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Impact of climate change on the livelihood of Allaichey Community Forest User Group (CFUG)

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Abstract

Climate change is contemporary global threat to the animal world.Green house gases are resulting global warming which is creating different impacts in the world. Because of human activities greenhouse gases are increasing. Nepal temperature is increasing at an alarming rate. Increasing temperature is creating different impact on biodiversity disturbsthe livelihood of local community. This study was conducted on mathagadi rural municipality Gothadi of palpa district.

The main objective of the study was to access impact of climate change on agriculture, livestock farming, health, biodiversity which directly linked with livelihood of people. Interview survey, focus group discussion were conducted in collecting primary information. 140 houses were sampled out of 150 house hold. The data were analyzed using SPSS computer software, Arc GIS, MS- Excel.

Major observed impacts include reduce precipitation and an irregular rainfall pattern, affecting agricultural crops, livestock production, reduced forest regeneration due to increase in new invasive species like *Lantana camera*which replace forest vegetation which threaten income of CFUGS.

key words: climate change, biodiversity, livelihood

Introduction

Climate change is a global problem that affects all of us. Earth climate is now changing faster than at any point of human civilization. Nepal's average temperature is rising at the rate of 0.03°c - 0.06°c per annum between 1997and 1994 with a higher rate in mountains than in low lands (Gurung and Bhandari 2009). At the place of current co_2emission scientists expect an increase of temperature between 1.5°c and 5.3°c in average temperature by 2100. The WMO says that if the current warming trend continuous temperature count rise 3°c -5°c by the end of this century.

Because of extreme temperature there has also been change in weather. Number of monsoon days has been shortening with early onset and late withdrawal and the intensity of monsoon days has shown increasing trend (Gurung and Bhandari 2009). Livelihood of developing countries has been changing and threatening from climate change.

Climate change brings wide range affects on environment, socioeconomic and related sectors including water resources, agriculture and food security, livestock production, human health, biodiversity etc. changing in the rainfall pattern can cause flooding and soil erosion(UNFCC, 2007). Developing countries are most vulnerable to the impacts of climate change. Nepal is one of the most vulnerable countries affected from climate change (UNFCC, 2007).

Nepal has an extreme attitudinal range from 60-8850m with heterogeneous topography and distinct climatic zone with an area of 147,181sq km. Nepal is nestled between India to the south and Tibet Autonomous to its north of which 0.03% and 0.3% of total land area of the world and Asia respectively. Geographical location of Nepal is 26°22' to 30°27' latitude and 80°4' to 88°12'

longitude (DOI 2061). Topographically, the country is divided into 3 ecological regions named mountains, hills &terai which cover (21%, 62%, &17%) of the total land area of the country respectively. About 85% if people are living in rural areas. More than 70% of people still depend upon agriculture. Nepal is rich in biodiversity, diverse climate and topographical spatial diversity. All topographical variations have their specific quality which provides natural resources to the community among different locations. By managing those natural resources, people are earning livelihood.

Change in the environmental component (temperature rainfall) also affects livelihood of the people.Palpa lies in Lumbini Zone of Provience no 5. Tansen is headquarter of palpa district. Study area is Alaichey community forest of mathagadi rural municipality which is beautiful and rich in biodiversity.

Objective of the study

Specific objective of the study is

- To assess the impact of climate change on the livelihood of CFUG of Alaichey community forest.

General objectives are:

- To examine the impact of climate change on agriculture.
- To assess the impact of climate change on livestock production.
- To measure the impact of climate change on economy.

Research Methodology

Sources of data collection

Primary data were collected from interview, field visit.

Secondary data were collected from articles, reports,published and unpublished documents.

1. Rational of the selection of study area

Hilly region of Nepal is mostly affected by climate change. Limited area is choose for study because it is easily accessible and heterogenous in socioeconomic , cultural and geographical structure. Most of the people of this region are engaged in livestock farming, agriculture which are widely affected by climate change. Thus, this area is selected to access livelihood impact, health impact in the people of this community due to climatic hazards.

2. Data collection tools and techniques

The study used questionnaire, interview and observation methods. Primary information was acquired through filling questionnaires. Secondary data were acquired from different reports, articles.

2.1. Interview survey

Researcher requested to fill the questionnaire to the respondents related to impact on agriculture, livestock farming, human health etc.

2.2. Field visit

The data were collected from field visit and observation method, observing the household environment, agricultural field and sites.

2.3. Group discussion

Group discussion was carried out with community forestry user groups and with farmers.

2.4. Data tabulation and analysis

All the related data were tabulated by using SPSS program (statistical analysis software) .All the necessary statistical tools like tables, graphs were calculated from programs.

Study Area

Palpa, a hilly district of western Nepal is located at 27°34' to 27° 57N and 83°15' to 84°22'E with an altitude ranging from 152m to 1936m above the sea level. It lies on the churia and mahavarat range of Himalayas. Most of the area have low, high mountains and foothills. It is surrounded by gulmi and arghakhanchidisctricts from west; gulmi, syanja and tanhundisctricts from north; nawalparasi from south. Geographically palpa district is divided into medium mountain areas(82%) &chure hill region(18%). The change in the elevation provides variation of climate from tropical, subtropical to temperate while most of the area lies subtropical region. The average temperature of the district is highly fluctuating from maximum 32°c in summer to minimum 4°c in winter. The study area is mathagadi rural municipality ward no. 6 of palpadistrict(Allaichey community forest). Majority of people living in this area is magar. Almost 80% of them are engaged in agricultural activities for their livelihood.

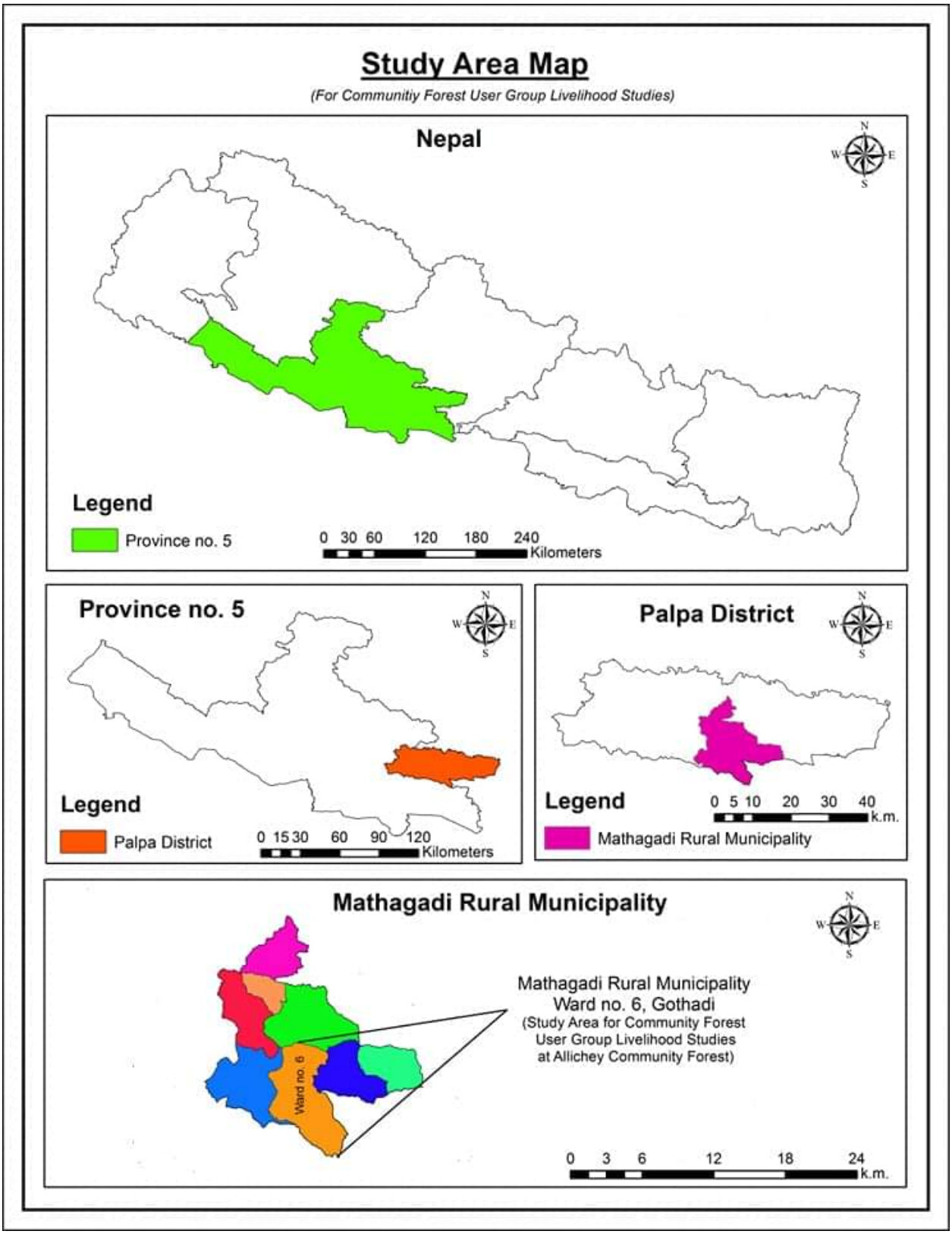


Figure 1: Map of study area

Result and Discussion

As described in research methodology section, primary data is collected from one of high undulating village (Mathagadi rural municipality ward no. 6 gothadi of palpa district). All interviews and group discussion were related to impact of climate change on livelihood of people which is directly related to (Agriculture, water resources, health of people, livestock farming) the impact of climate change could be seen by the study of rainfall patterns, temperature, nature of weather etc.

The questionnaires is mostly related to rainfall patterns, change in temperature and their impact on agriculture, livestock farming, water resources which defines the livelihood of that area.

Local people's perception on climate change

Interview and group discussion within the people of CFUGS indicates that the experience change in the rainfall patterns and temperature. They feel increase in temperature but unknown about the real cause of temperature increase. About 90% of people are realized change in the pattern of rainfall. Unseasonal rainfall, irregular and erratic rainfall and droughts which affect agriculture.

Likewise 80% of respondents said temperature is increasing every year while 20% has indicated no change in temperature. Main cause of changing in rainfall pattern and increase in temperature are mostly due to human activities like burning of fossil fuels, deforestation etc.

Impact of climate change on Agriculture

Almost 80% of the respondents depends upon agriculture and livestock farming and remaining 20% engaged in other activities like business, foreign employment etc.

Agriculture heavily depends upon seasonal rainfall due to less and irregular rainfall adverse effect on agriculture and livelihood has been noticed unseasonal rainfall, irregular and erratic rainfall has resulted in flood and drought. This has adverse impact on crop productivity which is threatening food security and livelihood of people.

Effects of rainfall on Agriculture

S.N.	Effect of unseasonal Rainfall	Respondents	
		Number	Percentage
1	Rise in production of crops	0	0%
2	Decrease in production of crops	50	47.61%
3	No change in production of crops	30	28.57%
4	Difficult to cultivate	25	23.8%

Source: field study 2019

The above table shows the effect of unseasonal rainfall on the production of crops and its effect in cultivating process. Scarcity of water resources is creating various problems on agriculture sector, both cash crops and food crops have been affected respondents have shared their experiences that it is difficult to harvest paddy, maze, wheat and other food crops on time. The pattern of production and productivity of crops has been changing day by day.

Effect of Temperature on Agriculture

Respondents realize in temperature as a main cause of early flowering of different species of fruits and crops. Species found in tropical region can now be found in

temperate region. New insect's have appeared and spread on crops. According to respondents, climate change decrease the period of maturation of crops, decrease the time of breading of seed.

Effect of Increase in temperature of crops

S.N.	Effect of increase in temperature on crops	Respondents	
		Number	Percentage
1	Early flowering of fruits and crops	35	33.33%
2	Wide spread of insects – diseases	20	19.04%
3	Decrease in maturation of crops	25	23.8%
4	Decrease in time of breading of seed	25	23.8%

Source: Field study 2019

The above table shows that 33,33% of respondents of study area indicate early flowering of fruits and crops, 19.04% of respondents indicate wide spread of insect-diseases , 28.8% of respondents indicate decrease in maturation of crops and 28.8% of respondents indicate decrease in the time of breading of seed.

Impact of climate change on people's health

Respondents experience various kinds of diseases like allergies, itching, skin disease, menstruation problem in girls malnutrition on child. Many respondents pointed out the need of mosquotes net, these days.

Problem occurred from increasing temperature

S.N.	Problem from increasing temperature	Respondents	
		Number	Percentage
1	Increasing flies, mosquitoes and other insects	50	47.6%
2	Appear new disease to human	25	23.8%
3	Others	30	28.57%

Source: Field Study 2019

Among the respondents 47.6% noticed increase in flies, mosquitoes and other insects, 23.8% experienced appearance of new diseases in human lifeand 28.5% respondents experience both problems.

Increase in disease is making their life harder expenditure of cure of disease on medicine and health services are increasing unbearably.

Increment in Medicine and Health Cost

S.N.	Level of expenditure	Expenditure increment over the previous year	Annual expenditure on medicine and health services
1	Maximum	20%	50,000
2	Minimum	7%	1,000
3	Average	13%	10,000

Source: field study 2019

Because of increased of disease, the expenditure to cure disease is rising annually. Annual expenditure on medicine and health services are rising. According to respondents, the average increase in expenditure is 13% and annual expenditure on medicine and health services is 10,000.

Impact of Climate Change on Biodiversity

Ecosystem are affected by the climate. The respondents have experienced loss of native flora and fauna, grass lands wetlands are continuously degrading. Grassland have been converted to barren waste land due to less rainfall and drought. Most respondents pointed out that there is loss of forest species such as kafal(*Myricaesculanta*), dhayero, kaulo(*maesachisia*), khayar(*Acacia catechu*), dhalekatus(*Castanopsisindica*), masurekatus, sal(*Shorearobusta*), Chilaune(*Schimawallichii*) etc.

They also explained about NTFPS and Medicinal plants including amala, chautaro, gurzo, toprejhar etc.

Similarly, Respondents said that wild fauna like kaliz, sparrow, crow, gauthali and wild animal like deer, rabbitsand jackal are hard to see because of migration.

Spread of Invasive species

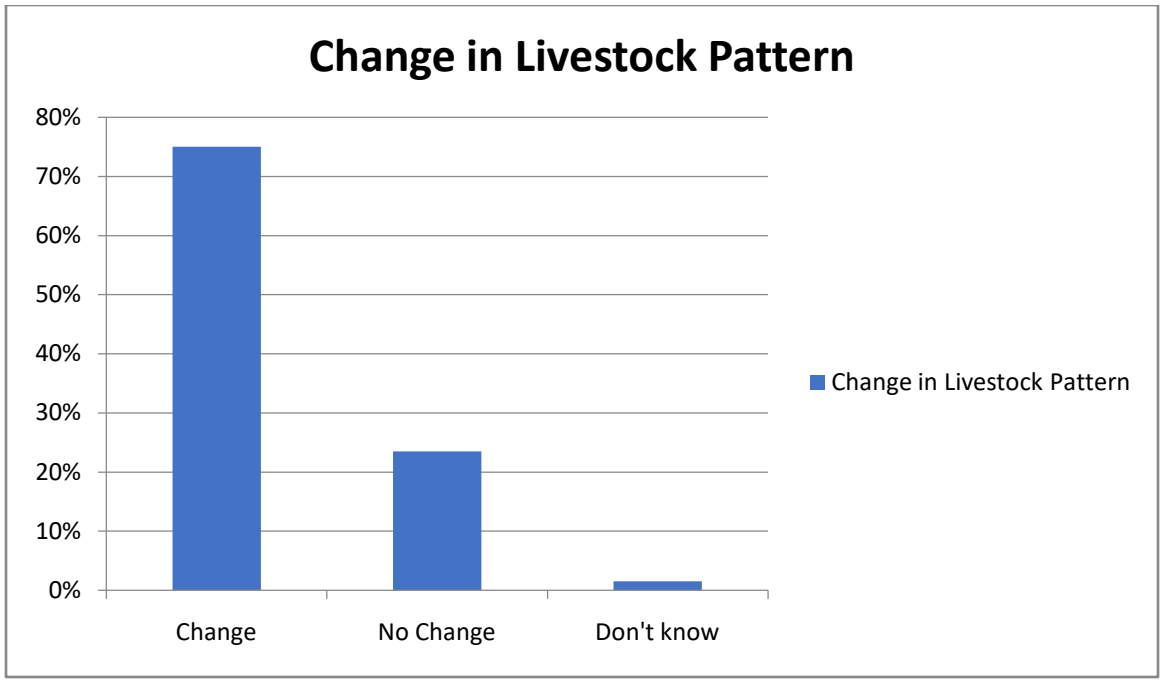
Change in temperature, Rainfall pattern are creating favourable environment for pest, diseases and invasive species like Banmara(*Lantana camera)*, Gandhejhar(*Ageratum conzyoids*), Kandejhar, Titepati are evident in the study area.

Furthermore, respondents have noticed that invasive species are spreading very fast and damaging agriculture, pasture and forest lands.

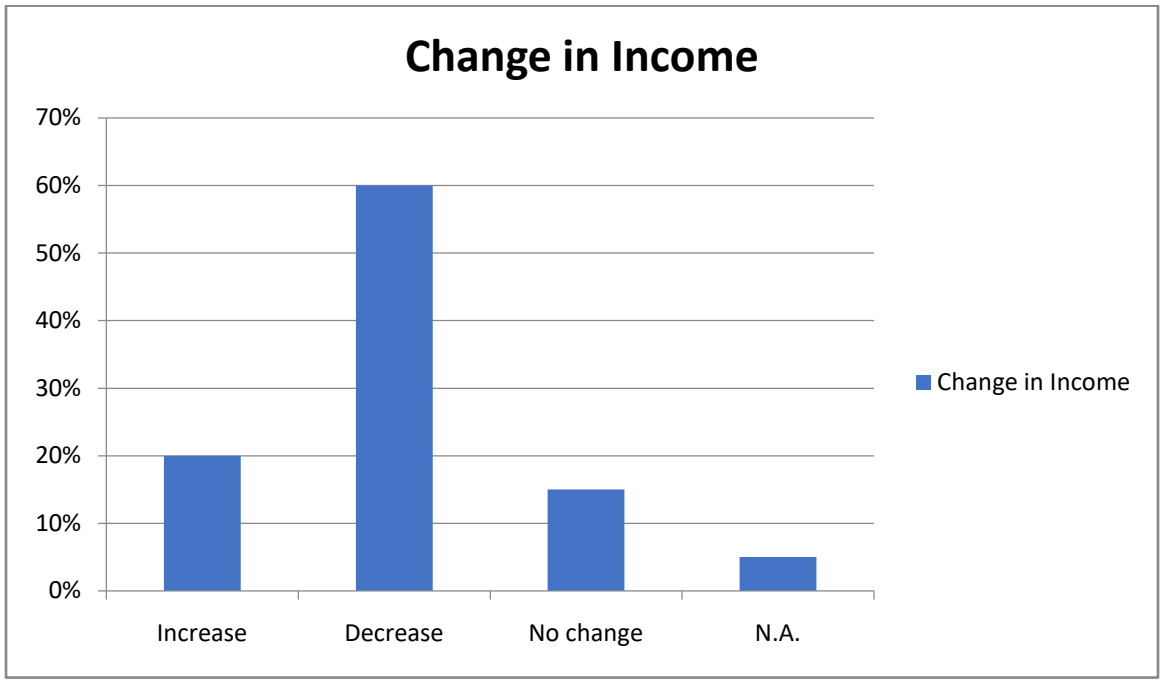
Impact of Climate Change on Livestock

Due to extreme drought, there was direct impact on growth of palatable species. Regeneration of fodder species and forest fodder is also declining because of less rainfall the effect of livestock and further on production of milk, milk products and meat. Drought affects the livestock by drawing wetlands, parser land and water resources, decreasing in availability of drinking water for livestock.

Scarcity of food and space for livestock raring, community is forcing the farmer to change their livestock pattern.



Above figure shows the status of livestock changing pattern. Due to scarcity of resources for livestock, livestock pattern have been observed. Furthermore the change in the income from the change in livestock pattern are:



Approximately 60% of Respondents experienced that their income level is decreased, 20% of the Respondents said that their income level is increasing. Furthermore, 15% of the respondents said that their income level was constant.

Impact of Climate Change on Overall Economy

Livelihood can be measured from the dependency of household on which they are depending about 80% of the households depend on agriculture, livestock farming which indicate that impact on agriculture and livestock effects in the livelihood of the people. Impact of climate change has been observed on agriculture, livestock, health obviously it affect in the overall economy of the people.

As agriculture and livestock farming are the main income of the people the loss of these cause threats in the income level to fulfill the income gap youth are engaged in business, foreign employment etc.

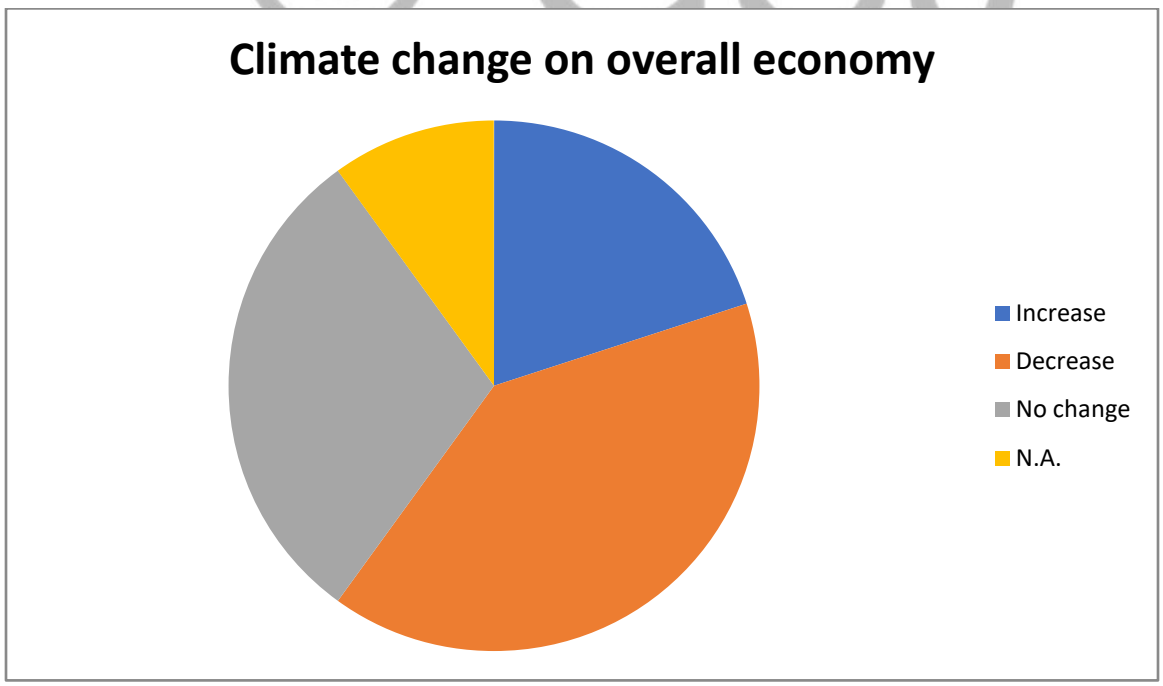


Figure shows that 20% of Respondents have said that their income level is increasing, 40% of the Respondents said that their income level is decreasing and only 30% of Respondents said that their income level is constant.

Conclusion and Recommendation

Conclusion

Climate change is a global problem that affects all of us.Many people have been affected from climate change in third world, like Nepal. Only few studies have been conducted effects of climate change at the local level yet.

This study was based on the impact of climate change on the livelihood of local people Gothadi of Mathagadi rural municipality of palpa district. Climate change is largly caused by human activities which presents a serious threat to agriculture, biodiversity, livestock which is directly related to the livelihood of the local people. The main reason of climate change is in rainfall pattern and increase in temperature. Change in the rainfall pattern lead to the intensification of global cause flood, increasing increasing sea level which threaten agricultural productivity and livestock production.

Agricultural productivity as well as cash crops has been decreasing every year. Due to low productivity income of people are declining day by day which affects livelihood of people. Livestock production is also affected by the changes in climate. Pasture land, forest land, wetlands are converted into barren land which lacks the availability of foddercrops Biodiversity has also been affected by climate .Germination, flowering maturation and shedding time of plant species have been changing. Different species have been disappeared. With the increase in temperature different health related problems arises e.g allergies, skin diseases, fever are increasing. It is found that medicinal expenditure on rehabilitation

ofpatients is increasing every year. Because of all these impacts on agriculture, livestock production, health problems affects directly on livelihood of the people. So nowadays youth are engaged in different activities like business, foreign employment etc.

Thus, climate change is threatening the life of people in rural areas and opportunities for libelihood have been narrowing down. Poor, marginalized, women and children are affected more from climate change.

Recommendations

- More studies need to be conducted on climate change and livestock.
- Research also required on changing lifestyle of people in relation to climate change, production and productivity of crops and income generating activities and direct impact on health.
- Loss of biodiversity and its implication on lives of the people.

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