Report I

Disaster, Displacement and Adaptation Recovering from the Kosi Flood 2008 in Nepal *

Researchers and policy makers have increased their attention on the displacement due to disasters like floods and adaptation to such disasters, particularly in the context of climate change. Many studies have shown that such incidents would increase in the coming days due to the climate change. Discussion on this issue becomes important in order to understand the process of recovery in the post-disaster phase and to move the dealing of such disasters beyond the narrow focus on relief and rescue after the incidents, through the formal bureaucratic-administrative mechanisms. In this context, this paper analyzes the case of Kosi flood of 2008 which occurred due to the breaching of the eastern embankment in the eastern Tarai of Nepal. The aim of the paper is to analyze the plight of the displaced people while they were recovering from the disaster. The case will broaden our understanding of the micro-level situation created by the flood such as the displacement and return of the displaced people and on how recovery occurs in such setting.

Migration and population displacement have been linked with environmental change in different ways. For example, movement of people may be caused by natural disasters like floods, hurricanes, landslides etc. or by gradual and cumulative change in environmental quality such as deforestation, desertification and so on (Bilsborrow 2002: 14). Both types of movements are also discussed in the climate change context. There are few examples of environment induced displacement from Nepal. Floods in the Tarai region, landslides in the hill region and glacial lake outburst flood (GLOF) in the high Himalayan region are examples of disasters which create displacement every year. These disasters are also linked directly or indirectly with the impact of climate change. Similarly literature that links gradual incremental change in environment with migration and displacement in the

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context of Nepal is limited. According to this literature, such links are mediated through the livelihood process. For example, people leave their places when there is relative deprivation caused by environmental degradation (Bhandari 2004). According to Menon (2008) rural agrarian households tends to diversify their livelihood sources when rainfall is uncertain. Migration is one way of diversifying the livelihood options. Very recently a case that came frequently in the Nepali newspapers is about a village in Manang, where the entire village is being relocated due to the scarcity of water, caused by climate change. Therefore examples of both types of environmental change induced displacement are found in case of Nepal. However the later types are more complicated since the gradual change in environment causes migration through the complex process of livelihood. The process is also widely debated in the migration literatures. The first type of linkage of environmental change and displacement through disasters, which is focus of this paper, is more obvious and is based on the 'common sense' that flood like disasters destroy people's land, houses and other tangible goods and assets and people leave the place (Perch-Nielson et al 2008: 377).

Another example of debate on environment induced displacement is taking place on the issue of "environmental / climate refugee". The debate is also related to the various discourses of environmental security. That is about how the displaced people could be or could not be a security threat. Most of the debates on environmental / climate refugee are centered on whether there is something like environmental / climate refugee and how to protect such 'refugees'. This is also related to the question of whether we should consider them as security threat or address their human security. Discourse of environmental refugee is not new for Nepal. People displaced either by development and conservation projects or by decline of resources and disasters are brought under this category in Nepal. Very recently Manang people who were being displaced due to climate change induced water scarcity were also put under the rubric of climate refugee. We may assess critically the causal weights of environmental change to make people migrate or can debate the term environmental or climate refugee on the normative or analytical ground. This paper rather accepts the fact that people are displaced by certain types of environmental change, for example, flood. The paper, by focusing on what happens to people after the displacement and what determines their recovery in the post disaster period, aims to bring some lessons for adaptation and resilience from a case of flood in Nepal. The analysis will have certain implications on understanding the adaptation and resilience of communities/ households / individuals who are vulnerable to such types of disasters in the days to come due to climate change.

Therefore, the aim of this paper is to analyze a case of flood having components like disaster, displacement, return and recovery. The case is

about the Kosi flood of 2008 and flood victims. The case is chosen since it is a very recent incidence where people and supporting agencies worked hard towards recovery. The discussion is based on the question, how people recovered from the shock. As mentioned above, the flood itself was not caused by any climatic or environmental factors *per se*, and similar cases will become more frequent in the Tarai region of Nepal in the future due to climate change. The case will reveal how people cope with such situation and what are issues and reasons behind their ability / inability of coping with such incidents.

The paper starts with discussion on the flood of 2008, how people responded to that incidence particularly through displacement, what types of relief activities were employed, and the present scenario. It is based on secondary literatures and interviews with stakeholders during a brief field visit. The discussion highlights the post disaster situation of displaced (now returned) people. At the end, after the discussion on the case, the paper highlights some conclusions drawn from the case related to the post-disaster recovery of flood affected people. The discussion is important to understand adaptation and resilience in the context of climate change.

Kosi Flood of 2008: Disaster, Displacement, Return and Recovery

Disaster and Displacement

The Kosi river breached its eastern embankment of flood control about 12 km north from the Kosi barrage in Sunsari, Nepal. Although the incidence occurred during the monsoon period when the river brings loads of sediments, the cause of that breach was not just climatic or environmental (Dixit 2009: 70, Pun 2009: 4). It was mainly due to the embankment, its low maintenance and high siltation in the river. When the river breached the embankment, its major portion starts flowing along its older course (the course before the barrage construction) inundating large areas of settlement and agriculture in Nepal and India until it reached the Ganga in Bihar, almost 150 km downstream.

The flood had devastating impact on three VDCs (Paschim Kushaha, Shreepur and Haripur) of Sunsari districts in Nepal and four districts (Supaul, Saharsa, Madhepura and Khagariya) of the North Bihar. Initial estimation of damage revealed that almost 50,000 people (more than 7000 households) in Nepal and 3.5 million population (30000 households) in India were affected and almost 6000 ha of agricultural land in Nepal and 35,000 ha in India was damaged (Dixit 2009: 71). Estimated loss in Nepal was almost equal to NRs. 881.7 million.

Recent statistics of District Administration Office (DAO) in Inaruwa, Sunasari shows that total number directly affected in Nepal is

42,765 and number of household is 7,563. Table 1 shows number of directly affected and displaced population and households in all village wards of three VDCs in Nepal.

Table 1: Number of Affected Population and Households in Sunsari by Kosi Flood 2008

Ward	Shreepur VDC		Haripur VDC		Paschim Kusaha VDC	
	Households	Individuals	Households	Individuals	Households	Individuals
1	325	1719	256	1315		
2	162	856	211	1015		
3	429	2418	130	591	218	1202
4	259	1410	190	810	881	5016
5	441	2606	306	1386		
6	268	1437	235	1116	1	6
7	829	5765	452	2288	1	2
8	648	4301	370	2101	2	8
9	186	1113	238	1278	525	3006
Totals	**3547**	**21625**	**2388**	**11900**	**1628**	**9240**

Source: Statistics of DAO, Sunsari (October 2010)

It seems authorities of both countries were aware about of the weakening of spurs of the eastern embankment in Paschim Kusaha to some extent (see for example Pun 2009). It was also verified by local people who pointed out that there were notices about the breach even before the incidence. People also shared the fact that they neglected such notices thinking they were rumors. Some people neglected the warning coming even after the breach which increased loss of properties. In fact DAO Sunsari had disseminated warnings all across, but people dismissed these warning considering them as rumors. When the river breached the embankment in the morning of 18 August 2008, few local residents along with some local journalists and authorities were present at the site of the breach. Some journalists have even filmed the incidence[1]. When the river flooded the farmland and settlement area, there was a kind of winter fog like situation all around decreasing visibility. Then started dissemination of the information by phone and loudspeakers and some organizations and security agencies started their rescue operation. Proper rescue operations started from the next day.

People in the lower villages, such as Shreepur and Haripur, where the river hit few hours later, were informed about the flood through the

phones and loudspeakers from authorities like security personnel and from their own relatives and fellow villagers. Most of people who did not have concrete buildings and did not possess much property / assets at home left villages with rescuers from that evening in vehicles and on boats. Others left later. After a few days, there was frequent movement of people and rescuer through boats and other means. Those people, who were more alert and got boats, could bring some of their properties and assets. Some were able to bring their stored grains. Those who were left at home were rescued by army helicopters.

Displaced people were brought in the public places like schools, temples, Madarasas etc. on both sides of main Kosi river: Bhardaha in the western side in Saptari district and Laukahi and Inaruwa in the eastern side in Sunsari district. Most of displaced people stayed in the camps with their families. Only few of those who had other options, for example having home in other places or having relatives in other areas either went there or at least send their children and elders there. A retired policeman from Shreepur-1 reported that he sent his children to Biratnagar with relatives where they stayed safely and continued their study but himself stayed in a rented house in Inaruwa and got ration and other supports form the agencies and organizations.

People residing in the public places were shifted later on to proper camps with the support from NGOs and INGOs. There were more than two dozens of temporary camps and couple of permanent camps. When people were relocated in the camps from the public places, different agencies and organizations started providing support, materials and facilities, in the coordination with the relevant government offices. For example, WFP started food distribution under government coordination. To determine whom to give what support and what amount of food item, a white card was given initially by DAO to every affected family. Some problems came at the beginning when 2-3 members of a family got the card. There were also issues of Indians were getting support. There was no proper documentation system to resolve all these issues. Then another slightly modified card was distributed to each family. There were also Red Cross cards through which WFP distributed foods. Different organizations supported in different ways. For example, some distributed clothing, some worked for health and sanitation, some helped to construct / maintain tent, and some worked on raising awareness on different issues, like health and sanitations.

Most of the responses to the issue of displaced flood victims were made in highly administrative and formal way. In order to coordinate the relief and rescue efforts, coordination committee was formed under the leadership of CDO, with the participation of different district based government agencies, security personnel and NGOs and INGOs which were active in the relief operations. Every decision was made through

meetings of the coordination committee which used to hold meetings twice a day at the beginning. These meetings used to monitor ongoing activities in different aspects by different agencies and resolve any disputes or fulfill any demands. It seems such meeting did not involve flood victims at beginnings. If there were any unresolved problems, they would invite political parties' local representatives. Frequency of such meetings decreased in the subsequent days and months. Such meetings were still continuing during the field study (October 2010) at least once in a month. Therefore response to displaced people was done mainly through the government (including security personnel) - I/NGOs interface backed by local politicians if needed. Later on Badhi Pidit Sangharsha Samiti (flood victims' struggle committee)[2] made authorities involve flood victims in the decision making process.

People seemed almost content with the facilities and support they got in the camps during the displaced time. Most of them acknowledged the support provided particularly by NGOs and INGOs. Activities of I/NGOs were coordinated with government agencies. Some of the displaced people were unsatisfied with basic services at the camp like food, drinking water, sanitation while others raised the issue of safety and security of their own assets and belongings, particularly in their homes, which were getting vandalized.

Return of the Displaced People

People started to return back to the village with the beginning of winter (a couple of months after the incidence) when the river declined drastically and achieved a definite course. The decision of the households about return was related to the level of damage on the assets, the family size, and possibility to go back to home and subsist life there. Those households having less damaged properties and / or having higher number of adult members who could repair the home earlier, returned back to the village earlier. Even after increase in possibilities for return, people wanted to stay in the camp in order to be entitled to the support provided there.

WFP continued distribution of food for almost 5-6 months. Then government introduced the provision of 'return package' of NRs. 50,000. The return decision which was made by government at the top level was also favored by the situation. With the coming of spring, when the tents were being damaged by wind, people were no longer interested to stay in the camp and wanted to return back. When they started to return back to their homes, the package helped them repair the house and settle back in village. There were other compensation packages and support provisions which were provided based on the level of damage and assets they possessed.

Categorization Based on the Level of Damage

Flood affected regions and households were categorized into submerged / mainstream (where river was still flowing), red (completely damaged with only sands and gravels), yellow (partially damaged) and green (less damaged). This categorization was made based on survey, aerial map of flooded area and other digital mapping procedure. The categorization was used for making decisions about support / compensation packages, particularly for crops and land. Table 2 to 5 shows the land area and household numbers under different levels of damage made by the flood. All these statistics are based on DAO record, in October 2010. According to these statistics, more than half of the total affected agricultural land was hit most severely and categorized as red (table 2). If we see the damage according to the siltation level, almost half of land had siltation of more than 60 cm (table 4). More than one third of the displaced people were from the red zone (table 3). During the flood, almost 20 percent households were displaced from the completely submerged region, more than 40 percent households from the complete- partial submerged region and more than 10 percent were from the partially submerged region (table 5). All these statistics show that, the level of impact of the flood was severe which made the affected area almost inhabitable for at least few months.

Table 2: Area of Damaged Agricultural Land

S.N.	Area	Land(Bigha)	Percentage
1	Green	2400	34.29
2	Yellow	1000	14.29
3	Main Stream in Red	360	5.14
4	Only in Red	3240	46.29
	Total	7000	

Source: Statistics of DAO, Sunsari (October 2010)

Table 3: Distribution of Cards to Households Based on Level of Damage

Card Description			
S.N.	**Type of Cards**	**Numbers**	**Percentage**
1	Red	2279	35.03
2	Yellow	2234	34.34
3	Green	1993	30.63
		6506	

Source: Statistics of DAO, Sunsari (October 2010)

Table 4: Area of Affected Land Categorized Based on the Siltation Level

Land Categorized				
S. N.	**Land Type**	**Siltation Rate of Sand**	**Land(ha)**	**Percentage**
1	Low Damaged	(0-15) cm	455	19.44
2	Medium Damaged	(15-60)	786	33.59
3	High Damaged	More than 60 cm	1099	46.97
			2340	

Source: Statistics of DAO, Sunsari (October 2010)

Table 5: Number of Household and Population from Different Level of Submerged Zone

	Various Damage Zones			
S.N.	**Types**	**Households**	**Individuals**	**Percentage (hh)**
1	Complete	1543	9457	20.4
2	Complete/ Partial	3103	18386	41.03
3	Partial	787	3731	10.41
4	Partial/Slighat	525	3006	6.94
5	Slight	1605	8185	21.22
	Total	7563	42765	

Source: Statistics of DAO, Sunsari (October 2010)

Support Packages to the Displaced People

There were altogether four types of support packages made available by government to the affected people.

1. Return package of NRs. 50,000 (to all displaced households)
2. Land and crop compensation (to all farmers who had agricultural land)
3. Timber support (for construction of houses)
4. Land and house to the landless (mostly dalit) people (2 Kattha of land to all landless people and a low-cost house on that land to 237 landless people)

Almost all displaced people received the return package of 50,000 which was revealed during the discussion with villagers. For most of them, it had been very useful in various ways, to construct / repair house, to buy

foods (particularly in the red zone where there was nothing to eat for many people) and to contribute to the household expense, for example affording children's education who were sent outside the village.

Crop and land compensation was distributed in two installments to those households which possessed agricultural land. It was 2.5 lakhs per Bigha[3] for mainstream land, 2 Lakhs for the red zone and 1 lakh for yellow zone, even though people were demanding more, at least 5 lakhs for the red zone. First installment of the land compensation had been provided to all farmers and more than half of them had received the second installment too.

Although the return package was meant for all, land and crop compensation could not be provided to landless people. Instead, landless people were given 2 katthas of land and some of them also received a low cost house constructed by UNHabitat and Lumanti. Two kattha of land with a house, a toilet and access to water in a community of almost 240 households with some open spaces and other provisions so far planned up to now seemed quite good option to the landless people. Some local elites however questioned the strength of the houses. Such skepticism, according to authorities at DAO, was due to the frustration of not getting the contract for the construction.

Statistics of landless people were generated based on a survey and with the support from DDC and VDC. Later on the Sangharsh Samiti was also involved in the generation of data about landless people. Almost 900 households were recognized as landless (most of them were dalits) and total land distributed to them by government came around 29 bigha 6 kattha up to now. Government was planning to buy new plots of lands for landless people. While providing land to landless people, an agreement was made with them so that this land could not be sold for the next 10 years.

Table 6: Compensation Details Besides the Return Package

Compensation Detail			
S.N.	**Description**	**(Nrs)**	**Remarks**
1	Land compensation	700million	Ongoing
2	Land purchasing for Landless	12 million	Ongoing
3	Crop Compensation	88million	Ongoing
		800 million	

Source: Statistics of DAO, Sunsari (October 2010)

As of October 2010, timber was being distributed. According to authorities at DAO, it had been difficult to make such a large amount of timber available at one time and needed to be distributed in certain order. But questions were raised by the Sangharsha Samiti about the process /

order of distribution of the timber and suspected that real victims would not get the timber. When such questions were raised by the Samiti in the meeting, authorities warned that the timber support process would be discontinued as it was being used by the Sangharsha Samiti representative as a method of dividing flood victims organized under the committee. Local people also shared that only those individuals who had access to and good network with authorities and who were more vocal were getting the timber supports. It seems there were enormous suspicions and politics around the timber support, which needs to be analyzed in detail. However distribution of timber was in the progress as informed by DAO personnel.

Most of the support to the victims was in the form of cash or good and materials which required highly formalized administrative- bureaucratic mechanism for the post disaster recovery. There was little support in other aspects, such as for the livelihood or agriculture recovery and local institution building as argued by the authorities. However local victims had not been able to enjoy the impact of such efforts. It demanded concentration on the long-term recovery since all people had returned back to the village.

Support for the Livelihood and Recovery from the Disaster

According to the local people, the most pressing issue for their recovery from the situation is about livelihoods, particularly related to revival of agriculture system in the area. Although yellow and green zones were slowly recovering from the disaster, the most affected red zones still looked barren and people looked quite helpless. Most of the livelihood support activities, for instance support to cultivation by NGOs / INGOs, were concentrated in the less affected regions (yellow and green). Local people and Sangharsha Samiti members accused government and other support organizations that there was no support activities and short or long term plan for the recovery of the red zone, such as Shreepur-5.

Most of households in the region were completely dependent on agriculture for their livelihoods. Being a highly productive region in the country with a fair amount of available arable land, most of households owned the productive agriculture land. It had made them self-sufficient and self content locally for food and livelihoods. But when the flood brought enormous amount of sand and sediments, almost 5 feet or more sand on half of the agriculture land (see table 4), it had devastated farmers who did not have any options outside these lands. According to local people from the red zone, they did not have anything to eat without purchasing in the market and there was nothing to do for subsistence in their knowledge. Since they did not have own saving, they used the money provided as support package just to purchase the food. But such situation could not go for very long time. Local people also did not have any cultural practices and

knowledge to adopt new livelihood strategies outside agriculture. Therefore consequences of the flood to these people were enormous. In such situation, residents of the red zone thought that government or other support organizations had not done anything for their livelihoods and agriculture.

According to the government agencies, there had been many activities related to livelihood generation even in the red zone. Since the zone is completely devastated, it was hard to see any visible impacts of such activities very soon. Some of livelihood support activities were related to, formation of the user groups at the village-unit (Tol) level and carrying out different activities as a collective action. People in the red zone had been supported in agriculture or in any livelihood generation work whatever they wanted through such unit groups. They had grown some vegetables and crops which could be grown on the sand. There were some support to cultivate Jatropa and some efforts to engage people on various resource based income generating activities such as mat or bag making however many people were found less interested in such activities. Some cultural barrier had been responsible to limit the adoption of new methods of farm and off-farm income generation. It would need more time and efforts. Similarly construction of ponds (for fishing) or roads had also supported them for earning to some extent. These activities were very limited to show any visible impacts, for which revival of the sandy land was must. Authorities also accepted that there was a need of long-term planning for the region which according to them was related to reclamation of soil by channeling the irrigation with a bigger project.

Besides problems in the agriculture related livelihoods, people were facing some health related problems as well. Sandy environment made local people mainly children suffer from various health problems like eye infection and respiration problems. Such problems became severe especially during the windy season. Similarly rebuilding of local infrastructures or roads had been major concern of the local people.

Local elites, currently heading the Sangharsha Samiti, were more concerned about the support provided by authorities such as construction and rebuilding of infrastructures, leveling of sand and filling the low lying area, building houses for poor landless and timber and construction activities. The group had been able to mobilize local poor and landless people. It seemed that the local elite were not interested in the activities that would make significant changes such as education and skill generation, making outside networks and involve in the outside and non-farm income.

Based on the scenario described above, we can draw few issues that help us understand the recovery process more generally.

Some Issues and Conclusions from the Case

Following issues are relevant for the understanding of disaster induced displacement and adaptation of flood-displaced / affected people. Some of these conclusions are provisional and requires further studies for verification.

Disaster Induced Displacement and Return of the Displaced People

Disaster like Kosi flood, which destroyed lands, houses, assets and infrastructures and displaced people from the region. However the consequences of disasters were lesser to those households which have strong infrastructure and houses. For example, in Shreepur-5, local elite having a concrete house well surrounded by bamboo and other trees was less affected by the flood. His house worked as a shelter for many villagers right after the flood for a couple of days. Besides the level of damage, family size (number of adult member in the family) and level of dependence on the external support vis-à-vis possession of own asset would determine peoples' decision to return. If households had few or no adult working member or they were more dependent on the external support and possessed low level of assets, they would return later.

We can argue that flood displaced people are more likely to return back to home than migrating permanently elsewhere. Based on this assumption, we can question the argument that the disaster displaced people would move to other regions and destabilize the new destination. Such arguments are made in the context of the environmental refugee in the environmental security literatures. However the voluntary return of the displaced people as seen in this case also needs careful interpretations since there was provision of 'return package' given only to returnees.

Relief Operations and Politics Around It

During the post disaster phase, particularly the relief and support activities create a unique political environment. It is because the case brings so many actors and institutions having different interests and objectives and different levels of power and legitimacy. The case shows that most of relief and support activities were implemented by the government and the non-government agencies, external to the local people. Most of activities were carried out in purely administrative approach which had excluded local people and their institutions. Such approach was essential for the kind of support provided which was mainly in the form of cash or in the form of tangible goods and materials. But on the other hand it made local people, mainly local elites feel excluded from the mechanism. As a response, local people formed the group like Sangharsha Samiti which was headed by local elites. The Samiti was formed beyond the existing structures of usual political parties which were closer to the formal bureaucratic /

administrative structures than to the victims as argued by some of leaders of Sangharsha Samiti. Such micro-level politics represented by different groups and organizations need to be analyzed in detail in order to understand the existing institutional problems on the post disaster recovery. Dixit (2003: 169) has also criticized the government-centric approach of responding to floods in the Himalaya-Ganga regions for ignoring local institutions and aspirations.

Since such types of relief activities are based on providing monetary support, there is high possibility of corruption. As a result many disgruntled groups and individuals can mobilize against ongoing activities. It suggests that we should think beyond administrative bureaucratic government-centric relief operation for recovery from the disasters. Building local institutional mechanism is also important to carry out disaster preparedness and management at the community level.

Diversified Livelihoods and External Networks of Households and Individuals

The case shows that impact of flood is particularly higher in the region since most of people were dependent solely on agriculture which was completely destroyed by the flood. Consequences were less severe for those households and individuals who had external networks, outside the region or for those who had more diversified livelihood options particularly outside the agriculture. Therefore emphasis on education, social capital or external networks and access to non-farm livelihood options increase the resilience of households against disaster and enhance the post disaster recovery. Some local people also accepted it and said that individual assets, such as education, are more essential to bring households in the original situation after the shocks than some materials or goods provided in the relief support.

Inadequate Activities for the Most Affected Zones

The case shows that there are few options left for the post disaster recovery to the most affected regions like red zones. Since the region has been hit by the flood so adversely that relief agencies and support organizations are not able to focus in such regions yet. It makes such zones more neglected for activities beyond immediate support. Innovative methods and more investment along with research and development are needed for highly affected regions. Usual way of doing development work, such as creating groups and implementing usual farm or non-farm based activities through such groups may not be adequate. While conceptualizing any development options, cultural contexts should be considered seriously. E.g., one development worker revealed that people in the affected regions are not interested for collective actions and they think every option should come in more individualistic way. If so, effectiveness of group based

activities will be decreased drastically. In such situation, development initiatives should be thought differently.

Impacts of Flood to the Households According to the Economic Status

Another conclusion drawn from the case is that the consequence of the flood is more severe for the middle income groups than higher and lower income groups. Most of middle income groups, being quite content during the pre-disaster time, are less likely to diversify livelihoods and increase external networks as compared with higher and lower income groups. For higher income groups, it is obvious that they can recover from the shock more easily. Even for the lower income groups, recovery may be faster since provided support means a lot to them and they are ready to adopt any options available to them. Therefore, consequences of flood increases with the decrease in economic status but after a certain level of income, it becomes less severe. Although such formulation may require more sophisticated statistical proofs, it gives some hints about how to carry out recovery activities for various types of households.

Adaptation Options

Most of climate change literatures on vulnerability and adaptation have conceptualized vulnerability as the exposure to the risk or perturbation, sensitivity to such risks and capacity to adapt (see for example Nelson et al 2007). Therefore vulnerability, resilience and adaptation are determined by the exposure to the risk (flood in this case) and sensitivity to the risks. Perch-Nielsen et al (2008: 383) have presented various adaptation options to floods. All these options are kept under two types of modifications: exposure modifications and sensitivity modifications. Based on the Kosi flood case, exposure modifications have major scope for the adaptation to floods in Nepal Tarai where adaptation options include, forecasting and warning (credible warning mechanism), community preparedness, land use planning, sensitivity modification at the household level such as storing foods, saving income and its investment etc. and disaster aided or insurance based loss sharing mechanism. Similarly hazard resistant design and emigrations could be also the options mainly related to the exposure modifications. Emphases more on relief and rescue operations and on post-disaster external support providing cash and goods / materials usually have limited impact for recovery of people's livelihoods. Instead, more focus should be placed on above mentioned adaptation options. However it may need proper institutional mechanisms and shift activities beyond the bureaucratic-administrative framework.

Notes

[1] Sunsari based NTV journalist of that time Mr. Mahesh Shrestha has made a documentary on this event, which was screened and discussed at Martin Chautari, Kathmandu in 2010.
[2] The Sangharsha Samiti was formed almost 24 days after the flood as a pressure group and handed a memorandum in the next day to the chief district officer (CDO). This vocal group came in the limelight when it protested against the compensation package proposed by government through the strikes and Bandh which made government form a high level task force to study their demands. Later on government recognized its existence and allowed them to participate in the coordination meetings.
[3] 1 Bigha = 0.6773 ha = 20 Kattha

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