

# Economic impact of flood in nepal economics essay

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Abstract Flood has set the record of highest economic loss among the list of disasters in Nepal. It causes massive damage to crops, agricultural land, physical properties and human settlements. The study has made an attempt to realize the overall economic impacts of flood after using different coping strategies by the rural affected migrant and non-migrant households. The study is based on data collected from 80 households in a Terai district, Mahottari, low land areas of Nepal. Questionnaire survey, interviews and case studies conducted with the flood affected migrant and non-migrant households, located in the Gauribas, Maisthan and Khyarmara VDCs of Mahottari have lead to some meaningful implications regarding the income of both type of HHs, their loss due to flood, their coping strategies like seasonal migration, alternative sources of income generation etc and the factors influencing them. The inferences drawn from the study indicates that the flood has extensively affected the economic condition of the vulnerable households. Agricultural land erosion and degradation were the main affected parts that the surveyed HHs had to face. The significant loss in 6 years record could not be recovered still by using different coping techniques by the HHs. Yet, income and loss wise, migrant households had to suffer more compared to non-migrant hhs. Even choosing to cope by migrating was not the satisfactory decision the migrants took because the statistical result using T-test points out that non-migrant households obtained higher income by using different coping strategies within the area. Less income before flood, more amount of loss added with less income after flood increases vulnerability of the migrant HHs to disaster like flood. Primarily depending upon the migrant's income with less extra occupation was also another

reason for migrant HHs being more vulnerable. Flood changed the major occupation of both the households from agriculture to other income generating alternatives. Both type of HHs started to increase their annual income after flood by being occupied with more than one type of occupation. While comparing, non-migrant households started to earn more. However, none of them have yet able to recover their loss amount. Finally, from the findings, it can be concluded that seasonal migration cannot be proved to be reliable strategy to cope with disasters like flood for stabilizing or improving their economic condition, since the people not migrating can optimize their earnings and adapt with flood by utilizing the local resources or improving their existing basic occupation such as livestock farming, local labor work and agriculture if not having good investment to invest for new occupation.

Keywords: Coping strategies, Seasonal migration, Flood, Migrant, Non-migrant, Economic Impact, Mahottari, Nepal.

### **Problem Statement:**

Natural disaster occurred since history in Nepal. Fragile and rough geographical structure, high slopes, complex geology, uneven climatic conditions, unplanned settlements, increasing population, low literacy and poverty have made Nepal more vulnerable to natural disasters. Now, it counts to be one of the highly vulnerable countries to Flood, landslides and drought around the world. The intensity of flooding has been increased in recent years compared to past decades because of heavy rainfall and river overflow (NAPA, 2010). Flooding results from the unequal distribution of rainfall in time and space. More than 80 per cent of the rainfall in the country occurs during the monsoon from June to September (MoHA, 2009). It can

bring major physical and economic risk in near future if the intensity increases constantly. A current study by UNDP/BCPR, (UNDP/BCPR, 2004) ranked the country as thirtieth at risk country in all over the world for floods. Another report of World Bank, (World bank, 2005) claimed Nepal to be one of the ' hot-spot' around the globe for natural disasters. The National database of Nepal prepared the trend of disaster events for 1971-2003, which shows two deaths in each day over the period. Official statistics claims that around 1000 people die each year in Nepal due to different kinds of natural hazards, in which around 300 deaths occur due to floods only. The country therefore, bears a direct loss of 1208 million Nepali rupees approximately per year (NSET, 2008). Nepal is one of the world's poorest nations, with 31% of its 28 million populations living below the poverty line and the gross national income per capita is just \$1, 100 PPP (World Bank, 2004). It has also been ranked low in human development index (HDI) in UNDP. Rayn says, one of the major contributors of the low rank is, weak and under developed country's agriculture production and infrastructure (Ryan Bartlett, 2010). Poverty is one of the major vulnerable factors to natural disasters like flood. The increasing intensity of natural disasters compounds the poverty rate.

## **Fig: 2 possible post-disaster GDP paths**

Source: (World Bank; UNDP, 2010) Poor and vulnerable people will directly be affected by physical and huge economic loss, whereas in the macro level, GDP will also be affected by economic loss due to such kind of disasters. For example- Loss as GDP in 1987 was 2. 6%, 4% in 1989 and again 2. 6% in later 1993 due to natural hazards in Nepal (NSET, 2008). In Nepal, Flood causes massive damage to crops, agricultural land, physical properties and

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human settlements. The country experienced devastating flood in 1993 in Terai region that took life of more than 1, 200 people and affected around 575, 000 people. In 1998, flood again affected about more than half million people and caused total loss of \$US29million approximately. Since 1971, flood has appeared every single year affecting livelihoods of people (GRIP, 2008). As rural people fully depend on environmental resources for their livelihood in Nepal, they are more vulnerable to natural hazards. As the country is highly dependent on nature for economic livelihood, rapid disasters will be a true evil that destroys their limited sources of income. It can push poor and vulnerable people to further poverty and eventually hamper the GDP growth. With such a failure, the worst affected people are the poor and landless whose complete source of income is agriculture farming. Kelkar has mentioned the observed data of agricultural growth and economic growth of Nepal from 1971 to 1990. According to her, agriculture growth from 1971 to 1980 was 0. 8% which increased to 3. 8% at the time of 80's but decreased to 2. 5% in 90's (Ulka Kelkar, 2007). Natural disaster is one of the main reasons for the declined rate of agriculture production.

### **Fig: 3 Economic impact of Flood in Nepal (1900-2007)**

Source: (UNDP, 2010)Central terai of Nepal is prone to flood events. Every year more than 100 events occur in whole terai region, and the intensity has been increased recently. Extreme events like flood and landslide have started to be common in the study area (Mahottari district) of terai region of Nepal affecting more than 1100 HHs each year (Misra, 2010). These types of environmental hazards has led to agricultural degradation, land erosion, and property loss that could be counted as a loss of major source of economy in

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each HHs. The intensity of flood has been increased in the study area since 2006, and the vulnerable people staying closer to the river bank are affected every year by flood. Land erosion and yield loss are the major problems they face, which extensively affects their economic condition. In average, the affected people lost properties equivalent to around \$11000 USD in total since 2006. In such devastating situation, the most vulnerable ones are those who use different coping strategies like- borrow money, eat cheaper foods, sell assets, out migrate, take children out of school to survive the devastated economic loss. Out migration has become one of the major coping strategies in the study areas. More than Thousand people in the district migrate seasonally to different places within the country or outside, especially to neighboring country India. The seasonal migration is mainly due to flood. In recent years, Flood has started affecting thousands of rural vulnerable livelihoods staying closer to river bank (ratu river). The agricultural lands and other properties are washed away and they cope with different alternatives to recover their economic loss and to stabilize their income. The agricultural destruction due to flood is the main reason for the people to seasonally migrate to different places for earning. Additionally, Illiteracy, lack of alternative source of income apart from farming and poor economic condition contributes to decision to migrate. People with subsistence income and less damage due to flood normally do not decide to migrate, rather cope with different alternatives using local resources. Many studies claim that migration is a good strategy to adapt with Floods, especially in poor country like Nepal, where as some deny that migration is not the way out, it does not assure to bring out the affected HHs from

vulnerability and risk to flood (Marcus Moench and Ajay Dixit, 2007). According to Pasupati, (Pasupati chaudhary, 2009) the main reason for increasing vulnerability is due to the lack of well adaptation and mitigation strategies, which is not yet recognized by policy makers. A research conducted by Marcus Moench and Ajay dixit regarding adaptive strategies of Flood in Nepal highlights a case study of two river basins-Bagmati and Ruhini. They have compared the vulnerabilities and coping/adaptive strategies of local people for during and post flooding situations. The major coping strategies they highlighted in those basins were- Wage earning by children-8%, Wage earning by adults-30%, sold ornaments-20% and Temporary migration-19%. The question is, are these strategies suitable enough to stabilize or increase their income. Low level income HHs are compelled to sell assets, eat less, borrow money etc. These kinds of coping strategies are itself one of the vulnerable factors to natural hazards and poverty. The level of risk increases with the increase in frequency of Hazards because of lack resources, population growth and also because of absence of different systematic approaches to disaster risk reduction as the coping strategy.

### **1. 3 Rationale of the study**

There have been few researches on the economic impact on the flood affected people in developing countries. However, disaster and its economic risk on the poor affected HHs have not been analyzed in a deeper context. Even now, Poverty reduction strategy and millennium development goals have not included Disaster and its impacts (UNDP, 2009). Disaster and development specialists have been unaware to discuss about the poverty

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problems, internal displacement and migration and livelihoods in light of natural disasters as one of the cause factor. Past research has shown that the determinants of household's poverty in Nepal include HHs location, HHs human capital, and HHs wealth. One important determinant of poverty not been included for quantitative analysis in Nepal was disaster risk until UNDP published a study about analyzing the relationship between Disaster and poverty in 2009. There are some studies in context of Nepal, on vulnerability assessment and adaptive strategy of flood affected people (Marcus Moench and Ajay Dixit, 2007). Moench and Dixit have extracted the data from Terai lands, the most flood prone region and delivered the case studies of two River basins i. e.- Bagmati and Ruhini Basins comparing the level of vulnerability and adaptive strategies of both areas. Another research on disaster risk reduction has also been done by UNDP and MoHA (MoHA, 2009) (UNDP, 2009). In 2009, NEST did a study regarding relationship between poverty and disaster. It mainly presents the background of disaster and poverty situation. It has analyzed the quantitative dynamics of poverty and qualitative vulnerability assessment to disaster. Though there are some studies regarding immediate loss/impact of flood, the analysis of constraints and benefits of different coping strategies to overcome the loss by affected people have been overlooked; therefore long term economic impact has not been studied yet. There is also no research on how flood impacts differently to the affected Households i. e. (migrant and non-migrant HHs). It is important to look beyond the poverty impacts, on how affected people cope with the situation and what will be the final impact after coping. Therefore, before, immediate after flood and long term flood impact is necessary to be



analyzed for the true economic impact analysis of the flood affected people. The focus of this research is to analyze the economic impact of migrant and non-migrant HHs due to flood. Not only the immediate impact would be evaluated but the vulnerability level and coping strategies of the affected ones will also be analyzed. The findings of this research would be useful and supportive in drawing detailed picture of overall economic impact of the affected people and also to map out different suggestions for policy making. Certain policies like Natural disaster relief act, Disaster risk reduction, Agriculture insurance policy are recognized in Nepal for Natural disaster since 1982. Though various international organizations like- JICA, USAID, OXFAM, UNDP, CARE, SCF and UMN etc use to provide fund and technical support for disaster relief, investment for the pre and post disaster activity is insufficient from the total funds from INGO and Nepal government (Chhetri, 1999). Furthermore, there is less practice of evacuation and early warning system. Public and also the department are less aware regarding the benefit of hazard mapping of Flood (Baral, 2009). Agricultural insurance policy has been recognized for Nepal by the World Bank (World Bank; ISDR, 2009), but farmers lack access to and awareness of agricultural insurance in local level, which is the main challenge for policy makers in Nepal. Moreover, the current policies mainly focuses on government led technical tools as an adaptation strategies for local people, but the community based adaptation techniques are been ignored. Policies should also consider the local adapting mechanisms, ways to strengthen those adaptive strategies, and provide substantial fund for this. Therefore, the findings of this research will provide the recommendations for future policy development as well. The study area

that I have chosen is the most vulnerable and risk prone area in case of Flood disaster out of 75 district in Nepal (NAPA, 2010). The research empirically tests the different coping strategies people take to survive the flood and their ultimate economic impact out of it.

## **1. 4 Conceptual framework:**

Source: Modified from (Roy Brouwer, 2006)

## **1. 5 Research Objectives**

1. To study the impact of flood on the economic condition of migrant and non migrant households
2. To assess the coping strategies of the surveyed households that are been followed to overcome the hazard.
3. To make recommendations to the policy interventions to implement proper adaptive strategies for reducing poverty

## **1. 6 Scope and Limitation of the Study**

The main scope of my research is to assess the economic impact of migrants and non-migrants households. The main coping strategies of the non-migrants and migrants will be analyzed. It will focus only on voluntary seasonal migrants those affected by flooding in the target region. Based on the limited time and resources, research focuses only on economic impact of vulnerable communities in the target area.

## Chapter 2

### Literature Review

#### 2. 1 Flood and its impact estimation:

Floods impacts both communities as well as individuals. It has economic, social and environmental consequences. The consequences might be positive and negative, greatly depending with location and intensity of flooding. IOM says, the most severe impact of flooding would be displacement of people. Christian Aid's alarming figure is around 1 billion Climate change refugees by 2050. Thus migration could be the major impact of disasters that can further lead to much more negative impacts and some positive impacts can be negligible (IOM, 2009). Not all people may decide to displace until and unless they have any alternatives (Reuveny, 2007).

Different types of coping strategies are undertaken due to the major impact of Flood i. e. Loss of economy. The range of consequences and damages that a flood brings includes economic, social, political, social, ecological, psychological and environmental damages, which are actually interlinked and intertwined in a network. Each cannot represent a disaster phenomenon, rather together contributes to a big picture of consequences of disaster. According to author Jonkman, there is not only direct economic damage but also indirect damage, which should equally be considered while calculating the damage rate (S. N. Jonkman, 2008). Direct economic damage can be – Cost of residence, Capital assets and property, Agricultural land and cattle, business interruption inside the flooded area. Whereas indirect cost can be- Cost for temporary housing, clean up cost, evacuation and rescue operation etc. These costs equally have to be considered. He has considered

water depth to be the determinant of direct damage. Kreibich et al. (2005) and Thielen et al. (2005) investigated other influencing factors, like contamination, flood duration etc. Framework that is much in use in academic research is input-output based models to analyze losses as main link between economic actors. According to Dushmanta, (Dushmanta Dutta, 2003) Impact of flooding might be severe in future according to current estimation, but there are lack of flood management tools to prevent and control the flood. Even though hydrologist, meteorologist, engineers and planners have options with preferred flood management like embankment and dams, critics argue that even though it may meet the short term goals, it fails to reduce the loss especially the economic loss from flooding. As flooding increases, it is unsustainable and expensive to increase the floodwalls height.

## **2. 2 Relationship between Flood and Poverty:**

UNDP has published a report of " relationship between poverty and disaster risk" in 2009. According to the UNDP research, there is a two way link between extreme events like flood and poverty. Poverty makes disaster outcome more severe and poverty is also the result of these types of events. At national level, with relatively less GDP with low economic growth, poor countries are more sensitive to events like flood. Less GDP means country's low tax revenue, so the government cannot invest in basic services like- transportation, communication and infrastructure to support economic growth. Moreover, poor country will have least priority to invest in disaster risk reduction management and rehabilitation program. In micro level, HHs income and property are the main sensitive and vulnerable factor to flood.

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People with low HHs income often live in marginal areas, thus are more exposed to flood events (Padma Lal, 2009). In Latin America 80% of poor, 60% of poor in Asia, and 50% of poor in Africa live on marginal lands that is characterized by less productive and disaster vulnerable areas (World Bank, 1997). They don't have safe sanitation and water security, and most are illiterate as well. Therefore, fully depending upon the natural resources for livelihood and having no alternative sources of income, it is expected that flood can increase the level of poverty status of people. With the limited income and financial savings, the ability to respond and recover from disaster is very limited for the poor. Moreover, the poor cannot adapt easily to disasters through disaster-proof technologies, nor can they relocate and replace the assets and items by taking out insurance (World Bank 1997). In Nepal, every year some proportion of GDP is decreased due to natural hazards. It is ranked as the lowest GDP among all SA countries. In terms of key economic indicators, the country is currently the least developed country in South Asia (UNDP, 2009).

### **Fig 5: GDP per capita trends in South Asia, 1975-06**

Source: (UNDP, 2009)Poverty is one of the vulnerable factors to natural disasters like flood in Nepal. The increasing intensity of natural disasters compounds the poverty rate. Poor and vulnerable people will directly be affected by physical and huge economic loss, whereas in the macro level, GDP will also be affected by economic loss due to such kind of disasters. For example- Loss as GDP in 1987 was 2. 6%, 4% in 1989 and again 2. 6% in later 1993 due to natural hazards in Nepal (NSET, 2008). In Nepal, Flood causes massive damage to crops, agricultural land, physical properties and

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human settlements. The country experienced devastating flood in 1993 in Terai region that took life of more than 1, 200 people and affected around 575, 000 people. In 1998, flood again affected about more than half million people and caused total loss of \$US29million approximately. Since 1971, flood has appeared every single year affecting livelihoods of people (GRIP, 2008). As rural people fully depend on environmental resources for their livelihood in Nepal, they are more vulnerable to natural hazards. Agriculture is the main source of economy still in rural areas. About 66% of the total population does agriculture farming for livelihood. As the country is highly dependent on nature for livelihood, rapid disasters will be a true evil that destroys their limited sources of income. It can push poor and vulnerable people to further poverty and eventually hamper the GDP growth.

### **2. 3 Flood and income levels of vulnerable households**

Helene Bie and Katleen have operationalized Flood impacts on income levels of LDCs as impacts on smallholder subsistence agriculture. Author emphasizes low capitalization, small farm size and lack of good technology to be the vulnerable factors of economy to Flood. The author has discussed the impact of income level in two separate statistical models: Macro-based model: This model analyzes the impacts of CC in national GDP growth and income of labor. It claims that rise in temperature and change in rainfall has negative effect on GDP. Micro-based model: Micro-level studies found negative impacts of rise in temperature and heavy rainfall. The agricultural income level will be less in this case (Lilleør, 2011).

## **2. 4 Defining Vulnerability and adaptive capacity to flood:**

" Vulnerability is a characteristic that influences damage: some communities absorb and recover more readily than others because of physical assets (building design and strength), social capital (community structure, trust, and family networks), and political access (ability to get government help and affect policies and decisions). Measures to reduce vulnerability include mitigation (which reduces the hazard's likelihood, as in reforesting the slopes to prevent rapid runoff and floods or reducing green-house gas emissions to reduce the frequency and intensity of extreme weather events), prevention (measures to reduce damage, as with higher plinths for floods), preparedness (evacuation plans), and relief" (World Bank; UNDP, 2010). "

Vulnerability can also be defined in terms of the capacity of individuals and social groups to respond to, that is, to cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being" (N. Adger, 2000). Capacity is mainly defined as the ability to respond and cope with natural disasters. Many researchers say that capacity and vulnerability are two opposite ends. If vulnerability is high there is low capacity to adapt with, and people will be more vulnerable. Author Dixit, argues that " Capacities and vulnerabilities are not necessarily at opposite ends of the disaster spectrum, that is, high vulnerability does not equal low capacity per se. For example, someone with a low nutrition or poor health status may be an active community mobiliser in a disaster context- her physical capacity may be poor, but her social capacity is high." (Marcus moench, 2007). According to Pelling, vulnerability definition focuses on risk exposure as well as adaptation and coping mechanism (Pelling, 1999). Besides exposure of risk,

adaptive mechanism used by target groups can be seen as a main component of the vulnerability concept (IPCC, 2012). According to Brouwer, Capacity to adapt is considered to be an adaptive process to sources of environmental risks and stresses. Poor people are more likely to suffer than the wealthy people though both are exposed equally to the flood event (Roy Brouwer, 2006). Different literatures define the vulnerability in different way depending upon the situation and local context. It depends upon the social structure, level of disaster and the capacity to adapt with the situation. Author Dulal's argument is quite appealing in this case, where he says "vulnerability has two sides- external and internal. The external side includes risks, shocks, and stress to which an individual or household are subjected, whereas internal side mainly constitute lack of means to cope without damaging loss (Hari B. Dulal, 2010). Figure 6: Hazard impact analysis Source: (Hari B. Dulal, 2010)" Adaptive capacity varies between countries depending on social structure, culture, economic capacity, and level of environmental degradation. Areas of concern include water and agriculture sectors, water resources, food security, biodiversity conservation and natural resource management, coastal zone management, and infrastructure. Capacity is increasing in some parts of Asia, for example the success of early warning systems for extreme weather events in Bangladesh, but is still constrained due to poor resource bases, inequalities in income, weak institutions, and limited technology" (OECD, 2010) Economic impact is closely linked with adaptation techniques. Adaptive strategies are the strategies that are used to adapt and cope with the natural hazards. It does not mean only to control the water flow by using different technologies. Strategies that guide people



to develop alternatives and reduce vulnerable livelihoods and their susceptibility to hazards are more effective response than applying flood control measures (Marcus moench, 2007). Different adaptive approaches help to reduce vulnerability of people by enhancing the capacity of the people to diversify their livelihoods. Limited strategies and livelihood option leads to low adaptive capacity and high vulnerability. People in Nepal have limited options for livelihoods due to direct impact of flood. Most of the people have limited assets, less investment and low savings. Moreover, the magnitude and frequency of flood in Nepal has made people much more vulnerable to lack of adaptive capacity. The increasing level of depletion of natural resources, Low literacy rate, inadequate services and lack of capital and investments limits the livelihood options of the people. Therefore, " there is a need to implement measures that would enhance capital asset accumulation, increase institutional support and the role of microfinance service providers. This can be achieved through policy formulation and action by the State to give the people access to capital assets" (Hari B. Dulal, 2010)

### **Post flood coping strategy assessment in Nepal:**

60% of total Nepalese households those affected by floods make decision to migrate, whereas 30% of total drought influenced people decide to migrate (Gemenne, 2010). Severe natural disasters occurred in 2008-2009. An emergency assessment was done after 4 months of flood in terai region of Nepal by UNWFP in 2008. The assessment concludes that even after 4 months many HHs practiced coping strategies like- relying on less preferred foods (51%), borrowing money to purchase food (32%), less food intake

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(16%). The more severe coping strategy was much higher than normal that includes selling household assets (34%), agriculture assets (23%). Worst case was out-migration, where the migration rate was double in worst flood affected area i. e. 32% HHs migrated from less affected area whereas 67% in the worst affected area (UNWFP, 2008). Another assessment was done in hilly regions by WFP in 2009 regarding drought impacts. Major coping strategies were: borrow money (80%), eat cheaper food (60%), sell assets (40%), out-migration (40%) and take children out of school (10%) (WFP, 2009).

## **2. 5 Disaster management Policies in Nepal:**

In Nepal, there was no well structured law and policy prior to the National disaster relief act (NDRA), 1982 A. D. Rescue and relief work used to be carried out either as social work or on the power base. Thus, realizing the need, NDRA was formulated in 1982 A. D. and was also revised already in 1989 A. D. and 1992 A. D. However, National Disaster Relief Regulations (NDRR), 1982 does not mention the duties of disaster management agencies. Furthermore, Even though various committees were formed by NDRA like -Relief and action Sub-Committee, Rehabilitation and Shelter Sub-Committee, Regional Disaster Relief Committees and Local Disaster Relief Committees, they could not work well. CNDRC and DNDRC are working more actively. Besides, as the Act does not mention the duties and responsibilities to the related disaster agencies of districts, the problem of coordination, cooperation, and mutual understanding between the agencies is seen.

Therefore, according to Chhetri, (Chhetri, 1999) there is a need of formulating the NDRR where job of all disaster related agencies has to be

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described well. The disaster management work is currently been handled by Ministry of Home Affairs. National policies formulation and implementation, rescue and relief, mitigation and preparedness of disaster, fund collection and distribution are the main responsibilities of the Ministry. The CDO in all the districts are the crisis managers at times of disaster (Baral, 2009).

### **Fig 7: Disaster relief committee**

Source: (Baral, 2009)" The Nepal Risk Reduction Consortium (NRRC) was formed in May 2009 to support the Government of Nepal in developing a long term Disaster Risk Reduction Action Plan building on the National Strategy for Disaster Risk Management (NSDRM). The founding members of the Consortium are the Asian Development Bank (ADB), the International Federation of the Red Cross and Red Crescent Societies (IFRC), United Nations Development Programme (UNDP), UN Office for the Coordination of Humanitarian Affairs (OCHA), UN International Strategy for Disaster Reduction (ISDR) and the World Bank. Based on Government priorities and discussions with multi stakeholder groups, the Consortium members and government identified five flagship areas of immediate action for disaster risk management in Nepal: 1. School and hospital safety- structural and non-structural aspects of making schools and hospitals earthquake resilient2. Emergency preparedness and response capacity3. Flood management in the Koshi river basin4. Integrated community based disaster risk reduction/management5. Policy/Institutional support for disaster risk management" (UNDP; IFRC; ADB; ISDR; OCHA, 2011)Though Policies are focused on disaster risk reduction, preparedness and relief, it has not yet included the coping strategies and community based adaptation measures.

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Also, the vulnerability and adaptation assessment has not been included yet which has to be included in disaster management program. Agricultural insurance policy has been recognized for Nepal by the World Bank (World Bank; ISDR, 2009), but farmers lack access to and awareness of agricultural insurance in local level, which is the main challenge for policy makers in Nepal. Moreover, the current policies mainly focuses on government led technical tools as an adaptation strategies for local people, but the community based adaptation techniques are been ignored. Policies should also consider the local adapting mechanisms, ways to strengthen those adaptive strategies, and provide substantial fund for this.

## **2. 6 Relationship between Flood and economic migration**

There is empirical evidence, from 23 case studies supported by European Commission, that confirms environmental factors to be one of the many variables that drive migration (Dr. Koko Warner, 2008). Movement of people as a result of environment change is not a new phenomenon. People have been migrating for centuries, in response to the changing environment, more often seasonally for increasing income level. However, since the last 20 years or so the international community has begun recognizing slowly the wider linkages and implications of changing climate and its effect on migratory behavior. In 1990, IPCC (Practical Action, 2009) warned that " the greatest impact of climate change could be migration of human", where millions of people being displaced by coastal flooding, shoreline erosion and severe drought (Aghazarm, 2009). In addition, in 1992, IOM and Refugee Policy Group together published a report on " Migration and Environment" which stated that: " Large numbers of people are moving as a result of

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environmental degradation that has increased dramatically in recent years. The number of such migrants could rise substantially as larger areas of the earth become uninhabitable as a result of climate change." (Aghazarm, 2009). There is little research done in environmental drives for migration. Governments are mostly concerned about the types, volume and direction of migrating people but not about the root cause of migration. Environment could be the major cause of migration in many cases that links with economic cause. Economy being the immediate cause for migration, socio-economic reason is undertaken as the major cause of mobility but environmental cause normally is overlooked. Therefore, deep analysis is necessary in many cases. Flood does not directly motivate people to migrate but produces environmental and mostly the economic effects and intensify current vulnerabilities by decreasing income level that make people difficult to survive where they are (Aghazarm, 2009). Some empirical studies have found out the link between flood and migration. Past example of Climate variability such as drought, rainfall, storm and other extreme events have affected migratory behavior of people. Erratic rainfall has empirically proven the event of migration. Study of southwest Mexico provides how people migrated to US because of the declining rainfall, since many depend on the rain-fed agriculture (Richard black, 2008). There were about 25 million displaced people due to environmental change in 1995 (Black, 2011). It is estimated that more than 2.5 million people migrated due to drought in the mid-west of US in 1930's in earlier times. The main point author wants to argue here is that, effects of drought and erratic rainfall on migration depend upon the socio-economic situation of the people. Author Richard Black also

agrees that migration could be linked with Natural hazards indirectly through economic drive (Black, 2011). In 1990's, Thailand also experienced same problem of temporary migration to Bangkok's metropolitan region during dry season. One-third of Thai people internally migrated to BKK when labor demand decreased for agriculture work. In India, 20 million people migrate seasonally and temporarily each year. Most of the movements are rural to rural from drought area to irrigated agriculture land area as seasonal labor. However, recently demand for semi-skilled labors in construction sector has dragged the rural people towards urban regions. In Bihar (India), temporary movement to urban area has grown from 3 per cent to around 24 per cent from 1983 to 2000 (Tacoli, 2009). The intensification and rapidness of natural disasters and environmental degradation can be analyzed as the result of Climate Change in current scenario. Researchers have proved that the impacts of Natural disasters like flooding; landslides, Land degradation etc are mostly the impact of CC recently and would be the major reason of CC in future if the natural disasters happen in multiplied rate (Reuveny, 2007) (Tacoli, 2009). Natural disasters have been doubled in last two decades, and more than 20 million people had to be displaced due to rapid/sudden-onset climate-related disasters in 2008. Climate change, with global temperature to rise is expected from 2 to 5 degree centigrade by the end of the century. Major impact would be on the movement of people if the temperature (Aghazarm, 2009). Floods can affect people's movement in many different ways. First, rise in sea level has a risk of coastal flooding, with erosion risk of costal land as well hampering agricultural land. This type of risk might lead to displacement of people. 44% of total population in the

world lives within 150 km near the coast (Aghazarm, 2009). Secondly, Competition for natural resources due to intensified natural disaster also turns to displacement (Aghazarm, 2009). In glaciated mountain region like in Nepal, melting of glaciers may lead to glacial outburst flooding risk which would automatically displace the vulnerable and affected people (Black, 2011).

## **2. 7 Flood and migrants in Nepal**

Migration is common in Nepal, especially seasonal migration used to be held from the very beginning for subsistence livelihood maintenance. More and more people are migrating from Nepal internally as well as internationally to Gulf countries and India in recent years. Flood may not directly link to the seasonal or forced migration but it can influence the drivers of migration which can increase the migration rate. People mostly the poor and disadvantaged ones are from the rural areas of Nepal who does seasonal migration at times of hardship and they are the most vulnerable to CC impacts i. e. extreme events like Floods and droughts. The frequency and intensity of flood in prone areas might increase the rate of existing migration. People who did not use to migrate can start migrating for survival. Main problem of developing countries like Nepal are water scarcity, diseases, food scarcity and unemployment. These problems increase vulnerability to disasters and lead to migration (Michelle Leighton, 2011). People hugely depend upon subsistence farming so are in greatest risk of loss of livelihood from slow-onset disasters like drought and desertification. Districts of Nepal like Kailali, Jumla, Humla, Jajarkot, Dailekh etc are prone to winter drought. Since several years back there is record of drought each or every alternative

year (NAPA, 2010). People migrate seasonally and sometimes permanently from these areas to another place within Nepal and some even move to India for seasonal employment (WFP, 2009). Agriculture degradation and low production are the main reason for people to migrate. Low land areas of Nepal likewise, are in risk of floods and land degradation. Districts like Mahottari, Chitwan, Saptari, Rautahat etc are prone to rapid onset- disasters (NAPA, 2010). Many usually are forced to displace whereas some voluntarily displace because of Agriculture decline. Major factors that affect Nepal's disaster vulnerability are poverty, hunger and unemployment (Gautam, 2012). Overall, a much larger number of people are expected to migrate due to gradual deterioration of environmental conditions rather than natural.

## **2. 8 Economic drives of migrating decision**

Until and unless there is any life threatening situation in extreme events, People can decide whether to stay or migrate. The decision to migrate generally is not due to single cause or not even only because of push and pull factors but have many root causes- i. e. economic factor (unemployment, poverty etc), social factor (education), environmental factors (disasters), lack of security etc (Dr. Koko Warner, 2008) (Black, 2011). Author Rauvery adds that, in case of voluntary migration decision mainly in slow-onset disaster, minor rapid onset disasters and early phase of disaster, the forcing factors (push and pull) can be the main cause of migration (Reuveny, 2007). Richard Black (2008) argues that there are three categories of key drivers of migration- 1. Factors related to location of origin- economic, political factors; 2. Factors related to the place of destination- employment opportunities, higher wages, facilities and access to resources;

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3. Intervening factors- transportation facilities, network, government policies of migration etc, these can facilitate or restricts migration. Therefore, Richard Black's argument is somewhat similar to Reuvery's argument.

## **2. 9 Flood and economic benefits of migrants**

Most of the governments in developing countries perceive that disaster induced migration to be a growing problem. The reasons behind thinking it as a problem are- urban poverty, resource degradation, spread of crime, HIV/AIDS. In case of environmentally induced migration, lot of developing countries would be drive to huge loss because of their dependence on Agriculture. Environmental degradation however would make the vulnerable ones to switch and contribute to non-farm economic activities. Therefore, it can be a big challenge to justify migration as crisis or benefit. Many researchers counts disaster induced migration as an opportunity rather than risk. According to IOM report, migration represents adaptive strategy that could reduce risk to livelihoods and ecosystem, and enhance household's capacity to further risk and desertification. (IOM, 2012). This is true with the fact that, migrating behavior especially for income generation purpose increases income and remittance at the time of hardship. Dr. Koko gives an example with the fact that, Rural to urban migration in response to environmental hazards like drought, flood send remittance back to home to support larger number of family still living in rural areas. Some people even send their children to the urban areas to reduce the risk of livelihood loss because of environmental degradation. Dr. Koko also adds the case of Vietnam, where remittance income was the way to stabilize the climate variation hazards (Dr. Koko Warner, 2008). The key argument of Tacoli was

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that, a radical change in perceptions of migration and a better understanding of the role that local and national institutions need to play in making mobility be seen as part of the solution rather than the problem. (Tacoli, 2009). Dr. Camillo argues that migration cannot be only taken as a failure of adaptation but also as one of the possible way of adaptation to climate change. He further adds that migration always has been good coping strategy for the people facing natural disasters whether that can be permanent, temporary, and internal or international (Dr Camillo Boan, 2007). NAPA primarily argues migration to be a coping strategy, primarily in response to slow-onset climate changes like drought that have started occurring already. According to Warner, Environmentally induced migration may be adaptive in some cases, whereas it would not be as an adaptive strategy when people are forced to displace or migrate (Warner, 2009). Insecurity and Conflict are other main issues that have come out as a negative result of flood induced migration. Author Reuveny argues that, Disaster induced migration could encourage conflict in the host area that receives migrants. In his article, he has mentioned five different factors that can bring conflict- Competition, Ethnic tension, Distrust, Fault lines and Auxiliary conditions. According to him, the arrival of migrants to the receiving area might burden the resources- economic etc leading towards competition over resources. There might be separation between the migrants and residents of host area that lead towards ethnic tension and discrimination. It might even create distrust between the governments of two areas/countries (receiving and origin countries of migrants). These factors can increase the risk of having conflict. He further adds that conflict is more possible in case of environmental

migrants than other migrants, because the migrants basically depend upon the environment for their livelihood both before and after entering the host country (Reuveny, 2007). Here, the author mainly points out to the LDCs vulnerable ones, who fully rely on environment/ climate for their livelihood. Dr. Koko argues that the migrated people may not feel secured and may not get sustained support from the host country, rather have to struggle themselves for location and social security (Dr. Koko Warner, 2008). In case of Nepal, migration either seasonal or long term, is a key strategy for adapting in many households from the very beginning. The research done by Massey in 2007 addresses the environmental migration from Chitwan Valley, Terai district of Nepal. Massey hypothesized five factors to link between environmental degradation and migration: 1) " higher levels of population density will be associated with higher rates of out-migration among residents of the Chitwan Valley"; 2) " perceived decline in agricultural productivity will be associated with a greater likelihood of out-migration among farm households"; 3) " local areas with less open farmland will have higher rates of out-migration than those where agriculture is more abundant"; 4) " families facing less access to fodder will have higher rates of outmigration"; 5) " variations in access to fodder and firewood are expected to have different effects on the migratory behavior of men and women." He concludes that labor migration is done as adaptive/coping strategy to CC in Nepal. However, he further adds that, almost all of such migration is internal or within valley; there is less evidence of international migration linked with environmental component from Nepal (Douglas Massey, 2007). Remittance through migration has been one of the good drivers to GDP growth in Nepal.

According to Basnyat (2012), from 1996 to 2004 poverty reduced by approximately 10% from 42 to 31 percent, and that remittance is one of the reasons for decline of poverty more than half. Basnyat further adds that, remittance has considerably increased income as well as consumption in Nepal (Basnyat, 2012). According to WFO report (2009), rural farmers do temporary/seasonal migration to neighboring country India and also Kathmandu (capital of Nepal), at the time of low harvest and lack of production due to drought and flood. However, there is less evidence on whether Flood induced migrants get actual benefit from all perspective by migrating or it's just a minor coping strategy that can handle or stabilize existing economic condition. There is also no clear evidence that disaster migrants are relatively different from other migrants. Rather, some researchers have also pointed out certain negative points of out migration in Nepal. According to Sapkota- though migration might help increasing income it bears some social cost as well like- family separation, health risk like sexual transmitted diseases and other financial cost mostly bearded by female. Basnyat points out that, Migration has caused new problems such as poor housing and sanitation in migrated place in Nepal. It is impossible to control unless certain changes are made in the political, social and economic sector (Basnyat, 2012). Even though migration helps increasing remittance economy, the side effects are predictable such as, social and financial cost. A study from National Planning Commission (NPC, 2010) suggests that the financial benefit from short-term seasonal migration to India is low and that the associated health risks are high. Therefore, it is also important to analyze

whether economic benefit of flood induced migration can cover the risk and disadvantages of migration.