

A Country Report  
On  
Impacts of Climate change on Women Peasants'  
With the case study of peasant women in Gulmi District

Regional Thematic Focal Organization, Food Sovereignty, Climate Change,  
Livelihood and Climate Change  
South Asia Alliance for poverty Eradication

## **Unit -I**

### **Introduction and Background of the study**

#### **1.1 Country Background**

Nepal is a mountainous country with great geographical and climatic diversity. The geographical setting of the country ranges from nearly sea-levelled lowland found in Southern Terai Plain (between 152m to 610 m. above sea level) to large amount of snow covered Himalayas (between 4877m to 8848m. above sea level) including the highest peak of the world. Water and forest are the major natural resources of the country, while water is the most important one which accounts for about 2.27 percent of the world water resources. The major sources of the water are glaciers, snowmelts from Himalayas, rainfall and ground water. Because of the varieties of topography, the country experiences tropical hot monsoon (in lowland Terai Plain) to alpine tundra (in High Mountain and High Himalayan regions) types of climate. In these two regions the average annual temperature is reported to be greater than 20 degrees Celsius and less than 10 degrees Celsius respectively. Monsoon normally arrives over eastern Nepal during the month of mid- June and last up to September. About 93 percent of total annual precipitation occurs during the monsoon season (ANPFa, 2011).

Being a least developed country and ranking 142 in HDI (out of 177 countries, UNDP 2009), the status of women is still pathetic in Nepal despite some illuminating political changes in the recent times. The Nepali women are still sadly crushed in between the orthodox Hindu religion and patriarchic culture and thus compelled to live a miserable life amidst the socio-cultural norms of discrimination, manacles of segregation and morasses of holistic crisis. The 2001 census report reveals that the literacy rate of women is more than 20% less than that of their counterpart (F 42% and M 65%), their economic rights is 9th times lower than that of male (property rights 10.74%) and the social prestige, decision making power and the employment opportunities for women are lowest ranking (CBS, 2001). Though there have been some remarkable changes in the decision making level since the historical movement of 2062/63(April 2006) especially regarding the representation of number in the constitution assembly and budding concept of inclusion of women in different sectors of country. The signature in universal declaration of human rights and CEDAW and provision of at least one third representation in the Interim constitution has never been practiced properly in the poor country which has a short history of democracy and human rights. Some of the data to prove the gender disparity and women's attachment with the farming are, Women Headed Household 14.9%, Life expectancy 63.3 %, Literacy rate 42.8%, School enrollment 71.4 %, Women in Higher Education 30.2 %, Ownership on House 5.5, Ownership on Land 10.8%, Women in non agriculture sector 27.2%, Women in Agriculture sector 72.8%, Women in administration 0.2%, Women technical/professional 1.8%, Women in clerical work 0.6% etc. (UNIFEM, 2010). Women in our society slave in their households and fields day after day, carrying crippling loads, and holding the burdens of society silently on their backs. They do their work thanklessly and without pay. Although the law states that Nepali men and women receive equal rights, in practice this is not the case. The future for the rural woman of Nepal is far from bright and promising. The majority of these overworked women are uneducated and under privileged. They sorely lack self-confidence and due to the attitude of the prevailing cultural orthodox belief, society does not consider themselves on par with men. They carry the weight of the caste system, the pressure of the dowry system, and the guilt of being a burden to their family. Women are directly

discriminated against in the job market. The majority of women are confined to the informal sector where wages are low, working hours are long, conditions poor and wage compensation is non-existent. Till today, the women are thought of as ornaments of the house in theory and slaves in practice.

Since around 70% of women are employed in agriculture and the tasks performed by women are more closely related to resource management, farm practices and gathering or collection of fodder, water etc, so the impact of climate change in women peasant is high. A study conducted by Home Net and UNIFEM in 2004- 2005, states 2.2 million home based workers in Nepal i.e 90% of the total labor force and 74% of them are women (UNIFEM, 2005). Over 70% of women workers are confined to self-employed, unpaid and low-wage informal sector work with few formal job opportunities. The problems faced by women in the job market stem from a number of factors including stereotypical roles confining women to the household, limited access to education and skill/vocational training, exploitive and unsafe working conditions, discriminatory wage rates, sexual harassment at work and discrimination in employment opportunities. At the same time due to the migration of their male counterpart more than 5 millions of women are forced to bear the triple burden of reproduction, production and management. That is why their responsibility in the agriculture has increased and thus any change that affects the agriculture also affects the women, Nepalese women.

In recent years, Nepal has experienced a sharp and sustained decline in food security (MoAC, 2008). Like many countries in the world, Nepal has been hit by a collision of crises, the intertwining effects of: the World Food Crisis, the International Economic Crisis, and the Global Climate Change Crisis. These crises come on top of serious domestic food challenges, including a domestic food production crisis, high rates of poverty, 10 years of recent civil conflict and ongoing political instability. Compared to neighboring countries, and indeed countries around the world, Nepal's food security situation has suffered considerably over the past 3 years. WFP estimates that: 3.4 million people have become highly to severely food insecure due to 2007/08 food price increases and the 2008/09 winter drought, an additional 5 million people have potentially fallen below the poverty line in Nepal during the past 3 years, and the cost of coping with food insecurity has increased dramatically (e.g. 30 percent of rural and regional families monitored by WFP during October—December 2008 removed children from school, and over 30 percent sold agricultural assets, WFP, 2008).

We have come to realize that the modern ways of man has placed an enormous stress on the Earth that nature simply is not being able to handle and it has already shown some of its effects. Increase in the volume of greenhouse gases in the atmosphere causing sustained global warming and thus melting of the polar ice caps, rise in sea level, desertification of land, extinction of species and serious impact on livelihood of people are noticeable at present (ANPFa,2010). Climate change is all above in this list of problems. Women face the greatest hardships and are the main victims of climate change impacts. Climate change is becoming an ever more important issue in women's lives.

In the recent years, Nepal is witnessing continuous disturbances in its ecology due to climate change resulting floods, severe landslides, and soil erosion and so on (SAARC, 2010). Climate change is also responsible for erratic weather patterns such as the thick haze that covers many parts of the southern plains of the country during winter seasons which destroys crops and livelihoods. So, the report had hypothesized that since more than 70% women are engaged in farming for their survival, the impacts of climate change in their livelihood is rampant.

Climate change and agriculture are interrelated processes and climate change has significant impacts on conditions affecting agriculture, including temperature, precipitation and productivity of soil and crops produced. A country where traditional subsistence farming is the basis of livelihood of around 67% people, and who also depend on natural resources, the impact is undoubtedly high. Climate change is hitting and will hit developing countries like Nepal, the hardest.

Nepalese economy depends heavily on agriculture which is very sensitive to climate variability. Hydro-power is the primary source of electricity and has a huge potential for growth but it is susceptible to glacier lake outbursts due to climate change. Tourism is also an important economic sector of Nepal which is also affected by climate change. Nepal would be affected by the climate change impacts at several fronts: hydropower, irrigation, domestic water uses and disasters. Reduced precipitation and moisture availability could also hamper the grasslands, fodder and forage production and productivity and this accompanied by heat stress to livestock would mean decreased livestock production and productivity. Even though such fluctuations can be countered by investments in irrigation or by greater food imports, Nepal, a poor country, can hardly take those measures effectively. Then on the other hand, monsoon precipitation coinciding with snowmelt in the mountains could lead to floods during rainy seasons damaging not only agriculture and livestock but also the livelihoods of many people. All this would culminate to decreased crop yield and lower livestock productivity which if uncompensated by rising imports may threaten even the food security concerns (Alan M, Regmi B.R., 2005).

## **1.2 Climate change and women**

Climate change scenarios predict adverse environmental and socio-economic consequences including frequency and intensity of heat waves, droughts, floods, and typhoons; altered ecosystems; reduced output and productivity of the agriculture, fishery and forestry sectors, loss of livelihood, food insecurity and diminished supplies; and heightened incidence of certain diseases and pests on people, animals and plants. The brunt of these will be borne by poor people and their communities who are most dependent on the land and natural resources for their food, livelihood, fuel and medicine yet less equipped to cope to natural disasters and weather variations. Women are particularly affected because of socially ascribed roles resulting from entrenched feudal-patriarchal discrimination and illiteracy. Rural women also take a heavy toll being the ones engaging in various remedies to make ends meet.

Climate change manifested in change of weather pattern, frequent floods and or prolonged droughts, increased temperature, emergence of diseases and pests, affects women's crop and livestock production. This entails rural women to increase their working hours in collecting, storing, protecting and distributing water resources, and securing food production. Amihan (national federation of peasant women in the Philippines) noted three ways by which the climate change crisis disproportionately affects peasant women. First, peasant women have fewer assets to sell to cope when harvests collapse either because of floods or droughts because of lesser resources that they control and own. Second, more women than men fall into chronic indebtedness related to climate-induced crop failures because of micro-credit is largely targeted at women, and as managers of production and household expenses, they are under stronger pressure to bridge resource gaps. Third, during food shortages, it is usually the mother who gives up her share of food for the children and even for the husband. Altered rain patterns with erratic monsoons disrupt planting seasons and adversely affect crop yields which have devastating

consequences for livelihoods and economic security. Similarly Nepali Indigenous peasant women in the higher region are noting an adjustment in their agricultural calendar to cope with the changes in rain and dry patterns. It is said that rice planting season generally has been moved one to two months later from what used to be the schedule at least within the decade. There is a common observation of rise in temperature with occurrence of farm pests such as giant worms and the occurrence of Malarial/dengue fever which was hardly heard in the region 20 years ago. While there is a general rise in temperature, sudden fall of temperature is observed during cold months (December to February). So, it is very urgent to overview women's perception and adaptation regarding climate change.

Climate change is a result of the unparalleled greed of imperialist governments and their corporations in their desire to control and plunder the world's remaining resources and amass more wealth. Imperialist institutions like the WB-IMF-WTO have imposed upon poor government development policies and packages which only tie third world nations to debts and impoverishment driving neo-colonial governments to offer their countries' natural wealth to capitalist countries and their corporations. The capitalist culture of consumerism has reached women in far-flung villages through items which compete with local resources (e.g. instant coffee) or items which are not a necessity (fabric softener).

Indigenous agricultural systems, enriching the land, hydrology, forest management systems, pest management systems, etc, are proven effective and sustainable compared to market-oriented systems which impose use of hazardous chemicals and mono-cropping of engineered or modified plant and animal varieties in large scale for the market, which damage the environment and cause climate change. It is already revealed from the study that as survivors, rural women have developed mechanisms to cope when produce is low and when disasters happen (Via Campesina, 2010). Traditional practices of cooperation and survival strategies, rural women display their organized strength to prevent and stop extractive industries such as mining and logging, corporate plantations, market-oriented agricultural systems and aqua-culture in their territories (Via Campesina, 2010). However, rural women also face the constraints of resources, technological support and capacity in confronting the challenges of climate change. Therefore it is also important to study the women's reaction to climate crisis.

The impact of climate change is already seen in Nepal too. Unpredictable weather along with drought and flood, degradation of quality of apples and vegetables, emergence of new pests and insects, replacement of crops and plants by new species are some of the evident (ANPFa, 2011). At present it is already felt that due to variations in natural climatic conditions, poor people of the developing countries and the Agriculture and livestock sectors are severely impacted, though it is threatening the existence of every life in the long run. The most vulnerable people are in general the poor, since they have less capacity to adapt, and their livelihoods are often dependent on resources that are linked to climate. As climate change also affects the ability of developing countries to achieve their poverty reduction and sustainable development strategies, the effects of climate change are expected to deepen poverty and affect livelihoods, assets, infrastructure, environmental resources and economic growth. The use of chemicals, pesticides, hybrids and GE seeds and fuels in industrial farm has put more risk on the climate and environment of the world.

At this juncture, we all have to think about the alternatives to combat both the problem of food crisis and climate crisis. A country where traditional subsistence farming is the basis of

livelihood of around 67% people, and who also depend on natural resources, the impact is undoubtedly high. Climate change is hitting and will hit developing countries like Nepal, the hardest. In one side women are badly affected by new crisis where as in the other side it has badly affected traditional system of farming and roles and responsibilities of women. Adaptation can be a key response in these countries. The documentation of such strategies can be very much fruitful for the whole world where the farming practices is still based on traditional indigenous knowledge and skills. It is possible for the research to contribute to improving adaptive capacity with a comprehensive understanding of the context in which decisions about adaptation are made. More than men, women can be the source of vast knowledge in all aspects of climate regards from understanding impacts, assessing losses and recommending mitigation and adaptation measures.

### **1.3 Objectives and Outputs of study**

There are various issues in regard to climate change in Nepal. One of the main concern is how it is affecting the oppressed group of society, the lower class of women. This research paper has attempted to collect the information and find out the answers of following questions.

- What is the history and the present trend of climate change in Nepal?
- What are the impacts of climate change in agriculture (of Hill Region)?
- What are the overall impacts of climate change in Nepal and specific to the area?
- What are the particular impacts of climate Hazard specific to the women?
- How it affect the livelihood of women?
- How does the women perceive and are responding to climate change?
- How can climate information along with adaptive response can be used to support peasant women of the rural Nepal.
- What measures help enhance adaptive capacity of women for managing agricultural systems on the face of climate change?
- How women of Nepal are managing their farming system in changing context and what policy spheres can help them to face effectively the challenge posed by climate?

#### **Specific objective(s)**

This study was designed

1. To review the general trend of climate change of the specific area as well as Nepal in general
2. To identify impacts of climate change especially climatic hazards on women peasant.
3. To identify and assess the perception and knowledge of rural women peasant on climate change hazard and explore role of women in climate change adaptation.

### **The outputs of the study were**

1. General trend of climate change of the specific area were found as well as the whole country
2. Perception and knowledge of rural women peasant on climate change hazard is identified and assessed the vulnerability.
3. Impacts of Climate change especially hazards on women peasant is known
4. Effective adaptation strategies practiced by farmers to cope with climatic hazards documented
5. Climate change trends in study area and Nepal as a whole and climate change impacts in terms of various hazards in general experienced by the local communities of the study area.
6. Challenges of Agriculture and peasants at the current scenario found
7. Impact of climate change on food sovereignty and right to food found
8. Adaptive response of the farmers in response to climate change found

### **1.4 Significance and rationale**

As climate change is one of the biggest problems of present world, the study on effect of climate change in agriculture especially in regard to the women who are most vulnerable group of climate change in Nepal bears great significance. It is also important to study how they have responded to the climate change. Thus the study was very important and relevant. Climate change and its impending hazards, at the present scenario of environmental crisis, has appeared as the most catastrophic threats especially to the small, rural farmers of poor nation depending on natural climatic cycle as their underdeveloped state fails to meet its obligations.

Farming is one of the most sensitive sectors in response to weather condition of wind, rainfall, hailstone, snowfall, drought, temperature etc. So, the farmers and peasants of Nepal are at the high risk and the weeping of the suffered hearts started to notice as the impacts are rampant. At the same time, these farmers have also adapted some of the adaptation strategies to reduce the impacts of changing weather condition based on their own knowledge and experience. Presently when Nepal is moving ahead for the new constitution, it is right time for all the marginalized and backward communities to raise their voices and ensure their rights. So, it is right time to analyze what should be done and what is left to do before making constitution especially the issue of gender, agriculture and climate change. And for the gender balanced constitution, all women including male should act accordingly with the clear vision and strategies which in the past had never been seen. So, we should analyze the various issues from gender perspectives. The research studies which collects the facts about women's challenges and practice in the context of climate change not only represent 70% of Nepalese women, but also help to carry out further step in combating climate change in Nepal.

The havoc caused by capitalist-intensive agriculture in a deeply traditional and feudal society is borne out in the daily lives of women, Dalits, children, youth and the elderly. This study addresses the social implications of the agrarian crisis and shows how the economic and social

realms are inextricably linked in the lived reality of peasant women. The picture of the increasing production and decreasing poverty were mere propaganda of the Green Revolution, liberalization and capitalism. As we move to the rural area peasant especially women peasant are crushed under various problems. The findings of research by our colleagues from India shows the aftermath of farmer suicides triggered by indebtedness and other related reasons with the increasing impacts of climate change, land grabbing, decreased production (BKU, 2010). As we take the example from India, Approximately 80% of those who committed suicide recently were between age 21 and 50 – the most productive years in a person's life, 40% were landless, Dalits while the rest were largely small and marginal peasants. It is sure that the sheer burden of managing the needs and demands of fatherless families takes its toll on women in the form of depression and other health problems caused by the overwhelming psychological pressure of grinding poverty. And most importantly, women's economic activities in tending to livestock, fodder collection, and doing all kinds of work within the house to make ends met.

A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base. 'Livelihood' is a seemingly neutral, descriptive word - about making a living - yet livelihood perspectives have been adopted widely, appearing in outputs from the World Bank to the most radical social movement. But what are the power relationships underlying this new discourse, and how do they in turn shape action? The underlying politics of livelihoods knowledge-making has been rarely discussed, and if so only obliquely. But when terms emerge which gain power and influence in constructing and shaping debates, it is worth reflecting on livelihoods perspectives as discourse, as well as methods and analytical tools. Politics and power thus must be central to livelihood perspectives for rural development. So in the context of the climate change too, the livelihood perspectives can be a best approach while talking about women.. The term sustainable livelihood implies that livelihoods are stable, durable, resilient and robust in the face of both external shocks and internal stresses. That is where the neo-liberalism, globalism and capitalism and unsustainable practice of green to gene revolution was hitting hard. So, it was important to talk about the issue of sustainable livelihood of women.

### **1.5 Methodology of achieving objectives**

This paper applied comparative analytical research design. The general climate scenario of Nepal was overviewed and the impacts on various groups were compared. The primary data were collected to study the perception, impacts and adaptation of women to climate change.

Both primary and secondary data were used. The data were both qualitative and quantitative. The primary data were collected through questionnaire, interviews (formal and informal), observation and key informants interview. Secondary data were collected from various published and unpublished books, journals, project reports, articles, feature writing, newspapers, official letters and statement, formal and informal speeches. These were collected from various archives, libraries, governmental, non-government documents and reports, reports of the different research centers and institutions, similarly, various concerned individuals, officers, scholars' study, comments, expertise, key informants', stakeholders and others related materials are also taken. Group discussion in the form of RRA is also used in the data collection process. Interview with civic and political leader and women leader is also included in the study.

To carry out this study nonrandom purposive sampling technique was used. There was no personal prejudice while selecting sample. 100 respondents were selected purposively from all



three clusters, Jaisithok, Nayagaun and Paudi Amarai VDC. The respondents were both men and women, as it was important to compare the differences in socio-economic and climatic indicators.

Any data used hereby were clearly stated with its clear citation. Different consultative meetings, key informant interviews and focus group discussion were conducted with the locals to make sure that collected information was accurate. The reliability of the data was also based on comparison with district and national level data. The primary data were checked through recheck or retest method and key informant to make them valid and reliable.

For the perception of climate change temperature, wind, precipitation, humidity, flood, drought, attack of new pests etc were measured. Impacts and vulnerability were also measured on the basis of frequency and extent of the climate change Hazard. Similarly comparison were made on the basis of sociological and anthropological basis especially in relation to roles, status and norms and values.

## Unit II

### Impacts of Climate change in Nepal

#### 2.1 Climate Change and Agriculture in Nepal

Weather is an atmospheric condition at the surface timescale from minutes to weeks and has an important impact on agriculture (ICIMOD/ UNEP, 2007) whereas the average weather is called climate. Increase in temperature and vents of erratic rainfall directly affect the agriculture and food supply through their effects on crops. So, agriculture is sensitive to short-term changes in weather that affect the production of crops. Insufficient rain and increasing temperature cause drought, whereas intense rain in short period reduces ground water recharge by accelerating runoff and causes floods. Both the situations induce negative effects in the agriculture. The climate change also causes disruption in normal weather pattern changing intensity and duration of monsoon affecting agriculture. The evidence of climate change in the Nepalese agriculture perspective is proliferation among day by day. Because of climate change the minimum temperature, rain fall pattern, water discharge etc is changing which can be prove from the following evidence, affecting the productivity of different crops (ANPFa, 2011).

- Reduction in crop yields and agriculture productivity: It is an evident from the various studies that there is decrease in production due to increase in temperature mostly it is affecting the tropics and subtropics. There is decrease in production since many of the traditional and adaptive species of crops are disappearing and climate change results in rise in temperature, shortage of water, flood, drought and other problems unfavorable for the crops.
- Traditional rainfalls of Jestha and Ashar (mid July) have been shifted in Shrawan and Bhadra. It has affected negatively in the paddy production
- Small peasants are most affected due to impact in agriculture and Decline in rainfall from November to April adversely affecting the winter and spring crops. Decline in food production has threatened the food security of people. Decreased production in 2009 as compared to previous years as there was less winter rainfall. The production was decreased as Wheat 14.5 percent and Barley 17.3 percent.
- Shifts in agro-ecological zones, prolonged dry spells, and higher incidence of pests and diseases.
- Increased incidence of fire in recent years affecting more than 50,000 people and loss of large areas of productive forest land.
- Eastern Terai faced rain deficit in the year 2005/06 by early monsoon and crop production reduced by 12.5% on national basis. Nearly 10% of agri- land were left fallow due to rain deficit but mid western Terai faced heavy rain with floods, which reduced production by 30% in the year (Regmi, 2007).
- Early Maturity of the crops due to increase in temperature may help to have more crops in the same crop cycle (NARC annual report).
- Shifting of climatic zones has been observed in the country. Extinction of natural vegetation: local basmati rice varieties, some local wheat, maize and other agricultural crops was also observed.
- Cold wave in Nepal in 1997/98 had negative impacts on agricultural productivity and showed reduction in the production of crops by 27.8, 36.5, 11.2, 30, 37.6 and 38 % in

potato, toria, sarson, rayo, lentil and chickpea respectively (Source: NARC annual reports from 1987/88 to 1997/98,).

- Farmers are distracting from farming and searching for new source of livelihood.

Rain caused a reduction in the 2009/2010 summer crop production across the country. Paddy production was reduced to 4.02 million MT and maize was reduced to 1.86 million MT; this represents a reduction of 11 percent and 4 percent respectively compared to last year. In August 2009, MoAC estimated the edible cereal deficit to be 400,000 MT for FY 2009/2010 compared to the total requirement of 5.4 million MT. This deficit represented the cereal requirement of seven percent of the population. The districts most affected by poor summer crop production are in the Mid-and Far-West Hill and Mountain regions; in these districts the summer crop was reduced by up to 30-50%. Paddy production was reduced by half a million MT (equivalent to 11%) compared to last year. This significant reduction was mainly due to the late arrival of the monsoon. Almost 5% less land was planted and the per hectare yield decreased by 6.6%. Maize production declined by almost 4% compared to last year. Millet production increased by 2.3%, this increase was however not large enough to compensate the losses in paddy and maize due to 4,500 the very small share (about 4%) of millet in total national cereal 4,000. Although productions of minor local crops are not monitored nationally, evidence from local field monitors indicated that minor crop production followed a similar trend to major cereal crop production. The summer crops (paddy, maize and millet) comprise nearly 80 percent of the total national cereal production. Paddy production was reduced by half a million MT (equivalent to 11%) compared to last year. This significant reduction was mainly due to the late arrival of the monsoon. Almost 5% less land was planted and the per hectare yield decreased by 6.6%.

Similarly, climate change parameters: temperature, rainfall pattern and humidity have an impact on the development and distribution of pests and diseases. Increase in temperature and CO<sub>2</sub> will lead to an increase in population of pests and severity of diseases in presence of host plant. It increases the rate of reproductive cycle of insect and pest. The increase in insect population leads to demand for more use of pesticide, which unknowingly causes lots of harm to ecosystem as well as human society. Incidence of pest and diseases would be most severe in tropical region due to climate change. Pest and disease of plain ecosystem may gradually shift to hills and mountains. Some pathogens of important crops from Terai zones has adapted in hills and mid-hills (eg. rust and foliar blight) that may adversely affect the agricultural production. Livestock is a major component of agriculture. It includes poultry, dairy production and rearing animals such as cattle, buffaloes, sheeps, goats and pigs. Meat and milk products are perishable goods, which require more energy to conserve the products. It is highly sensitive to fluctuation of atmospheric temperature. Increase in temperature by 2oC would decrease the meat and milk quality, hatchability of poultry and increases the possibility of disease in the livestock. Thus, it increases the probability of vector born diseases in the human society. On the other hand, increase of atmospheric CO<sub>2</sub> will increase the greenery of the land or fodder and pasture for the livestock's. Increase in amount of green fodder helps to boost up meat and milk production. It will ultimately help in improvement of economic status of Nepalese livestock farmers. However, if CO<sub>2</sub> is increases rapidly, all the living creatures have to suffer from various impacts like diseases and other problems.

Some of the highlights of recorded impacts of climate change in Nepal are,

- OECD (2003), shows that there will be 1.2 degree Celsius temperature rise by 2030 and 3.0 degree Celsius by 2100 compare to pre 2000 baseline.
- Fifteen Glacial Lake Outburst Floods (GLOF) events have been documented in Nepal already and the most recent event was occurred in 1985, when Dig Tsho, a lake in the headwaters of the Koshi River, breached after an avalanche and slid into the river, overtopping the dam. The event destroyed hydro-electricity projects, bridges, houses and farm land not only in Nepal, but also to Bihar state of India (NCVST ISET, 2009).
- The monitoring result of Shorong Himal since 1978 shows that the retreat until 1989 was 30 m, which is equivalent to 12 m thinning of the glacier surface. Glacier surface has further retreated by 14 m after 1998. Glaciers in Khumbu region have retreated in the range of 30 to 60 m. Some smaller glacier began to disappear and Glacial retreat in Nepal can have two direct consequences (i) changes in the hydrological regime, and (ii) Glacial lake outburst floods.
- Twelve warmest years since 1975 to 2007 (eg. 2006 was the warmest year)
- Late or pre-monsoon, unusual precipitation, decreased rainy days and intense rainfall events caused more runoff and low groundwater recharge.
- Extreme fog conditions have recently been observed in the terai regions.
- Receding snowfall and retreating of the glaciers (AX010 small glacier mountain shrinking at alarming rate) due to increase in atmospheric temperature in mountain environment.
- KTM valley frost day decreasing, winter cold shifted to a month later than regular and snowfall in Kathmandu (Feb 2007, after 60 years).
- Recently Darchula district of the country faced unusual snow fall affecting collection of precious medicinal herbs Yarsa gumba (Kantipur news may 2008)
- Mosquito from Terai and Mid-hill being able to survive in high- hills (Ilam, Mustang and Helambu area)
- Eastern Terai faced rain deficit in the year 2005/06 by early monsoon and crop production reduced by 12.5% on national basis. Nearly 10% of agri- land were left fallow due to rain deficit but mid western Terai faced heavy rain with floods, which reduced production by 30% in the year (Regmi, 2007).
- Early Maturity of the crops due to increase in temperature may affect the productivity as well as the crop cycle (NARC annual report).
- Shifting of climatic zones has been observed in the country. Extinction of natural vegetation, local basmati rice varieties, some local wheat, maize and other agricultural crops was also observed.
- Cold wave in Nepal in 1997/98 had negative impacts on agricultural productivity and showed reduction in the production of crops by 27.8, 36.5, 11.2, 30, 37.6 and 38 % in potato, toria, sarson, rayo, lentil and chickpea respectively (Source: NARC annual reports from 1987/88 to 1997/98,).

## **2.2 Women in Nepal and issue of climate change-Interrelation**

Women of Nepal represents more than half of the total population but yet recognized as the second class citizen of the country. They have no decision making power as well as right of their own life. More than half of the total population of women are illiterate, while they hold the

double work responsibility of house holding, employment and reproduction. Women live in an oppressive, background and feudal environment which is caused by patriarchal value system, unequal power relation and socio-religious and cultural norms and traditions. Therefore women are directly affected from climate change in Nepal. The constitution of Nepal has expressed its commitment to guarantee all citizens the fundamental rights to equality. Nepal has so far ratified to sixteen international human right instruments including first and second optional protocols to the international conference on civil and political rights and convention on the elimination of all forma of discrimination against women of Nepal.

Nepal is a country of having patriarchal value, norms and beliefs where women are recognized by the male member of family from their childhood up to old age. Consequently women don't have their own identity and they are not free to do their personal decision. Violence is wide spread in Nepal. Cultural, religious and economic factor reinforce male dominance and female subservience thoroughly that neither the violence nor the failure to complain about it unusual. Every sector of civil society of Nepal responds to domestic violence by encouraging compromise family member. A woman is completely dependent on her husband for food, clothing and shelter for herself and her children. In the context of our country violence against women is seen clearly in all the activities of society. Women have equal potentiality and possible capacity to participate in the development but the society of our country has worked as the hindrances. Male's feeling of superiority is the main responsible actor to make women as the victim of society, which is the true reflective of violence against women in Nepal.

Twenty years ago, women were not considered an issue worthy of international attention or concern. This began to change in the 1980s as women's groups organized locally and internationally to demand attention to the physical, psychological, and economic issue of women. Gradually, violence against women has come to be recognized as a legitimate human right issue and as a significant threat to women's health and wellbeing. Today violence against women is still a universally tolerated and often unpunished crime. However, this is generally downplayed by the public as well as by policy makers. Violence that is tolerated in times of peace often intensifies during times of armed conflict, political instability and even during the peace process. The breakdown of dawn and order and the displacement of people are often manifested in increase violence against women, particularly those in vulnerable situation such as young women, refugees, displaced and internally displaced, women, women with disabilities and women migrant workers.

Nepalese women are especially in minority group, they are compiled to face various problems in the society. There is no right of parental property which creates economic dependency of women. In the house of culture, religious and traditional values and norms, they are severely victimized by family, community and even by the state too. They don't have control over their own sexual and reproductive health. This situation is a great challenging issue for the campaign of bringing women into the mainstreaming of development. In this context, the knowledge and awareness among women on the perspective of climate change is inquired to know the impact of climate change in the rural woman.

The climate change, neo-liberalism and green revolution led farm practice along with migration of men has thus severely impacted the rural Nepali women peasants. Community wisdom, which has been practiced in farming in seed selection, storage, exchange and breeding along with manure preparation, disease control and disaster management is closely related to women as male counterpart mostly do earning jobs. We have evidences, indigenous agricultural systems,

enriching the land, hydrology, forest management systems, pest management systems, etc, are proven effective and sustainable compared to market-oriented systems. Green revolution led neo-liberal system has promoted the use of hazardous chemicals and mono-cropping of engineered or modified plant and animal varieties in large scale for the market, which has damaged the environment and caused climate crisis. As survivors, rural women have developed mechanisms to cope when production is low and when disasters happen. Traditional practices of cooperation and survival strategies, system of seed conservation and storage will prevent and stop the effect of chemicals and GMO where as conserve the bio-diversity. Thus, women peasants are the ecological sustainer.

Contribution of women in farming is far more than that of men. 70% of farm works are related to women where as only 30% share is of the men. At present due to the migration of men women's' role in farming has increased that is why it is the reality that the agriculture of Nepal has been feminized. The poor and marginalized people living on the rural area are the main victim of climate change. In the case of Nepal, Dalits and indigenous groups are such victim. Women among them are at the centre.

Various researches shows that the biggest contribution of rural women against climate change is the continuing fight against extractive industries, market-oriented production and over-consumption while asserting effective and sustainable practices on land and natural resource control and development through collective efforts (ANPFa, 2010). Report provides an assessment of the nature and type of climate change impacts on forests and forest dependent people in Nepal, by reviewing available literature and compiling the observations and perceptions of local people (ANPFa, 2010). People in the plains and the hills have observed unexpected changes in the weather, water availability and local ecology. Reduced rainfall and water supply, upward shifting of certain plant species and increased incidence of diseases on crops and livestock are major issues. These experiences of climate change and associated impacts are in line with scientific predictions. The review confirms the high vulnerability of Nepal to climate change. Reports from diverse communities and locations in different ecological zones of Nepal show that climate change has already affected the livelihoods of millions of rural people who primarily depend on the forest-agriculture interface. The livelihoods of such peasant communities are likely to suffer most as they are the most exposed to extreme climatic events such as droughts and floods, and at the same time have very limited capacity to respond and adapt.

In the case of Nepal, women are the main groups who are at the bottom of social hierarchy and excluded multidimensionally. Livelihoods perspectives have been central to rural development thinking and practice in the past decade. But in the study we have only focused on the impacts of climate change in rural women with the references of power relation and economic burden.

## Unit III

### Findings

#### Case Study of Jaisithok, Nayagaun and Paudi Amarai VDC of Gulmi district

##### 3.1 Introduction of study area

**Gulmi** is one of the 6 districts of Lumbini zone situated in the western part of Nepal. The total land area of the district is 1149 sq. Km. The district is bordered by Baglung to the North, Pyuthan to the West, Palpa and Arghakhachi to the South and Parbat and Syangja to the East. It covers an area which stretches East to West from 270 55' to 280 27' longitude and in North to South latitude from 83010' to 830 35' degrees. The district East to North length is 40 Km. and North to South width 30 Km. The total population of this district is 2,96,654 of which the male population is 1,33,771 and the female population is 1,62,883 According to census 2058 BS that is 29,112 female populations is more than male population. The total number of households is 59,189 and the average family size is 5.01 people. The population density of the district is 258 per square kilometer. The annual population growth rate is 1.08%. The economic active population of the district is 61.42% in which male 61.14% and female 61.14%. The 82.15% population engage in agriculture section whereas 17.85% in non-agriculture sector. The total agricultural land is 21,182.61 hectare in which 25.41% land is irrigated. The literacy rate of the district is 57.8 % in which female literacy is 48.1% and male literacy rate is 70.1%. The study area are Jaisithok, Nayagaun and Paudi Amarai VDCs of the districts having three different climatic and crop production. Jisithok VDC lies 13 KM west from Tamghas, the headquarter of Gulmi district. Similarly, the Nayagaun VDC lies just at Southern boarder of Jaisithok but most of the village is North facing. The Paudi Amarai VDC is in northern part of the district. These villages bear various characteristics of the hilly region, with low hilly and high hilly region as well as grows both crops of plain region as well as hill region. And another reason is the migration of men in the region is very high. And the another rationale of the selection of study area was that the district, Gulmi falls among the 16 districts which produce food only sufficient for less than 10 months. So, the effect of production could be seen on livelihood of people.

### 3.2 Details of the respondents

#### 3.2.1 Size of the family

Table 1, Size of the family

Caste of family	No. of family members		
	Up to 4	5 to 10	>10
Total	17.6	77.6	4.8

Source, Field survey, February 2011 (The figure in the table is in percentage)

The table shows the average size of the family of the respondents. The average family size is 6.9. 17.6 % of the respondents have a small family and 77.6 % of respondents have large size family consisting of 5-10 family members. 4.8% of respondents have very big family having more than 10 members living under the same roofs.

#### 3.2.2. Family details by residence

Table 2, Residence of the people in respondents' family

Residence	Total
Local	69.25
Internal migration	18.75
Migration to India	7.5
Migration to other country (Especially Arab and Malaysia)	4.5
Total	100

Source, Field survey, February 2011(The figure in the table is in percentage)

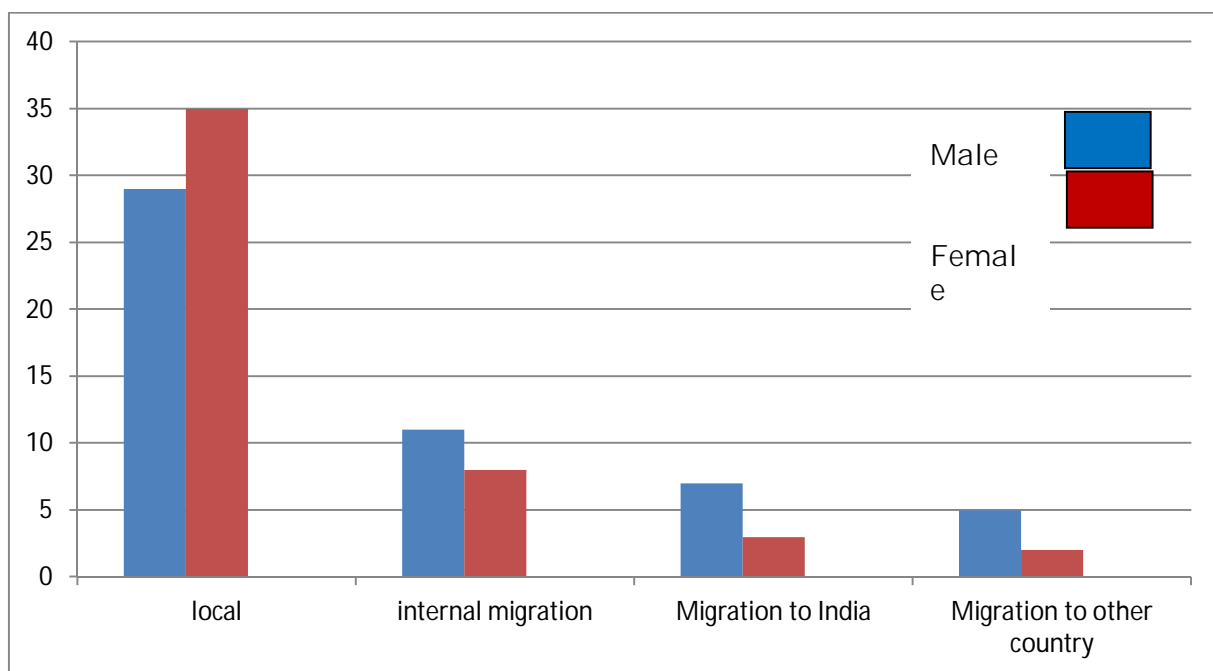
The table shows the migration of people among the respondents population. Around 31 percent of people were migrated to different places in search of alternative occupation. Migration within the country is 18.75% followed by migration to India



which is 7.5%. As compared to the previous researches which showed that about half of the working population was migrated to India, this data also reveals the same. Migration in cluster B and C is lower than in cluster A. This data was helpful to know about the people depending on farming and the people who need other alternatives for their living. The dependency in farming and occupation security was also known from these data. As migration was higher, it points out the search of alternatives in farming communities.

### 3.2.3 Residence Vs Education Vs Gender data

Figure 1, Residence and Gender cross tabulation data



Source, Field survey, February 2011

The above bar shows that only few of the females are migrated to other places. The percentage of local residence is higher in females where as in case of migration it is lower in the case of female. It shows that women are mostly engaged in farming and less in outer works. The feminization of farming and gender disparity can be seen from the above data.

### 3.3 Respondents Details/ Individual data

### 3.3.1 Education status

Table 3, Education status of respondents

Caste Education	Total
Illiterate	38.71
simple literate	20.96
Primary	21.903
Lower sec.	9.67
secondary	6.67
Higher sec.	4.8
Bachelor	3.2
Masters	0
total	100

The number in the table represents the percentage, Source, Field survey, February 2011

The table shows the literacy among the respondents. 38% of the respondents were illiterate and illiteracy is higher in ethnic and schedule caste communities. As the respondents were the farmers, if we compare this data with to the socioeconomic information, it is found that the people engaged in farming are mostly back in education than people doing other occupation. The literate people are migrated and illiterate are doing farming because they don't have other alternatives. The lack of information, marginalization of farming and farmers are the results we got from this data.

### 3.3. 2 Gender wise educational status

Table 4, Gender wise educational status

Education	Female	Male	Total
Illiterate	20.96	17.74	38.71
Literate	8.06	12.90	20.96
Primary	6.45	9.45	12.90
Lower Secondary	0	9.67	9.6
Secondary	1.6	8.06	9.6
Higher Secondary	0	4.83	4.8
Bachelor	1.61	1.61	3.2
Masters	0	0	0
Total	38.71	61.29	100

Source, Field survey, February 2011(The figure in the table is in percentage)

The table represents the educational status of respondents. If we compare the education with gender, more women were illiterate than male. Only thirty eight percent female were the respondents out of which only 18 % were literate where as 47 % male were found educated in the same place. The inequality of education in gender can be clearly seen from the chart as the trend shows the least number of female continuing higher educations. The higher female illiteracy but local residence and doing farming but higher literacy of males and higher migration both suggest the degrading situation of farming and serious risk of climate change.

### 3.3.3 Perception on flood, drought and temperature rise

Table 5, respondents' perception on flood, drought and temperature rise

	Perceptions
--	-------------

Perception on	Intensity and frequency rising	Falling/decreasing	Constant/similar
Drought	91	7	2
Flood	7	82	11
Temperature (Hotness) rise	23	8	69
Precipitation	2	97	1

The figure in the table is in percent, Source, Field survey, February 2011

Most of the respondents perceived that winter drought is increasing and even the precipitation is irregular during the monsoon time. Extreme hotness during summer and coldness during winter was also observed by the respondents.

### 3.3.4. Who are the most vulnerable groups of climate change?

Table 6, Caste of the family Vs perception on vulnerable group

Caste	Perception on vulnerable group				
	Dalit	Janajati	Women	Poor	Total
Brahmin & Chhetris	7	0	2	21	30
Baishya (Ethnic groups)	2	6	6	32	46
Sudra (Dalits)	6	0	0	18	24
Total	15	6	8	71	100

Source, Field survey, February 2011(The figure in the table is in percentage)

The table shows the respondents response about the most vulnerable groups of climate change. There were only four options as lower schedule caste (Dalits), Ethnic (Janajatis), women and poor people of any caste and creeds. Most of the respondent viewed that the vulnerable communities are poor. Though there was not a specific reason some of the people believed that they are the most victimized groups due to climate hazards, other also opined that the lower caste people are most vulnerable.

### 3.3.5 Who are the vulnerable communities and why?

Table 7, the reason for the most victimized groups of climate change

	Dalit	Janajati	Women	Poor
Reasons	<ul style="list-style-type: none"> <li>•Because they were poor</li> <li>•Because they were subsistence farmers</li> <li>•They were dependent on others land as share croppers</li> <li>•They lack information</li> <li>•They have no rice land or very less land</li> <li>•They were living on disaster prone areas</li> </ul>	<ul style="list-style-type: none"> <li>• Because they lacked information</li> <li>• They were using indigenous methods which was challenged by market</li> <li>• They were more dependent on nature and natural resource</li> </ul>	<ul style="list-style-type: none"> <li>• Because women's work was related with natural resources as land, water, forest etc and changes in these resources badly impacts their lives</li> <li>• The increasing feminization of agriculture</li> <li>• Because they were illiterate thus risks of effect of pesticide and chemicals were higher</li> </ul>	<ul style="list-style-type: none"> <li>• Because they depends on farming much and don't have alternatives</li> <li>• They lack enough land thus the decrease in production badly impacts their livelihood</li> <li>• Most of them were illiterate</li> <li>• Migration and search of alternatives was also difficult for them</li> </ul>

Source, Field survey, February 2011

Most of the respondents replied that the poor were the most vulnerable communities to climate crisis as they don't have alternatives. The poor were also lacking information and has very less land so if there was any effect on the production their livelihood for the whole year would be badly affected. The poor may be from any caste but mostly belong to lower caste and upper caste communities. Women within the poor household had more work in farming. As womens' work was related to collect water, fodder, maintain soil fertility and moisture which in the course of climate change were affected, women were more victimized. Due to decrease in production and insecurity and higher risks in farming farmers were migrating in search of alternatives, which was also making women more victim of extra burden and more vulnerable.

### 3.3.6 Changes in Natural resources

Table 8, Impacts of Climate change on Natural resources

Natural Resources	Changes	Impact analysis	Impacts
Water	<ul style="list-style-type: none"> <li>• Scarcity of ground and fresh/flowing water</li> <li>• Pollution of water resources</li> <li>• Enhanced frequency and intensity of flood and droughts and variation in river runoff</li> <li>• Unreliable and unpredictable river flow pattern affecting irrigation channels</li> <li>• Deepening of the river George</li> </ul>	High	<ol style="list-style-type: none"> <li>1. Crop loss due to flood and drought</li> <li>2. Diseases due to flood, drought and water pollution</li> <li>3. Food insecurity and famine</li> <li>4. Socio-economic impacts due to scarcity of water for irrigation and drinking purpose</li> </ol>
Rainfall	<p>Unpredictable precipitation</p> <p>Changing form of precipitation</p> <p>Change in monsoon time</p>	High	<p>Reduced crop production</p> <p>Crop loss due to water related risks such as drought, heavy rain and hailstorm.</p>
Forest	Deforestation	Medium	<ol style="list-style-type: none"> <li>1. Disasters</li> <li>2. Pollution</li> <li>3. Loss of natural beauty</li> <li>4. Loss of bio-diversity</li> </ol>

Land, Soil	Loss of fertile land due to flood, landslide, soil erosion Pollution of land due to use of chemicals and pests	Very high	Impacts of production and Health impacts
Wild Animals and birds	Displaced and disappear in the region	High	Impacts on ecosystem

Source Field Survey, January 2010

There were various changes in water, air, soil, forest and other resources. Due to change in rainfall, freshwater, biodiversity and soil the agriculture was badly impacted. So, economic, social, environmental and health impacts were resulted due to these changes. Changes of water use (irrigation), climatic conditions and agricultural inputs such as herbicides, insecticides and fertilizers was changed the traditional practice of farming.

### 3.4. Findings from FGD and Observations

Key informant interviews, Focus group Discussion and observations were conducted to collect the data on climate regards. Two separate focus group discussion were held, 10 key informants including 5 local enumerators and researchers was taken and intensive observation was done. The FGD was undertaken one with males and one with women peasants. The following findings were made. Most of the respondents had observed the change in frequency and intensity of climate change indicators though they lack information on what is climate change, what its causes are and what its trend is. The impacts of climate change were observed by respondents in all clusters. There were also various impacts of these phenomenon.

Key informants and group discussion viewed the effect of climate change on Agriculture due to

1. Change in temperature and precipitation,
2. Change in soil moisture and soil fertility,
3. An increased of extreme climatic conditions as flood and drought
4. Snowfall, fog and extreme cold condition
5. Increasing pest attack even in the harvested seeds
6. Less adaptability of the previous varieties of crops
7. Change in monsoon
8. Emergence of new insects and pests

They also viewed that agricultural was highly affected by these changes. Similarly these phenomenon were leading to

- Crop damage due to flood and drought resulting to shortage of food. Change in crop pattern (contraction or variation on crop season)
- Lower yield of production.

Poor communities were found more vulnerable to extreme weather events, Due to the following reason

- Since they were living on more climate disaster prone area which also lacks services and other technology/structure to reduce the harm. This had increasing vulnerability to

flooding, landslide and drought. They also had limited means to cope with the losses and damage inflicted by natural disasters.

- Poor farmers also risk losing crops as the flood, heavy rain with wind, snowfall and extreme drought occurs.
- They also risk losing wage opportunities as poverty as well as climate disasters are increasing the sickness and injury as a result they cannot work or as the disaster destroys the need for labor. Recovery strategies, like selling assets, can leave the poor without income and thus more vulnerable.
- They were highly depending on a small subsistence based farming system which was more prone to climate change. Some of them were sharecropper and farming in other land, low productivity was surely affecting their household economic badly.

### Impacts on women

Women play a vital role in household and community in the study area. The statuses of women peasant in studied areas was low due to

1. Lack of access resources
2. Decreased economic opportunities
3. Increased domestic violence
4. Increased health risks and disease rates
5. Limited coping strategies

As there exists the problem of gender discrimination and the flow of intellectual people is high and most of the young people (especially man) have gone to abroad, the remaining child, old and women are left in the village for agriculture and household purpose. So, the impact of climate change in women peasant is compared higher than any other in this district. Observation and field visit found that women do more work in agriculture than men in the study areas. Though the role of women are not dominant and decision making, the tasks performed by women were far more and important. Women, both as participants and decision makers, had shared the responsibility of planting, transplanting, weeding, harvesting, carrying grains to the mill for grinding, including collecting wood, water and fodder. Women's involvement was very significant in care and management of livestock and poultry, and kitchen gardening. Despite women's important role in agriculture, traditional social norms and customary laws which generally were biased in favour of men, were a barrier to women's equitable access to productive resources.

Table 9, Attachment of men and women with agriculture

Tasks	Female	Male
Agriculture	<b>Mostly women</b>	
Fuelwood collection	<b>Mostly women</b>	
Water collection	<b>Mostly women</b>	
Grass collection	<b>Mostly women</b>	
Leaf fodder collection	<b>Mostly women</b>	
Food processing	<b>Mostly women</b>	



Cooking	<b>Mostly women</b>		Field survey
Various domestic	<b>Mostly women</b>		

vey, February, 2011

Rural women were equally involved in both field and post-harvest work in crop production. Ploughing was considered a man's job, whereas all other work, though shared by men, was mostly undertaken by women. Collecting and carrying compost to the field was normally performed by women. Women's involvement was more in producing major crops such as rice, maize, wheat, etc. In both rainfed and irrigated agriculture time spent by women is higher relative to that of men. In rainfed areas women devote more than 12 hours per person per day, whereas men do only 9 hours. Women in rural Nepal have a very close relationship with forests. Collecting fuelwood meets 95% of the cooking-energy consumption (Denholm, 1991). Collecting fodder and other forest products is most tedious and tiring, which has traditionally and primarily been performed by women. Women's task of buffalo raising requires a great deal of daily care year-round. More than three-fourths of household time spent collecting forest products is done by women.

Women were actively involved in livestock production. Fodder collection, grazing and milking were generally performed by both women and men, whereas activities like feed preparation, feeding, cleaning sheds and preparing milk products were women's domain. Women had a crucial role in detecting illness of the animal because of their close and frequent contact with them.

### **Overall scenario of climate change impacts especially on women**

Local people of Jaisithok VDC of Gulmi district were facing an increasing risk from super disasters such as floods, drought and rise in infectious diseases, which had a host of increasing environmental, health, and economic impacts. As per the field survey, impacts of climate change on Jaisithok VDC of Gulmi district were successfully assessed during field trip whereas consciousness towards the climate change among the people of this area was very low. The impact on agriculture directly affect the economy. In the study area agriculture is the backbone of the economy and accounts for 80% of the population's livelihood and contributes to 35% of the GDP. Likewise, more than 85% of people in the study area had primarily depended up on agriculture.

In the study area, impacts of climate change on agriculture were seriously assessed using focus group discussion with local women. Their perception on climate change impacts due to indicators as regional temperature, precipitation, rainfall pattern, soil moisture, sunshine and cloudiness, threatened the traditional agricultural practices, floods, drought, and hailstorms, affecting agriculture was drastically in the study areas. Most of the respondents perceived that winter drought is increasing and even the precipitation is irregular during the monsoon time. Extreme hotness during summer and coldness during winter was also observed by the respondents.

A woman in Gulmi still faces various types of violence in their lives and often is the victim of disaster. Increased harassment and abuse both in the home and relief shelters have been widely reported. Moreover, health care and proper hygiene were often inadequate in shelters, particularly for pregnant, lactating and menstruating women. They adjust dietary consumption

when certain foods are scarce and preserve food and supplies such as fuel, matches, blankets, animal fodder and medicine—in preparation for shortages or disaster. Women were vulnerable to climate change in Gulmi. Women's livelihoods were deeply threatened by climate change. Access to water is increasingly unreliable. As more men are moving to urban areas in search of employment, women are left to cope in the villages. Despite heavy work burdens, women in Gulmi district have been active in climate change adaptation and mitigation.

Migration, child marriage, tradition of taking early responsibility by boys including poverty were believed to be the cause of higher drop out and hindering factor of education severely affecting women's lives. The local residence was higher in females whereas in case of migration it was lower in the case of female. It shows that women are mostly engaged in farming and less in other works. The feminization of farming and gender disparity can be seen from the above data.

The various impacts of climate change observed in the study area can be summarized as follows. In all cases women were the groups bearing more burden and suffered from higher impacts.

**Economic impacts:** Due to the effect on fertility of soil, water and various agricultural resources, there was a decrease in production. This had direct economic impacts on the livelihood of the people. Poverty was increasing due to economic loss and decreased production. Due to the practice of new varieties which was the attempt to adapt with the new situation there are also economic impacts. The pesticide and chemical fertilizer has also impacted the economics of rural agriculture. Therefore, the cost of farming had increased but the production was not affecting the family economics badly.

**Socio-cultural impacts:** The culture was badly impacted by the changing scenario. There was a change in farming practice which was slowly replacing traditional skills, knowledge and technology. Due to the effect on culture which binds people together, there has been a social impact. The political impacts of the climate change were conflict due to the scarcity of water. Dependency on pesticide and chemical was increasing, there was a distraction from farming especially rice and people were in search of a new source of livelihood. Food insecurity of the poor and marginalized community especially in poor and scheduled caste forcing them rural-urban migration/ displacement and the pressure on city lives were other social impacts. Women, children, disabled and elderly people were the worst victims due to these impacts.

**Environmental impacts:** Loss of biodiversity, air, and water and soil pollution was the main impact of climate change on the ecosystem. The traditional species of crops as well as various plants and animals had become less common and even replaced. Land degradation, desertification and persistent drought processes had undermined the capacity of ecosystems to provide food, water and other services, leading to major declines in the welfare of vulnerable populations - particularly those living with poor resources.

**Health impacts:** Pollution of air, water and soil due to flood, drought and use of chemicals had various impacts on the health of the people. The women, children and elderly people who were mostly illiterate were affected. Increasing water and vector borne disease such as Cholera and diarrhea, skin diseases, pressure on sanitation and safe drinking water were other health impacts.

Unpredictable precipitation, changing form of precipitation, change in monsoon time and thus enhanced frequency and intensity of flood and droughts; causing unreliable and unpredictable river flow pattern has affected irrigation, water mills and fisheries in streams. Before 10 years water mills were regular but now there is a shortage of water. People feel that during the monsoon

the irrigation channel is damaged more severely which indicate the occurrence of flash flood. There can be also noticed the deepening of the river George which has also caused sliding of land in some places and difficulties in irrigation channel in other. Scarcity of ground and fresh/flowing water is widely noticed changes. Both due to change in precipitation and use of water in other purpose as well as due to development works as roads, the source of water had become dry and very low. The availability of fisheries in the stream also indicates the pollution and chemicalization of water. Wind/hailstone/snowfall were the climate change indicators frequently observed the study area in the past few year which were less common for the region. Decrease in humidity and temperature rise has caused increasing abundance of insects and pest as mosquito in the region which was totally absent in the Jaisithok and Nayagaun before 12-15 years. Desertification of land was also the result of prolonged drought as well as excessive use of chemicals and pest in search of climate adaptation. Many of the species have been extinct and new plants as Banmara had become wide.

## Unit IV

### Summary, Conclusion and Recommendations

#### 4.1 Summary

The climate change has undoubtedly become a great problem of the country like Nepal due to its fragile mountain ecosystem, weak geological condition and diverse nature of climate. The impact of global warming and climate change is already being felt by poorest people in Nepal threatening the very existence of varieties of life forms and affecting the livelihood of rural peasants, indigenous people, women and Dalits. Risks are higher because climate change is affecting agriculture, fisheries and other components that constitute the livelihood of rural populations.

The study was linked with the assessment of impact of climate change on rural women peasants especially of vulnerable communities. The main objective of study was to trace out the current trend of climate change on livelihood of women peasants of indigenous and schedule caste communities in Nepal and also to collect the data regarding the adaptive responses of those peasants in the changing context.

The survey research was carried out in Gulmi District of western Nepal. Gulmi, one of the inner hill districts of the Lumbini zone and its VDC, Jaisithok, Nayagaun and Paudi Amarai was selected for the study. The reasons for the purposive selection of three clusters was to represent different communities, traditions and pattern and to make the study more representative as well as to compare the data of three different but interrelated cultivation patterns. The availability of a cluster of community of Dalits, indigenous communities and upper caste was also the reason for the selection. A semi structured interview schedule was prepared to obtain the information about socio-economic, demographic, and farm characteristics, income sources, resources status, and impacts of climate change in their livelihoods at various levels and document the adaptive response. The key informant interview, focus group discussion and observation were also used during the data collection.

The finding from the study showed that despite having more than 80% people literate, the region has very low information on climate change. More than 80 % people do not know what climate change is, what its causes are and how it is happening but they have experienced the variation in climate indicators and experienced the hazards. 77% people have big family size consisting of 5-10 members and average land holding per family is very low. As the land is not enough for producing sufficient food for the family almost 30% people are migrants in the study area. Keeping the youth especially the male population of the village in mind, this data shows the serious effect in agriculture.

Quite different from the country scenario where 67% people are primarily engaged in farming, only 42 % sample people found doing farming. Farming was highest in Ethnic and schedule caste people where as low in upper caste people. 17 % of the respondents were illiterate and 83 % were literate. There were only 13 % people who had completed their secondary school level education. There was not a very big difference in educational status of the various caste people but it was highest in schedule caste people and around one fourth of the population were illiterate. More than half of the female in the sample area were illiterate which shows the gender disparity as less than one third of the male were illiterate. Among the literate also there were less than 10% female respondents who have completed primary education. The data also showed that

food produced from their field only supports for few months. It was due to small size of land, big size of family and low productivity. Similarly, maximum number of respondents replied that they grow food only for 3 months or 6 months and only 16% of the respondents grow food enough for the whole year and they share negligible amount of it with neighbor and in the market. Regarding the most vulnerable groups of climate change, most of the respondent viewed that the vulnerable communities are poor Dalits or indigenous group. But most of the Dalits had less land thus poor. It is found from the collected data and the table that Blast, Maruwa, Daduwa, and Decaying of root, black and dark spot, swallow roots has become more common these days compared to the past. Since respondents also reported that despite the use of pesticide and treatment, the pests and diseases are not controlled, it concluded that new pests were attracting the crops especially rice.

Around 31 percent of people were migrated to different places in search of alternative occupation. Migration within is country is nearly 19% followed by migration to India which is 8%. As compared to the previous researches which showed that about half of the working population was migrated to India, this data also reveals the same. This data was helpful to know about the people depending on farming and the people who need other alternatives for their living. The dependency in farming and occupation security was also known from these data. As migration was higher, it points out the search of alternatives in farming communities.

There were no landless families among the respondents as the respondents were purposively selected as farmers. Most of the families have fallow land which is not appropriate for farming. But due to migration, low production and shortage of labor the barren land has increased in noticeable amount in these days. The fallow land provides the fodder, firewood and wood to the respondents which were equally important in livestock rearing and economic stability.

The impacts of climate changes were found in all natural resources including agricultural resources, forest, water, land, pasture and air. There was change in temperature and precipitation, soil moisture and soil fertility, increased of extreme climatic conditions as flood and drought, snowfall, fog and extreme cold condition, increasing pest attack even in the harvested seeds etc.

Agricultural was highly affected by these changes. Due to flood and drought there was huge crop loss resulting to shortage of food and change in crop pattern (contraction or variation on crop season), lower yield of production. Poor communities were more vulnerable to extreme weather events, because they were living on more climate disaster prone area which also lacks services and other technology/structure to reduce the harm. Unpredictable precipitation, changing form of precipitation, change in monsoon time and thus enhanced frequency and intensity of flood and droughts; causing unreliable and unpredictable river flow pattern was affecting irrigation, water mills and fisheries in streams. Scarcity of ground and fresh/flowing water is widely noticed changes. Both due to change in precipitation and use of water in other purpose as well as due to development works as roads, the source of water had become dry and very low. The availability of fisheries in the stream also indicates the pollution and chemicalization of water. Wind/hailstone/snowfall were the climate change indicators frequently observed the study area in the past few area which were less common for the region. The Secondary impacts were on food Security, health and economy. Infectious diseases due to rise of mosquito, cholera and typhoid and a rise in diarrhoea and skin diseases and other water related conditions was also observed in the study area. Due to secondary effect of the climate change under-nutrition was increased. As farmers had changed the varieties of crops they used to produce, it has affected their yearly crop cycle system and nutrition. Wage laborers were vulnerable to hunger and

famine. As climate change was impacting the agriculture it had also affected the agro-labor whose livelihood was proportional to the agriculture production. Due to low production people were even leaving the land barren which had reduced the opportunities for wage labor. It has also decreased in income and food availability. Decrease in humidity and temperature rise had increased the abundance of insects and pest in the region. To address the climate change impact for these community people were considered reduction in pollution, forestation and proper policies as mitigation measures.

The adaptation strategies and resilience of the farmers were also significant in the study area. The adaptive responses found in the region were mostly very effective, feasible and sustainable. But due to neo-liberal attack these strategies based on traditional knowledge were replaced. Since most of the respondents were illiterate, they were not confident about the strategies they were applying as there was increasing pressure from market to practice new technology, seeds, fertilizers, pesticide and new methods and techniques.

Women in the study area do most of the farm works. As farming is highly affected its burden are higher in women. As their male partner are out of the villages in most cases, their illiteracy and lower social status is a serious cause for bearing higher impacts of climate crisis.

#### **4.2 Conclusion:**

Analysis of climatic indicators revealed a significant change trend in study area in recent decades. Trends of flooding were gradually increasing in frequency and size and gradual increased size and frequency of floods have been also revealed since the last five decades. Temperature was increased and impacts were rampant due to erratic rainfall and emergence of new pests etc. Therefore, climate change generally in Nepal and especially in study area was adversely affecting agriculture thus food production creating food insecurity and further aggravating rural poverty, joblessness and misery. The impacts were most among the poor people. The women within indigenous people, farmers, agricultural workers and Dalits who occupy lowest position of the social hierarchy were poor and thus most vulnerable groups.

Due to the impact of climate change in agricultural resource as land, water, forest and change in temperature, precipitation, humidity etc productivity is decreasing. Indigenous and schedule caste women were hard hit as they were economically backward, more dependent on natural resource for their livelihood and mostly illiterate. In one hand, the poor communities were facing numerous negative impacts of climate change and other side they were pushed in to further trap by false solutions offered to them. Still most of the communities were lacking climate information but they were facing the impacts. The lack of information, poverty and higher dependency on nature and natural resource were the main reason of higher impacts on women, Dalits and indigenous groups. The use of traditional practices to cope with changes were natural actions but highly challenged by present politico-economy. Some of the farmers were using inorganic farming because of the motivation of their neighbor, motivation from markets and inspiration from state. The subsidies of government and non government agencies were also destroying the traditional system. They were exploited by current market mechanism prevailing in the country as it was undermining the local traditional products.

On the basis of analysis and inferences, it can safely be derived that climate change had prominent effect in farming since majority of people depends on rice and it is most affected in course of climate change progression. Dalit and indigenous people especially the poor were important classes of marginal communities in Nepal dwelling in resource poor and disaster

vulnerable areas. The modern varieties used by the respondents were more prone to diseases and insects demanding high external inputs like pesticides and thus making the product less competitive in market due to rise in cost of production. Local varieties of many crops have extinct. This was the main area of degrading the women livelihood aspects. Planting time of major crops was also changed affecting their productivity. Livestock and fishing were also equally threatened due to the change in forest, water and pasture. Impact of precipitation and evapo-transpiration had impacted the water availability and flow of water.

Though the communities had negligible contribution for the change in climate there were some of the activities at local and national level to emit GHGs. Pollution of air, water and soil, increased deforestation due to increased population density, industrialization and over use of natural resources were some of them. These activities were causing scarcity of water, emergence of new disease, loss of fertility, increase in water temperature and loss of biodiversity. This had led to the economic loss and decrease production. There was increasing dependency on pesticide and chemical and due to negative cost benefit ratio. There was distraction from farming especially rice forcing people to search new source of livelihood and making women and poor people more vulnerable. Social conflict, poverty, cultural loss and displacement and migration were some of the secondary impact of climate change.

Rising annual temperatures had affected crop cycles and reduced crop yield and productivity. It had altered crop and variety suitability. Floods and changes in monsoon patterns were triggering physical loss of fertile soil and sedimentation problems. Extreme events of flood and drought had changed land use patterns including altered patterns of crop and variety use. Outbreaks and extension of minor diseases, pests and unwanted weeds, were causing major problems in crop and livestock sectors. Loss of labour through migration, loss of local knowledge of traditional management and adaptation strategies has caused serious socio-economic impacts.

But on the other side, diversity of genetic materials adapted to a wide range of climate were offering good opportunities to react to the change and stress tolerance at least in some cases. Some of local varieties were of great significance in adaptability and adaptation to changing climates. These varieties were also adaptive to drought, flood and wind. Rich traditional knowledge maintained by a wide diversity of local and ethnic groups in diversified agro-ecological condition can be of great significance if managed properly. Women had a number of good practices of community-based conservation and use of genetic resources. Seed conservation, exchange, maintenance of soil moisture and fertility, use of various traditional varieties according to climate suitability were readily available for dissemination to wider farming communities.

Commitment of donors, government sectors and civil society organizations to work together in an integrated manner to share information and development of strategies to maintain and use agro-biodiversity in sustainable manner should be promoted. Development and promotion of organic farming, recognition of importance of food sovereignty and the maintenance and use of local diversity along with conservation of ecosystem can be good strategies to reduce the effects as well as mitigate the climate crisis. If women empowerment and agrarian development is integrated that can be a wise step for the socio-cultural reconstruction.

### **4.3 Recommendations**

Impact of climate change and variability are already having an intense effect on the livelihoods of poor rural communities especially women, so immediate action need to be taken now. Policy

makers need to focus attention on the implications of climate change. Support for adaptation to the impacts must start now. Focus on poverty relief through diversifying livelihoods of rural women peasant and extension support for sustainable agricultural systems, must be a priority.

On the basis of above analysis and inferences, it can safely be derived that climate change had prominent effect in Nepalese context, something different from general trend world wide. Since women, Dalits and Schedule caste people forced to live under poverty due to historical discriminatory traditions and their livelihood is largely derived from resources depended in water, forest, fallow land etc., they were most affected in course of climate change progression. Current model of neo- liberal trade-led growth pattern was neglecting the issue of livelihood problem of weaker sections of society and that is why the local communities were being swallowed by profit motive of MNCs. Therefore, the policy and program executed by both public and private sector should recognize this social sensitivity while discharging any program. Cochabamba declaration of small and rural peasants can be a guidelines for the formulation of plans and policies.

General recommendations of the study are given below:

- Farmers and general public especially of lower class (women, Dalits and indigenous people ) should be informed on climate issues
- All government departments must acknowledge the importance of climate change and analyze the impacts for their sector. Disaster planning and risk reduction strategies must account for the new challenges of climate in woman peasant.
- More rigorous studies on impacts of climate change and documentation of adaptation strategies should be initiated and results should be disseminated widely
- Climate-forecasting system for reducing hazards should be developed and provided to the farmers properly.
- Women status should be raised
- Farmers should be encouraged to use local seeds, organic manure and sustainable local technology and wisdom.
- As women have a greater role in traditional agriculture system the program on women empowerment and agro-ecology should be correlated.
- Government should facilitate, screening of the varieties against disease, soil testing along with construction of more flood control embankments, plantation and field dissemination of appropriate technology
- Cooperation and coordination mechanism with neighboring countries to cope with climate change can be of great importance for technologies and seeds
- Documentation of effective adaptive response and their dissemination should be initiated urgently
- Food Sovereignty as an environment friendly and culturally adaptive development approach for farmers to reduce the potential hazard of liberal economy should be established as fundamental rights of people.
- Capacity of people and institutions to cope with climate change should be technically, financially and culturally strengthen.
- Adaptive agronomic infrastructure to respond to climate change should be built
- Climate change perspectives should be reflected in the political transition and peace building efforts/processes.



- Research in water and nutrient management in various agro-ecologies to meet the climate change, in green maturing crops, cover crops, to preserve soil moisture, soil organic matter and micronutrients, on new technologies towards low carbon economy and on land use planning, watershed management, vulnerability assessment and resource management should be prioritized.
- Seminar, workshops, training and general education to rural population dependent on agriculture should be launched
- Comprehensive agrarian reform is important along with land reform and just distribution of productive resources
- Women, Indigenous communities and Dalits should be empowered politico-economically and their traditional knowledge, skills and technologies should be respected, valued and preserved.
- Women should be given equal rights and access to productive resources.
- Policies should be formulated to end landlessness, bonded labor and share cropping system making the producer the owner of the productive resources.
- Identification and investment is required on appropriate cropping patterns and systems, crop varieties and species, emerging pests and diseases, and evolving and anticipated climate stresses on crops and livestock. Training and the support of extension worker for farmers will be necessary in these areas.
- The impacts of neo-liberalism in agriculture should be reduced
- Gender-sensitive policies and plans based on gender-roles related to household livelihood strategies and rural poverty and household food security concerns should be formulated;
- Gender-disaggregated technology, training and input need assessment as a basis for agriculture and rural development policy development should be promoted;
- Based on the respondents view, following mitigation measures to be taken to reduce the impacts and damage of climate change along with control climate change as
  1. Reduction of pollution
  2. Aforestation
  3. Literacy and information dissemination
  4. Conservation of nature and natural resource
  5. Awareness and training on climate change and its adaptation strategies.
  6. Organization of the farmers
  7. Organic farming
  8. Use of traditional varieties
  9. Policy, advocacy and lobbying for climate policies
  10. Information dissemination and capacity building

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