

Indigenous Flood Management Techniques from Gender Perspective: A Case of Kailali District

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In the Terai region of Nepal, flood poses as a serious hazard among many other natural disasters. Flood affects both women and men but it has a gender dimension. Women are more vulnerable to flood related problem but they demonstrate courage and creativity to prepare for, survive, cope with, and recover from the flood crises to sustain the livelihood. The main purpose of the study was to assess women's vulnerability to flood and to identify the indigenous coping strategies, techniques and mechanisms that the rural women/men use to protect against the flood ahead of time and during flood in the Dhansingpur Village Development Committee of Kailali District. Both the quantitative and qualitative sampling techniques were used and the sample consisted of 100 women. The results showed most of the women in the study site are vulnerable to flood due to the geographical location, gender role, poverty, gender inequality, lack of education and training, and lack of information and awareness. They have their own indigenous coping strategies and mechanisms to manage with the regular flood. They are also using the modern technologies achieved from flood related projects in the village. The study suggests strengthening the indigenous mechanisms, providing income generation activities and making the women aware about the vulnerability.

Keywords: *flood; vulnerability; indigenous techniques; livelihood sustainability; gender.*

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Background

The Himalayan region of Nepal can be considered as one of the severest flood hazard zone of the world. Mainly, the Terai region is more prone to floods. The floods occur almost every year in one part of the country or the other causing loss of life and heavy damage to physical properties (Ministry of Home Affairs, 2008). Official statistics of recent years say that about 1000 people die in Nepal every year due to the natural hazards; about 300 deaths occurring only due to floods and landslides. The occurrence of flood of Koshi River and far western region in 2008 is one of the examples of disaster in Nepal (Dhahal, 2006). More than half million people were displaced by floods in the far western Terai in September 2008 and same number again in the eastern Terai in August 2008 (Uprety & Ulrike, 2010). A UNDP/BCPR study, 2004 ranked Nepal, in terms of relative vulnerability to floods, as the thirtieth most at risk country in the world (UNDP/BCPR, 2004).

Floods can cause an increment in women's vulnerability. Vulnerability to social and economic threats and stress create livelihood insecurity. However, local people have developed coping strategies and resilience mechanisms. It is important to study the coping strategies and resilience mechanisms that help people to overcome or minimize vulnerability (Uprety & Ulrike, 2010). The most vulnerable to flood include the very young and very old, the poor, ethnic minorities, physically and mentally disabled, and women, particularly the poor, elderly and those who are pregnant (Mehata, nd.).

Gender is a matter of culture: it refers to the social classification into masculine and feminine behaviors (ANN OKELEY, 1985). Gender system and cultural norms interact to determine the extent and kinds of resources and opportunities male and female are exposed to, existence and absence of which often have the power to determine life options. In addition gender plays major role in the participation, involvement and in decision making, resource allocation, mitigation and preparedness of floods (CARE-Nepal, 2009). Not all women are more vulnerable compared to men around them in case of floods but in every

Indigenous Flood Management Techniques from Gender Perspective: A case of Kailali District

culture and society, a great many girls and women are at high risk, because of gender based inequalities (UNDP/BCPR, 2004). Women are the poorest of the poor. In many parts of the world, they rely on the local water, animals, and land for their income and livelihood, so natural disasters hit them hard (UNDP/BCPR, 2004).

Women are less likely to protect themselves than men to live through a floods because they put others first and aren't always free to act in their own best interests. It has been observed that most women die in floods when they try to save their children and property (Shrestha, Syed & Rezaul, 2008). Often, women lack the information due to their confinement to the domestic periphery. They are less exposed to outside world and are very much unaware of what is happening in their surroundings. The social construction of predefined gender bias creates a gap between equal accessibility to resources and opportunities. So women can not afford extra income that is needed to prepare their homes for protection from the floods. But they apply their own indigenous methods and mechanism using local resources and their own capabilities to be safe from the floods. Women also use some modern techniques to be protected from the floods (CARE Nepal, 2008). It is increasingly being realized that indigenous knowledge is important in the livelihood strategies of people³ in the context of flood management. Experience has also shown that poor people have their own coping strategies in order to overcome from effect of flood.

Women are primarily responsible for domestic duties because the cultural and societal norms generally considers women as a means for reproduction and domestic work (Shrestha, Syed & Rezaul, 2008) they don't have the liberty of migrating to look for income generating work as men have; and women have to bear double burden as heads of the households. The failure to recognize this reality, women's labour becomes less visible in the society. Floods leave women with heavier responsibilities and workloads and often-poorer health. Women are more vulnerable to floods through their socially constructed roles (Mehata, nd.).

Women are most likely affected by floods (Shrestha, Syed & Rezaul, 2008). Housing is often destroyed in the floods forcing many families to relocate

to shelters. In such situation, women's domestic burden as well as their economic burden increases, leaving them with less freedom and mobility to look for alternative sources of income. When economic access/economic resources become scarce to women, their bargaining position in household is adversely affected. Thus floods themselves can serve to increase women's vulnerability (Mullings & Gloria, 1988).

Generally, men make the key decisions about disasters—how and when to prepare, evacuate, rebuild, or relocate. Women do not enjoy their full human rights in most societies and cultures and this too makes it more difficult for them to cope with the effects of disasters. But in flood prone area, floods often provides women with unique opportunity to challenge and change their gendered status in society: For example, forming groups and network of community people, local leaders, school teachers and other stakeholders for essential preparedness and mitigation of floods (Elaine, 2001). At the same time, if women get involved in decision making process they may get platform to share their experiences on how women are disproportionately affected by the economic and social dislocations of households that are caused by floods.

Thus, the present study was to assess the role of women in flood management in the rural communities of Kailali district.

Objective of the study

This study intended to identify the *indigenous flood management techniques* used by women ahead of and during the flood. *Attempt was also made to analyze women's vulnerability* to floods in relation to gender role, illiteracy, poverty, and gender inequality.

Methods

This study had adopted both the qualitative and quantitative research approaches to collect information by using the group discussion, semi structure survey questionnaire, key informant interviews and observation techniques. A list

Indigenous Flood Management Techniques from Gender Perspective: A case of Kailali District

of the households from the VDC was taken and 100 households were selected randomly from the 6 wards (Mallaha Tole, Toil Gaun, Ram Danda, Ram Nagar, Phanta and Banga). The total number of households in the selected 6 villages was 345. Women of these 100 households formed the population of the study. Preference for the 6 villages was as they were adjacent in placement making it easier to communicate.

The research design adopted for this study was basically descriptive and explanatory. Semi-structured questionnaire was prepared – Both open and closed ended questions were involved in the questionnaire. The questionnaire contained the demographic and socio- economic characteristics of the respondents and their households including women's roles and responsibilities, and their preparedness for the upcoming floods and their coping mechanism strategies during floods.

Checklists were formulated for Focus Group Discussions (FGDs) and key informants interviews. Jayashra Sawant (School Teacher, Rastriya Secondary School); and Khagendra Saud (member of Dhansingpur VDC) were the key informants for the research work. Interviews of the key informants were taken at their respective work places. One FGD exclusively with the women's group was conducted in each sampled ward. The researcher sought permission from the members of the village council and individual level interview was performed in the respective place preferred by the women. This allowed them to be more comfortable and share their experiences and views more openly. Prior to data collection the women were made clear about the objective of the study.

Observation was made for women's roles and vulnerability in floods regarding geographical location of the research site and poverty. Women's indigenous mechanism for flood situation in the communities also was observed.

The quantitative data had been edited, processed manually and analyzed using simple statistical tools. Qualitative data were analyzed in a systematic scientific order. For this purpose, the open questions were noted down and later on clubbed according to their commonalities and presented in the form of facts.

Study Area

Dhansingpur Village, one of the VDCs of Kailali district, is situated in the far western region of Nepal. It is in the bank of Mohana river of Terai region. According to 2001 census the total population of Dhansingpur is 11,000 where the female comprises of 50.5% and the male 49.5%. Brahmin, Chhetri, Dalit with dominating number of Tharu/Janajati reside in this VDC and their primary source of livelihood is agriculture and wage labour. The land is fertile where rice, sugarcane and mustard seeds are grown. Most of the people are ultra poor and illiterate having one floor house with thatched roof. The people experience frequent floods during rainy season. Being prone for the prevalence to floods, this village was chosen for the study. There are 9 wards in Dhansingpur out of which ward no.1 (Mallaha Gaun also called Srilanka Island) surrounded by Mohana river, needed boat to go in and out of the village was the most affected where the flood hit 60 percent of the total population (CARE-Nepal, 2009).

Findings

Demographic characteristic

The age of respondent between 21-30 years is highest (43 percent) and the lowest percent (9 percent) of the age of the respondent is above 50 years. A majority (90percent) was found to be married and mothers of small children, with 80 percent married and 10 percent widowed. Only one-tenth were found to be unmarried.

In terms of the respondent's caste and ethnicity background, most of them (78 percent) were from the Tharu family, 13 percent from Brahmin/Chettri and 9 percent from Dalit (socially excluded in terms of resources access). As the respondents were mainly from the Tharu community which falls under Janajati, the percentage of respondents was high in Janajati than any other caste. Ninety five percent of the respondents were Hindu by religion followed by Buddhist (3 percent) and Muslim (2 percent).

Higher percent (63 percent) of the respondents were less educated as compared to 37 percent literate. Among the literate 50 percent became literate through non formal education, 30 percent did primary level schooling, 15 percent secondary level, 5 percent had SLC and above education level.

Economic characteristics

For the income and livelihood, most of the respondents' households (83 percent) depended primarily on agriculture followed by wages and remittances (from seasonal migration to India) (30 percent) and service (4 percent). Few households had secondary sources of income from small businesses. Larger percent of the respondents were farmers who had limited knowledge, skill and equipment for modern farming. The indigenous equipments in their possession were not adequate to divert the strong current during flood and hence they were in utmost need of modern mechanisms which they couldn't afford due to poverty.

Ninety percent of the respondents had one floor houses with straw roof and mud floor.

In respect to the size of agricultural land, majority were small holders. Only 37 percent had more than 20 kattha of agricultural land. However, 24 percent respondents were landless and growing crops on others' land and rest had 5-10 kattha land.

There were 41 percent households whose annual income was less than Rs. 15000 and remaining households earned between Rs.16000- 30,000 per year. It was clear from the finding that most of the respondents were from the lowest income groups and faced income poverty.

The majority of the women (63percent) were living in a joint family. This shows majority of women had to take care of large number of family members.

Women's Vulnerability to floods in relation to gender role, poverty, less literacy, and gender inequality.

The information for women's vulnerability was mostly collected through qualitative methods using FGDs, informal and formal consultation and sharing with VDC officials, respondents and key informants in the field.

Gender role

The household role:

The women took prime responsibilities to look after the households duties. Most of them cooked, fetched water and fuel for the family members, looked after their children, and elderly people. Most of time, they were busy in agricultural/ livestock raising activities of their own or working in the work place for wage. From respondents view it was found that many male members have migrated in India in order to seek job. As a result, the women were also undertaking the responsibilities of the men.

The Community Role:

It was found out that 69 percent of the respondents were associated with the groups naming Aama, Laxmi, Jivan, Nirmala Ekata samaj, DRRC (Disaster Risk Reduction Committee), Krishi Samuha and Emergency fund raising committee. Many women were involved in more than one group. From the qualitative information, it was identified that these groups were active in one or more of the activities like: Saving and credit, maternal and neo-natal health care, HIV/AIDS, improvement in agriculture and livestock and local haat bazaar and raising fund for emergency cases. Women were taking part in different tasks of Community Flood Awareness Program and Community Flood Preparedness Program. Seven percent of the women involved in the groups reported that they are the members of executive body in their groups which represent women in leadership position.

Greater percent (61percent) of the women were encouraged by social mobilizers and 39 percent by NGO officials, relatives, friends and family members to involve in the group. Among the 69 percent women who were involved in the groups, 51% said they just attend the meeting and come back but 49 percent said they participate in discussion. From the focus group discussion it was found that in the mixed group also women's voices were heard and they also participate in decision making. A majority (51percent) of women take their small children with them when they go out of the house for works/meeting/training and group activities. Those who left their children at homes were looked after mostly by mother-in-laws. One of the respondents of Tharu community also participated in rescuing the flood survivors by swimming (from key informant information)

Poverty

Respondents' occupation, their annual income, home ownership, land size and the roofing/types of house were taken as indicators for measuring women's economic status (poverty). The analysis of the data revealed that a majority (83percent) had agriculture as the main occupation for livelihood followed by wage/remittances and service.

To supplement the income for survival, almost all the male members migrate to India for wage labor. For such migration, often the family takes loan to cover the travel expenses and until the male member sends some money back, the women are required to arrange for the repayment. The absence of male members and added burden of responsibilities to feed the family and loan repayment, the women had to seek alternatives of income. So they cannot afford enough time to take part in community activities. Women who have taken part in group activities also said they are overburdened and sometimes cannot attend the meetings as they have to look for earning for family survival. Due to poverty and lack of time women are not even able to make use of good opportunities which are being provided in their communities. As a result these women who lacked knowledge to save themselves and their family in times of flood become more vulnerable and dependent on others.

Types of houses were also taken as one of the indicators of poverty assessment. Two most common types of houses found in the study area were: Tharu house and Achhami(pahadi) house. The Tharu houses (one roomed, thatched roof) belonged mostly to the poorest of the poor and were more vulnerable than the Achhami houses. The Tharu/ Janajati people could not afford an attic at their houses to save their belongings during flood time. In Achhami houses most of the house had a small attic which could be used at the time of flood to store belongings and even family members could take shelter at time of heavy rainfall. It was found out that almost all the house had mud and grass walls. The flood water easily makes holes through such walls and there is high risk of the house collapsing in case of severe rainfall.

From FGDs it was found that due to lack of money and food, the women and their family members had to starve many days during until the relief materials came in their areas. Some took refuge on the roof tops of their houses while some took shelter in neighbors' houses, school, health post etc. This shows women's vulnerability due to poverty.

Less literacy

From the research it was found those women who were literate and the women who had higher level of education were more aware of flood preparedness and most got the opportunity to take part in these activities. The women who were less literate were found having less confidence to share about the community level risk and disaster management activities.

Gender inequality

Migration of men in Kailali district is very common. However there is a good practice that most of men return to their house during rainy season in order to be with family member during flood. But with the unexpected and off season floods women had to cope alone.

Being women, they had to bear multiple roles and gender discrimination. Their social as well as biological reproductive role makes women more

vulnerable. Due to their affection and emotional attachment with their children they could not leave them alone at the time of flood. A woman in FGD in Mallahotal, reported “my husband had gone to India for seasonal employment when the floods occurred, the water covered the floor of the house. So I climbed the roof of the house holding one small child tight to my chest and the other one with the other hand and remained there during heavy rain which made me and my children more vulnerable”.

Some of the socio cultural practices of the community related to women stands as a hindrance and pulls them towards vulnerability. An example can be taken of the Pahadi community of the researched area where the women during their menstrual period has to practice Chaupadi (staying separately outside the house without touching anyone). This was a challenging moment for these women at the time of flood. As most of the women had to stay at one room together during floods, they were not allowed to stay with others in safe places. During rescue time also, men hesitate to hold their hands and they also hesitated to catch others hands to be rescued during menstrual period, which made them more vulnerable.

The belief that "Women are physically weak and men are stronger" is deeply rooted in the society. With this social concept and belief in mind, men get priority in the training of search and rescue. So being unequal in the eyes of the society in gender quality, women are thus having less opportunity for different types of initiatives in the local level.

Coping Strategies and Indigenous Mechanisms used by women

Indigenous mechanism: The women had their own indigenous coping strategies and mechanisms to deal with floods since the flood occurs in regular interval. The community people have some of their own means to prepare for the flood and some scientific measures have been shared by some project for the flood preparedness. Respondents were asked whether they were prepared for the flood that occurs every year. Eighty two (82) percent respondents reported they were prepared for the regular type of flood that occurs every year but for the sudden

Indigenous Flood Management Techniques from Gender Perspective: A case of Kailali District

and heavy flood that comes when the rainy season was over, their coping mechanism did not work. Table below reveals the indigenous mechanisms and strategies used by the women in floods preparedness.

Table 1, Indigenous Mechanisms and strategies

| Indigenous mechanisms | | |
|--|-----|----|
| | No. | % |
| Keeping Belongings at the higher places | 42 | 42 |
| Transforming the valuables to the safer places | 68 | 68 |
| Storing food grains in the mud containers | 79 | 79 |
| Making houses with wooden log legs | 15 | 15 |
| Plastering the cane frame of the house with the paste of mud and grass | 76 | 76 |
| Making small dam at the entrance of the house with the mud and grass | 83 | 83 |
| Keeping mobile chulo(clay stove) | 76 | 76 |
| Keeping Attic (small floors at a height) at their homes | 50 | 50 |
| Keeping all valuables on wooden beds with robes on its four legs and pulling it towards the ceiling of house | 50 | 50 |
| Making a trench in front of the house | 68 | 68 |
| Keeping kin relationship | 30 | 30 |

Note: The number of respondents exceeds due to multiple answers

The practice of the above mechanism (Table, 1) for the flood preparedness was common in almost every household. On regular basis they kept the belongings at the higher place inside their house. During the time of floods they transported their valuable goods in higher and safer places in their village. The Tharu villages have their traditional ways of storing food grains in large mud containers (daivre). These containers were special in their kind as they were made of mud and grass with four wooden legs raised at half to one foot from the ground. In comparison to simply mud utensils it lasts longer when in contact with water. In the focus group discussions the women shared that they have learnt this practice of keeping the grains in those containers from generations.

They practiced the same technique in building their houses. They use the bamboo sticks for the frame and then the mixture of mud and grass is pasted on the frame. The women told that such houses last longer than simple mud houses. Few well off families (who can afford the logs) were observed erecting the wooden logs of about 5-7 feet height as legs so that the flood does not reach the room.

They shared that when the water level reaches up to the legs they make a small dam like structure at the entrance of the house with the same mixture of mud and grass. This helps to prevent the water from entering into the houses.

It was observed that most of the houses had mobile 'Chulo' (cooking mud stove). The specialty of these stoves was that they can be carried any where for cooking food. Some women shared that they used their 'mobile chulo' on the 'thanti' (traditional attic) and cooked food for the family when their ground floor was flooded with water.

The families who are economically sound have houses with a traditional attic (thanti). A small staircase leads to this attic and the attic is mainly used for storing grains, valuable belongings and even family members use it for sleeping purpose. Families who do not have attic used their wooden bed in a traditional way for storing valuable belongings and even to safeguard their children when water entered their houses. They tied ropes at the four legs of the bed and raised

the beds at a certain height and tied it on the ceiling of the house. This was found to be an effective technique in most of the villages.

Modern mechanism: To survive from the upcoming floods, many women who have learnt modern techniques (knowledge and skills) from the projects conducted in the villages applied them in the time of flood. Table, 2 reveals the modern mechanisms and strategies used in the villages for flood management. The respondents were active participating in raising the road level to control the flow of water and the collection of emergency funds and using help from the health posts and other scientific measures learnt through the local projects. As most of the villagers in this VDC were poor and lacked resources to cope with the flood for a longer time, many families sought help from their neighbors and their relatives who were economically sound, and from VDC office/schools. They were less aware of other measures to face the floods.

Table 2, Modern mechanism and strategies

| Modern mechanism | | |
|---|-----|----|
| | No. | % |
| Seeking help from the neighbors and relatives | 33 | 33 |
| Seeking help from VDC office/schools | 41 | 41 |
| Seeking help from health post | 23 | 23 |
| Raising the road level by putting clay from both sides to control water level | 75 | 75 |
| Planting tree at the banks of the river | 03 | 03 |
| Climbing up on the roof of the house | 40 | 40 |
| Collecting for &Contributing in emergency fund | 60 | 60 |

Indigenous Flood Management Techniques from Gender Perspective: A case of Kailali District

| | | |
|--|----|----|
| Discussing in the group meetings | 24 | 24 |
| Swimming | 10 | 10 |
| knotting net for dam construction | 35 | 35 |
| Teaching students in the school about the flood management | 2 | 02 |

Note: Number exceeds due to multiple answers.

Conclusion

The study was conducted in Dhansingpur VDC of Kailali district of the far western region of Nepal. The study gives an overall scenario of women's involvement in the flood management. In general the majority of the respondents were from the Janajati group. The literacy rate among the women respondents is higher than that of the national level which is 34.6% for 15 and above women according the 2001 census which may be the result of effective Non formal education in these areas.

The vulnerability of the women in the disaster prone areas could be elaborated from the qualitative study. The culture of the villages bounds women and men to their specific roles. In the village, majority of the people were involved with the agriculture as their primary occupation. And men from majority of the households were migrating to India for employment which has resulted in the over burden of work for women. This has resulted in their limited involvement in development activities but still many women are involved in groups and flood management activities. Indigenous coping strategies have an important role in helping the community people to protect themselves in times of floods in this area. They applied the indigenous mechanism ahead of time and also during floods to protect from the effect of the floods. They have been using it from generations and are cheaper for the community people to adopt.

Since the majority of the people are poor, more and more measures could help the women to strengthen their indigenous measures for flood preparedness. Projects could look into ways to strengthen the mud houses, food storage utensils, support for houses with wooden legs etc. The project could encourage people to build low cost thati.

Women's vulnerability could be reduced by strengthening their ability to use technology to cope with floods and food insecurity¹². A number of integrated approaches could be used to enhance the access to resources of vulnerable groups to improve their livelihood security. The collected money for emergency funds by the community are basically saved for emergency period and mostly remained idle for the rest of the period (from FGDs). The funds collected could be used in better cause like giving loans to establish an agro-based industry in the community, leasehold farming, fish farming, river belt vegetable farming, agro processing, improving traditional skills of indigenous flood management and establishment of market centers. Implementation of these activities would reduce women's vulnerability to floods due to poverty, reduce seasonal migration, increase income and self employment, diversifies livelihood options, reduce burden of women from household chores and increase social and political capital. This would also encourage the male members to stay back in their own village once they realize there is more income generating opportunity for them.

Practice like 'chaupadi' is prevalent in the communities. This makes the women more vulnerable during flood as they are expected to stay far from their household during menstruation. Awareness programs that ensure this issue in its program should be a part of the activity.

Women's physical strength is mostly overwhelmed by the society, due to which they were not included in the search and rescue committee. But Tharu women were observed as being self-involved in rescuing the victims during the flood period. Hence, women should be included in the search and rescue task force committee of the village during the time of floods.

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