which increase the levels of most of these naturally occurring gases. Since the middle of 19th century, human agriculture and industrialization, have dispensed an enormous.

Quantity of these green house gases into the atmosphere, where these have trapped enough heat to begin climate change. The effects of climate changes are comprehensive Past and Current emissions mean that an increase in temperature of 1°c to 1.5°c is inevitable. Yet the increase of 0.6°c that has already occurred is having a severe impact on global ecosystems and especially on poor people. To avoid the most serious impact of global warming and climate change, the global mean temperature should be limited to a 2°c increase above pre-industrial levels.

Temperature rises beyond 2"e are likely to result in reduced crop yields in most tropical, subtropical and mid latitudes regions and some ecosystems will be it reversibly damaged or lost. It will contribute to result in much more flooding in low-

lying areas with decline in food production, an increase in disease, and the extinction of plants, animals and entire ecosystems.

Further, as a result of human activities, atmospheric concentrations of greenhouse gases are rising with them, global temperatures. In addition to increases in temperature, global Warming results in more extreme weather patterns, more rain, longer dry spells, stronger and more violent storms, more fires and the spread of tropical diseases. As climate change pushes the world toward more extreme weather, more and more people will be exposed to recurrent disasters during their lives. Ipecac (2007) predicted that there will be a widespread increase in the risk of flooding for many human settlements. Flooding and landslides, the unavoidable results of climate change, pose the most widespread direct risk to human settlements. It's estimated that by 2025 over half of all people living in developing countries will be highly vulnerable to floods and cyclones. Food, health, water and energy, the building blocks of livelihoods mayface many of the threats from and responses to global warming in the days to come. Without stopping the effects of global warming, it is clear that the viability of millions of people's lives and livelihoods will be undermined without significant new resources, millions of others won't be able to adapt to changes that are already happening The information is more scant for countries like Nepal as underdeveloped countries are Vulnerable to climate because of the factors like persistent poverty, illiteracy and ignorance. World Bank (2003) also mentioned that all countries are Vulnerable to climate change but the poorest countries and the poorest people within them are most Vulnerable. The scarcity of adequate information flow on climate. Change trends slow down the task of effective policy formulation regarding adaptation and mitigation, (Areal and Churchyard, 2009).

Making the poor countries and poor people more Vulnerable, Particularly, the poor and most Vulnerable people and the ecosystems in which they live on which they depend will bear the brunt of the impacts of climate change. In both developing and developed countries, the impact of climate change can be much greater for indigenous and davits communities who rely most directly on their immediate environments for subsistence and livelihood often living in the more remote and ecologically delicate zone.

To propose the impact of climate change in Agriculture of Gurans Rural Municipality in Dailekh is alike to be possible in several perspectives. This might be taken as a model of climate chance's impact. Dailekh is a one of the naturally beautiful district. In aspirant period it was divides thirteen states (Dailekh). Gaibanna is one of them. In Gaibanna it is available that rice, maize, wheat, potato farm etc. The landscape of this area is diverse including terraces, slops and flatlands covered by different types of vegetation. Most of the land is occupied by cash crops i.e. Tea, Broom grass, Big cardamom. This area is well forested with pine, utish, katush etc. But nowadays climate change is complex phenomena. So the impact is over many sector such livelihood of people, forest, animal, plants, flora and fauna, agriculture etc. Here in this thesis, the researcher try to study of impact of climate change in agriculture of Gurans Rural Municipality of Dailekh district Therefore, the study is helpful for those people who take interest about climate change and its impact in agriculture and to gain about knowledge of climate change for struggling from it. Also we can divide the impacts. of climate change among various sectors, water resources, health, forestry, agriculture, biodiversity, economy, tourism and so on. Here in this Study describes about impact of climate change in agriculture Sector.

1.2 Statement of the Problems

The historical and present condition between has been studying and analysis prove that climate change is changing before long time. Climate. change has become common problematic subject in the world. Particularly, Urbanization and industrial society main factors of climate change but it's effect has faced rural society and agriculture society. The lass of tap fertile soil due to soil erosion, landslide and folds coupled with negative effects of climate change way adversely reduce agricultural production in country. Nepal being agrarian country, in the absence of systematic irrigative facility, has to heavily depend upon natural rainfall (monsoon) So disturbances in natural rainfall pattern caused by climate change will responsible for enhanced food security and threat for Nepalese economy which is basically agriculture dependent Global warming may cause forest damage through migration towards the polar region, Changes in their composition, extinction of species This would affect net only vast biodiversity of Nepal but also the livelihoods of majority of people who derive fuel, food, fodder, timber and medicines form forest. The growing risk of malans, kalazar and Japanese encephalitis in commanded as the potential

impacts of climate change on human health as warmer temperature may create favourable. condition for more. Vectors and germs apurad such mesquites particulars subtropical and warm temperature regions of Nepal would be more Vulnerable to malaria, Japanese encephalitis and kalazar. That's why the main cause of the research are given on the points, (a) Less productivity became crisis livelihood because of the climatechange. (b) Agriculture sector and economic sector is becoming less day by day Global warming due to climate change has kept Nepal rich and diverse hie-diversity, ecology and infrastructure in the threat of destruction An increased emission of greenhouse gases into the atmosphere is further aggravation these problems though Nepal with the carbon emission of less than 0.023% in one of the worst suffers of climate change in the world and most vulnerable to climate due to its geophysical and socio economic conditions. According to a recent study Nepal's atmospheric temperature is increasing at an alarming rate of about 0.410e per decade (Dahal and Kansakar, 2005).

Poor people, women and marginalized communities are highly Vulnerable to climate change impacts. Thus, in order to secure their livelihoods, it is imperative that climate change issues be main-streamed as a key development concern Nepal being a largely agrarian economy highly sensitive to changes in climate and natural resource availability. Climate change threatens to reduce the effectiveness of development initiatives across Nepal. For example drying-added to a trend of warming will reduce food security and affect the availability of water resources. Further increases in the intensity of rains in other parts of Nepal particularly those where the topography is broken and soils eroded will experience increased flooding and landslide risks threatening human security, water supplies, urban infrastructure etc threatening all forms of livelihood of the poor people.

Nepal Agricultural Research council (NARC) has warned that the effect of a rise in temperature due to global warming will be greater on winter crops like wheat and millet. The vegetative state of those crops would be shorter with higher temperatures, thus lowering productivity (Upreti, 2003). All these scenarios are showing that crapping systems could change with climate change.

While the effects of climate change on glacial retreat and its associated hazards have been well assessed, there is paucity of information on its effects on

Himalayan vegetation, as well as plant succession on recently de glaciated soils Mountain communities are highly dependent on natural resources for the ecosystem services that they perform, Provisioning services (genetic resources, food, fibber, fresh water etc), regulating services (regulation of climate, water and human diseases), supporting services (Productivity, soil fertility and nutrient cycling), and cultural services (spiritual enrichment, recreation, aesthetics etc) (httpd.org/) Therefore, understanding the effects of climate change on Himalayan soil and vegetation dynamics is important for assessing impacts on mountain livelihoods, as well as for implementing effective conservation strategies.

There are very few studies regarding the impact of climate change in agriculture of particular place. This study helps to know the major thing about climate change and its impact as phenomena. This study will help the scientists who interested about climate change and its impact. The main purpose of this study is to find out the impacts in agriculture from climate change of the study area and give some recommendations to develop the agricultural crops as a model farm in future.

1.3 Research Questions

The research was oriented towards impact of climate change in agriculture techniques coped by the farmer. In addition to obtain proper information, following questions were asked and proper answer collected from respondents.

- What are the impacts of climate change in rural livelihood in the study area?
- What are the adaptive mechanism applied by the farmers?
- How these adaptive methods can be implemented on rural farm?
- Are they felt about climatic variations in theirs environment?
- Have they felt any changes in climate behaviour in last few years?

1.4 Objectives of the Study

1.4.1 General objective

The general objective of the study is to know the impact of climate change in rural livelihood in Gurans Rural Municipality of Dailekh.

1.4.2 Specific objectives

The specific objectives of the study area:

1. To assess the impact of climate change on rural livelihood in study area.
2. To analysis the impact of climate changes in rural livelihood.

1.5 Significance of the Study

Necessary the importance of studying the impact of climate change is increasing day by day. Because of climate change the crops are affected by climate and people have to know about climate and its effects it is inform the effects of climate change for making door environment for the coming generation. Today's necessity is to know the impact of climate change for making good environment. It has seen. population growth and food scarcity present context. So, scientific study and analysis is necessary to know impact of climate change. What types of climate change effects agriculture? Which place in effected by climate change? Which place is affected by climate change? It must be find out compulsory such kind of problems. We can know actual problem by the study and evaluation impact of climate change. So, to live being happily human community must be accordions about impact of climate change.

1.5 Limitations of the Study

Any kinds of Research works have been done with in certain area of limitation. But it determines its nature, situation and area of study. This study has some limitations which are as follows:

- The research was conducted in Gurans Rural Municipality of Dailekh District.
- The result was applicable only for the study area,
- The research was based on sample data collection in Gurans Rural Municipality.

- The research was related with agriculture sector where included maize farm, paddy farm and other type of farming.
- There work asked primary data and secondary data for the research.
- The research was conducted within 25 households in stay area.
- The conclusive/result derived from the research depends on the reliability primary and secondary data collected by different data collection instruments.
- This study mainly based on the data of field survey and secondary information was also used as and where needed. The research highlights the present condition of impacts of climate change in agriculture of Gurans Rural Municipality.
- The research was concerned only about the subject water of climate change.

1.6 Organization of the study

This thesis is divided in to four chapters as follows.

Chapter One:present introduction of the study, statement of the problem, objective of the study, justification of the study and limitation of the study.

Chapter Two: discusses the relevant literature of different issues related to the climate change and its effects on rural livelihood from the different perspectives

Chapter Three: presents the methodology adopted for the study to collect data from the field and the method of analyses.

Chapter Four: presents the introduction of the stay area and research data analysis and presentation, the agricultural trends in Gurans Rural Municipality impact of climate change in rural livelihood and biodiversity in Gurans Rural Municipality, problems faced by people of Gurans Rural Municipality of impacts of climate change.

Chapter five : Recommendations Presents summary, conclusion.

CHAPTER-II

REVEW OF LITERATURE

This chapter contains the review of different literatures related with the concepts, theories, impacts and adaptation measures that are practiced in the global context and Nepal. Various issues that are linked with the climate change and its impacts as well as the adaptation measures applied against adverse impacts of the climate change are presented in this chapter. Further, the identification of the gap and possible solutions on linkages between climate change impacts and possible local level adaptation measures are presented in this chapter.

2.1Theoretical Review

The theoretical review has been presented for providing the basis of the study. This research is fully based on Community Based Adaptation (CBA) theory and practices which concentrates on community's perceptions on the adaptation measures carried out according to the need of the community people. CBA theory focuses on empowering local communities so as to reduce their vulnerabilities at the community level. It has been increasingly recognized as a vital theory to build the capacity of vulnerable communities and people to adapt against the adverse impacts of climate change. The theory is grounded in good development practices with major development learning. It also focuses on sustainable livelihoods, attention to differences within communities of impacts and adaptive capacities, integrating right-based approaches, and addressing gender inequality and marginalization. These all ensures that the most vulnerable groups and people are able to adapt against adverse impact of climate change (CARE International, 2009).

Similarly, Climate Change Theory discusses about concentrations of greenhouses gases in the atmosphere which are rising. The Earth surface is rapidly warming and its climate is changing (Smith and Peake, 2009).

2.1.1 Anthropogenic Global Warming (AGW) Theory

It is the first theory developed arguing the change is due to the anthropogenic activities. It believes that human activities mostly industrialization has resulted in the higher emissions of greenhouse gases like carbon dioxide (CO_2), methane (CH_4) and

Nitrous Oxides (N_2O) that have been responsible for the rise in global temperature (Bast, 2010).

The proponents of AGW theory are confident that human emitted CO_2 from massive industrialization have been responsible for the consequences like floods, occurrences of droughts, severe weather patterns, failure of different food and cash crops, extinction of species, spread of diseases, ocean coral bleaching, famines and literally hundreds of other catastrophes. The author stressed that the disasters are likely to become more frequent and more severe as there is continuous rise in temperature. Further, the theory concludes that with the rapid reductions in the emission of these greenhouse gases, the planet is likely to be saved from catastrophic events; without its reduction, the planet is soon likely to face catastrophic events (Bast, 2010). Thus, it can be argued through this theory that the recent changes in the climatic factors have been human induced and it depends upon us to save our planet from facing catastrophic events.

2.2 Concepts of Global Warming, Greenhouse Effect and Climate Change

2.2.1 Global Warming

The issues of global warming first entered the general public's consciousness by the hot summer of 1988. James Hansen of the National Aeronautics and Space Administration's Goddard Institute for Space Studies warned that the Earth's temperature was gradually rising. It was agreed by most of scientists that climate change occurred due to carbon dioxide emissions from industrial activities (Douglas, 2010). The United Nations, alarmed by this and similar disclosures, in turn established the Intergovernmental Panel on Climate Change (IPCC) at the end of 1988 to assess the impacts of global warming and suggest strategies by which nations could curb carbon dioxide emissions.

Rising fossil fuel burning and land use changes were major factors responsible for increasing the quantities of greenhouse gases in the Earth’s atmosphere. The rise in these greenhouse gases has caused a rise in the amount of heat from the sun that are withheld in the Earth’s atmosphere, heat that would normally be radiated back into space. This increase in heat has led to the greenhouse effect called global warming, resulting in climate change (Peake and Smith, 2010).

Climate change is a natural phenomenon but recently the anthropogenic activities have accelerated the emissions of greenhouse gases (GHGs) primarily from industrialization, deforestation, and increased use of fossils fuels for transportation (Long, 2010). The IPCC's fifth assessment report clearly indicates with 95-100% confidence level that anthropogenic activities have accelerated the processes of global climate change (IPCC, 2013). Increasing GHG emissions has contributed to the increase in the atmospheric temperature. There have been changes in rainfall patterns (high, low, and intensive rainfall) and seasons due to climate change (IPCC, 2013). The available data shows that air temperature near the earth's surface rose by 0.74 degree Celsius from 1906 to 2005 and scientists estimated it could increase as much as by 6.4 degree Celsius on average during the 21st century (IPCC, 2007).

The major characteristics of climate change are: increases in average global temperature (global warming); changes in cloud cover and precipitation particularly overland; melting of ice caps and glaciers and reduced snow cover; and increases in ocean temperatures and ocean acidity – due to seawater absorbing heat and carbon dioxide from the atmosphere (IPCC, 2013). It is now clear that global warming is mostly due to man-made emissions of greenhouse gases (mostly CO_2) among other six GHGs. Over the last century, atmospheric concentrations of carbon dioxide increased from a pre-industrial value of 278 parts per million (ppm) to 379 ppm in 2005 and 391 ppm in 2011, and the average global temperature rose by 0.85° Celsius from 1880 to 2012 (IPCC, 2013).

2.2.2 Definition of Climate Change

According to Intergovernmental Panel on Climate Change (IPCC), climate change refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties and that persists for a decades or longer periods. It refers to any change in climate over time, which may be natural variability or as a result of human activity (IPCC, 2007).

Similarly, United Nations Framework Convention on Climate Change (UNFCCC) has defined climate change as a change of climate that is attributed directly or indirectly to human activity, that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over

comparable time periods. So, climate change is changes in parameters of climate over the time periods due to both natural and human causes, showing its impact globally to local level in all sectors. Scientists have also projected about its adverse impacts in near future as well.

2.2.3 Drivers of Climate Change

Changes in the atmospheric concentrations of GHGs and aerosols, land cover and solar radiation alter the energy balance of the climate system; which are known as drivers of climate change. They affect the absorption, scattering and emission of radiation within the atmosphere and at the Earth's surface (Peake and Smith, 2009).

Natural and anthropogenic substances and processes are major drivers of climate change that alter the Earth's energy budget. Radiative forcing (RF) quantifies the changes in energy fluxes caused by changes in these drivers for 2011 relative to 1750 (IPCC, 2013). Now, the fifth assessment report of IPCC has revealed the radiative forcing is positive and has led to an uptake of energy by the climate system. The largest contribution to total radiative forcing is caused by the increase in the atmospheric concentration of CO_2 since 1750 (IPCC, 2013). Similarly, positive radiative forcing leads to surface warming whereas negative radiative forcing leads to surface cooling.

Climate change is the greatest issue in the world. Efferent scholars and organizations have defined climate change self style. In this regard, according to Windpipe the free enevelopedia "Climate Change is any long term change in the statistics of weather over periods of the time that range from decades to millions of years" It can express itself as a change in the mean weather conditions, or in any other part of the statistic distribution of water. The effects of green house gases on both drought and flooding events have been found. Including several winter drought and excessive monsoon flooding. Climate change has been alarming in the world by global warming which caused by increasing concentration of green house gases (GIG) physical impacts of climate change and deforestation. In Nepal 95% of (GHG,o) envisions from forestry sector only. The consequences of global warming have seemed globally specifically in developing and in to mountainous countries like Nepal has high Extensibility rainfall during ring season it resulted heavy floods, landslides

and soil erosion. It also common to find drought in many parts of Nepal that comes out the impacts of climate change are evidences on sectors like forest, water resources, agriculture, human health and biodiversity in Nepal. Likewise, altogether 14 glacial lake outburst floods (Glans) have happened between 1935 and 1991 in Nepal In total 21 GLF, have been identified as being potentially dangerous at present In this way, climate change and livelihoods integral part and have voiceversa relationship. The low income and subsistence users are about 38% of total population of Nepal lies below the poverty line have hard time to afford for their livelihoods in Nepal. That is a great challenge to cape with climate change induced hazard and extreme events. The livelihoodsof more than 80% local people of hilly area such as agriculture forest and livestock and on other natural resources such as water and irrigation Some of the literature related to study have been discussed as follows,

Nepal has felt the adverse impact of climate change even though its contribution to global green house gases (GHGs) is negligible. Many scientists have expressed concern that the general rise in temperatures at high altitudes poses a serious environmental and humanitarian threat in Nepal as many glaciers and glacial lakes are located in the high Himalayas. For this study, I have observed rising temperatures in the Lang-tong catchment are decreasing Given these findings, Nepal may be facing increasing water scarcity while also keeping more serious watch on glacial melt. (Gautam, 2008)

Climate can be defined as the average weather scientifically, climate is the statistical description in terms of the mean and variability of relevant quantities over period of time ranging from months to thousands or millions of years. (Gautam, 2008).

Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to anthropogenic causes or natural processes. The united Nations Framework convention on climate change (UNFCC) also defines climate change in Article 1 as follows; "A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition

to natural climate variability observed over comparable times periods."(Gautam, 2008).

Anthropogenic climate change refers to climate change resulting from human activity Human activity that could possibly change the climate include emission of gases into the atmosphere, industrial activities, development of extensive cities, pollution of water ways and cities, diversion of water, creation of thousands of dams and lakes, conversion of grassland or forest to crop-land and agricultural activities. (Pistachio and Albrecht, 2006).

Global warming is considered as one of the major factors causing climate change. Even a conservative estimate of 1°c increase could have dramatic effects for all aspects of human life. For example, during the medieval warming period (1200-1500A.D.), and during the little ice age (1600-1700A.D.) The average temperatures were 0.5 higher and 0.5°c lower respectively than they are today (https://www.jstor.org, 1997).

Scientific studies have shown that due to a higher concentration of GHGsi the atmosphere, global warming has intensified. The higher carbon dioxide concentration has resulted from bumping of fossil fuels (coal, oil and natural gas) and deforestation. The global carbon dioxide (co2) concentration increased from 316 parts per million (ppm) in 1959 to 389 ppm in 2008. (Gantam, 2010).

Nepal is a mountainous and landlocked country having an area of 147,181 square kilometre. The country is located between 26°22' 10 30°27 north latitudes and 80'04" to 88°12 east longitudes. It occupies about 0.03 percent of the total land of the earth and about two-thirds of its land is hills and mountains. It extends approximately 885km east to west and about 193km north to south. Elevation of the country starts from 61 m to 8848 m within a span less than 200km. The world wildlife Fund (2005) reports that the Nepal Himalaya contains 3,252 glaciers and 2,323 lakes above 3,500m above mean sea level (aims). Glaciers cover an area

of 5,323km, with an estimated ice reserve of 481km,, By basin, the koshi River contains 779 glaciers and 1062 lakes, Gandaki River basin consists of 1025 glaciers and 338 lakes, the karnali River basin consists of 1,361 glaciers and 907 lakes, and the Mahakali basin (within Nepal), consists of 87 glaciers and 16 lakes. Glaciers are an important means of freshwater storage in Nepal as they accumulate

water in monsoon and winter seasons at higher altitudes and proved melt-water at lower elevations during the dry seasons. The importance of glaciers extends beyond Nepal, the Ganges Basin draws up to 80% of its water flow from Nepal rivers (World Bank, 2012).

Impacts of climate change can be categorized both positively and negatively. In a positive sense, winters will be less cold and more vegetation can be produced in high attitudinal areas. However the rise in mean temperatures, currently projected to be as high as 5.8°c. over the next century, may produce several of the negative consequences listed in table (Gautam, 2008).

In global context, 2009, ranked as the fifth warmest year on record since the beginning of instrumental climate records around 1859. On the decal scale, the 2000, (2000-2009) were warmer than the 1990s, which in turn were warmer than the 1980s and earlier decades. (WMO, 2009), n Water distribution is uneven in Asia and it has a large and dense population with a fast growth rate. In this setting, it is expected that climate change will intensify water scarcity in Asia, adding to already present socio-economic stresses (Gautam, 2008).

The Himalayan regions are located in the northern part of Indian sub-continent. The Himalayan region contains many rivers and the abundance of water in the area influences meteorological and hydrological conditions in the Indian sub-continent. It is assumed thateven a minor change in the climate of the Himalayas could cause disastrous consequences on the socio-economic condition of millions of peoples living downstream of the river systems. (Bhutiyani, 2007).

Climate change may be intensifying the spread of mosquito-related diseases such as malaria, dengue fever, Ross River Virus and west Nile Virus. (Magar, 2013).

Gaire (2005) studies dynamics of Respectability relation to climate change at the tree line e co tone in language National Park. They collected tree core sampling and found that upward advancement of tree line should be expected in the coming decades. They further included that the general increase of winter minimum temperatures might be responsible for the upward advancement of the tree line and early melting of snow

Nepal Agricultural Research council (NARC) has warned that the effect of a rise in temperature due to global warming will be greater on winter crops like wheat and millet. The vegetative state of those crops would be shorter with higher temperatures, thus lowering productivity. All these scenarios are showing that cropping systems could change with climate change (Magar, 2013).

The average number of 'hot' nights per year in Nepal increased by 9. and the average number of 'cold days per year has decreased by 19 of days between 1960 and 2003 'Hot' day or 'hot' night is defined by thetemperature exceeded on 10% of days or nights in current climate of that region and season. A general circulation model (GCM) projection has shown that. mean annual temperatures are projected to increase by 1.3 to 3.8°c by the 2060s and 18 to 5.8°c by 2090s. (Gautam, 2008).

Several temperature analyses in Nepal have shown that warming is occurring at much higher rates in the high attitudinal regions than in the low attitudinal regions. (Chhetri , 2013).

Chaulagain (2009) studies glaciers in language Himalayas and found that they may disappear within two centuries at current temperature rates Seventy-five percent of language glaciers will disappear within 3-4 decades and only 24% of the basin may remain by 2100 AD even without any further warmingWhile the effects of climate change on global retreat and its, associated hazards (eg GLOFs) have been well assessed, there is paucity of information on its effects on Himalayan vegetation, as well as plant succession on recently de glaciated soils. Mountain communities are highly dependent on natural resources for the ecosystem services that they perform, provisioning services (genetic resources, food, fibber, fresh water etc), regulating services (regulation of climate, water and human diseases), supporting services (productivity, soil, fertility and nutrient cycling), and cultural services (spiritual enrichment, recreation, aesthetics etc). Therefore, understanding the effects of climate. change on Himalayan soil and vegetation dynamics is important for assessing impacts on mountain livelihoods, as well as for implementing effective conservation strategies (Gurung, 2012).

There is a worldwide consensus that global warming is a real, rapidly advancing and widespread threat facing humanity this century Scientists have presented evidence and tested models to substantiate this truly alarming facts. The

evidence confirms that man-made factors such as deforestation, agriculture, industries, automobiles, and the burning of fossil fuels, are contributing to Greenhouse Gas (GHG) emission, a major cause of global warming. The warming has manifold impacts on ecosystems and biological behaviors. Some widely discussed impacts include snow melting and glacier retreat, drought and deforestation, flooding, frequent fire, sea level rise, species shifts, and heightened diseases incidence. These ecological and biological responses can consequently lead to serious consequences. for human wellbeing. (Mehl and Karl, 2000).

Temparature and precipitation are two important climate factors affected by climate change in general and global warming in particular. Although global average temperature was warmed and cooled many times in the past, it has been constantly rising since the mid-twentieth century and is likely to rise constantly in the future mainly due to an increased concentration of GHGs in the atmosphere without GHGs, the earth's surface temperature would be 60'c cooler than it is today (Groom. 2007).

Global warming is not only affecting climate and ecosystem, but it is also impacting human wellbeing Warming affects various man- dominated ecosystems and biophysical systems that support human wellbeing. Agriculture is affected most when drought adversely impacts rain-fed agriculture, largely in developing countries where the majority of farmers practice subsistence agriculture. (Pimeatal and Pimeatal, 2006).

Ecosystem degradation often follows the floods, GLOF and droughts caused by snow melting and heavy rain. Floods carry debris downstream, affecting soil properties, hydrology, hydrochemistry, evapo-transpiration and microbial activities. Water upsurge and debris flows. triggered by GLOF have damaged forests, agricultural lands, walking trails, bridges and rivers as for as hundred of meters downstream (www.unep.org, 2002).

As in other regions of the world, climate and ecological changes caused by global warming have resulted in several negative consequences for people's health, the economy and livelihoods in Nepal. Every year, diseases and natural calamities caused by such changes claim the lives of several people, the majority being poor women and children who lack the capacity to adopt to change For instance, Diarrhea kills 12,000 people annually in Nepal and most of the affected are children below.

It is likely that when the weather gets warmer, micro-organisms become more active and act more quickly on the foods we eat. Since people in developing countries often have poor sanitation and lack refrigeration, and thus have no choice but to eat leftover foods, they are likely to be affected by such pathogens very easily. Foods following ice melting and lake outburst or river overflow also kill several people by adversely affecting water quality from debris carried by adversely affecting water quality form debris carried along with the flood. Between 2000 and 2005, more than 1300 people, mostly poor, were killed by floods and landslide related disasters. (CBS, 2006).Agriculture the mainstay of rural food and economy that accounts for about 96% of the total water use in the country-suffers a lot from erratic weather patterns such as heat stress, longer dry seasons anduncertain rainfall, since 64% of the cultivated area fully depends on monsoon rainfall. (CBS, 2006).

The earth has warmed and cooled several times as a natural process and will do so in the future. What concerns the global community is the alarming constant, yet unprecedented, increase of temperature exercised in some regions. Scientists are now in agreement that human activities releasing GHGs into the atmosphere are responsible for the already observed global warming causing climatic changes, (https://www.ipcc.ch/). It is important to reduce the effects of climate change byrestraining activities that produce carbon and other green house gases Certain mitigation measures can be followed to reduce carbon emission and enhance carbon sinks, as suggested by the international community and agreed upon in conventions. Forests provide a carbon reservoir as they contain about 60% of all carbon stored in terrestrial ecosystems and they serve important adaptation buffers. Since deforestation contributes about one-fourth of global carbon emissions, the first and most important task is to curb deforestation and invest in reforestation activities. This can be achieved by providing rural people with alternative energy sources, such as biogas, solar power and hydroelectricity and by adopting better land use management to improve carbon sinks. If we preserve forests, they can store large amounts of carbon and reduce warming substantially. Non-agriculture employment and other alternative income source can also reduce the dependence of people on forest resources. In forming, better agricultural technologies, including introduction of drought-tolerant (water-glass) crops that perform well with low external inputs (eg chemical fertilizers, pesticides), can also offset crop losses that might be caused by drought. These

measures all require strong and vibrant policies and commitment to international treaties such as facilitation of the clean Development Mechanism (CDM) and carbon markets that facilitate payment for important environmental services. (Magar and Arayal, 2009).

The greater Himalayan region, sometimes called the 'Roof of the world, is noticeably impacted by climate change The most widely reported impact is the rapid reduction in glaciers, which has profound. future implications for downstream water resources. The impacts of climate change are superimposed on a variety of other environmental and social stresses, many already recognized as severe (Ives and Messeri, 1989).

The 'roof of the world is the source of ten of the largest rivers in aria. The basins of these rivers are inhabited by 3.1 billion people and contain seven mega cities. Natural resources in these basins provide the basis for a substantial part of the region's total GDP and important environmental services, which are also of importance beyond the region. (Penland and Kulp, 2005).

Continuing climate change is predicted to lead to major changes in the strength and timing of the Asia monsoon, inner Asian high pressure systems, and winter westerlies the main systems affecting the climate of the Himalayan region The impacts on river flows, ground water recharge, natural hazards, and the ecosystem, as well as on people and their livelihoods, could be dramatic, although not the same in terms of rate, intensity, or direction in all parts of the region. Given the current state of knowledge about climate change, determining the diversity of impacts is a challenge for researchers, and risk assessment is needed to guide future action. (Shrestha, Baidhya and Nepal 2006).

The Himalayas display great climate variability. The mountains act as a barrier to atmospheric circulation for both the summer monsoon andthe winter waster lies. The sammer monsoon dominates the climate, lasting eight months (March-October) in the ea stem Himalayas, four months (June-september) in the central Himalayas, and two months (July August) in the western Himalayas. (Chalise and Khanal, 2001).

The monsoon rainfall is mainly of an orographic nature, resulting in district Variations in rainfall with elevation between the southern slops of the Himalayas and

the rain shadow areas ont the Tibetan Plateau. On the time-scale, the impacts of climate mainly due to local topographic characteristics. (Chalise and khanal, 2001)

Climate change is currently taking place at an unprecedented cate and is projected to compound the pressures on natural resources and the environment associated with rapid urbanization, industrialization, and economic development. It will potentially have profound and widespread effects the availability of, and access to, water resources. By the 2050s, access to fresh water in Asia, particularly in large basins, is projected to decrease (Shrestha, 2004).

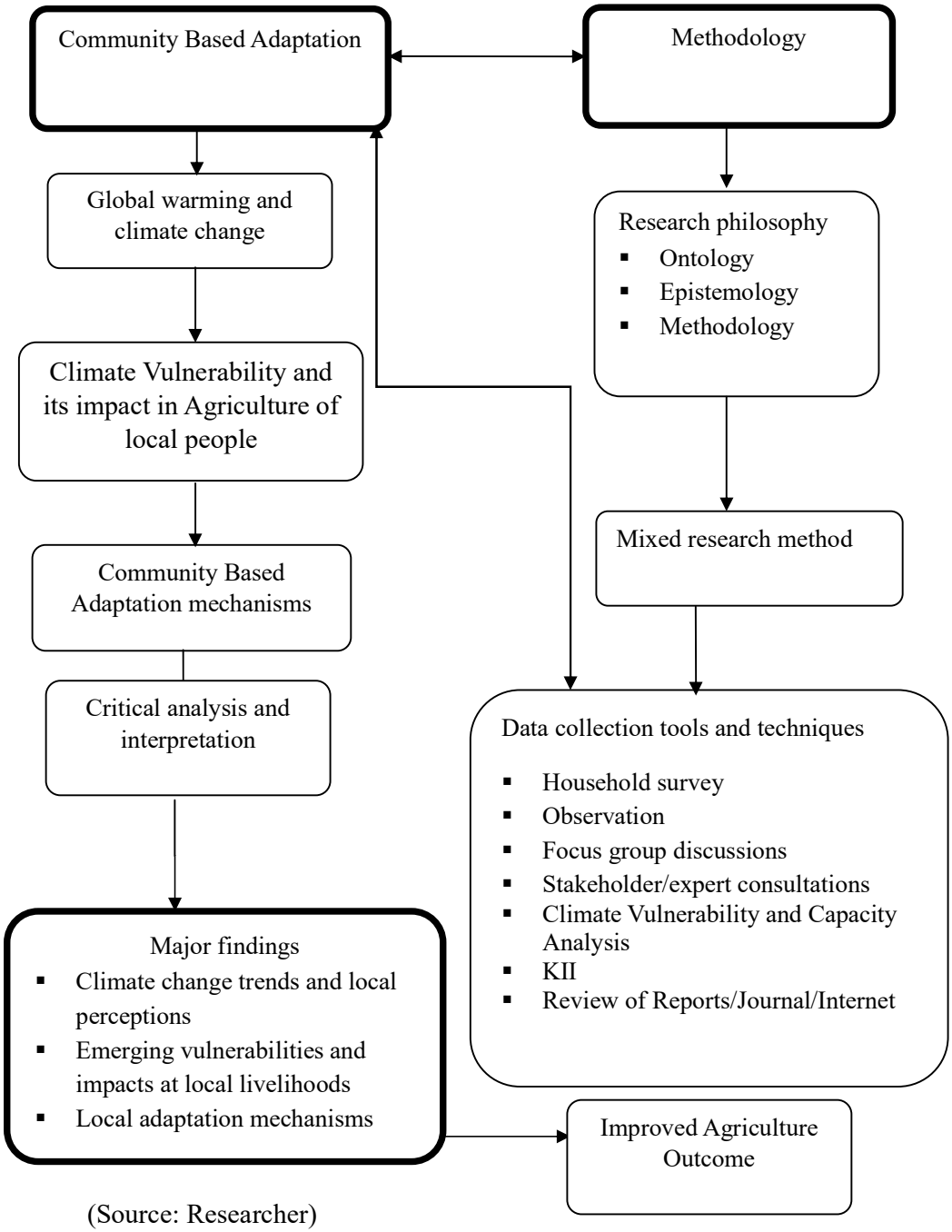
The location and area of natural vegetation zones on the Tibetan platesen will change substantially under projected climate change scenarios. Areas of temperate grassland and cold temperate conferous forest could expand, while temperate and cold deserts may shrink. The vertical distribution of vegetation zones could move to higher altitude climate change may also result in a shift of the boundary of the farming-pastoral transition region to the south in North-east china, which mayincrease grassland areas and provide more favourable conditions fr livestock production. However, the transition area of the forming Pastoral region is also an area of potential desertification, and of protection measures not taken in new transition areas, desertification may occur. (Li and Zhou, 2001).

Mountain ecosystems contain a series of climatically very different zones within she rt distances and elevations. They display a range of micro-habitats with great biodiversity. Mountain ecosystems are sensitive to global warming and show signs of fragmentation and degradation.and wires, 2004). The impacts of climate change on forest ecosystems include shifts in the latitude of forest boundaries and the upward movement of free lines to higher elevations, Changes in species composition and in vegetation types, and an increase in net primary productivity. In the eastern Himalayas, forest vegetation will expand significantly, forest productivity will increase from 1 to 10%, and it is expected that forest fires and pests such as the North American pine-wood nematode will increase as dryness and warmth increase (Rebate and Desertion, 2004) The impact of climate charge on health conditions can be brokeninto three main categories: (i) direct impacts of for example, drought, heat waves, and flash floods, (ii) indirect effects due to the spread and aggravated intensity of infectious diseases due to changing environmental conditions,

"Climate change is any long tone change in the statistic of weather over periods of the time that range from decades to mull us of years. It can express itself as a change in the mean weather conditions, or in any other part of the statistical distribution of weather Climate change may occur in specify-specific region, or across tide whole earth. The term climate cleaning is often used interchangeable with the term global warming but according to the National Academy of sciences the phrase Climate change is growing in preferred use to global warming because it helps to convey in caning of other tents related to climate change in addition to rising temperatures Climate change refers to any significant change in measures of climate (Such as temperature, precipitation at wind) lasting for an extended period, decade or longer Sudden and unexpected change in weather or season is known as climate change (Sapkota, 2064) reveals strong need of government, civil societies, involvement of Nags for the lags quality of outcome in the bead of climate change and environment management. In my opinion climate change is the common problems of the solid So, we should be aware tom today.

2.6 Conceptual Framework

My research was fully based on Community Based Adaptation (CBA) theory and practices. Similarly, this study has applied Climate Change Theory for making the study more scientific. Following is the conceptual framework applied for study.



(Source: Researcher)

CHAPTER-III

RESEARCH METHODOLOGY

Research methodology is necessary for any research work appropriate to present short account of methodological aspect which has been used for this study. There various methodology that applied to get related information and facts for their specific research however, there is not only one method to collect the information related to all aspects of human society and used of more techniques is also not be a practical in terms of cost, time and technique should be selected for Therefore appropriuate data collection study. So, that the researcher could get maumum information by utilizing this une cost and other available resources. For this study a combination of data collection techniques are used. Reliable and relevant study can be made possible only by applying scientific method, us, the primary purpose of this chapter is to discuss and design the framework for the research.

3.1 Rationale Selection of the Study Area

This study focused on the impact of climate change in agriculture. Peoples of Gurans Rural Municipality of Dailekh district are selected as the project for the study. Dailekh District is one of the famous districts for the agriculture as tees, cardamom, maize, millet, rice cultivation texture between 26°18 Norths latitude and 8725 Fast to 8745 Fast longitudesGurans Rural Municipality is Dailekh district. It is called Athirai Polhari panchayat befor 2037 Bs. The elevation of the study is 1204 meter to 2500 meter from the sea level. In the 19" century one of cest of limbo is kundarngwa who made as umbrella mone which is big and stayed in Dailekh in called in Nepali MunicipalityChhata Jasto Dhunga The name of Gurans Rural Municipality derived from it. In this Gurans Rural various types of plants are available which creates vegetation situation round the year. The land scope of the area is drivers inclualing terraces, slopes and flat lands covered by different types of vegetation. Most of the land is occupied by cash crops, Tea. Hroom grass, cardamors. This area is well forested with pine, urish, shhap, katush etc. Hecause of climate change study area, there is available for orange, mango, utish etc, Climate is a one of the determining factor for human settlement as well as agricultural cultivation. If climate is suitable, there will be the great possibility to develop the agriculture. In Gurans Rural Municipality the emulate is sub-tropical which has made an applying atmosphere

round the year, water resources are going to he disappeared so the life is very congested and not proper managed Such Type of research has not done in the past, such research study was necessary to be done, therefore, the rescurcher chooses this area as a research etc.

3.2 Research Design

The present study is based on filed survey in order to fulfil the specific objectives of the study. Exploratory research design is applied this study is based on both primary and secondary dam, but the analysis is mainly depended on primary data, which is collect by questionnaire method the research. applied of impact of climate change agriculture in Gurans Rural Municipality of Dailekh. Te To meet the objective of the study (research) descriptive and exploratory research design has been adopted. The study depends upon the response of respondents Since the research aims at findings out the impact of climate change in agriculture in Gurans Rural Municipality of Dailekh.

3.3 Universe and simple size

Gurans Rural Municipality of Dailekh District has been taken as the universe for the study but due to various constraints lewis universe cannot included studied. So, only the selected area of hat this research the respondents selected fry purposive sampling method and simple tanksampling procedure bus been used for survey of local residents who interested about climate change. The purposive sampling method used to reach the problems and to know the actual condition of the selected area out of 40 households, the sample size was selected 25 households in Gurans Rural In general, the researcher visited in the salty area and determined the population of worker by anther, used to purposive sampling method to select the respond onrse and Sample Size of the Study .drinking water were directly observed during the field survey period through participant and semi participant observation methods observation from developed and used in order to obtain qualitative information observation technique is also applied for qualitative data.

3.4 Nature and Source of Data

The primary data and also supported by the secondary data. Primary data has been collected survey through differed data collection tools and techniques. Similarly,

secondary data has also be relevant book newspapers, reports, bulletins and previously done/dissertations. Both pyrometer and secondary data are used for this study to make study more effective and authentic Bloch qualitative and quantitative data were taken from the field work.

3.5 Methods of Data Collection

For the data collection is following thechniques and tools were used:

3.5.1 Households survey

The households survey information was collected to the interview face to face about the climate change and close ended questionnaire were prepared to get information of households man.

3.5.2 Key information interview

Unstructured schedule the data was also collected from instructed interview. The respondent of such key information interview were especially renowned persons of Study area as well as Dailekh District.

3.5.3 Observation

Different condition of water resources, forests, crops, castle's directly observation by the help of site observation check-list during the study period. Prior to the vista of the filed a check-list was papered not to be confused during filed study for what to be observed.

3.6 Data Presentation and Analysis

When the field survey and data collection were completed. The gathered data and maturation were processed manually The data were analysed both in qualitative and qualitative ways. Descriptive analytical tools such as percentage table and charts were also presented wherever for necessary.

3.7 Ethical Consideration

On the process of study on respondents on Guresh rural municipality of Dailekh District the researcher followed formal process of research ethics review. So, the researcher requested the research committee to approve the ethic review that the researcher is no violating any considerations. Researcher maintained the confidentiality and balanced behavior and anonymity to anyone. The researcher did not force to answer the questionnaire if they didn't wish to answer.

CHAPTER-FOUR

RESULTS AND DISCUSSION

4.1 Socio-economic Status of Respondents

This sub section of the study was concerned with the analysis and interpretation of household information and socio-economic features of the respondents which include number of family size, education, marital status, etc. of the respondents.

4.1.1 Age structure

Age is **t**he duration of time that a person or thing has existed. In the study, respondents with different age groups were found which has been presented in the following table.

Table 1

Distribution of the respondents by age group

Age group	No. of respondents	Percent
Less than 20	2	4
20-25	3	12
26-30	3	12
31-35	8	32
36-40	5	20
Above 40	4	16
Total	25	100.00

Source : Field survey, 2024

Table shows that 4 percent respondents belonged to the age group less than 20 years, 12 percent of respondents belonged to 20-25 years, 12 percent of respondents belonged to the age group 26-30 years and 32 percent of respondents belonged to the age group 31-35 years. Similarly, 22 percent of them belonged to 36-40 years group and 14 percent of the total respondents belonged to above 40 years in the study area.

4.1.2 Family Size of Respondents

Family size is a fundamental social group in society typically consisting of one or two parents and their children. Respondents were asked about the number of their family members and the response obtained from them has been shown in the table no. 2.

Table 2

Distribution of the respondents by size of family

Size of family	No. of respondents	Percent
Up to Three	8	32
Four	9	36
Five	6	24
More than five	2	8
Total	25	100.00

Source : Field survey, 2024

Table 2 reveals that 32 percent of respondents had up to three members in their family. Similarly,36 percent of respondents had four members, 24 percent of respondents had five members and 8 percent of respondents had more than five members in their home. The median family size is 4 members in the study area.

4.1.3 Educational status of Respondents

Respondents were asked about their educational status. The following table first of all identify the literacy status and then among the literate primary include 1-8, higher education include up to 12 and above, no schooling literate means adult literacy or informal education. The response obtained from the respondents has been shown in table no. 3.

Table 3

Distribution of the respondents by educational status

Educational status	No. of respondents	Percent
Non schooling literate	2	8
Primary	5	20
Lower secondary	4	16
Secondary	9	36
Higher education	5	20
Total	25	100.0

Source : Field survey, 2024

The table above presents that among the literate, 8 percent of respondents had non schooling literate, 20 percent of respondents were primary, 16 percent of lower secondary, 36 percent of respondents were secondary and 20 percent of respondents had higher education belonged education status.

CBS (2022) mentioned that 56 percent women are literate in Nepal whereas 20 percent of respondents were literate in the study area. The data shows that the literacy rate was very higher than the national literacy rate.

4.1.4 Religious composition of Respondents

In Nepal, there are 10 identified religious groups (CBS, 2022). In the study area, different religions were found too which has been shown in the following table:

Table 5

Distribution of the respondents by religion

Religion	No. of respondents	Percent
Hindu	25	100.00
Total	25	100.00

Source : Field survey, 2024

The above table presents that almost all (100 respondents) belonged to Hindu religion. In Nepal, 81 percent people belonged to Hindu (CBS 2011). It can be concluded that the number of respondents belonged to Hindu religion were very high than the national data

4.1.5 Population Composition of Gurash Rural Municipality

Population is the main part of the society, Different categories of Population play the vital role for the development of any area the following table Shows the population composition of Gurash Rural Municipality.

Table 4.1

Population Composition of Gurash Rural Municipality

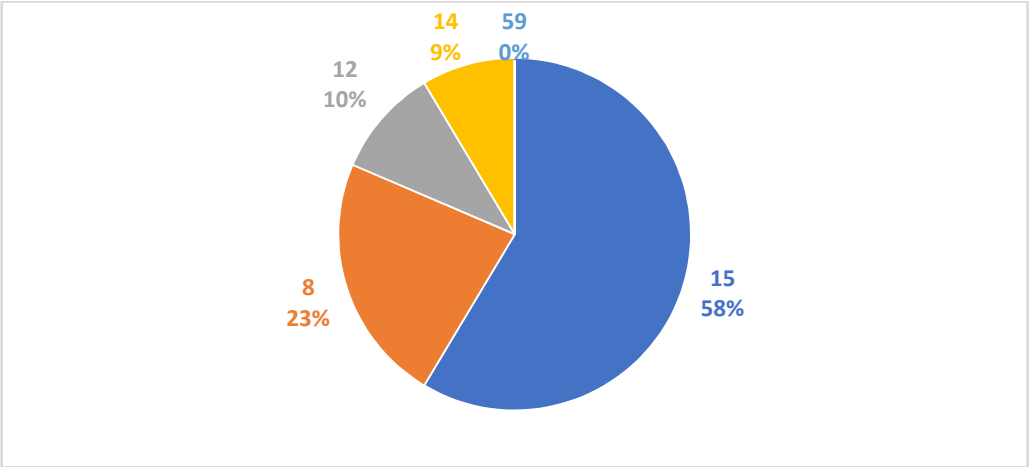
Age group	**Male**	**Female**	**Totel**	**Percent**
0-4	250	191	341	8.22
5-9	260	255	515	12.41
10-14	280	292	572	13.73
15-59	1150	1175	2425	58.46
60 above	170	125	295	7.11
Total	2110	2038	4148	100

Source: DDC Dailekh, 2081, BS

The table no 4.1 shows that in Gurash Rural Municipality total number of Population are 4148, among them the number of male population are 2110 and female are 2038. The highest number of population are 15-59 age group which is also called the active population and their number is 2425 both male and female.

Figure 4.1

Population Composition of Gurash Rural Municipality



Source : Field survey, 2024

4.1.6 Occupation Structure

Agriculture is the backbone of our country which Contributes 39 percent of national GDP. About 65 percent people are engaged in agricultural occupation. Some time our social hierarchy and deep-rooted social values set the occupation of people living set the occupation of people living in rural society. The following table shows the occupational structure of household population in Gurash Rural MunicipalityAgriculture.

Table 4.2

Occupation Structures of HHs Population

S,N	Occupation	Total no population	Percent
1	Agriculture	3825	92.21
2	Teaching	45	1.08
3	Govt.Servics	8	0.19
4	Police services	312	2
5	Army	391	2.87
6	Ingo	267	1.75
	Total	4848	100

Source : Field survey, 2024

The table no 4.2 clearly shows or presents that most of the people (92.21 percent) are engaged inagricultural occupation which is the main source of income. Similarly 2.87 percent are involving different occupation like some are carpenters, wage labour, driver, foreign employees etc. 2percent are involving in local services, I/NGO services, 1.08 percent are engaged in teaching profession. Likewise 0.19 percent are in govemment services, 0.48 percent are in police job, 2 percent are in army job, 1.75 percent are involved in medical service, 0.84 percent are involved in business. So This data shows the main occupation in the study occupations is agriculture with comparison other

4.2 Geographical Location

The study area fires in Dailekh district which is situated in the eastern development region of Nepal. In the present context it lies in the region no. 1 of Nepal according to the constitution of 20781 of Nepal, the hilly region among three ecological zones Dailekh district extends between 26 03 to 27 18 northern attitude and 87 25 to 87 45 eastern longitude this district is famous for model agriculture farming. Gurash Rural Municipality is one of the village's development committee of this destrict. The total area of 198 square km. (Source: Rural municipality report 2081). This area is about 24kro from distinct Birendranager Surkhet bazzur. The elevation of the rural municipality is 946 meter to 2200 meter from the sea level. The landscape of Gurans occupies divers structure including terraces, slops and flat lands that are covered by different type of cash crops. Most of the lands are occupied by cash crops cardamom and Broom grass.

4.2.1 Climate

Climate is a one of the determining factor for tourism as well as human settlement and agricultural cultivation. If climate is suitable, there will be the great possibility to develop Tourism and other things, Gurash Rural Municipality the Climate is subtropical Which has made UN appealing atmosphere round the year. But the Katik, Mangsir and Falgun to Baisakha are the best month to visit this Gurash Rural Municipality. The area gets heavy monsoon rain totaling 3600 mm annually. The month of June to Agust will have the maximum precipitation. The winter is cold and pleasant. Temparatumre during winter lies between 15°c to 20° as.maximum and

to 3 minimum. The summer Climate is between 18°c. to 24 c maximum and 15 to 20 minimum.

4.2.2 Vegetation

Vegetation is the main source for tourist attraction. So in this locality various types of plants are available which creates vegetation situation round the year. The landscape of this area is diverse including terraces, slopes and flat lands covered by different types of vegetation most of land is occupied by cash crops, Le. Tea, Broom grass, Big cardamom.

4.2.3 Land Holding Pattern of Households

Land holding patterns of the households indicates the economic as well as social status of household in our traditional rural society. Generally it is believed that person who has possessed land will consider as of higher economic status and who have small size of land will consider as of poor status in the society. The land holding size of households in the study area is presented in the following table.

Table 4.4

Land holding pattern of Households

Land size in Ropani	No. of HHs	Percent
1.10	137	15.53
11.20	207	23.47
21.30	219	24.83
31.40	108	12.25
41.60	78	8.85
61.above	101	11.45
Landles	32	6062
Total	882	100.00

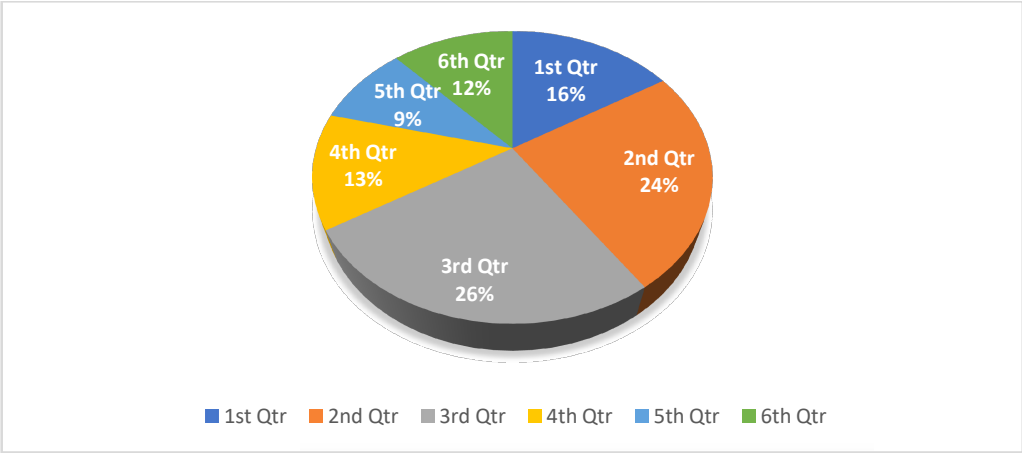
Source : Field survey, 2024

The above table no 4.4 clearly shows the landholding pattern of hose holds in the study area in Guresn Municipality, there are 24.83% households have 21-30 ropanies of land which is the highest percent out of total households. Similarly 32

households or 3.62 percent are landless.The above data is shown in har diagram as well.

Figure 4.4

Land Holding Pattern of HHs in Guras Rural Municipality



4.2.4 Types of Paddy Production

There are mainly three types of paddy production in Guras Rural Municipality

Table 4.5

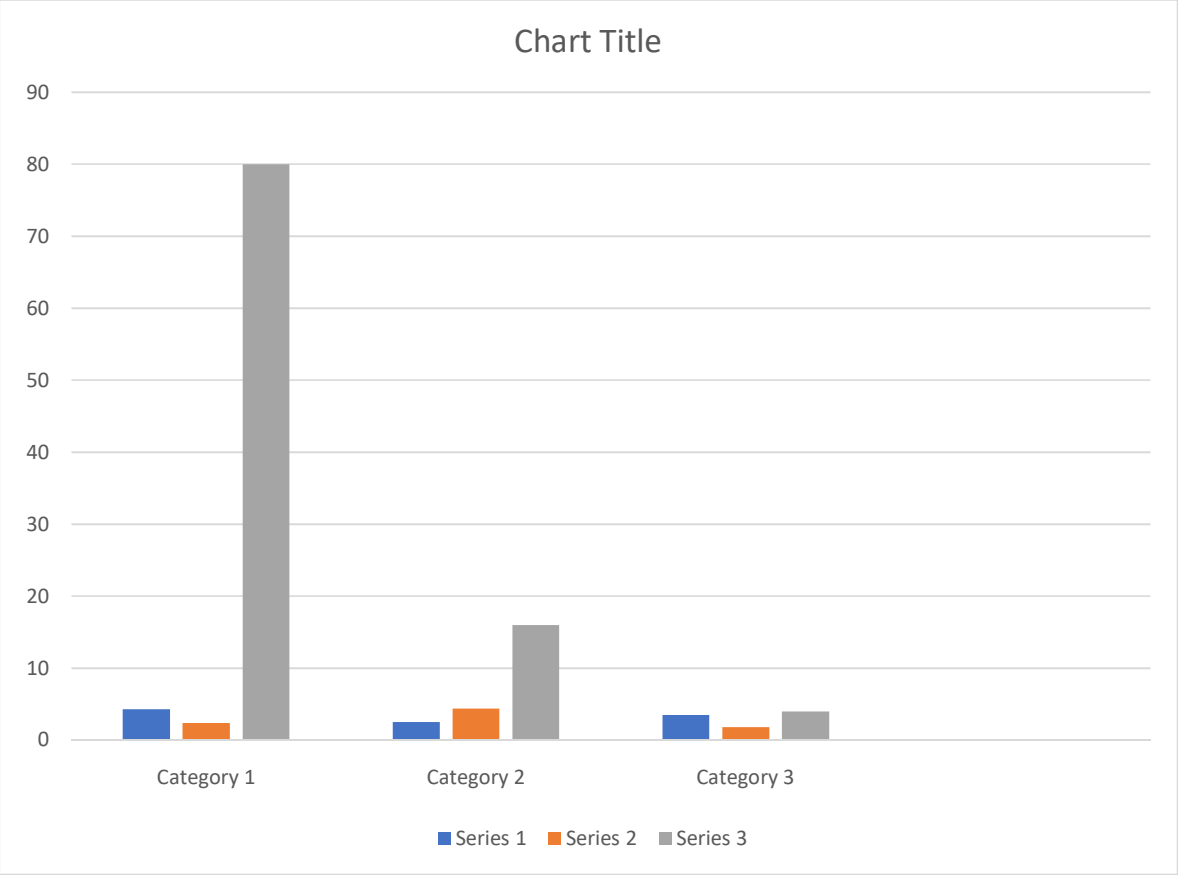
Types of Paddy Production

Name of Itam	No.of respondent	percentage
potatyo	20	80.00
Banda gopi	4	16.00
Kauli	1	4.00
Total	25	100.00

Source : Field survey, 2024

Figure 4.5

Types of paddy production.



Source : Field survey, 2024

The table 4.5 (fig no 4.5) shows that 80 Percent respondents say Chirakhe nce, 16 Percent respondents say Tarme rice and 4 percent respondents say Basmati rice is suitable for this land.

4.2.5 Scarcity of Water Resources

The most of the respondents reply that the water resources are going to be disappeared specially in Bishak and Jesth because of climate change or increasing temperature.

Table no: 4.6

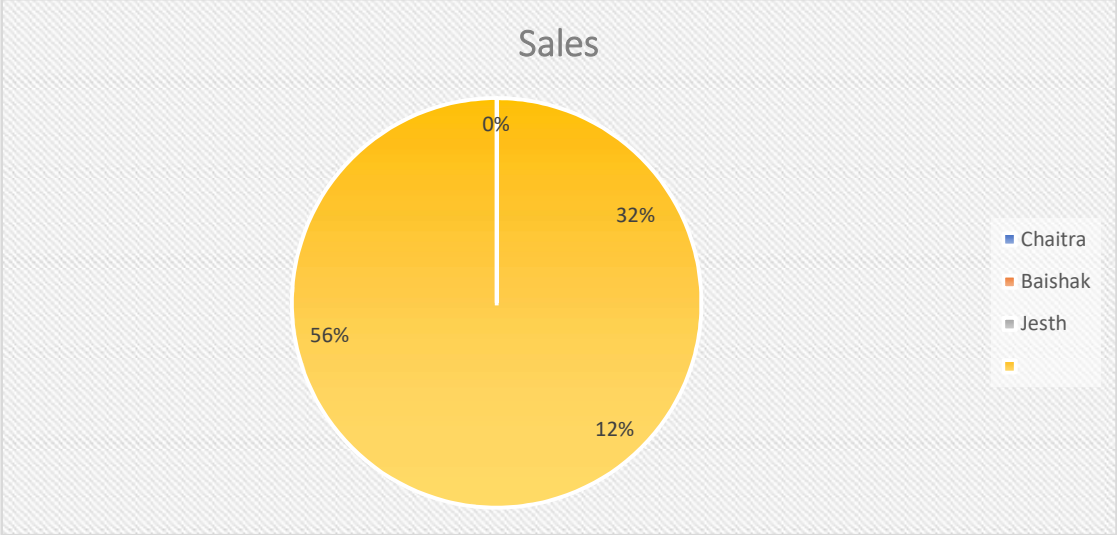
Feeling about water resources

Month of the year	No.respondents	percentage
Chaitra	8	32.00
Baishak	3	12.00
Jesth	14	56.00
Total	25	100

Source : Field survey, 2024

Fig No. 4.6

Feeling about water Resources



The table no. 4.6 (fig no 4.6) clarity that 32 percent respondent say water resources disappear in Chaitra, 12 percent respondent say water resources disappear in Baishak and 56 percent respondent say in Jesth.

4.2.6 Changing the Fruits Ripen Season

The most of the respondent feel about fruits ripe is in before time They feel that many fruits are ripening quick or before time because of increasing temperature:

Table no 4.7

Changing the Fruits Ripen Season

Saying fruits Ripen	No of Respondent	Percentage
Ripen before time	20	80.00
Ripen time	5	20.00
Total	25	100.00

Source : Field survey, 2024

The table no. 4.7 shows that 80 percentage respondents reply that the fruits are ripen quick nowadays than three five years ago and 20 percent respondent reply that fruits are ripen in timely.

4.2.7 Land Ownership

The land holding size of Respondents family is given below

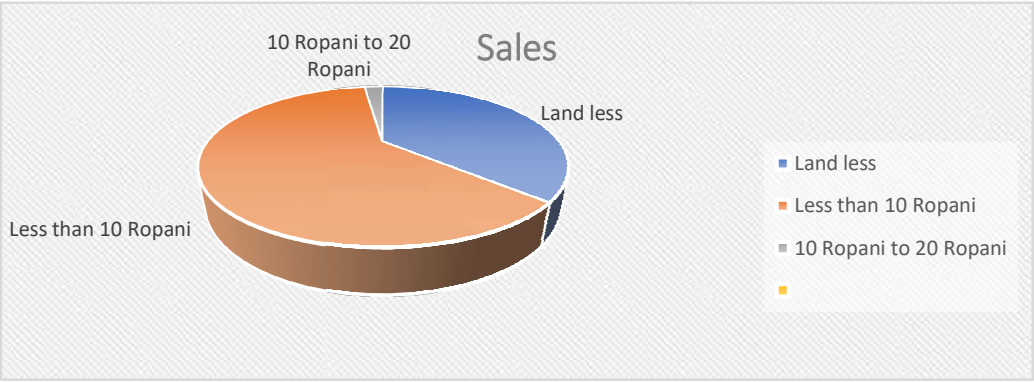
Table no 4.8

Land Ownership

Land size in Ropani	No. of Respondents	Percentage
Land less	6	24.00
Less than10 Ropani	10	40.00
10Ropani to 20 Ropani	9	36.00
Total	25	100.00

Source : Field survey, 2024

The table no.4.8 (fig. no4.8) indicated that most of the land holders 40 percent are less than 10 ropani similarly 24 percentage land less and32 percent respondent have 10 to 20 ropani land owner.



4.2.8 Realizing Difficulty for Irrigation

The most of respondents realize difficulty for irrigation in the agriculture sector day by day because of lack of rainy and increasing temperature.

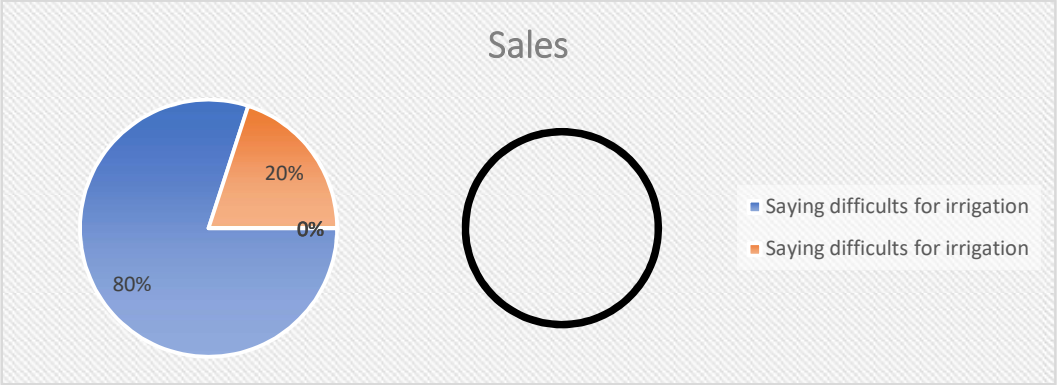
Table no.4.9 Realizing Difficulty for Irrigation

Particulars	No.of Respondents	Percentage
Saying difficult for irrigation	20	80.00
Saying difficult for irrigation	5	20.00
Total	25	100.00

Source Field Survey, 2081

Figure no 4.9

Realizing Difficult for Irrigation



The table no 4.9 (fig no.4.9) clearly shows that 80 percent respondent realize that imigation is difficult because of lack of rain and 20 percent respondent realize same as before.

4.2.9 Agricultural Trends in Guras Rural Municipality

Land use is important aspect of development of country. If we don't suitable use of land our development will be weak. Unsuitable and. too much use of land, it affects negative results such as landslide, flood which decreases soil. We get land

spoil by natural and human activates which is the world Temperature of world increasing day by day because of green house effect. The temperatures of world have increase from 14 18°c to 14.33°c in the period 1980-1999 AD. In this way temperature of world regularly increases day by day, the world have to face great disaster in future similarly people of Guras Rural VIX realize that temperature of climate is increases to much so that nowadays many crops are suitable for in high altitude of land. Except fix this people like to destroy forest to conduct the life for increasing population. In this Guras Rural Municipality people cannot use the modern system in agriculture So the situation of productive is lies in problem. Chemical drawn and seeds are used by people in land it depreciate the quality of land. So that is arises a question for sustainable development

4.2.10 Agricultural Development and Role of its in Development

Rural Development often confused with agricultural development but it involves more where the majorities or rural men and women-und many of their children-earn areas are directly or indirectly related to the fortunes of the agricultural sector. The aim of Agricultural Development planning is to improve production and income earning opportunities in agriculture through improved information, institutions, techniques, technologies, information, institutions, techniques, technologies, infrastructures and marketing Agricultural Devopment planning can stress the depth of analysis and expansion for the fulfillment of this purpose.

Almost developed countries of the world have decreasing proportions of their economically active populations dependent on agriculture Despite increased demand for food production, the percent of the population which makes a living directly from agriculture continues to fall in developing countries Intensification of production through improved technology and increased in puts is responsible in most cases for increased production, rather than from increased numbers of producers high rural population growth rates and increased efficiency in agricultural production have led to increased and a consequent migratory drift (Some would say flood) to cities in search of work and better standards of living National budgets tend to be directed to satisfying the need of urban centres at the cost of funding and services for rural areas This urban bias and rural neglect has led to decreasing levels of real income in the rural areas

Rural Development more than agricultural Development. A continuing problem in designing Rural Development programs in the persistent notion that the best rural development strategy is a healthy production agricultural sector. But climate change complex phenomenon so that the effect of climate change is overview of all sectors. Climate change's effect lies on agricultural sector. Because of effect of climate change resource of water e disappeared day by day. It effects on crops. In Guras Rural Municipality a few years ago, there is a found water resource everywhere but nowadays it cannot be found such as Because of climate change temperature of Guras Rural in creased per year so that on high altitude of land, there is suitable for orange cultivation. Lack of water and too much hot the cardamom cultivation is about going to be spoil Rural Municipality realize that a few year later many people migrate from here so that for suitable resident making other should be tamp on the resource have to be got on Guras Rural Municipality.

4.3 Impact of Climate in Agriculture

Agriculture is backbone of the rural livelihood. There is no median to reduce rural poverty unless the development of agriculture. But problems in Guras Rural 4 Municipality Climate change is increasing day by day. There is no found environ mental protection from people. Frosts are destroying nowadays. So that effects of climate is directly seems here Environmental and ecological changes noted in the guras forest, flora and fauna indicate that global warming will have a serious impact on the lives and livelihoods of indigenous people of Guras Rural depend on agricultures for their livelihood and there is increasing concern that climate change will have a significant adverse impact on farming The study into indigenous peoples view on climate change revealed that landslides, soil erosion and debris flow glaciers, as well consequence of melting changing rainfall patterns, are leading to low productivity and crop failures are affecting many indigenous farming communities, who are decreasingly facing food insecurity. The informants also reported absorbing adverse affects on the hill ecosystem likewise Guras Rural Muncipality , and hence on the natural resources on which their livelihood depends, due to changing rainfall pattens and other climate changes People of Guras Rural Muncipality used to go to wetland sites to collect our traditional wild foods, vegetables, medicines ete it is one of their ancient traditions to harvest the foods for livelihood. At present, such foods, vegetables and medicinal herbs aredisappearing along with the wetlands This could be

an example of the impact of climate change on informant explained about climate change.

> My father established an apple garden a long time ago. The garden was a near a beautiful, sacred lake, with a view of the hill, which attracted tourists. And the garden became famous with tourists because at that time, all the apple trees bore very delicious fruits with a shiny, beautifulcolour. But for the last five years, different kinds of charges are appearing in this apple garden, for example early flowering, failure of fruit setting. early and tasteless apples and the trees and the apples often become rotten The shiny and beautiful colours of the apples have almost disappeared and that may be impact of climate changeHill (Like Guras Rural Muncipality) indigenous peoples are cattle and sheep headers, and declining production of grass in the grasslands due to moisture deficiencies resulting from reduced snow deposits is therefore a serious concede, forging people to seek grazing at higher altitudes. Stream flow and spring characteristics have also changed dramatically in recent years, making the management of water supplies a challenge.

4.3.1 Positive Impact of Climate Change

Although the impacts of climate change are considered mainly negative, some positive changes have also been noted. A study conducted the Guras Rural Muncipality of Dailekh district revealed that, surprisingly, many people in the region feel positive about climate changes and are hopeful about the future of the environment Most of the respondents, the impact is positive Farmers are growing vegetables such as cauliflower, cabbage, chilli, tomato and cucumber, which used to need green house to survive. Local fruits have better sizes and lasts. New plants that only used to grow at lower altitudescan be found. Many note the fact that this Guras Rural Muncipality Municipality is greener that it was a few decades ago local residents say this is because of churning climate rather than technological inputs improved seed vanities. The study, however, stresses that most people are unaware of the real consequences of global warming and that communities who are most vulnerable the effects of climate change are generally unaware of the nature of possible impacts.

4.3.2 Cultural Impacts of Climate change

The pressure on land of Guras Rural Muncipality Causing landslides soil erosion and so on, not only has practical implications for indigenous communities in Guras. The range and its snow, water, air and biological resources have secular, cultural religious and spiritual value for indigenous peoples in the region. Many believe that their ancestors souls live in the fall in the winter, increased rain and snowfall after the winter, unusually intense summer rainfall and increased frequency of avalanches, flash floods and hailstorms. Hill areas Mach as the Guras Rural Muncipality are therefore expected to be most affected by the adverse impacts of climate change.

4.3.3 Effects of Climate Change on biodiversity

Due to their shape and size, hill area supports a wide range of climatic conditions. It is said that climbing just 100 meters up a mountain slope can offer as much climatic variety as travelling 100 km across flat terrain. Each rise in altitude generates different conditions, with unique ecosystems that contain some of the world's greatest variety of plant and animal life With the rise in global temperatures, conditions in the different. Altitudes change Detailed studies have shown evidence of an upward say movement mountains of tree lines and alpine plants. Plants at the highest elevations are competing with and losing out to plants normally found at lower elevations. Such floral retreats and advances on mountains have also taken place in the past but current changes are taking place of an unprecedented speed. Consequently, the diverse plant and animal species are being seriously affected. Many rare species are already disappearing or are at risk of extinction. In the current speed with which changes are occurring due to rising temperatures continues, trees are likely to cover the high mountains and indigenous peoples will be deprived of their traditional resources and biodiversity, the means with which they have traditionally been able to cope with variation and changeWeather related extreme events like excessive weather related drought periods, landslides, floods are increasing both in the terms of magnitude and frequency. Mean annual precipitation is increasing, as is the occurrence of intense rainfall. This causes more erosion of soils and riverbeds and bunks, as well as sedimentation on fertile land. More floods and glacial lake out bursts will destroy origination and water supply systems, roads, bridges, settlements and

productive land. Flood-related deaths with increase land degradation will reduce on remaining fertile land. In the dry season, increased evaporation will lead to water sacristy Soil moisture deficits, droughts, fire and possible pest out breaks will decrease crop yields-climate change will have major impacts on ecosystems, land and water resources and major economic sectors such as agricultureIn the Guras Rural Muncipality there is an increasing risk of infectious diseases as an indirect consequence of warmer diseases as n indirect consequence of warmer temperatures warm up Ticks are proliferating northwards and at higher altitudes, causing disease, and insect pests are predicted to spread and cause damage to crops. Indigenous people in the Guras Rural Municipality are among poorest in the world and, with climate to show respect to these souls and pray for good health, a good harvests, healthy livestock and wealth. There is cultural, as well as religious and spiritual, dimensions of the hill landscape, along with the ancestral memories inscribed on it, are in danger of disappearing along with the glaciers.

4.3.5 Problems Faced by People of Guras Rural Municipality

Based on the field study with people of Guresh Rural Municipality opinion. Since then involvement in the agricultural sector the people strongly believe that their socioeconomic status has importart however, they feel that they have not received as much again. The researcher questioned the workers about their burning problems. There are categorized and presented below.

4.3.6 Lack of Drinking Water

Most of the respondent complains about the lack of drinking water Most of the water resources are disappeared because of climate change Lund lack of monsoon. Some of the drinking water plan is conducted but not properly managed. There are no sufficient resources the respondents opined that it is very difficult for sanitation and good drinking water.

4.3.7 Lack of Transportation

The people of Guras Rural Muncipality walk from more places There is no available sufficient road in monsoon the means of transportation are not available so the people walk to one place to another is difficulty. likewise,the roads. They get tired because of long walks and can't do work, very well. There has not provided

transpiration facility even though the people have been facing many problems on the way when returning from the working place sometime is to spend on

4.3.8 Lack of Other Facilities

According to the indigenous respondents, they have observed the melting of ice and glaciers, and environmental changes in their traditional territories for many years. Although they are not familiar with scientific data on climate change, they are experiencing the disappearance of foods, medicinal plants and herbs and they feel certain that the changing climate is the reason for the changes they are experiencing in their daily interactions with the local environment.

In many areas, a greater proportion of total precipitation appears to be falling as main than before. As are result, winter is shorter, this effects due to climate induced economic, dislocation, decline, conflict, drop failure, and associated malnutrition and hunger and (in) indirect effects due to the spread and aggravated intensity of infectious diseases due to changing environmental conditions. The latter effect includes the expansion of vector Horne diseases such as malaria and dengue, and water related diseases such as airheadHowever, there also expected to be positive climate change induced effects on the health status of certain populations in the Guras Rural Muncipality high altitude areas, formerly too cold, will open up to new types of agricultural production and new livelihood opportunities, people will find their homes and villages more comfortable due to warmer conditions and the risks associated with cold and respiratory diseases will be reduced as the use of fuel wood for heating is reduced. Valuable such as Agricultre plants.

CHAPTER-FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Agriculture Is the dominant sector of Nepalese Economy. More than so percent of its population are involved in agriculture. But cultivated land in Nepal is only 18 percent of its total area. So, the little cultivated land and increasing population pressure has caused the large scale of unemployment problem in agriculture sector Agriculture plays an important role in providing employment opportunity for people and to solve the unemployment problems to some extent. However, there are also expected to be positive climate change induced effects on the health status of creation populations in the hill region. High altitude areas will open up to new types of agricultural production and new livelihood opportunities, people will find their homes, and villages more comfortable due to less cold conditions, and the risks associated with cold and respiratory diseases will be reduced as the use of fuel wood for heating is reduced.

In the Gurras Rural Muncipality, the most of the respondents the impact of climate change is positive, they say. According to respondents of this rural Municipality, Farmers are growing new vegetables such as califlower, cabbage, chili, tomato and cucumber which used to need greenhouse to survive Local fruits have better sizes and tastes. New plants that only used to grow at lower altitudes can now be found. Many note the fact that their district is greener than it was a few decades ago. Local residents say this is because of the changing say this is because of the changing climate rather than technological inputs or improved seed varieties Now, Various studies have been conducted covering almost change covering almost all the aspect of impact of climate change on agriculture but till now there has not been any study regarding the climate change and its effect on agriculture. This study mainly has consent rated on agricultural in Guras rural Municipality of Dailekh district. The present study is based on filed survey in order to fulfill the specific objectives of the study and exploratory research design is supplied a combination of purposive sampling method has been adopted In this study, only 40 percent respondents were selected for interview. Both primary and secondary data are used for this study. The method of primary data collected for the questionnaire, instructed interview,

observation and check list Secondary data has been collected from the available literature such as, records, reports, publication of different related offices and possible resources. Data have been analyzed descriptively These study both qualitative and quantitative data have been collected curative information has been tried to interpreted und quantitative information has been demonstrated by the means of percentage and graph. There are various castes/ethnics, age groups participated in the study, area. The untouchable casts (Damai, Kami S) is also resident of the study area.

There are no organizations working on climate change and how to adapt to its impacts, neither are there organizations working on public education on the issue. Awareness raising, education, capacity building and advocacy programmes on climate change and its impact on indigenous livelihoods are therefore needed in this communities

While the effects of climate change on agriculture and its associated hazards have assessed, there is paucity of information on its effects on vegetation, as well as plant succession on recently deglaciated soils Communities are highly dependent on natural resources for the ecosystem services that they perform provisioning services as genetic resources, food, fiber, fresh water ete. Regulating services as regulation of climate, water and human diseases, supporting services as productivity, soil, fertility and nutrient cycling. Therefore understanding the effects of climate change on soil and vegetation dynamics in important for assessing impacts Guras livelihoods, implementing effective conservation strategies well as for Attractive greenery environmenttal development, tourism industry employment creation and gender development reflect that positive sign of climate change in local development.

5.2 Conclusion

Impacts of climate change can be categorized both positively and negatively In a positive sense, winters will be less cold and more vegetation can be produced in high altitudinal areas of Guras Rural Municipality. However, the rise in mean temperatures currently projected to be as high. For an alternative perspective, we can divide the impacts of climate change in Guras among various sectors, water resources, health, forestry agriculture, biodiversity, economy and so on.

In Guras Rural Muncipality, more than 80% of the population depends on agriculture, which is predominantly fed by monsoon system directly affects the production of food. Climate change may be intensifying the spread of mosquitoes, related diseases such as malaria, dengue fever, Ross River virus. It is seen that a mosquito problem has emerged in the.

Study area Respondents of Guras Rural Muncipality reported changes in biodiversity such as early budburst and flowering, agricultural pests and weeds, and the appearance of mosquitoes. They also reported that temperature increases appeared to he more rapid at higher altitudes, the people of Guras Rural Muncipality has warned that the effect of a rise in temperature due to global warming will be greuter on winter crops like wheat and millet. The vegetative state of those crops would be shorter with higher temperatures, thus lowering productivity. All these scenarios are showing that cropping systems could change with climate change.

5.3 Recommendations

On the basis of option expressed by respondent and according to the findings of the study the following recommendations are as follows in order to improve people status in Guras Rural Municipality of Dailekh district.

1. Reduction in water availability in basins fed by glaciers that are shrinking as observed in some places of Guras guresh Rural Municipality.

2. The Scarcity of water have shown in the Guras Rural Municipality.

3. Changes in water availability due to change in precipitation and other related phenomena eg. Groundwater, evapotranspiration recharge.

4. Water availability reduction, Stalinization of water resources andlower groundwater leveling more places of Guras Rural Municipality. The crops have not production enough for the livelihood before long time.

5. Informabon is lacking on the issue of climate change and adaptason in the indigenous communities in the Gurans Rural Municipality.

6. Participatory research to explore indigenous people's knowledge and experiences related to climate change, its impacts and adaptation strategies is therefore importation.

7. There are no organizations working on climate and how to adapt to its impacts, neither are there organizations working on public education on the issue. Awareness raising, education, capacity building and advocacy programmes on climate change and its impact on indigenous livelihoods communities therefore needed in Guras Rural Municipality.

8. Networking, co-ordination, lobbying and communication to ensure the appropruite implementation of international and national climate change conventions and policies that take into account indigenous people's rights, knowledge and customary systems are important.

9. In Guras Rural Municipality farmers are growing new vegetables such as cauliflower, cabbage, chili, wmato and cucumber, which used to need greenhouse to survive. Local fruits have better sizes and tastes

10. Many fruits npen season have change because of climate change 11 Climate change will have major impacts ecosystems, land and water resources and major economic sectors such as agriculture.

5.3.1 Community level

- Check dams should be constructed in the flood vulnerable areas.
- Plantation of fast growing varieties such as Stylo grass, Alnus should be promoted in the barren places where there is a risk of landslides.
- Harvesting of water should be given emphasis so that it can be used in the dry periods.
- Promotion of improved crop varieties that can resist drought and other diseases should be enhanced.
- Awareness programs should be carried out and focused on the identified vulnerable areas.
- Control of small dry streams by creating check dams is also a good option for preserving water.
- Control of forest fires should be encouraged and local participation is essential.
- Control on grazing of domestic animals in the community forest areas should be continued so as to conserve water resources and to reduce soil erosion.
- Advancement and change in the cooking stoves should be practiced so as to

reduce the use of wood.

- Introduction of wildlife protection programs should be implemented in the study area.
- Irrigation management system appropriate for this area should be identified and used.
- Promotion of cash crops such as fruits and vegetables should be promoted so as to uplift the livelihoods of the local people. This would increase the investment capability of the local people to fight against the negative impacts of climate change.
- Diversification of the cropping systems should be maintained that reduces the vulnerability due to drought and other diseases.
- Trainings for improved agricultural practices and adaptation strategies against vulnerabilities should be organized.
- Programs for the protection of drinking water sources should be initiated and implemented.
- Introduction of climate change issues in the school curricula is necessary so as to increase the awareness and reduce generation gap in such knowledge.

5.3.2 Policy level

Government of Nepal particularly local government (LG and province) should formulate one door system through local development planning processes for climate change adaptation activities. Such types of policy will synchronize the community level activities linking with climate change adaptation.

5.3.3 Further study

There is a need of scientific research and studies on the impact of climate change adaptation on local livelihoods and its adaptation strategies.

Finally, climate change adaptation efforts of the local people against changing climatic conditions are praise worthy (and lessons to other areas) and their expectations to make their efforts more effective need additional help from the government as well as non-government organizations.

REFERENCES

Alleed, I. (1992). Hydrological Areas of the Himalayan Reson, Kathmandu ICIMOD

Ambani, M., and Percy, F.(2012). *Decision-making for Climate Resilient Livelihoods and Risk Reduction: A Participatory Scenario Planning Approach*. Washington D.C. CARE International.

Andreas, 5 (2007) Immonal development agenda Sustainable Моммал Development. Kathmanda, ICIMOD.

Assenghe, S., and Pannell, D.J.(2013).*Adapting Dryland Agriculture to C limate C hange: Farming Implications and Research and Development Needs in Western Australia*. Climatic Change Vol.118:pp.167-181.

Babbie, E. (2009). *Research Methodology in Sociology*. New Delhi: Cengage Learning India Private Limited.

Baly, SK, Monol, PK. Shrestha, M.1. (2007) *Canae Profile sal observed chimune change and clonare variabirey in Nepal*. Kathmandu, Department of Hydrology and Metrology

Barachaya, S.R, Mool, P.K, Shrestha, B.R. (2008) *Inpacts of clanate change Himalayan Glaciers and Glacial Lakes*, Case stuches of GLOF and Axrociated thacards in Nepal and Bhutan: Kathmandu, ICINOD yow placations Quaternary international.

Baral, J. C. (2011). *Climate Change Adaptation in Nepal- An Overview of the Initiatives and Impending Issues.* The Nepal Journal of Forestry, Vol xiv, No.1, 75-84.

Bast, J. L. (2010). *Seven Theories of Climate Change.* Why does Climate Change?, What is Man's role?, What do Leading Scientist Believe? Chicago. The Heartland Institute. 19 South LaSalle Street #903, Illinois 60603.

Bhusal, Y.R. (2009). *Local People's Perceptions on Climate Change, Its Impacts and Adaptation Measures in Mid-Mountain Region of Nepal (A case study from Kaski district)*. Unpublished B.Sc. Forestry Thesis. Institute of Forestry, Pokhara, Nepal.

Bishwakarma, M. B. (2010). *Climate Vulnerability and Capacity Analysis of Taplejung*. Nepal: CARE-International in Nepal.

Bishwakarma,M.B., Khadka, G., Rajbhandari, D. (20113). *Climate Change: Local Adaptation Plan of Action,*Tulasichauda Village Development Committee, Dhanusha District, Nepal (in Nepali).

Bryan, E., Ringler, C.,Okoba, B.,Koo, J., Herrero, and M., Silvestri, S.(2013). *Can Agriculture Support Climate Change Adaptation, Greenhouse Gas Mitigation and Rural Livelihoods? Insights from Kenya*. Climatic Changevol.118:pp. 151-165.

Byg, A., and Salick, J. (2009). *Local Perspectives on a Global phenomenon - Climate Change in Eastern Tibetan Villages. Global Environmental Change*vol.19:pp. 156-166.

CARE International (2009). *Climate Vulnerability and Capacity Analysis: A Hand Book.* Washington D.C.

Carney, D. (1998). *Sastamalle Rural Ezvelshoosh*: London, DFID.

Chalise, SR. Khanal, N.R. (20811). *Climate Hydrology and hanshehle hazards in the hondskawk Humalayan region*. Kathmandu, ICIMOD Chen, Y.N. L WIH, Xu, CC. Han, XM. (2007), Effects of climate change resources in Tarim Roer Baum. Northwest china, *Journal of Em nonmentalSesences*.

Corbetta, P. (2003). *Social Research: Theory, Methods, and Techniques*. SAGE Publication

Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (2nd ed.). New Delhi: SAGE Publications: International Educational and Professional Publisher.

Hagger,V., Fisher, D., Schmidt, S., and Blomberg, S.(2013). *Assessing the Vulnerability of an Assemblage of Sub tropical Rain Forest Vertebrate Species to Climate Change in south-east Queensland*. Austral Ecology. Vol. 38: pp. 465-475.

Halment, T.P. Adam, C. Lellammarire, D.P. (2005) annal impacts of a warming chimate on water availability in w domum region KIMAD

Handyapahyay, J. Gyawali, D. (1994). *Himan wane renmores, exobagical and pol ресть of sumagot menantain Reseach and Development*, ICIMOD

IPCC (2013). *Summary for Policymakers: Working Group I Contribution to the IPCC Fifth Assessment Report, Climate Change* 2013: The Physical Science Basis.

Kothari, C.R. (2004). *Research Methodology: Methods, and Techniques*. New Delhi : New Age International (P) Ltd. Publication.

Malla, G. (2008). Climate Change and Its Impact on Nepalese Agriculture. *The Journal of Agriculture and Environment.* Vol. 9: pp. 62-71.

Manandhar, S., Vogt, D.S., Perret, S.R., and Kazama,F. (2011). Adapting Cropping Systems to Climate Change in Nepal: Across-Regional Study of Farmer's Perception and Practices. *Regional Environmental Change.* Vol. 11: pp. 335-348.

Nielsen, M.M. (2012). Community Based Climate Adaptation in Churia Livelihood Improvement (CHULI) Programme. *Internship Report:* CARE Denmark and CARE Nepal.

Parry, M. (2009). Climate Change is a Development Issue and only Sustainable Development Can Confront the Challenge. *Climate and Development*. Vol. 1: pp. 5-9.

Picketts,I.M., Curry,J., Déry,S.J., and Cohen,S.J. (2013). Learning with Practitioners: Climate Change Adaptation Priorities in a Canadian Community. *Climatic Change*. Vol. 118: pp. 321-337.

Practical Action Nepal. (2010). *Impacts of Climate Change: Voices of the People, Based on Field Observations,* Information and Interactions with the Communities in Nepal.

Pradhan, B., Shrestha, S., Shrestha, R., Pradhanang, S., Kayastha, B., and Pradhan, P. (2013). Assessing Climate Change and Heat Stress Responses in theTerai Region of Nepal.*Industrial Health. Vol. 5*1: pp. 101-112.

Regmi, B.R, and Adhikari, A. (2007). *Climate Risk and Vulnerability in Nepal*. Country Case Study. Human Development Report 2007/2008.Fighting climate change: Human solidarity in a divided world. Human Development Report Office Occasional Paper UNDP.

Salinas, C. X., Mendieta, J. (2013). *Mitigation and Adaptation Investments for Desertification and Climate Change: an Assessment of the Socio-economic* Jack Mcchanism.

ANNEX-I

Household survey

QUESTIONNAIRE-2081

1. Name:

2. Address

3. Age:

4. Religion

5. Cast/ Community:

6. Marital Status:

(a) Married (b) Unmarried

7. If married how many children have you got?

(b) Daughter ( ) (a) Son ( )

8. Education Status

(a) Literate (b) Illiterate

9. Where is your birth place?

(a) Terhathum (b) Other

10. How the days are going on?

11. What do you take as Occupation?

12. Do you work on farm"

13. Is there unseasonable fruits crops

14 What kinds of crops as form cultivaben?

15 In the agricultural sector do you realize any change because of climate

16. It is suitable, for agricultural farm in the high altitude area?

17 Where do you stay?

18. How many members are there in your family

19. How many people of your villagers are involved in agriculture and other occupation?

S.N	Name	Occupation	Remarks

20. Do you have own land?

21. If yes, how much land you have got

22. What on the following topics in your family member's annual income

S.N	Annual Income	Rs
1	Agriculture	
2	Business	
3	Government Services	
4	Others (If ant)	

23. What is your families annual expenditure in the following items?

S.N	Expenditure on	Rs
A	Food	
B	Clothes	
C	Education	
D	Agriculture	
E	Health	
F	Festival	
G	Other	

24 What are the present problems you are facing in agriculture" (a) (b) (c)

25. Is there any organization for agriculture?

26. What about the sensefoware of tourism in local people?

27 What sectors are supporting (economical and technical) for agricultural development

28. Which organization has been most involved for this sector (Chimote change in agriculture)?

29. What the support done in agricultural development with various activities

30 How mach the local people are active about agricultural activities program?

31. What is the main atraction of this area"

32. What kinds of vegetables are grown by farmers in this VIX

33. Is there people fisel positive or negative about climate change?

ANNEX-II

CHECK LIST

Date: ……

Name: ……..District: ……..

Age: ……..……..

Sex: ……..Ward No: ……

Post: ……..

1. What is your main occupation for livelihood?

(a) Agnculture() (b) Business()

(c) Employment () (d) Other ( )

2. Do you know about climate change?

(a) Yes() (b) No ( )

3. Do you feel abesat climate change?

(a) Yes ( ) (b) No ( )

4. Is there any pomirility of seasonable vegetation in this area"

5.What kind of agricultural activates are doing here?

6. How is going agricultural development in this ares?

7. How do you seen the effects of climate in agriculture in this area"

8. If any organization, do you think it is necessary for agricultural developinent.

S.N.	Name of the organization	Estd Year	Works hard done	Remarks

9. What problems do you think to develop agriculture in this area?

10. How the climates effect the agriculture sector"

11. Is there good or bad effect of climate for us?

12. Is it necessary to change the climate?

13. What is main possibility for the future?

14. How we can face the effects of climate change

15. At last, if you have any advice or suggestion

Annex II

Photos