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## Consequences of Water Induced Disasters to Livelihood Activities in Nepal

Anup Gurung,<sup>1</sup> Arpana Karki,<sup>2</sup> Rahul Karki,<sup>3</sup> Rajesh Bista<sup>3</sup> and Sang Eun Oh<sup>\*</sup>

<sup>1</sup>Gangwon-do Chuncheon-si, Kangwon National University, South Korea

<sup>2</sup>Caritas, Kathmandu, Nepal, <sup>3</sup>ForestAction, Kathmandu, Nepal

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### Abstract

**BACKGROUND:** The changes in the climatic conditions have brought potentially significant new challenges, most critical are likely to be its impact on local livelihoods, agriculture, biodiversity and environments. Water induced disasters such as landslides, floods, erratic rain etc., are very common in developing countries which lead to changes in biological, geophysical and socioeconomic elements. The extent of damages caused by natural disasters is more severe in least developing countries. However, disasters affect women and men differently. In most of the cases women have to carry more burden as compared to their male counterpart during the period of disasters.

**METHODS AND RESULTS:** This study examines the impact of disasters on the local livelihood especially agriculture and income generating activities of women in three districts of Nepal. The study uses the primary data collected following an exploratory approach, based on an intensive field study. The general findings of the study revealed that women had to experience hard time as compared to their male counterpart both during and after the disaster happen. Women are responsible for caring their children, collecting firewood, fetching water, collecting grass for livestock and performing household chores. Whereas, men are mainly involved in out-migration and remained out-side home most of the time. After the disaster occurred, most of the women had to struggle to support their

lives as well as had to work longer hours than men during reconstruction period. Nepal follows patriarchal system and men can afford more leisure time as compared to women. During the disaster period, some of the households lost their agricultural lands, livestock and other properties. These losses created some additional workload to women respondent, however at the same time; they learn to build confidence, self-respect, self-esteem, and self-dependency. Although Nepal is predominantly agriculture, majority of the farmers are at subsistence level. In addition, men and women have different roles which differ with the variation in agro-production systems. Moreover women are extensively involved in agricultural activities though their importances were not recognized. Denial of land ownership and denial of access to resources as well as migration of male counterparts are some of the major reasons for affecting the agricultural environments for women in Nepal.

**CONCLUSION:** The shelter reconstruction program has definitely brought positive change in women's access to decision making. The gradual increase in number of women respondent in access to decision making in different areas is a positive change and this has also provided them with a unique opportunity to change their gendered status in society. Furthermore, the exodus out-flow of male counterparts accelerated the additional burden and workload on women.

**Key Words:** Decision making, Disaster, Environment, Floods, Livestock, Poverty, Women

\*교신저자(Corresponding author),  
Phone: +82-33-250-6449; Fax: +82-33-243-6449;  
E-mail: ohsangeun@kangwon.ac.kr

## Introduction

The extent of damages caused due to natural disasters such as floods, landslides, earthquakes, droughts etc., are more severe in developing countries (UN, 2010; UNISDR, 2002). Nepal is extremely vulnerable to natural disasters since it is located in the heart of the Himalayas (Dahal and Hasegawa, 2008; Fort et al., 2010; Paudel et al., 2003; Ray and De Smedt, 2009). About 83% of the country is mountainous terrain and the remaining 17% is flat land, and natural disasters such as floods and landslides are major hazards in the mountainous regions (Fort et al., 2010; Pokharel et al., 2009; Ray and De Smedt, 2009). The elevation of the country varies from 100 m in Terai to 8850 m in the Himalayas, and also geographically, Nepal is characterized by a transitional mountain area between the fertile Gangetic Plain of India and the arid plateau of Tibet, China which further lies in the tectonically active zone (CBS, 2003; Pokharel et al., 2009).

Due to the sharp vertical variation, Nepal is susceptible various types of natural disasters, especially water-induced disasters such as landslide, slope failure, soil erosion, landmass movement, and flood (Dahal and Hasegawa, 2008; Pandit et al., 2007; Pokharel et al., 2009; Sudmeier-Rieux et al., 2011). In the year 2008, 235,816 people lost their lives from natural disasters as well as millions of people were displaced (NIP, 2009). Flash floods and landslides are the two major natural hazards in Nepal in the hills and mountains of Nepal are with most fragile ecosystems and poor agricultural potential due to weak geological structure, steep and rugged surface, and poor quality of soil (Pandit et al., 2007; Paudel et al., 2003). It is estimated that landslide alone kill over 100 person per year in Nepal (MoHA, 2009).

Nevertheless, men and women experience disasters differently worldwide (UNISDR, 2002). Usually women suffered more badly from disasters as compared to their male counterparts (UN, 2010; WHO, 2002). Apart from losing their property and lives, women and girls can be the victim of gender-based violence including rape, human trafficking, and domestic abuse during and after disasters (Karki, 2011). In other words: natural disasters place an undue burden on women who are responsible for unpaid household activities such as collecting firewood, fodder, water, providing care and preparing food (Karki, 2011; UN, 2004; UN, 2010; Wickramasinghe and Ariyabandu, 2005). In addition, disasters may affect the reproductive

outcomes adversely by inducing problems such as pregnancy loss, premature delivery, stillbirths and infertility (Ferris, 2010).

Nepal is predominantly an agricultural country which accounts more than 75% of human resource involvement and contributes to 35% of national gross domestic product (GDP) (2011) (Gautam et al., 2009; MOF, 2011). Agricultural sector plays vital role in human welfare as well as keeping the health of the national economy (Gautam et al., 2009; Ghale, 2008; Maharjan et al., 2012; MOF, 2011). Despite being the agriculture as the dominant sector in Nepal, the agricultural production is mostly in subsistence level (MOF, 2011). The sector is challenged by various factors such as climate change, lack of labor due to out-migration, lack of income from agricultural products and lack of market for the agricultural goods (Lokshin and Glinskaya, 2009; Maharjan et al., 2012; MOF, 2011; Subedi, 2009). On the other hand, agriculture in Nepal is feminized sector where women are extensively involved in agricultural activities as compared to their male counterpart (Ghale, 2008; Karki, 2009). It is estimated women's average contribution to the agricultural sector in Nepal is at 55% to 66% of the total labor although the nature and extent of their involvement differs from region to region in Nepal (Karki, 2009).

The livelihood of the poor peasants are vulnerable mainly due to water induced disasters such as torrential rain, landslides, floods etc., which ultimately damage the agricultural production in Nepal (MOF, 2011; Pokharel et al., 2009). Although host of literature can be found in relation to women and development, there has been very few studies made in relationship to women and disaster in Nepal. In addition, women do not have equal rights pertaining to land ownership and access to other resources in Nepal (Ghale, 2008). Therefore, this paper tries to fill the gap by empirically analyzing the impact of natural disaster on women in Nepal. The primary data was collected through mixed method using household questionnaire survey and group discussion. The main objectives of the paper are (i) to analyze the economic impact of disaster on women, (ii) to analyze work burden of women due to disaster, and (iii) to study the situation of women before and after disaster. Finally, the challenges and issues that are bottleneck in agricultural environments for women in Nepal have been discussed.

## Research Methodology

This study was conducted in Nawalparasi district, located on the southern plains of Nepal which is affected by natural disaster especially floods almost every monsoon (Karki, 2011). Three Village Development Committees (VDCs) namely: NayaBelhani, Parasauni and Tamsariya of Nawalparasi have been selected for the study. Nawalparasi was purposively selected for the study as it is near from the Kathmandu Valley in comparison to other shelter reconstruction projects in Nepal. Table 1 depicts the population profile of the studied VDCs. The data and information used in this study was collected through an intensive field survey conducted in 2011. The research has followed an exploratory approach and the primary data has been collected by employing interview and focus group discussion (FGD).

**Table 1. Population summary of three studied VDCs of Nawalparasi (DPN, 2008)**

VDC	Average household	Total no of household	Total population	Male	Female
NayaBelhani	4.94	2,348	11,594	6,055	2,896
Parasauni	5.5	1,172	6,094	3,003	3,091
Tamsariya	5.18	1,930	10,003	4,655	5,348

The study was based on the affected families of Nawalparasi district by the 2007-2008 natural disaster especially floods. The study focused on the role of women before, during, and after a disaster, and thus a semi structured questionnaire survey has been used for exploring a wider range of social characteristics pertaining to women. The questionnaire was prepared in Nepali language so that it would be convenient for the respondents. Altogether 80 women were selected from the "shelter reconstruction" program and interviewed. The questionnaire consisted of different sections: (i) demographic structure such as caste, gender, family member, and occupation; (ii) agriculture and numbers of livestock; (iii) socio-economic information such as health, education, annual income and sources of income, (iv) extent and magnitude of natural disasters, (v) impact of disasters on women, and (vi) external help and support during and after disasters. Similarly, elicited detailed qualitative data about rural livelihood experiences were also collected through the FGD. Altogether 7 groups were formed from the 3 shelter

reconstruction working VDCs of Nawalparasi.

The collected data has been processed qualitatively and quantitatively through a sequential step that includes editing, coding, classification and tabulation. These procedures were followed in order to arrange the collected data in systematic way to ensure their accuracy and completeness. All the collected data was processed and analyzed in accordance with the objectives of the research using Microsoft Excel Software 2007. Quantitative technique such as frequency distribution has been applied for reporting and summarizing the data (Pant, 2010). One-way analysis of variance (ANOVA) was used to determine the significance of difference in the livelihood activities of women before and after the disaster. The statistical significant was considered at  $p < 0.05$ .

## Results and Discussion

### Demographic structure of the three studied VDCs

The research findings revealed that there is a mixed group of people living together with different ethnic background in the shelter reconstruction program. It was found that majority of the respondents were belong to poor and disadvantaged groups such as Dalits (19%), Magar (18%), Majhi Bote (16%), Tharu (14%), and Tamang (10%). Majority of the women respondent were belong to age group of 25 to 35 (46%) and these active age group helped other weak or sick and old women to reconstruct their shelter. Respondents were also asked to give information about the average family members. It was found that 91% of the respondents have family members ranging in between 1 to 5, while 9% had family size in between 6 to 10.

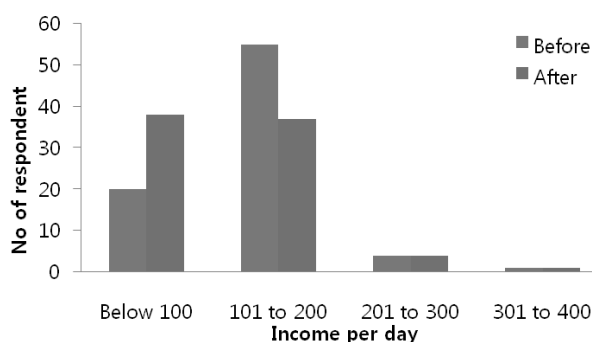
Among the respondent 89% were married, whereas 8%, 3% and 1% were unmarried, widowed and divorced, respectively. During the survey it was revealed that the work burden on married women was much higher as compared to unmarried women. The main reason was that married women were responsible for caring their children, gathering fodder and firewood, cooking, and other household activities. On the other hand, divorced and widowed were also had hard time since they didn't have men to support them. As depicted in the Table 2, 35% of the respondents were uneducated. However, illiterate women were helped by literate women to estimate the expenses for the shelter reconstruction program.

**Table 2. Distribution of the respondent by education**

Education	No of respondent	Percentage (%)
Illiterate	28	35
Literate	31	39
Primary	15	19
Secondary	6	7
<b>Total</b>	<b>80</b>	<b>100</b>

### Economic status of women in the shelter reconstruction program

Respondents were asked about their daily income before and after the disasters. The survey findings revealed that majority of the respondents (55%) earned between NRs<sup>1)</sup> 101 to 200 on day to day basis, while hardly few respondents earned between NRs 201 to 300 per day. However, after the disaster the household income pattern changed among the women respondents. Number of respondent who earned less than USD 1.25 increased by 47% after the disaster. The decrease in family income is due to loss of their productive agricultural land and livestock. Livestock is another important backbone of livelihood strategy in Nepal. The statistical analysis showed that there is significant difference among the income group of NRs 101 to 200 before and after the disaster ( $p < 0.05$ ). The number of income group earning NRs 101 to 200 on day basis decreased significantly after the disaster. However, the difference was not significant for income group of NRs 201 to 300 and NRs 301 to 400 ( $p < 0.05$ ) after the disaster.

**Fig. 1. Distribution of the respondent household income per day**

Prior to occurrence of disaster, 27% of the respondents were dependent on agriculture, 30% on daily labour-wage, 13% on livestock, and few respondents relied on

governmental job such as teacher. In addition, couple of respondents was also relied on remittance for their survival. After the disaster, 52 respondents (65%) relied on daily wages for their survival. The number of respondents getting remittance also slightly increased.

On the other hand, after the disaster majority of the household were facing economic hardship, especially poor and disadvantaged groups. The disaster increased the trend of taking loan among the women respondents although the amount of loan was not substantial. As depicted in the Table 3, they mainly took loan to reconstruct their houses after the disasters. The statistical analysis showed that there was significant difference among the respondents for borrowing loan in terms of buying seeds and livestock raising ( $p < 0.05$ ) after the disaster. The difference was statistically significant for construction purpose and business after the disaster ( $p < 0.05$ ).

**Table 3. Reasons for taking loan by the women respondents**

Loan purposes	Before	After
Buying seeds	25	3
Livestock raising	14	5
Construction purpose	1	35
Business (Mobile)	3	10
Medical	2	4
Educational	2	7
<b>Total</b>	<b>47</b>	<b>64</b>

### Situation during and post shelter reconstruction phase (disaster phase)

The survey findings indicate that disaster not only damage the properties but also pollute the environment. As depicted in the Table 4, majority of the women respondents defecated in the nearby open forest before the construction phase. None of the respondents had permanent toilet for defecating before the shelter construction phase. Due to lack of sanitary conditions, people were prone to water borne diseases such as diarrhea.

**Table 4. Distribution of women respondent on places they defecate**

Type of toilet	Before	During	After
<i>Pakki</i> Toilets	0	0	17
<i>Kachhi</i> toilets	14	3	33
Forest	58	62	24
Open space	8	15	6

1) 1 USD=77 NRs as 01. Jan. 2002.



Due to lack of employment opportunities at local level, both internal and international labour migration became usual phenomenon for the women respondent family after the disaster. Usually, men migrate to Gulf countries for abroad employment and thus, women are solely responsible for caring their children and household activities. Few people had migrated to India as well; however, wages are comparatively low in India than other countries.

#### Challenges and issues pertaining to agricultural environments for women in Nepal

Although agriculture sector is considered to be backbone of the Nepalese economy, it is vulnerable to different factors such as lack of labor, low productivity, and no market facilities for agro-products (Paudel, 2011; Subedi, 2009). Nepal is one of the least urbanization countries where more than 80% populations live in rural areas (NPC, 2010; WB, 2010). Thus, in rural areas majority of the populations heavily rely on agriculture for maintaining their fiscal and socio-political stability (Lokshin et al., 2010; Lokshin and Glinskaya, 2009). However the out-flow of active force i.e. out-migration is becoming normal phenomenon in Nepal mainly for better economic opportunities in foreign countries (Gurung et al., 2011; Lokshin et al., 2010; Lokshin and Glinskaya, 2009; Maharjan et al., 2012). The main reason for migration is that the modern developmental sector is incapable to provide enough economic opportunities within the country for the ever increasing economically active population (Gurung et al., 2011; Subedi, 2009). In recent years, the out-flow of people for better economic opportunities mainly in Malaysia, Gulf Countries, South Korea, Hong Kong, Brunei, United Kingdom, United States of America, Japan etc, has become usual phenomenon in Nepal (Gurung et al., 2011; Lokshin et al., 2010; Lokshin and Glinskaya, 2009; Maharjan et al., 2012; MOF, 2011).

The exodus out-flow of people has resulted in the shortage of labor especially male in the agrarian society because migration is a male dominant phenomenon in Nepal (Gurung et al., 2011; Lokshin and Glinskaya, 2009). The process of migration affects their families, households and society significantly and increases workload on women especially in agrarian households (Lokshin and Glinskaya, 2009; Maharjan et al., 2012). Women has sole responsibility to take care of their children, usual households activities and also have to take care of farming (Lokshin and Glinskaya, 2009). In the rural areas of Nepal, women is responsible for

household activities such as cooking, taking care of children, fetching water, collecting firewood and fodder (Gurung et al., 2011). Thus, the exodus out-flows of male counterparts' increases burden and workload on women.

On the other hand, Nepal still follows patriarchal system where women have many "taboo" pertaining to agricultural systems. For example, women are not allowed to plow field (Nandini, 1999). Nepal's agricultural sector is still dominated by the traditional methods in which plowing the field is must for doing farming. In such circumstances, when male labor are not available than women have to face with many problems (Lokshin and Glinskaya, 2009). Although approximately 66% of the total labor is provided by the women in Nepal, both men and women are involved before and after harvesting (Ghale, 2008; Karki, 2009). The decade long war between the government force and the Maoist (1996-2006) put another burden on women pertaining to their agricultural environments (Dhakal, 2008; Ghale, 2008). The process of male counterparts' migration accelerated due to armed conflicts in the country that added extra burden on women's workload as well as leads to the feminization of agriculture in Nepal (Ghale, 2008).

Nevertheless, the role played by women in Nepal's agricultural sector is undocumented and the Nepal's government has yet to adopt policy to address the challenges and issues incurred due to feminization in agriculture sector (Ghale, 2008; Karki, 2009). The skewed power relation and the orthodox male-dominated society has restricted the land ownership to women and limitations in access to economic opportunities which undermined the leadership of women in Nepal (Ghale, 2008; Karki, 2009; Lokshin and Glinskaya, 2009; Maharjan et al., 2012). The parental land is inherited to sons not to daughters and women have to leave their parent house once get married (Maharjan et al., 2012). Ultimately women are not recognized as autonomous farmers and restricted from access to different other production related services and facilities in Nepal (Ghale, 2008). Therefore, the land ownership and distribution pattern in Nepal affected the agricultural production directly or indirectly (Ghale, 2008). Denial of legal ownership of land and denial of access to resources are the bottlenecks for agricultural environment for women in Nepal.

#### Consequences of disasters to livelihoods in Nepal

Generally, the impacts of disasters are far-reaching and manifold in women as compared to men in developing

countries (UN, 2010; UNISDR, 2002). Usually women face different challenges and levels of vulnerability when disaster happen because women are inferior to men due to pre-existing social norms, gender discrimination, and also women are biologically weak as compared to men (Ferris, 2010; UN, 2010; UNISDR, 2002; WHO, 2002). Similar situation was observed in this study as well. The threat of disaster is more persistent on women as compared to male counterpart in the affected areas. Apart from disaster, women had to suffer from social discrimination especially for widow.

Due to its varied topography, climate and geology, Nepal is susceptible with a range of natural disasters and recorded the death tolls and economic losses every year when these hazards manifest into disasters (PRA, 2010). In terms of the total hazard-related deaths, Nepal ranked 23<sup>rd</sup> in the world (NDR, 2009). Thus, Nepal is recognized as “hot-spots” for natural disasters and always receiving threats of epidemics (Dahal and Hasegawa, 2008; Fort et al., 2010; Pokharel et al., 2009; Ray and De Smedt, 2009; WHO, 2002). In addition, Nepal is one of the least developed countries in the world with low per capita income (USD 440 as of 2009) (ADB, 2010). Furthermore, there is persistent disparity between the genders and urban/rural areas in terms of resource mobilization, political, economic and infrastructures within the country (ADB, 2010; NPC, 2010; PRA, 2010). Approximately 25% of the populations still live below poverty line (an income of less than USD 1.25/day) (NPC, 2010). Such sarcastic condition limits the services and facilities during and after the disasters happen (Karki, 2011). Moreover, natural disasters incur chain of negative effects on the livelihoods of poor and disadvantaged groups in Nepal (Karki, 2011; Pandit et al., 2007; Pokharel et al., 2009).

Among the water induced disasters, flooding is the most common disasters in Nepal which can occur relatively frequently thereby damage human properties including livestock, crops, and houses (Pokharel et al., 2009; PRA, 2010; UNDP, 2009). It is estimated that more than 5 million people had been affected by the natural disasters in Nepal between the years 1971 and 2007 (UNDP, 2009). As shown in the Table 5, majority of the people were victimized by floods (UNDP, 2009).

**Table 5. People affected by different types of natural disasters in Nepal during the years 1971-2007 (UNDP, 2009)**

Disaster	Percentage (%)
Flood	68.3
Landslides and avalanches	9.8
Epidemic	9.4
Fire and forest fire	4.6
Famine	1.7
Weather related	5.8
Earthquakes	0.1
Others	0.3

Flash floods and landslides are frequent and repetitive in the Terai and the fertile river terraces in the hills, and its population has experienced the drastic consequences (PRA, 2010; UNDP, 2009). The severity of the disaster increased during the month of July and between the years 1971 and 2007 approximately 3,062,008 people were affected only in the month of July (UNDP, 2009). Apart from human lives, flood is a persistent concern of damage to crops and livestock (Pandit et al., 2007; PRA, 2010; UNDP, 2009). In Nepal, the frequent and repetitive occurrence of water induced disasters especially; floods and landslides severely affected the farming sector (PRA, 2010; UNDP, 2009). Between the years 1971 and 2007 approximately 800,000 livestock were killed (per capita loss of 38 cattleheads) (UNDP, 2009). Therefore, the water induced disasters including erratic monsoon rains, floods, and landslides were responsible for economic loss and damaging human lives in Nepal (Dahal and Hasegawa, 2008; Fort et al., 2010; Pandit et al., 2007; Pokharel et al., 2009; Ray and De Smedt, 2009; UNDP, 2009).

## Conclusions

Disasters affect women and men differently due to their different roles and responsibilities undertaken by them, the differences in their capacities, needs and vulnerabilities. This study revealed that the water induced disaster i.e. flood in 2007 has really set its impact in the lives of the affected families, in every sector whether it be in their shelter, livestock, agricultural land, income, savings, defecation, migration or decision making etc. There were a lot of challenges but has even brought positive change, especially among the women respondents. Change such as women of the study area were confined to reproductive and productive work, which their work was not accounted for but

after the shelter program, women had opportunity to be a member of a group, participate in meetings and trainings and also help in community shelter construction work. Even though women were facing hard time they were becoming strong enough to tackle with the challenge. Women have gained greater confidence due to moving out in the public spaces for shelter construction regular meetings and trainings that took place for the program. This has not only built their confidence but also has changed the mindset of women about their own capacities.

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