

**Santosh Budhathoki**

# Effects of Climate Change on Agriculture in the outskirts of Kathmandu Valley

**Master's Thesis**

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**A THESIS**  
**ON**  
**EFFECT OF CLIMATE CHANGE ON AGRICULTURE IN THE OUTSKIRT AREAS**  
**OF KATHMANDU VALLEY**

**IN THE PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF**  
**MASTER OF SCIENCE IN ENVIRONMENT SCIENCE**

**SUBMITTED TO**  
**DEPARTMENT OF SCIENCE AND TECHNOLOGY**  
**THE GLOBAL OPEN UNIVERSITY**  
**DIMAPUR, NAGALAND**

**SUBMITTED BY**  
**SANTOSH BUDHATHOKI**

**ACADEMIC YEAR 2014-2016**

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**SantoshBudhathoki**

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## Abstract

Nepal is one among the most vulnerable country regarding climate change. The average rise in temperature of Nepal is  $0.06^{\circ}\text{C}$  but the rate is higher in the Himalayas. Climate change has affected almost all the aspects of life among which agriculture is one of the major ones. Therefore the research was purposed to find the effects of climate Change on agriculture in the outskirts of Kathmandu valley.

PuranoNaikap village was selected for the study because it resembles the altitude of all the foothills of Kathmandu. It comprises of all types of topography of hills of Kathmandu valley. The study followed both quantitative and qualitative research methodology. The major tools of data collection were questionnaire schedule, field visit, key informants interview and formal and informal meetings with the concerned stakeholders. Besides that, various sources were used for the desk review to collect secondary data. Purposive sampling technique was used for survey where affected farmers were collected and studied. The study continued for six months' time.

Many cases of adverse effects of climate change were found in the study area such as untimely rain, infestation of alien plants and grass species, infection of viral disease in tomato and paddy plants, invasion of different harmful insects like *GabaroKira* and *Green Caterpillar*. The fields were left barren due to drought in the lands where it used to be wetland throughout the year. There is lack of irrigation facilities and lack of manpower for agriculture. The farms were destroyed by viral disease, moths and different new insects. It was not possible to grow plants without using chemicals as vitamins and insecticides/pesticides. A typical farm of tomatoes occupying the area of five *ropanis* of land had to be used the chemicals worth of around 40,000 rupees within three months of time. New species of plants like *Began belly*, *Rajbriksha*, *Mango*, *Banana*, *litchi* are seen there. The fruits used to be found at the altitude of 600 to 700 meter are now found in the altitude of 1300 to 1500 meter. The tropical plants are shifting towards higher altitudes.

The status of agricultural products was found reduced to a greater extent. The study revealed that rice yield in Kg per *ropani* decreased by 65%, Maize by 50%, Wheat by 100% and legumes by 40% comparing between 10 years back and now. It was an awful condition. 99% of the households have to buy rice from market while 50% of the households used to sell paddy, wheat, maize and millet before 10 years. The crops like Wheat, Barley and Millet are no more planted in the study area. It was observed that farmers were compelled to cultivate paddy in the dry field due to the shifting back of monsoon season almost one month later. The paddy did not survive well due to lack of water. Some of the plants which were able to survive were destroyed completely by a kind of moth insect. The moth lays eggs in at the tip of paddy plant and goes inside the root which ultimately kills it. It was found that in some of the places, people have planted corn in some places in place of paddy to cope with climate change. Since corn needs less water and can be grown easily, it was one of the good options for them. It is better to replace with corn than to leave it barren.



## Abbreviations

AIRS- Atmospheric Infrared Sounder

CBS- Central Bureau of Statistics

CH<sub>4</sub> – Methane

CO– Carbon monoxide

CO<sub>2</sub> –Carbon-dioxide

DoHM- Department of Hydrology and Metrology

FAO – Food and Agriculture Organization

GDP- Gross Domestic Product

GHG- Green House Gases

GOLF- Glacial Lake Outburst Flows

H<sub>2</sub> SO<sub>4</sub> – Sulphuric acid

H<sub>2</sub>O- Water

ICIMOD- International Centre for Integrated Mountain Development

IEA- International Energy Agency

INGO- International Non-Government Organization

IPCC- Intergovernmental Panel on Climate Change

MM- Millimeters

MOAC- Ministry of Agriculture and Co-operatives

MOE- Ministry of Environment, Science & Technology

NO- Nitric Oxide

NO<sub>2</sub>- Nitrogen Dioxide

N<sub>2</sub> O – Nitrous Oxide

NARC-*Nepal Agricultural Research Council*

NASA- National Aeronautics and Space Administration

NGO – Non Government Organization

O<sub>3</sub> – Ozone

OECD- Economic Co-operation and Development

OH- Hydroxide

PPM- Parts Per Million

SO<sub>2</sub> – Sulphur-dioxide

SO<sub>3</sub> – Sulphur-trioxide

SSMP- Sustainable Soil Management Program

UNEP- United Nations Environment Programme

UNFCCC- United Nations Framework Convention on Climate Change

USD- US Dollar

VDC- Village Development Committee

## Key terminologies

***Climate change:*** The change in the climatic conditions and seasonal variations for a long period of time.

***Global Warming:*** The increase in temperature of the earth due to Green House Gases (GHG).

***Outskirts:*** A part remote from the center (Merriam-Webster Dictionary).

***Village Development Committee (VDC):*** The local governing body which governs a particular village premises only.

***Agriculture:*** The science, art and practice of cultivating the soil, producing crops and raising livestock is known as agriculture.

***Ropani:*** It is a local measuring unit of land. One *ropani* is equal to 508.74 Meter Square

***Pathi:*** It is also a local measuring unit of mass. One *pathi* is approximately equal to 4.5 Kg.

