MANUAL FOR COMMUNITY-BASED FLOOD MANAGEMENT

NEPAL

Asia Pacific J. Env. Dev., **11**(1&2), 2004, pp. 227-304

MANUAL FOR COMMUNITY-BASED FLOOD MANAGEMENT IN NEPAL

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List of Acronyms

ADB/N	:	Agricultural Development Bank of Nepal
CBOs	:	Community Based Organization
CFMC	:	Community Flood Management Committee
DADO	:	District Agriculture Development Office
DDC	:	District Development Committee
DHM	:	Department of Hydrology and Meteorology
DNCRC	:	District Natural Calamity Relief Committee
DOR	:	Department of Roads
DWIDP	:	Department of Water Induced Disaster Prevention
DWRC	:	District Water Resources Committee
GLOF	:	Glacier Lake Outburst Flood
INGO	:	International Non-Governmental Organization
JICA	:	Japan International Cooperation Agency
NGO	:	Non-Governmental Organizations
NRCS	:	Nepal Red Cross Society
RCC	:	Reinforced Cement Concrete
RUAA		Roorkee University Alumni Association
SIREN		Society of Irrigation Engineers
UNDP	:	United Nations Development Programme
VDC	:	Village Development Committee

EXECUTIVE SUMMARY

Floods in Nepal

Unstable steep slopes, weak and fragile geological formation of young mountains along with heavy monsoon rainfall make Nepal one of the most hazardous areas in the world. Because of its topographical variation and geological characteristics together with torrential rain during the monsoon season, the country frequently suffers from different kinds of water induced disasters like soil erosion, landslide, debris flow, floods etc. These phenomena cause loss of lives and property and pose severe hazards to physical infrastructures resulting in the disruption of the social and economic development of the country.

The Project

This project is a part of the Global Water Partnership's (GWP) Associated Program on Flood Management (APFM) and is sponsored and funded by the World Meteorological Organization (WMO). The broad objective of the project is to find out ways and means for strengthening the self-help capacity of communities for improved flood management under the IWRM framework. The overall goal is to contribute to the process of sustainable development and improve the quality of life by reducing flood vulnerability with a focus on non-structural measures. As a part of AFPM's activities in facilitating the development of regional activities, the project's study area included Bangladesh, India and Nepal under a common and collaborative research design. The project comprises two phases. Phase I of the study was completed in early 2003 which aimed to prepare a country paper to access flood management activities and practices in the countries with the focus on community involvement in such activities. The outcome of the Phase I study was presented in the Third World Water Forum held in March 2003 in Kyoto, Japan.

In Nepal, two study areas were selected for carrying out the study. The first is the area in Saptari District in Eastern Development Region affected by the Khando River and the second is the area in Rautahat District in Central Development Region affected by the Bagmati and Lalbakeya rivers. The selected location are shown in Figure 1.

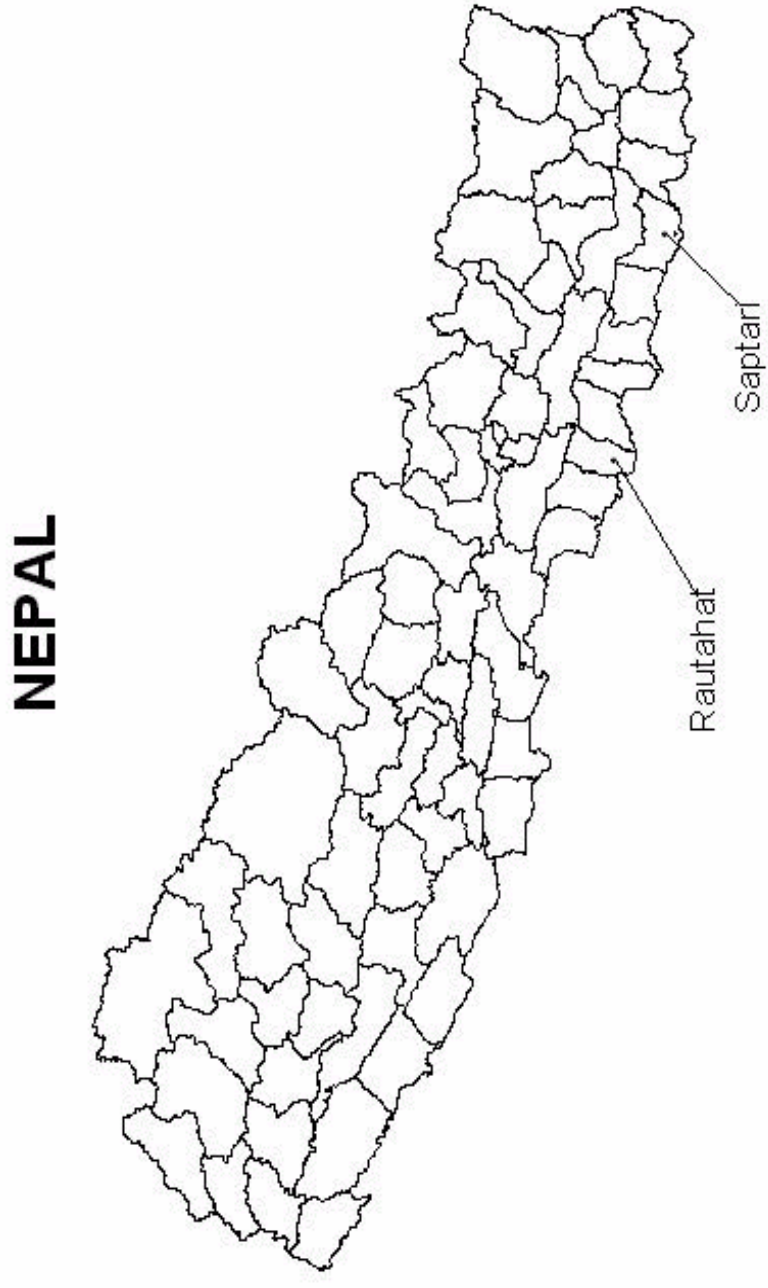


Figure 1 : Project Area—Rautahat and Saptari Districts, Nepal.

Phase II Study

The present phase II of the study project aims to gather additional knowledge about the flood affected communities and undertake appropriate activities to strengthen self-help capacity of communities for improved integrated flood management. The following activities are envisaged:

- Strengthen people's ability to understand flood warning messages and use them in combination with their own assessments through traditional methods.
- Undertake programme to enhance awareness, preparedness, and coping strategies of flood affected people.
- Provide assistance for improving the flood responses by the local people.
- Prepare a manual using guidelines provided by the national flood response strategies that are available in each country and knowledge generated through local surveys and consultations.
- Identify specific non-structural measures beyond the ability of the local community, which have to be provided by the government and NGOs / CBOs in each location to help reduce flood vulnerability.
- Facilitate confidence building and dialogue amongst individual professionals, and institutions dealing with the issues involved in flood management.
- Identify effective modalities of managing floods through effective regional co-operation as well as specific activities to accelerate such co-operation.

Two physical outputs are expected out of this study, the first is the manual on community approach to flood management and the second is establishment of some organized communities aware of improved integrated flood management and ready to make use of the manual.

Study Team

Jalsrot Vikas Sanstha (JVS) has been entrusted with the task of carrying out the pilot study in Nepal. Mr. Som Nath Paudel, Executive Director of JVS is the Coordinator of the study. The study team consists of the following:

Mr. Shiv Kumar Sharma	Team Leader/ River Engineer
Mr. Danda Pani Jaishy	River Engineer
Mr. Ram Chandra Dangal	River Engineer
Mr. Rajendra Pandit	Sociologist
Mr. Roshan Subedi	Sociologist

Further, two social organizers Mr. Rajesh Kumar Jha and Mr. Birendra Dev were involved on part time basis in Rautahat and Saptari project areas respectively.

Activities Accomplished

Under Phase II of the study, the Nepalese team has completed the following activities:

- Field visit and interaction with the people in July 2003.
- Preparation of a sample constitution for the Community Flood Management Committee (CFMC) and distribution to the key persons in the communities.
- Preparation of Manual on Community Approach to Flood Management.
- Presentation of the manual to professional groups, focused community of the study area and stakeholders at district level of the study area.
- Identification of further works to disseminate the manual.

This report marks the end of Phase II study.

Lessons Learned from the Field

Details of the findings of the field visits in the study areas and interactions with the affected communities are presented in Annex I and Annex II for Saptari and Rautahat respectively. Many common observations have been made, which are as follows:

- People temporarily shift to high lands, public places, schools, embankments, etc during floods.
- The communities have no collective pre-coping mechanism. All the activities are done on individual basis.
- Proper coordination is lacking among the agencies involved. The external support provided to the affected communities is inadequate and inequitable.
- Due to heavy sediment load in the river, the bed level is rising every year causing more threat of flooding in the future.
- There is no permanent flood management committee in the communities. However, they form an ad-hoc committee when river training works with support from the government agencies are to be constructed.
- Strong confidence for self-help is demonstrated by the communities, but scarcity of funds remains a major constraint

The following observations in the two study areas were not common:

a) Saptari District Study Area

- There is no flood warning system and people predict flood by watching the clouds and the rain.

- Some of the households in Tilathi community have individual pre-coping practices such as storing food, keeping plastic sheets and tents etc. But there is no such practice in the community of Launiya.
- Proper engineering design of river training works being undertaken is lacking.

b) Rautahat District Study Area

- The communities in Brahmapuri and Banjaraha entrust the elders for flood forecast who listen to the weather report from radio broadcasts and watch flood events for the purpose.
- Although the Government is about to complete embankments to stop water spilling over the banks of Bagmati and Lalbakeya, the threat of flood damage will remain the same.
- Growing urbanization and network of roads and infrastructure are increasing the drainage congestion and the depth and duration of inundation are also on the increase.
- The Red Cross has made some efforts to mobilize the youths of Banjaraha VDC amd train them in disaster management techniques.

The Manual

The manual has been divided in to 6 sections. Section 1 provides the general perspective of the study. Section 2 deals with classification of floods and flood-prone areas. This is expected to form a uniform base in the use of this manual. Section 3 has systematically listed a range of various activities a community may have to undertake as pre-flood preparedness that would prepare the community to face the flood. Section 4 categorically lists the activities the community has to carry out in the event of flood. Similarly, Section 5 deals with post-flood rehabilitation and maintenance. Section 6 elaborates on different activities to manage information for future reference and maintain transparency of the work performed by the community organization.

Further Works

The contents of the manual have been disseminated to the professionals in various forums, to the communities taken as focused groups for the study and the district level stakeholders of the study area. The manual, probably being a new endeavor in itself, was successful in gathering a lot of enthusiasm and appreciation from the stakeholders but there was almost no comment procedures enlisted in the manual. However, the dissemination provided a clear roadmap for further works to be undertaken, which are as follows:

An external catalytic agent is necessary to facilitate the community to organize, make its constitution and carry out works as illustrated in the manual for at least two or three years of monsoon. This will ensure the sustainability of the community organization. The lessons out of this process will be helpful in replicating the work in other concerned areas. The catalytic agent, which will need financial resource for itself, would also help channel external financial support to carry out various activities mentioned in the manual.

Many suggested incorporating simple but illustrative methods on how to do various things which can be done by the community by themselves with little assistance from outside. These methods can include a variety of activities such as how to construct spurs, how to construct in embankment, how to construct revetment, how to carry out plantation, how to make flood proof houses, how to choose location for taking refuge during flood, how to make tubewells free from contamination during flood, how to make water portable and so on.

The suggestions mentioned are very well-founded and should be included in future works.

1 INTRODUCTION

1.1 Floods in Nepal

Unstable steep slopes, weak and fragile geological formation of young mountains along with heavy monsoon rainfall make Nepal one of the most hazardous areas in the world. Because of its topographical variation and geological characteristics together with torrential rain during the monsoon season, the country frequently suffers from different kinds of water induced disasters like soil erosion, landslide, debris flow, floods etc. These phenomena cause loss of lives and property and pose severe hazards to physical infrastructures resulting in the disruption of the social and economic development of the country.

About eighty percent of the total land area of Nepal is hilly and many villages are situated on or adjacent to unstable hill slopes. As a result, frequent landslides and floods with debris flow occur. Unplanned settlements and physical constructions without due consideration to the natural hazards considerably aggravate the mountain hazards. On the other hand landslides add enormous sediment load to streams and rivers causing floods and debris flow downstream. Every year, such disasters cause loss of human lives and immense damages to agricultural land, crops, human settlements and other physical property.

Low lying areas, like the Terai, inner Terai and valleys are inundated and fields are filled with sediments every year due to floods during the monsoon season. In July 1993, Nepal experienced a devastating flood in the Terai region, which took the

lives of 1,336 people and left 487,534 people homeless. In 1999, floods and landslides killed 113 while 47 people were reported missing and 97 seriously injured; 8,844 families were affected, 3,507 houses and cattle sheds were destroyed and 17,732 hectares of land and agricultural crops were ruined. According to the government estimate, the disaster caused a total loss of NRs 3.6 million. In July and August 2002, Nepal experienced numerous floods and landslides in the eastern and central regions, which took the lives of 451 people and affected about 55,000 families.

Effective management of the rivers of Nepal which cause landslide and soil erosion in the hills, widespread bank erosion and flooding of arable land in the Terai and washing away of houses, bridges, roads etc. is not an easy task. However, efforts have been made by the government in the field of river training and landslide control with its limited means and resources and with the help of various donor agencies. The task being highly complicated and resource demanding can only be accomplished with an integrated development approach and active participation of the community.

1.2 The Project

This project is a part of the Global Water Partnership's (GWP) Associated Program on Flood Management (APFM) and is sponsored and funded by the World Meteorological Organisation (WMO). The broad objective of the project is to find out ways and means for strengthening the self-help capacity of communities for improved flood management under the IWRM framework. The overall goal is to contribute to the process of sustainable development and improve the quality of life by reducing flood vulnerability with a focus on non-structural measures but keeping unavoidable structural means in view. As a part of AFPM's activities in facilitating the development of regional activities, the project's study area included Bangladesh, India and Nepal under a common and collaborative research design. Jalsrot Vikas Sanstha (JVS) has been entrusted with the task of carrying out the pilot study in Nepal. The project is designed to carry out its study in two phases.

Phase I Study

This phase of the study was carried out in late 2002 and early 2003. The objective of this phase was to prepare a country report with the following specific objectives:

- Identify sources of information on floods among the flood-prone communities and assess their levels of flood preparedness;
- Ascertain the community's level and magnitude of perception of flood as a risk;
- Understand flood management activities and practices at the community level;

- Determine the needs and expectations of the communities vis-à-vis flood mitigation and loss minimization;
- Highlight the community level coping strategies at present, and their capacity to enhance their options for response in flood vulnerability reduction.

In Nepal, two study areas were selected for carrying out the study. The first is the area in Saptari District in Eastern Development Region affected by the Khando River and the second is the area in Rautahat District in Central Development Region affected by the Bagmati and Lalbakeya rivers.

The outcome of the Phase I study was presented in the Third World Water Forum held in March 2003 in Kyoto, Japan which has made the following generalizations about the salient traits of community approaches to flood management in GBM region:

- The status of flood forecasting and warning as well as information dissemination is inadequate.
- The communities depend to a great extent on traditional knowledge and experience for flood preparedness, supplemented by radio broadcasts.
- Assistance provided by agencies from outside the local community is often inadequate and inequitable. Self-help and assistance from neighbors and relatives are generally more forthcoming.
- Floods that destroy lives, crops, cattle and other assets are perceived as a hazard, and the people are conscious of the real need to adopt measures for vulnerability reduction.
- Among various coping strategies/practices (like evacuation, flood proofing, storage of food and livestock), community participation and mobilization are important, although extra-community assistance in relief and recovery is required.
- The communities expect such measures from the government and NGOs as the implementation of certain structural flood protection works, equitable and transparent (corruption free) distribution of post-flood relief materials, loans and grants, and support for the rapid restoration of the local infrastructure.
- The communities demonstrate strong confidence and potentials for self-help in flood management at the local level, though fund scarcity remains a serious constraint impeding their success.

Phase II Study

The present phase II of the study project aims to gather additional knowledge about the flood affected communities and undertake appropriate activities to strengthen self-help capacity of communities for improved integrated flood

management. The following pertinent activities are envisaged:

- Strengthen people's ability to understand flood warning messages and use them in combination with their own assessments through traditional methods.
- Undertake programme to enhance awareness, preparedness, and coping strategies of flood affected people.
- Provide assistance to improve the flood responses undertaken by the local people.
- Prepare a manual using guidelines provided by the national flood response strategies that are available in each country and knowledge generated through local surveys and consultations.
- Identify specific non-structural measures, beyond the ability of the local community to address, which have to be provided by the government and NGOs/CBOs in each location to help reduce flood vulnerability.
- Facilitate confidence building and dialogue amongst professionals, individuals and institutions dealing with the issues involved in flood management.
- Identify effective modalities of managing floods through effective regional co-operation as well as specific activities to accelerate such co-operation.

Two physical outputs are expected out of this study—the first is a manual on community approach to flood management and the second is establishment of some organized communities aware of improved integrated flood management and ready to make use of the manual.

1.3 Approach and Methodology

This report is the outcome of the Phase II study. This study has been carried out adopting the following approach and methodology.

- A study team was formed comprising a coordinator, a team leader, two engineers and two sociologists. The team discussed the scope of the study and worked out the general framework of the report to be produced. The team further discussed the issues that are needed to be addressed on the community approach of flood management, especially in the context of Nepal. Based on the report of Phase I study, other information and reports available on the web and in various agencies within Nepal, the team prepared a list of questions that would be utilized to get the relevant communities' perception on flood management and their existing social and physical systems and the way they respond to the floods. The team identified the subjects to be incorporated in the manual and prepared the table of contents of the manual.

- The team prepared a sample constitution for the Community Flood Management Committee (CFMC) in Nepali.
- The study team visited the study area in July 2003. There was flood in both the locations and the team had a good opportunity to observe it. Interactions were carried out with the flood victims, villagers, officials from local government agencies and relief workers from NGOs and INGOs. The interaction was focused on getting greater insight into the flood and related management issues in the area together with getting feedback for the essential elements to be incorporated in the manual.
- The team distributed the sample constitution for CFMC to the key persons in the communities to get the feedback.
- Field reports were written after the field visits which are presented in Annex I and II of this report.
- Manual on Community Approach to Flood Management has been prepared. While preparing the manual, local cultural and social setting, economic conditions and existing rules and regulations are duly taken into consideration. Section 2 onwards of this report is the manual.
- The study team presented the draft manual to a group of engineers in a talk program organized jointly by Society of Irrigation Engineers (SIREN), Nepal and Roorkee University Alumni Association (RUAA), Nepal Section and feedback was received. There were about 50 persons participating in the program.
- The coordinator and the team leader of the study presented a paper on the study to the "National Seminar on Water Induced Disaster Management" conducted jointly by the Department of Water Induced Disaster Prevention and JICA on 11-13 March 2004.
- Similarly, the paper was also presented to the seminar on "Disaster Management in Nepal" conducted by Nepal Engineers' Association on 11-12 April 2004 and feedback from the professionals was obtained.
- The manual, originally written in English, was translated into the Nepali language. The team visited Saptari study area from 28 February to 6 March 2004 and Rautahat study area from 23 February to 1 March 2004. The purpose of this visit was to disseminate the draft manual in Nepali to the community and stakeholders. Interaction programs at two levels, one at the community and the other at district level stakeholders, were conducted. The response of the community and the stakeholders was very encouraging as indicated by their overwhelming presence and participation in the programs. Major points of discussions were noted and are presented in this report as Annex VI. Video records of these interactions have also been prepared and kept on record for further reference.

1.4 The Study Area

This report including the manual has been prepared on the basis of feedback from interactions with the communities residing in two flood-prone areas located in Saptari and Rauthahat districts of Nepal. These areas are the same ones chosen in the first phase of the study (Refer Annex I and II).

In order to get more focused insight on flood related issues outlined by the scope of Phase II, two communities in each of the study areas were chosen for detailed interaction. These are the most vulnerable and affected communities and are most likely to get organized to adopt community approach to flood management. In Saptari District, one is from Tilathi and the other from Launiya VDC. Similarly in Rautahat District, one community is from Brahmapuri and the other is from Banjaraha VDC.

2 CLASSIFICATION OF FLOODS AND FLOOD PRONE AREAS

2.1 Types of Floods

Flash Floods: These are events with very little time lapse between the start of the flood and peak discharge. They are often associated with short intervals between storm occurrences and arrival of the flood wave. Floods of this type are particularly dangerous because of the suddenness and speed with which they occur. Flash floods are more common with isolated and localized intense rainfall originating from thunderstorms. Debris torrents are generally created in the hills from such flash floods. Rivers originating from the Siwalik range of Nepal are characterized by a sharp rise followed by a rapid recession often causing high flow velocities and damaging crops and properties.

Monsoon Floods: Monsoon is a rainfall phenomenon typical to this region which is characterized by intense rain during four months of June to September accounting for about 80 percent of the annual rainfall. This widespread and intense monsoonal rain causes flood and associated damages. Not all the inundation of land or damage to physical property, however, are from this hydrological phenomenon alone. Often other factors operate either to exacerbate an already occurring flood problem or to create entirely a separate flood problem. These factors are associated most often with the promotion of hydraulic surcharge in water levels. They include the presence of natural or manmade obstructions in the flood path such as bridge piers, floating debris, weirs, barrages and embankments constricting the flow path.

Monsoon floods from the major rivers generally rise slowly in the southern Terai plains and the period of rise and fall may extend up to 12 to 24 hours or more. Inundation of large areas due to floods overflowing the river banks causes extensive damage. The flood water erodes the banks causing permanent damage to the adjacent agricultural land.

Local Floods: High localized rainfall of long duration in the monsoon season often generates water volume in excess of local drainage capacity causing localized flood. The drainage congestion resulting from man made infrastructures such as roads, embankments and bridges often exacerbate the situation. This type of flood is common in the southern Terai part, inner Terai and in the valleys.

Glacier Lake Outburst Flood: Glacier lakes are common in the Northern Himalayan part of the country. The Mahalali River Basin within the territory of Nepal consists of 16 lakes, the Karnali River Basin consists of 907 lakes, the Gandaki River Basin consists of 338 lakes and the Koshi River Basin contains 1054 lakes. Altogether 2315 glacial lakes are identified in Nepal. Areas like the Upper Barun, Lower Barun, Chamlangtsho, Tsho Rolpa, Sabou, Dudh Kunda, Majang, Inja, Thulagi have potentially dangerous glacier lakes. These lakes contain huge volumes of water and remain in an unstable condition. As a result, they may burst at any time and a natural catastrophe may cause great loss of life and physical property. About 14 such glacier lake outburst floods (GLOF) have already been experienced from 1935 to 1991 in Nepal.

2.2 Classification of Floods and Flood Prone Areas

Nepal experiences major floods during the monsoon season (July to September) caused by incessant heavy rainfall. High monsoon precipitation almost in all the catchments within a short span of time resulting in large runoff from different catchments and consequent high water levels in the rivers, causes widespread inundation and river bank cutting in the Terai plains, and landslides and siltation in the hilly area. Accordingly, the flood prone areas of Nepal can be classified as:

i) Erosion Prone Areas
ii) Sedimentation Prone Areas
iii) Inundation Prone Areas

2.2.1 Erosion Prone Area

A considerable area of land is flooded during the monsoon causing heavy damage to cultivated land, houses, roads and other physical properties due to bank erosion and river toe cutting. The top soil suitable for fertile agriculture is washed away and the land is converted into sandy river beds. The land is lost almost forever as reclaiming it requires a lot of time and effort which is often beyond the capacity of the land holders. This type of area lies mostly along the banks of the river.

Managing the flood in such an area is mostly limited to adopting structural measures to protect the banks from erosion and maintaining the infrastructure.

2.2.2 Sedimentation Prone Area

Almost all the rivers originating from the hills and mountains of Nepal enter into

the Terai plain in the south. Most of the rivers have gradient high enough to carry with them sediment bed load in the hill region. As the gradient becomes flatter in the Terai, they deposit their bed load causing a considerable rise in the bed level. The bed rise triggers change of course and widening of the river every year. This phenomenon is more severe in case of the rivers originating from the Churiya range, which carry considerable flood discharge during monsoon and are almost dry during other months of the year. Every year, sedimentation occurs on large areas of cultivated land converting them into sandy areas. The top agricultural soil is washed away in some cases and replaced by coarse sediment and in some other cases sediment is deposited on top of the agricultural soil.

Similarly, floods overflowing the banks of the rivers deposit coarse sand in the adjoining land damaging standing crops and converting the land to infertile land mass. Reclaiming this land requires removal of the deposit which is costly and time consuming.

Growing crops immediately after flood recession is normally not possible in such an area.

Managing the flood in such an area is mostly limited to adopting structural measures to stop the flood entering into the area and maintaining the infrastructure.

2.2.3 Inundation Prone Area

When flood water level exceeds the natural bank level of river, floodwater spills over the banks. Sedimentation occurs in the immediate vicinity of the river banks which is called sedimentation prone area. After sedimentation prone area, flood water continues spreading over the adjacent areas and submerges agricultural land, villages and towns on its way. The flood water carries only fine sediments which gets deposited over the area as the flood advances. This deposit contains crop nutrients and thus helps increase the crop yield.

Drainage congestion due to settlements and man made infrastructure, such as road and embankments, change the pattern, depth and duration of drainage of the inundating water. Growing crops immediately after flood recession is possible in such an area.

There are lots of possibilities and scope of flood management by the community in this area.

Inundation area can further be classified:

According to frequency of flood

Occurrence of flood every year;
Once in five years;
Once in ten years;
Once in 25 years.

According to depth of flooding

(For the convenience of the local people the depth of inundation is kept in multiple of 1 foot= 30cm)

Severe: Having depth of more than 60 cm

Moderate: Having depth between 60 to 30 cm

Normal: Having flood depth less than 30 cm

According to duration of standing floodwater

Severe: Floodwater standing more than 30 hrs

Moderate: Water standing between 12 hours to 30hours

Normal: Water standing for less than 12 hours

Depending upon the type and extent of information available and the coping methods with which a community feels easier, any one of the classifications can be adopted for risk assessment.

3 PRE-FLOOD PREPAREDNESS

In areas where occurrence of flood is a regular phenomenon, preparedness is considered as one of the main activities to save life and property of the people. Preparedness includes three Ps—plans, preparations and provisions made in advance for carrying out activities when the area is being hit by the flood. The primary objective is to allow the passage of flood with minimum damage to lives and properties of the community.

We should always keep in our mind that the flood water is beneficial also. It brings humus sediment and deposits on the farm land. It makes the soil rich in fertilizers and nutrients and crop production after the flood is high. Unless the flood causes damages to properties and loss of lives, it will be beneficial to allow the flood water to come. Thus, preparing for the flood rather than driving it away in many instances will be better for rural farm areas.

3.1 Why Community Organization

In a country like Nepal where mostly poor people live in the flood affected area, vulnerability to flood is high because of inadequate knowledge in the field of flood management. Most of the activities during the flood are carried out on an individual basis which constraints the scope of minimizing loss of lives and damage to properties. If these activities are carried in an organized manner involving the community at large, risk and vulnerability due to flood can be minimized to a substantial level.

It is quite recently in Nepal that the role of communities in flood related activities has been recognized. The river training works that the government and local bodies

carry out are often form users' groups involving the beneficiaries. The users' groups are involved only during construction. But organized communities for nonstructural measures are almost nonexistent although some efforts are now being made such as this by NGOs.

The need of organized effort is clearly felt during the time of flood. It is observed that most of the coping practices are done on individual basis. People prepare themselves for flood to the best of their individual capacities. Therefore the well-to-do families in the community are better prepared for the flood than the poor ones who are poorly prepared and often face various difficulties in getting outside assistance. Furthermore, it is difficult to arrive individually at a collective decision for the solution of the flood related problems. If a coping strategy on communal basis is adopted, the coping mechanism will be more effective and efficient.

In general, outside assistance reaches the community only in the late post-flood situation and that too is not sufficient, and proper distribution of relief supplies is always in question in the affected community. It is therefore the community itself that has to prepare itself and act till such time as outside help reaches it. It is again at this time, during the flood and immediately after, that the loss of lives and damages to properties reach the maximum and the community's action can significantly reduce the damages. Institutions are often criticized for partiality and for not reaching out to the needful community. The community can help in identifying the needy and facilitate the institutions reaching them.

Having described all the benefits of community involvement in flood management; how to involve community in it? It must have a representing organization. This organization will speak for the community. We already have experience of having such organizations in irrigation, drinking water, forest and many other development activities. If we are affected by the flood, then we are in need of one more organization. We can give different names to the organization. We have suggested the name "Community Flood Management Committee", in short CFMC. Nepal's Water Resources Act allows registration of such a committee and once registered attains legal status.

Now we can summarize the benefits of having CFMC as follows:

- Better preparation for facing the flood event,
- Immediate response during flood,
- Better coordinated effort to fight flood,
- Ease in bringing external support,
- Making community's voice heard,
- Channelise government support,
- Establishment of legal body and registration.

3.2 Formation of CFMC

Community institutions are important to plan, implement and monitor different activities relating to flood disaster and minimize the impacts of flood on the community. Community development will start with the Community Mobilization component, to strengthen the organizational bases for local flood mitigation initiatives. Unlike the past practices in which people are hastily organized primarily for the construction of physical facilities, more focus should be placed on awareness-raising and capacity building of the communities themselves.

Prior to the formation of the CFMC, required information such as importance of community institutions, role and responsibilities of CFMC, formation process and involvement of the community, women, affected groups etc. should be disseminated to the concerned VDC and its representatives, local leaders, teachers and the community.

It is necessary to organize settlementwise meetings and dialogue with communities regarding the formation of the Committee.

Who will do all these things? Some catalyst organization is needed at this point. Depending upon specific situation, there can be a number of institution initiating this process. NGOs, the concerned VDC, Red Cross etc. can play this role. Furthermore, there are some Government organizations working in disaster management such as the local division of DWIDP, local office of the Chief District Officer, Local Police office, Local Military office which can initiate this process. The elite should seek the possibility of involving themselves in one or more of these organizations.

Again depending upon the specific situation of the affected community, there can be a number of ways of forming the CFMC. Interaction with the communities during the field study phase of preparing this manual has indicated two such options as follows:

a. Village Development Committee (VDC) should establish CFMC representing the affected communities, women and ethnic groups with the chairmanship of local Ward chairman of the affected area.

b. Affected communities should establish CFMC with the chairmanship of local elected community leader and with the representation of VDC and Ward representatives including women, ethnic groups, teachers, local leaders etc.

Initially, an Ad-hoc Committee of 5 to 7 members should be formed before the formation of the main committee. The AC will be involved in discussions and interactions among the affected communities, local leaders, teachers, women and different ethnic groups. For such discussions, the AC should seek the help of the catalytic organization. The main objective of this committee will be to make draft constitution of the committee and facilitate the formation of CFMC.

Once the draft constitution is prepared, the AC should call for a mass meeting for discussing on the draft. The draft constitution should be amended to reflect the suggestions received in the mass meeting.

The CFMC should have 9 to 13 members elected from the general assembly according to the constitution of the community. This CFMC will include women, ethnic groups, local leaders, teachers etc. There should be an advisory committee of which concerning district level government organizations, concerned members of VDCs, school teachers, local health workers, agriculture extension workers, local NGOs and CBOs will be the members.

According to the specific needs of the community CFMC should also form various sub-committees. Some of the possible sub-committees are as follows:

a) Forecasting and Warning Sub-Committee
b) Rescue, Evacuation and Search Sub-Committee
c) Relief Materials Distribution Sub-Committee
d) Rehabilitation and Reconstruction Sub-Committee
e) Health and Hygiene Sub-Committee

The CFMC with draft constitution will apply for registration to the office of the Chief District Officer. The format for application and the format of draft constitution and the list of necessary papers are provided in Annex –III.

3.3 Information Dissemination and Training

Once the CFMC is in place, it should focus on raising awareness and increasing the capacity of the community to be prepared for the flood through training. CFMC should discuss the need of such training with the help of the Advisory Committee. There can be several types of training that the community may need. Following are the sample list of such training:

Training for preparedness

a) Developing flood warning and forecasting system
b) Construction method of flood proof housing
c) Flood resistant crops and their cultivation
d) Office management and record keeping for CFMC and Sub-committees
e) Bioengineering methods of river training

Training for flood response activities

a) Evacuation, rescue, search methods such as boating, swimming
b) Management and distribution of relief materials
c) Maintaining health and hygiene during flood situation
d) Food storage and handling during flood

Training on post flood rehabilitation and reconstruction activities

Training on income generation activities such as nursery establishment, apiculture, gabion wire netting, local handicrafts, sewing/cutting and weaving training for women, candle manufacture at local level, Dhaki: District DOSCI is the main concerned agency.

Information dissemination is the most powerful tool for public awareness. Information makes people aware about the potential danger from the flood and the training makes the community prepared to cope with incoming flood hazards. CFMC should inform the people of its activities, make them aware of the likely flood situation and possible measures. Information dissemination to the community can be done in several ways some of which are given below:

- Regular talk program in the community
- Distribution of pamphlets, posters and other materials
- Raising awareness through mass media (radio bulletins, television, newspapers etc.) in local languages
- Preparation of documentary films; slides for public shows
- Inclusion of Flood Management Manual in secondary school syllabus
- Poetry, debate and essay competition in the schools on flood
- District level, regional level workshops and national level conference (every year) involving community organizations

The CFMC should make a list of possible institutions that can provide assistance in training and information dissemination. The committee should seek the help of such institutions. The list of possible institutions should be listed in Annex IV. CFMC should note that such training is required at different times and for different groups of persons.

3.4 Assessment of Flood Hazards

In a community the vulnerability to flood may be different at different locations. The type of damage for those living along the river bank is different from those away from it. Similarly different types of houses in the same area may have different degrees of vulnerability according to the mode of construction. CFMC should first prepare a map identifying the area in accordance with the type of flood prone area. On the map, features like public land, public utilities, high land, roads etc. should be delineated. If possible, the map should also delineate areas having different depths of water or duration of standing water.

While preparing the map, CFMC should interact with the people and also seek help of organizations working in disaster management. The local office of DWIDP and many NGOs and social organizations can also provide technical support for preparing such maps.

Preparation of this map would facilitate assessing where the flood is likely to affect the most and accordingly prepare plans to minimize the damages. The map prepared so far would provide list of houses that are likely to be submerged during flood event and the area of crop that is likely to be affected. If at all preparing the map is not possible, the CFMC can prepare a list with its own experiences of previous flood events and interaction with the people.

With the list of houses prepared, CFMC should now try to categorize these houses in terms of their vulnerability to the flood. Use of following nomenclature is recommended.

Type and condition of houses

I. On the basis of construction:

Ia. Permanent type (R.C.C. type)

Ib. Temporary type hovels (local material based, generally single storied)

II. On the basis of stories:

IIa. Single storied (all temporary huts made with local material)

IIb. Multi-storied

III. On the basis of location:

IIIa. Nearby riverbank.

IIIb. Depressed area (constructed on lowland in comparison with average peripheral topography)

On the basis of this categorization, the rescue plans can be prepared as illustrated in the following section.

3.5 Making Provisions for Emergency Relief

Occurrence of flood is common every year, which may affect partly or fully the local inhabitants of the community. Hence, some of the necessary relief materials should be collected and stockpiled for the emergency period. The CFMC should identify need of such relief material and quantify them. A variety of relief materials may be required as shown below:

- Provision of safe drinking water—installation of tube well or other pipe water arrangement
- Materials for making temporary latrines
- First Aid medicines especially for water borne diseases; treatment with like paracetamol, Jevanjal. Chlorine tablets, Oral re-hydration powder etc.
- Fast food items like satoo, beaten rice, noodles, bread, biscuits, beans etc.

- Cooking utensils, stoves etc.
- Provision of energy for lighting and cooking—lantern, torches, dry wood, LPG gas cylinders
- Provisions of clothes, blankets, tents, plastic sheets etc.

It should also be borne in mind that not all the members of the community would need assistance from the resources of the CFMC. Therefore, interaction with the people is needed to identify those who can make their own arrangement and those who cannot do so and provisions should be made considering the needs of those who cannot make their own arrangement.

For those who can make their own arrangement, CFMC should provide adequate training, especially to the women, on how to keep such provisions.

3.6 Making Temporary Refuge

There may be houses in the community which are liable to flooding or damage during flood. Temporary refuge may be necessary for the households and cattle residing in such houses. Classification of houses and the list prepared described in previous section will help identify such house and households that need temporary refuge. It should also be borne in mind that many households needing evacuation take refuge in the neighboring houses which are suitable for such purpose. Considering the needy people together with those individuals who can provide refuge to their neighbors, the size of temporary refuge can be determined.

Once the size of temporary refuge is determined, one or several locations suitable for such refuge should be selected. Ideally such location should be on higher elevations well above the flood levels and should be easily accessible to the evacuating people. Public land and utilities are usually suitable for such purpose. CFMC should explore the possibility of making use of land occupied by public schools, health post, VDC buildings, temples, churches, *Hatia*, community forest, embankments of river/canals, roads, private buildings which could provide temporary refuge. If some of the locations selected are lying in the low land area, CFMC should consider raising the land. On the other hand, if some construction is in the offing, CFMC should ensure that the public buildings to be constructed are suitable for taking refuge during flood. CFMC, with wide public consensus, can also establish housing norms that require new houses to be built on safe locations.

Once the temporary refuge is located, CFMC should make arrangement for providing emergency relief to these locations. The relief materials can be stored in such refuges.

3.7 Making Provisions for Flood Fighting

Often during the flood, various measures such as filling the breaches of the embankment, deflecting flow from one to other direction, isolating water wells,

provision stores, health centers and other structures from being flooded may become essential. Adequate provision of required materials for such activities should be made and stored at convenient places.

Based primarily on the experience of the previous flood, CMFC should first assess the need of such materials. CFMC should procure such material from its own resource or from external support or both. A wide range of such materials should be considered. Sand bags, stones, gabion wires, bamboo poles, straw and bush, plastic sheets, nylon ropes, earth cutting tools, grass cutting tools, nails, hammer, lighting equipment, raincoats are some common material for such provisions. Consideration should also be given to sell off the perishable items in time and replenish them before monsoon.

3.8 Generating Financial Resources

There can be several ways to generate the resource internally from within the community. Some of the possible ones are:

- The community can own forest and grass belt and sell products
- Nursery products in case the community runs nurseries
- Group savings, donations etc.
- VDC can give a part of the money it receives as royalties from the use of natural resources in the area
- Local industries can provide support
- Charity shows to raise money

Most of the time when a flood event has to be faced, resources available from the community alone are not sufficient and therefore CFMC should seek support from external institutions. Quite often, it is the capacity of CFMC that convinces such institutions for support. At this point, it is essential that CFMC make convincing and clear proposal for the support requested. CFMC should make a trust fund to collect the money available. The money should be deposited in a bank account which should be operated by two members of the committee.

CFMC should make an inventory of GOs, NGOs, CBOs and other social organizations from which support can be requested with their full address and the contact persons. CFMC should then communicate with these agencies with its proposal. A support from a single organization may not be effective and may need supplementary support and therefore an individual organization may shy off from supporting CFMC proposal. In such a situation, organizing meeting of a number of organizations is very effective in drawing various supports from them for executing the proposal. CFMC should take lead in organizing such meeting.

3.9 Adjusting Land Uses

Flood is destructive in nature. But the flood in inundation prone area deposit fertile

loam rich in plant nutrients. Yields of paddy and other crops increase in such soils. Suitable adjustments to the crops can minimize the risk of crop damage. Adopting suitable crop resistant to water logging for the duration of the flood, and also suitable crop on sedimentation zone after flood can reduce damage due to flood. CFMC should play leading role in adopting various techniques for making best use of the opportunities available. For this, CFMC can seek support from various external agencies for information and training. Another approach could be exchange of experiences through visit of other flood prone areas.

To minimize loss to properties, houses and settlements should be located in higher places. The houses should be elevated well above the flood level. The CFMC should advise the community people to adopt such an approach.

3.10 Forecasting and Warning

Forecasting of flood and accordingly issuing warning to the people in the community can save many lives and properties. In many countries, the government issues flood warning and the people respond accordingly. However, Nepal does not have such warning system in place. The time between the rainfall and the occurrence of flood in an area is often very short. Having an effective warning system is difficult and needs a lot of resources which Nepal has not been able to afford so far. Therefore, it is important that individual communities should develop their own warning system based on available information and resources available. Following are some of the examples of local methods of flood forecasting.

- Radio and TV broadcasts in Nepal provide weather data such as rainfall and temperature at several places in the country usually at the end of each of the news bulletins. TV broadcasts from India received in Nepal also broadcast weather information with satellite images. All these information may be very useful in forecasting floods. Therefore, during monsoon season, we should listen to or watch these news broadcasts regularly.
- Assigning some persons to observe hydrological events in the catchment and water levels. Observing clouds in the upper catchments, changes in the water flow, e.g., rising levels of water surface, river water mixed with mud, leaves floating on the water, increasing number of fishes in the river may provide enough clue for issuing flood warning.
- Unusual sound/smell of rivers (e.g., rumbling sounds coming from the river, muddy smell of the stream) may also be read as nature's warming.
- Continued rainfall in the surrounding areas or in the upper catchments of the stream, monitoring such rainfall through public radio transmission often provide clues for likely flood event. (In the case of Rauthahat, the elite of the community come to know about Monsoon reports from Radio and TV during rainy season. They have experienced that when rainfall at

Kathmandu exceeds 60 mm in rainy season. it is as good as a clue for flood warming.

Flood Forecasting and Warning sub-committee of CFMC should be vigilant 24 hours during the four months of monsoon season. The sub-committee should keep record of indicators observed, the corresponding warning issued and the actual effect that took place. On the basis of such exercise following some events and continued refinement of the forecasting and warning methods, a sound workable system can be eventually established.

Warning follows forecasting. According to the degree of severity of the flood forecast warning should be in terns of different levels applicable to different parts of the habitat of the community. Each level of warning should again be tied up to some action that a resident in a particular area should take. The likely actions are—stay alert, keep your belongings, valuables and relief at higher elevations, prepare for evacuation, evacuate and go to safe refuge.

CFMC should make proper arrangement to disseminate the forecast and corresponding warning to the people. The whole area can be divided into convenient sectors of which one or two members of the Flood forecasting and Warning sub-committee can be assigned for disseminating information. There can be a number of mediums adopted for issuing the warning as follows:

- By showing flags (raising flags of different colors—yellow to indicate readiness to face floods, red to indicate flood is coming, people may evacuate, green to indicate that danger is over) on bamboo poles or hanging flags over tall public buildings at open space which can be seen from all sides of the village)
- From people to people by word of mouth
- By playing drums and announcement
- By using loud speaker
- By using local FM radio if available

By the time warning is issued, CFMC should also communicate the situation to the concerned agencies outside the community for possible help and rescue operation. CFMC should also respond to the warning by keeping all its sub-committee members alert and within reach to receive instruction and take action.

3.11 Preparing Evacuation Plan

In areas where standing water depth due to flood is high and it may cause damage to the houses, and houses are likely to be washed away by flood current or by erosion, the area should be evacuated timely to minimize loss of lives and valuable properties. CFMC should prepare evacuation plan after discussion with the people. The evacuation activities should be in conformity with the level of warning issued.

The Evacuation and Rescue sub-committee should assist the people to take a safe escape route and go for the temporary refuge. The whole area can be divided into convenient sectors; one or two member of the sub-committee should take responsibility of each sector. There should be information such as who is going to take refuge in neighbor's house, who is going to the temporary refuge, which temporary refuge is allocated for which area. Such information should be readily available to the members of Evacuation and Rescue sub-committee. This information should be disseminated to all the people in the community by organizing mass meetings before the onset of the monsoon.

The CFMC should delineate the escape route. The CFMS should also identify minor works needed to make the routes safer and execute the works in cooperation with the community and external support. The escape route can be a road or a flooded drainage channel.

The evacuation plan should include provision of appropriate equipment and tools needed for evacuation. According to specific situation, this may include boats, ropes, empty drums for floating, rubber tubes, stretchers etc. CFMC should assess the need of such provisions. The CFMC can also make it mandatory for each individual household to keep some of the provisions. The remaining provisions should be maintained by CFMC at locations easily accessible to the Evacuation and Rescue sub-committee members.

The members of the Evacuation and Rescue sub-committee should be provided with basic training of evacuation and rescue operation and emergency medical care.

3.12 Ensuring Communication Links

During the flood, there is no electricity supply and telephone lines are disrupted. The communication systems often fail which disconnects the community from the outside world. Maintaining fool proof communication link to the outside world is essential to inform their situation and call for necessary rescue and relief support. There can be various options that may be utilized:

The local Police have wireless communication. CFMC should ensure that the equipment are available during flood emergency for their use and they have enough of energy (battery, fuel for running generator) to run the equipment at least for 3 or 4 days.

There can be local PCO office. CFMC should make sure that the office is located at higher elevation and has enough of power to run the equipment.

The Community can procure a mobile phone set for use only during the flood.

CFMC should prepare some residents in the area to carry messages out of the area. Basic training on swimming and operating boats may be needed for such people. Depending upon the reliability of each of the options, the CFMC should maintain at least two systems for communication.

3.13 River Training Works

River training works should be done for various purposes such as protecting land and settlement adjacent to the river bank against erosion, diverting the flood water away from the bank, checking the river from spilling flood water into the village. Several types of river training are in use. Revetments are provided to protect the bank from erosion. Material like loose stones, bricks, stones filled in gabions, sand filled in bags are used for such works. Similarly small spurs, usually called studs, are provided to keep the flood water away from the bank. Long spurs are provided to direct the course of the river to a direction away from the bank. Loose stones, stones filled in gabion box, bricks, sand bags, bamboo piles, bamboo mats are used to make the spurs. Similarly embankments are constructed along the river bank to raise the level and stop the water spilling the bank and entering the villages. The embankments are made of earth. These are sometimes protected with revetments and spurs also.

The community, may need to do various river training works mentioned above. In Nepal, there are various division or sub-division offices of the Department of Water Induced Disaster Prevention, which provide technical support for such works. The community through CFMC should ask for such support from the respective offices in their area. These offices often provide material support such as gabion boxes, nylon boxes, sand bags etc for river training. The CFMC should check and ask for such support from these offices. It should then mobilize the community to do rest of the work such as collecting stones, filling them in the gabion, earthworks etc. There are many other organizations that may provide technical as well as financial support to carry out these works. CFMC should be well informed of these possibilities and should make every effort to seek such support. But we should always keep in our mind that **SELF-HELP IS THE BEST HELP**.

4 DURING FLOOD RESPONSES

This section deals with the situation when the flood has actually arrived and the community has started responding to the situation. It is in fact testing the preparedness of the community. At this time CFMC members and all other sub-committees should remain active in their respective areas.

4.1 Role of CFMC During Flood

CFMC and the sub-committee have the following role in this situation:

- CFMC should monitor activities of all its subcommittees.
- CFMC should maintain communication link to the outside world and inform on regular basis about the flood situation in the area. It should also call for necessary help for rescue and relief operation to be conducted.
- The Rescue, Evacuation and Search Sub-committee should carry out its

operation in such a way that nobody is left unattended. Priority should be given to any call for rescue. For evacuation priority should be given to the disabled, old persons, women and children. The sub-committee should remain vigilant for a call for search of a mission person and act immediately.

- The Health and Hygiene Subcommittee should monitor health conditions of the people in the community. The first priority should be given to potable drinking water. The sub-committee should avail of means and chemicals to purify the water. The sub-committee should also monitor the sanitation situation. It should also monitor incidence of water related deceases and provide available medical treatment to the patients.
- The Relief Material Distribution Subcommittee should start distributing relief material to the people in need. A brief meeting with the CFMC can be held to finalize mode of distributing such materials depending upon the availability of materials and situation obtaining.
- CFMC should coordinate rescue and relief operation with external assisting institutions.
- Rehabilitation and Reconstruction Subcommittee should concentrate on flood fighting activities with the help of the people and the material at hand.
- CFMC should monitor the effectiveness of the preparedness plan and keep record of important activities conducted on day to day basis.
- CFMC should also keep record of expenditure and use of material on day to day basis.
- CFMC should assist security institutions in maintaining law and order in the area.

5 POST-FLOOD REHABILITATION AND MAINTENANCE

5.1 Prioritizing Rehabilitation Activities

When flood starts receding, the immediate need is to bring normalcy in the community as early as possible through rehabilitation and maintenance of the damaged infrastructures. Life of the people at this stage is still disrupted and they seek help from their own community and from outside. At present rehabilitation operation in Nepal is spread over a large number of sectoral line agencies and institutions and that too is available late after the occurrence of flood. The government line agencies such as DWIDP, Department of Roads, Nepal Electricity Authority, Nepal Telecommunication Authority do the rehabilitation of the damaged infrastructure under their respective jurisdictions. Hence a coordinated approach to delivering necessary help is essential.

The CFMC with the help of proper supporting agencies should focus its activities in order of the following priority.

- Restoration of health care and maintenance of hygiene and sanitation
- Helping people in need of food
- Restoration of communication and coordinating external support
- Prepare restoration plan
- Start immediate repair and maintenance that the community can do by itself
- Seek and coordinate external help for restoration of houses and infrastructures

Furthermore, rehabilitation and maintenance activities should be carried out in three stages- Stage I Immediate, Stage II Intermediate and Stage III after Normalcy. CFMC should identify the activities to be executed in each of these phases.

5.2 Immediate Rehabilitation Activities

The immediate relief activities that are needed in the community in this stage are as follows:

- Supply of potable water and monitoring of its availability
- Monitoring hygiene and sanitation situation and maintenance.
- Mobilizing health personnel for the needy people, children, pregnant women and the elderly
- Ensuring availability of basic food items in the market at reasonable prices
- Informing relief agencies of their need and establishing communication with them
- Fair distribution of the relief materials
- Helping establish law and order
- Mobilizing people to clear the drainages for fast drain out of flood water

5.3 Intermediate Rehabilitation Activities

When flood recedes and normalcy starts returning, then the CFMC should focus on the following activities:

- Assess damage caused by the flood through sub-committee. Form-2 (Annex-V)
- Prepare immediate restoration plan and identify who is doing what (persons, committee and external agencies)
- Start executing immediate restoration plan

- Seek external help by communicating with related agencies
- Coordinate external restoration activities
- Facilitate people in getting reconstruction materials such as wood, roofing material etc.
- Educate people in reviving the damaged crops and facilitate them in getting seeds, fertilizers and external support
- Facilitate needy people in getting work for their day to day maintenance; activities such as food for work can be brought to the area where poorer section of the community can work to earn
- Facilitate reconstruction by ensuring that the rebuilt constructions, houses, bridges are now safe against the next flood

5.4 Rehabilitation Activities when Normalcy Returns

The following activities should be done during this stage:

- Review the effectiveness of the preparedness measures and decide what the deficiencies are and what improvements are necessary in the preparedness for the next flood
- A restoration plan should be prepared as per the revisions made above
- Facilitate starting income generating activities for the poor
- Facilitate growing new crops according to the situation and needs
- Start those activities which can be done by the communities and seek help from external agencies which cannot be done by the community
- Coordinate the work being done by different helping agencies
- Conduct next cycle of activities of preparedness

6 MANAGING INFORMATION FOR FUTURE REFERENCES

6.1 Keeping an Account of the Events

Flood relief activities of the past, in most cases are criticized for mismanagement. Relief institutions come to help people only after occurrence of flood and damage to the community. This situation can be better managed if information collected from different sources are communicated to different helping institutions in time. Structural measures are still in vogue to control flood in many communities. Many people of a community mostly demand for structural measures, which they think, are the best method of flood control. The structural measures are often unsustainable due to their inherent technical deficiencies. Non-structural measures of flood management described in the previous section, though sustainable, require much effort on educating people and proper management.

CFMC in coordination with different institutions should collect required information on preparedness, forecasting and warning, crop management, before, during and after the floods. The information on the damages caused by each flood is very important for reviewing preparedness plan.

CFMC should keep record of all the flood events and the associated damages caused, together with the activities conducted by the CFMC in response to the flood. The records should be in writing. It will be a good practice to send a copy of these records to the local office of DWIDP for safe-keeping.

6.2 Mapping Resources and Services Available at Local Level

Mapping of resources and services available at local level is necessary to cope with the disasters of flood. Mapping of resources such as cultivable land, forest, grazing land, and villages etc. should be made by CFMC with the help of different organizations. Similarly services available in a community such as schools, health posts, public/private ponds, nurseries etc. should be mapped and a detailed inventory of such services should be made. This resource and service map is instrumental to assess the risk and vulnerability involved in a community as well as for the mitigation planning.

The flood risk maps prepared should be updated annually after the end of each monsoon season. The list of organizations available locally for support and their address should be updated periodically.

6.3 Maintaining Transparency

CFMC should maintain transparency at all levels of its activities. CFMC should maintain records of all the expenditure incurred in any operation on daily basis. It should maintain the record of the use of material in stock. It should also maintain the records of money, relief material received from external agencies and their uses and expenditure. At the end of the monsoon season each year, CFMC should call a general meeting and make public all these records for comments. CFMC should also make public its activities periodically. Maintaining transparency would increase public acceptance of CFMC.

Annex-I

FIELD REPORT
ON
FLOOD MANAGEMENT IN SAPTARI, NEPAL

1 Introduction

The study was conducted by a group consisting of an engineer and a sociologist in the flood affected area of Launiya and Tilathi Village Development Committes(VDC) of the Saptari District to asses the ways and means for strengthening the self-help capacity of communities for improved flood management under the Integrated Water Resources Management framework. These VDCs are frequently affected by the flood from the Khando River during the monsoon period. The severity of flood is high in the Launiya and Tilathi VDCs. Other villages in the vicinity such as Bishahariya, Sakarpura and Malhaniya are also affected by the flood but to a lesser extent.

The community in the flood affected area consists of downtrodden people who have been affected by the flood several times a year and the vulnerability is increasing every year as the existing embankments are not maintained and the riverbed level is rising every year. This village is a proof in itself that structural measures alone cannot save a community from floods. Hence, non-structural measures will have a long-term positive effect in these communities to cope with the inevitable floods.

1.1 Location of the study area

Considering severity of the flood, Launiya and Tilathi villages have been selected as the study area. The study area lies in the Saptari District of Eastern Development Region. There are 114 VDCs and one municipality in Saptari district. Rajbiraj municipality is its headquarters. The two villages, Launiya and Tilathi, are located in southern part of the district with the gross area of about 700 and 550 ha of land, respectively. Both the locations are about 10 km away from the district headquarters. Bus service is available in Tilathi whereas Launiya is about 2 km away from the nearest roadhead, Birpur. The study area has been shown in Figure 2.

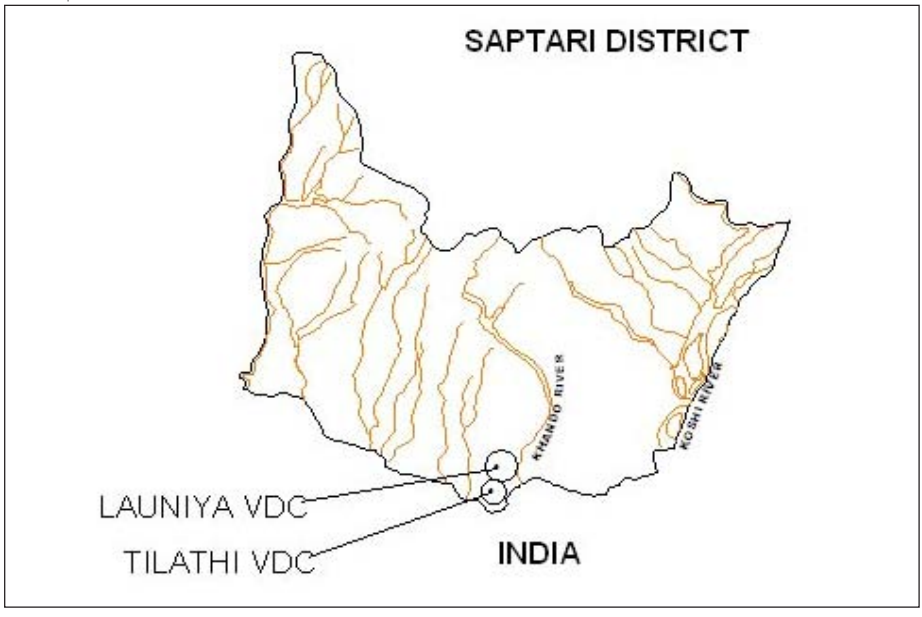


Figure 2: Focused Study Locations in Saptari District

1.2 Geographical characteristics of flood plain

1.2.1 Land and Climate

The land of the study areas is fertile cultivated Terai plains with clayey loams to sandy loam types of soil.

The study area has a sub-tropical climate with hot temperature in summer. The average minimum and maximum temperatures recorded are 19.6°C and 31.1°C respectively. Annual precipitation is about 1200-1300 mm.

1.2.2 Streams & Rivers

Major rivers in Saptari are Koshi, Khadag, Khando, Mahuli and Sundari. Koshi is located in eastern part of the district and is providing irrigation to the district. A barrage has been constructed across Koshi river. The river training works constructed along the river both upstream and downstream of the barrage provide protection to the area although some damages occur during high floods.

South Saptari is regarded as flood prone area due to a number of flashy rivers flowing through the area. Most of the rivers are seasonal and originate from Siwalik (Churiya hills). They carry large quantity of sediment from the steep hills and deposit it on the flat fertile land. Increased deforestation and encroachment of the forest land in the hills have increased erosion further aggravating this situation.

According to the District Soil Conservation Office, about seventy VDCs are affected moderately by flood and about 20 VDCs are highly affected. The study area lies on the banks of Khando River.

Khando River

The upper catchment of the Khando river falls in the Siwalik Hills and the lower in the Terai Plain. It meets Koshi river in India. The river is seasonal and is almost dry throughout the year except in the months of the rainy season. The catchment in the Siwalik hills is sparsely vegetated. The geological condition is fragile with loose pebbles and cobbles contributing to the high bed load. The catchment area of Khando is about 165 km^2 of which around 30% falls in the Siwalik range. The elevation varies from 65 m at the study area to 300 m at the Siwalik Hills. Maximum flood discharge is about 250 m^3/s (100 years return period). The rising of bed due to sediment deposition has caused widening of river channel and overflow into the adjacent land. Its width within the study area varies from 25 to 200 m. The river has changed its course over the years.

1.3 Demographic and socio- economic characteristics

1.3.1 Population

According to the national census 2001, population and the number of households of the study areas are provided in Table I-1.

Table I-1: Population and Household Numbers of PRA Locations

District	Location	Population	Total HHs
Saptari	Tilathi	3,079	709
	Launiya	2,960	630
	Total	**6,039**	**1,339**

1.3.2 Caste & Ethnicity

The study area is dominated by the terai caste/ethnic groups such as Yadhav, Tharu, Khatbe, Dhanuk, Shah, Telli, Rajpoot, Kayastha, Dom, Chamar, Newar, Brahmn / Chhetri (hill), Haluwai, Mushar etc.

1.3.3 Economy & Land use Pattern

Agriculture is the mainstay of the economy in the study area. About 79 percent people of the area depend on agriculture for their livelihood and the remaining on service, trading and others (Source: District Agriculture Office). The main crops

cultivated are paddy followed by wheat and potato. The predominant form of production is subsistence agriculture. Family is the basic unit of production. The average land holding size in Saptari district is 1.3 ha. Food production in the area is just enough to feed the area.

2. Floods, its types and intensity in the area

2.1 History of flood

The riverbank of the study area is prone to erosion every year. It is learnt from field inquiries and observation that the river has been eroding its banks at a rate of 0.5 m/annum on average. The floods of 1998 and 2002 have caused severe inundation. The community provided the following records of damage by the floods:

1983: Damaged land and houses in various VDCs including Sakarpura, Tilathi and Bisariya. Khando River changed its course. People of both Tilathi and Sakarapura VDC are in dispute over the route of Khando.

1993: About 100 ha of paddy land inundated, about 100 households shifted for two months and took refuge in the school and on the bank of fishponds. A large number of cattle in this area perished in the flood.

2000: Paddy crops were damaged in Tilathi and Bisariya and 20 to 30 houses inundated.

2001: Embankment (gabion boxes) constructed by DOI were damaged and one house was destroyed, 10 ha of paddy crop inundated.

2002: At Launiya about 25 ha of land silted up, 40 ha of transplanted paddy were submerged and hence replanted, two ponds completely and two partly damaged, 26 huts swept away, 60 houses partially damaged, 100 houses inundated, and Koshi canal No. 6 and its minors silted up and banks damaged in many places.

At Bisariya 25 houses inundated where water level rose to above 3 feet and 10 ha of crops silted up on the left bank of Khando.

At Tilathi 100 households shifted and took refuge in school compound for seven days; 100 ha inundated and three ponds destroyed.

2003: Ward nos. 1, 2, 3, 4, 5 and 7 of Launiya were severely affected by the flood, whereas other wards 6, 8 and 9 were also moderately affected. The river washed away the right embankment at ward no. 4 of Launiya. 26 houses were washed away, 100 houses were partially damaged and 3 fishponds were completely filled with sand. Similarly, about 30 ha of paddy land was filled with sediment. Straw of paddy stored to feed the cattle (from about 150 ha) was washed away and around 400 trees of Mango and Sisham were uprooted and taken away by the flood.

At Tilathi VDC, the floods washed about 15-20 huts away and about 150 houses were partially damaged by inundating water 3-4 feet deep. It was

observed that about 200 ha of paddy land was inundated. According to the community, the flood caused severe damage in ward nos.5, 3 and 7 of Tilathi. It was also observed that most of the local roads were damaged.

2.2 Types of flood

The main type of flood that causes damage in the study area is flash flood in the Khando River. This river carries a considerable discharge during monsoon and flooding occurs in the Launiya, Tilathi, Sakarpura and Malhaniya VDCs. The flood water carries sediment from the hills and deposits it in the lower reach. The river remains almost dry during other months.

2.3 Intensity of flood

The country slope of Launiya VDC is comparatively higher than that of Tilathi VDC. The overflowing floodwater enters first to the area in Launiya VDC and the effect of inundation remains only for about 3 to 4 hours. The high velocity of flood causes damage to standing crops and physical property. As the water reaches Tilathi VDC, it remains there for up to 7 days causing difficulty for the people in their daily work and to the cattle. The depth of floodwater in some residential areas of Tilathi VDC observed by the study team during their field visit was up to 3 to 4 feet, whereas the depth in other paddy fields was up to 4 to 6 feet.

2.4 Causes of flood problems in the area

According to the local people, flooding used to occur in Launiya, Tilathi and Bishahariya VDCs in the past but of a small magnitude. The floodwater from Khando river used to spill from its low banks and disperse in a larger area causing less damage in the community. However, the situation has changed now due to construction works which are not done in a planned manner. Embankments have been constructed recently on both banks in a bid to contain flood from overflowing and reclaim the eroded land. The embankments have not allowed enough waterway for the flood. At one location the river has been narrowed down to 40m only. The result is frequent breaching of the embankment with increased damages. One of such sections was breached during the monsoon of 2003 before the study team reached the field. The study team observed emergency reconstruction of this section during the field visit. The reconstruction was done with the help of District Administration Office (DAO) and Department of Water Induced Disaster Prevention (DWIDP). The rebuilt section was only about 1.5m wide and about 3m high. Gabion boxes filled with sand bags were piled up in a vertical section and bamboo piling was done on both sides (see photograph). This section was again washed away by the flood (see photograph) on 29th July 2003. Flood water entered from this location to the Launiya and Tilathi VDCs causing widespread damage in these two VDCs.

Another characteristic of Khando River is that it carries heavy amount of sediment which is deposited in the riverbed causing the riverbed to rise. There is an approximately 2 to 3 meter rise of river bed relative to the adjoining village ground level. This has further increased the vulnerability to flood. As the waterway is not enough for the flood, breach of embankment occurs every year and in a different location. Hence, flooding has become a regular phenomenon for the people of these VDCs.

3 Description of current flood event of 2003

Flood occurred four times in the Launiya and Tilathi VDCs in the monsoon of 2003 till the day of field visit—on 29th June, 7th July 7, 13th July 13 and 29th July. Of these, the flood of 29th July was a devastating one. On the night of 29th June at about 1:00 am, the right bank embankment of Khando River breached and the flood water entered into the villages. The study team was in the field on 29th July and got an opportunity to observe the effect of flood closely.

According to the community, ward nos. 1, 2, 3, 4, 5 and 7 were severely affected by the flood, whereas other wards 6, 8 and 9 were moderately affected. The flood water washed away 26 houses of Launiya VDC, 100 houses were partially damaged and 3 fishponds were completely filled with sand. Similarly, about 30 ha of paddy land was silted up. Paddy straw stored to feed the cattle (from about 150 ha) was washed away and around 400 trees of Mango and Sisham were uprooted and taken away by the flood. People set their cattle free and ran to the school area and other highland areas of the village with their children. "Many people would have lost their lives had not Mr. Ram Lakhan Mandal and Kris Mandal of Launiya VDC warned the villagers about the possible breach of the embankment" said Mr. Muneswor Mandal a resident of Launiya VDC. Many people took shelter in the Umeswor Rastriya Primary School, which is situated in the relatively higher area of the village. Many people also stayed overnight on the high banks of Koshi Branch canal which runs from east to west in the Launiya VDC. Many people also stayed on the top of the embankment of the Khando River. People were seen collecting their leftover belongings the next morning.

Many people were seen eating beaten rice and *moori* (puffed rice) which they had taken with them while taking refuge on high land. Their houses were inundated with water and their kitchens were wet and would take days to get dried up. People took drinking water from the tubewells of high areas that were not damaged by the flood. Many tubewells were under flood water making them unsuitable for use in fetching drinking water.

Children, women and the old people seemed to be the most affected groups. The floodwater was flowing with high current along the village roads; it was very difficult for these groups to make their way to the safe places through the current. Children were excited to go out in the water and it was hard for the elders to guard them. Cattle were kept in the school premises but there was very little fodder for them.

Similarly, the flood entered into the Tilathi VDC and brought havoc there. The floods washed about 15-20 small huts away and about 150 houses were partially damaged by rising water level up to 3-4 feet. It was observed that about 200 ha of paddy land was inundated. It was also observed that most of the local roads were damaged and under water. The people were facing problems commuting. People whose huts were damaged took shelter in the premises of Rastriya Primary School and nearby neighboring houses. Seven families took shelter for 2-3 days in the school compound. Some cattle were also kept inside the classrooms and locked from outside as the owner had gone out for work. Most of the children were not in a position to go to school after schools opened, because village roads were damaged by the flood said Dayananda Mishra lecturer of M.B. Campus, Saptari.

The flood created psychological discomfort and fear for the residents of affected areas. During the flood, people felt unsafe and discomfort while shifting from one place to another. They also faced difficulty to manage foodstuffs daily. It was observed that the well-off households of Tilathi migrated due to the fear of recurrence of flood. According to the community, about 100 households were already shifted to Kathmandu, Biratnagar, Rajbiraj, Janakpur etc.

4 Existing coping practices

The team collected information segregated into 3 situational aspects—before flood, during flood, and after flood.

4.1 Pre- flood situation

It was informed that there are no collective coping practices in the community. The severity of flood was observed by the community only after the construction of embankments and its breach. There was no preplanned coping mechanism in both Tilathi and Launiya. However, in Tilathi most of the community members were aware of the frequency of flood and mentally prepared in coping with it on an individual basis. It was revealed that most of the households in Tilathi have the practice of keeping plastic sheets and few have tents for temporary shifting. Similarly, some of the people managed to keep their food stocks in the elevated locations. But in Launiya, there was no such preparation for it. Most of the households of Launiya community have adopted wait and see strategy. Some of the families sent their female members and children to their maternal home due to fear of flood.

4.2 During flood situation

The community people of both Launiya and Tilathi were fully aware that flood has devastating after effects and could hamper the whole community at any time. During flood, most of the households are compelled to manage individually as and when needed. If the flood happens to come during the night, people set their

cattle free and run with their children to a safer place. The cattle are then collected next day in the morning. The community as per their own traditional judgment move away to seek safe places like schools, roads, and other embankments when the water level rises above risk level. Similarly, the families whose houses are completely damaged or destroyed take shelter in schools and neighboring houses. Those who have tents and plastic sheets also move towards safer places. Livestock are also kept on the uplands. Those households who have permanent buildings stayed in the first floor and kept their cattle in the upland areas.

According to the community in Tilathi, the flood water remains for about 7 days whereas in Launiya it lasts for about 3 to 4 hours.

4.3 Post- flood situation

Most of the people found it difficult to arrange things like clothing, shelter and food. Similarly, when the water level starts to subside, occurrence of waterborne epidemics like diarrhea, cholera, dysentery, pneumonia etc is high. Similar is the case with the livestock. Help from outside world often comes after the flood causes damage to the community, and which, most of the time is insufficient and reach late. Some of the community leaders provide assistance to the affected families.

During the flood event of 2003 in Launiya and Tilathi, there was no immediate rescue operation from the government side in the flood-affected areas. Chief District Officer and District Police Officers visited the area only after 10 days after the occurrence of flood. In Launiya VDC, a relief package containing one tent, one plastic sheet, one school bag, note books and pencils for the children and a cash amount of Rs 1,100 for each of the 26 affected families were distributed by the District Administration office from the fund from District Natural Disaster Relief Committee (DNDRC). According to the community, only those, whose houses were totally damaged, were provided relief package. However, no relief package was available to those whose houses were partially damaged. No food items were given in this package.

Similarly, relief packages were distributed to the affected families of Tialathi. According to the community, about 102 people received the package. Many people of the area criticized this relief operation as they felt that there was inequitable distribution of the fund and that the needy people did not get the relief package while some people of the same family got the package repeatedly.

The district administration gave priority to reconstruct the damaged embankment in Launiya. The Chief District Officer had given word to the flood affected people to supply about 500 gabion boxes and 35,000 plastic bags. The bamboos for the piling work were to be supplied by the villagers. Till the end of the field visit, a total of 4,200 plastic bags and 102 gabion boxes were made available.

5 Risk assessment

The risk due to flood is on the rise due to rising riverbed level every year. At the same time the embankments and spurs constructed are not maintained regularly and are prone to damages. Narrowing down of the Khando River in Launiya VDC has posed yet another risk in the community. Because of this narrowing down of river, breach of embankment occurs every year. The location of breach being unknown to the community it poses great uncertainty to the whole community of Launiya and Tilathi.

6 Institutional Involvement and assistance offered

Different agencies such as DAO, DNDRC, DDC, NRCS, DWIDP, JICA etc are involved in flood rehabilitation activities. Although there are many agencies working in the field, coordination among them and joint planning are lacking. All of them work on ad-hoc basis.

District Natural Disaster Relief Committees (DNDRC) have been formed under the chairmanship of Chief District Officer, including police, army as well as development oriented line agencies related to irrigation, river training, agriculture, forest, housing and town development, banks and social organizations working in the area. Similarly, Japan International Cooperation Agency (JICA), was also found involved in the river training works. It was reported by the community that relief provided per head is usually not sufficient and DNDRC is ineffective and inefficient too.

Coordination and cooperation seem lacking among the concerned agencies and sometimes duplication of relief fund is also reported. The data available regarding the flood-affected areas are varied.

7 Potentialities for community approach to flood management

As per the discussion, the communities in Launiya and Tilathi were found committed to make efforts from their side to adopt required preventive measures regarding flood management in an organized way through the participatory approach. However, the communities are in favor of structural measures rather than the non-structural ones. Some non-structural measures along with the structural ones preferred by the communities are as follows:

- Identification of flood shelter and relief camps
- Awareness creation on flood fighting through training, drills and campaign.
- Establishment of forecasting and warning system regarding the impending flood
- Arrangements of first aid and necessary medicines of mainly waterborne diseases and provision of fast foods like beaten rice
- Formation of Community Flood Management Committee (CFMC)

- Immunization provision for both humans and animals
- Spray of insecticides after flood to save from epidemic waterborne diseases like diarrhea, dysentery, cholera, typhoid, pneumonia, etc.
- Coordinate the works being done by the different helping agencies
- Arrangement of training to local teachers, VDC and NGO personnel
- Introduce community flood management course in school education

Some participants of Tilathi in Saptari opined that Khando river course should be made straight and the old course through the Sakarapura should be reactivated. It was learnt from the community that both Tilathi and Sakarapura communities have serious dispute over the route of Khando River. They have disputed over the right of way issue due to regular changes of the river course.

8 Approach and methodology

The study team consisting of an engineer and a sociologist visited the field during the flooding time and observed the current situation through the transect walk along the Khando river in Saptari district. During the visit, discussions were held with the various communities. Information regarding the floods in the study areas was gathered. The study team conducted Focus Group Discussion (FGD), community meetings, observations and PRAs in the flood affected area of Bishahariya, Launiya and Tilathi Village Development Committees (VDCs). Some key informants were also interviewed while collecting the additional information about the flood and its effect on the community. Similarly, the study team visited offices of the District Development Committee (DDC), Local Development Officer and Chief District Officer (CDO) in Saptari district. Discussions were held with these offices on the flood-affected community and on activities carried out by the various agencies on flood mitigation, relief and rehabilitation.

In order to orient the community to form organized groups for flood management activities, a model constitution of the committee was distributed and read in the community gathering.

9 Study findings

The major findings of the study are as follows.

- There is no flood warning system and people use traditional practices of watching clouds and rain.
- People temporarily shift to high lands, public places, schools, embankments, etc during floods.
- The communities have no collective pre-coping mechanism. All the activities are done on individual basis.
- Some of the households in Tilathi community have individual pre-coping

practices such as storing foods, keeping plastic sheets and tents etc. But there is no such practice in the community of Launiya.

- Proper coordination is lacking among the agencies involved. The external support provided to the affected communities is inadequate and inequitable.
- Due to heavy sediment load in the river, the bed level is rising every year causing more threat of flooding in the future.
- Proper engineering design of river training works is lacking.
- There is no permanent flood management committee in the communities. However, they form an ad-hoc committee when river training works with support from the government agencies are undertaken.
- Strong confidence in self-help is demonstrated by the communities, but scarcity of fund remains a major constraint.

Photographs

Reconstructed embankment made of bamboo pile, sand bags in gabion boxes

The above embankment in the flood the next day

Village road converted to drain during flood

The main road to India from the village under flood

Fish pond silted up by sediment deposition

School on high ground, where people take refuge during flood

Annex-II

FIELD REPORT
ON
FLOOD MANAGEMENT IN RAUTAHAT, NEPAL

1. Introduction

1.1 Location of the study area

The study area lies on the southern part of Rautahat district, Narayani Zone, the central development region of Nepal. It is geographically located at $26^0$45'N to $26^0$46'30"N and $85^0$15'E to $85^0$20'E. The study area comprise of two locations in the vicinity of Gaur Municipality, the district headquarters. To the east of Gaur lies the first location which is ward nos. 6,7 and 9 of Brahmapuri Village Development Committee (VDC). The second location lies in ward nos. 1 to 9 of Banjaraha VDC.

Gaur is connected with east-west highway by a 42 km long Chandranigapur-Gaur road. Daily bus services from the Gaur and air service from Simara are available from Kathmandu. The road distance of Gaur from Kathmandu is 334 km. The location of the Study area is presented in Figure 3.

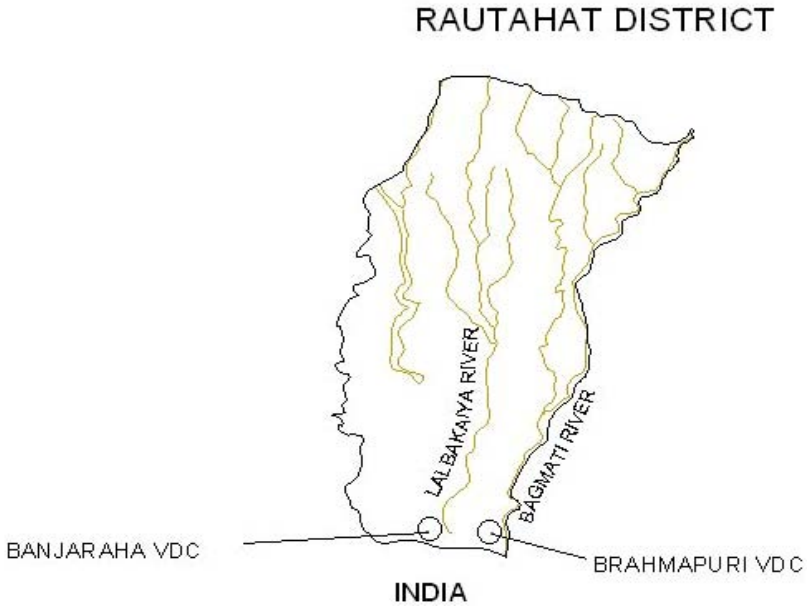


Figure 3: Focused Study Location in Rautahat

1.2 Geographical characteristics of flood plain

1.2.1 Climate

The study area has a sub tropical climate with hot temperature in summer. The average minimum and maximum temperatures recorded are 19.6°C and 31.1°C respectively. Annual precipitation is about 1200-1300 mm.

1.2.2 Land Use

The elevation of the study area varies from 73 to 76 m above average mean sea level (amsl) and is topographically in the Terai plain. The soil is comprises of clayey loams to sandy loams. Total covered area for study is about 6,600 ha which include two selected locations. About 20% of the land is occupied by settlements, roads and drainage whereas remaining 80% has been used for agriculture.

1.2.3 River and Streams

Major rivers flowing within Rautahat district include Bagmati, Lalbakaiya, Chandi and Jhanjh. Among these Bagmati and Lalbakeya are the rivers directly affecting the study area due to flood.

a) Bagmati River

The Bagmati River rises in the Shivpuri range at about 16 km north-east of Kathmandu at an elevation of 2,800 m. Bagmati river has the total catchment of 7,000 sq km in Nepal at the border with India. Its discharge of 100 years return period has been estimated to be 10,500 cumecs.

The first 150 km of the river drains hilly and forested area from which it enters flat Terai land. The river is generally braided in Nepal Terai up to Nepal-India border and is of meandering type downstream. The river drops sediments in its stretch passing through the study area. It occasionally shifts its course; causes bank erosion and spills its banks inundating areas in Nepal and India.

HMG is constructing embankments along the bank. The work started a decade ago and will be completed in next three years.

b) Lalbakeya River

The Lalbakeya River originates at an elevation of 1,512 m in the Churia ranges. The river is a major tributary of Bagmati River. Its first 80 km length lies in Nepal and the remaining 29 km in India when it finally joins Bagmati. The catchment area of the river within Nepal is 896 sq km. The maximum discharge of 100 years return period is estimated to be 500 cumecs.

Churia range, being geologically fragile, adds large volumes of sediment into the river system. The sediment is carried out downstream and deposited in the relatively flatter area when it passes through the study area. The river becomes wide and often changes its course damaging the adjacent agricultural land. It also spills its bank causing inundation.

Recently, HMG has constructed embankment along the banks of the river

1.3 Demographic and socio- economic characteristics

1.3.1. Population

The study area has a total population of 29,397 comprising of 15,481 males and 13,916 females., Average household size is 5.3. The latest census report of 2001 has recorded the total number of households as 4,922.

1.3.2 Caste /Ethnicity

The study area is dominated by Terai ethnic group like Yadhav, Musalman, Tharu, and Rajput. Similarly, some occupational caste like, Kurmi, Baniya, Musahar, Teli, Dhobi, Mali and untouchables remain as minority. Braman, Chhetri, Rai, Newar as hill ethnic groups also figure in the ethnic composition.

1.3.3 Economy

Agriculture is the mainstay of the economy in the study area. According to the District Agriculture Office, 79 percent of the people depend on agriculture for their livelihood and the remaining on service, trading and others. The main crops cultivated are paddy followed by sugarcane or mustard, wheat and potato. The predominant form of production till today is subsistence agriculture. Family is the basic unit of production. Female and child labor along with adult male labor is used for the purpose. There is hardly any surplus since the size of the landholding is very small. However, wealthy farmers are switching from domestic to commercial farming. The average landholding size in Rautahat district is 1.06 ha.

2 Floods, its types and intensity in the area

2.1 History of flood

During PRA and FGD people were asked about the floods they remember. The following are the main flood events that they instantly recalled:

Year	Depth of Water
1954	60 cm
1975	60 cm
1993	180 cm
2002	150 cm
2003	150 cm

Depth of inundation has increased over the years. Excessive inundation occurred in the last two consecutive years. Drainage congestion due to development activities such as roads and embankments in and around the area have contributed to the increasing depth of inundation. The flooding situation occurs normally about thrice a year and flood water recedes in about 24 to 30 hours.

2.2 Types of floods

The type of flood causing damages to the Brahmapuri area is monsoonal flood of Bagmati River. The flood erodes the bank permanently washing away the agricultural land and making people landless. At high floods the water spills over the bank and the village gets inundated.

Similarly, Banjaraha village is affected by the floods from Lalbakeya River. The type of flood in this river is flash flood. During floods, the water spills over the bank and inundates the village. Embankments and roads constructed recently in and round the area obstruct drainage path and the water remains stagnant in the area causing much inconvenience to the people and damaging houses and standing crops.

2.3 Intensity of flood

Flooding occurs almost once every year in the area although the extent of damages may depending on the severity of the flood. The floods of Bagmati and Lalbakeya rivers spill over their banks from several points within and from some points upstream of the area. The spilled water spreads over the area causing widespread inundation. The depth of inundation reported in some part is as high as 1.8 m in some years. The stagnated water remains in the area for about 30 hours in residential areas which are relatively higher land and for about seven days in low lying agricultural land. Embankments and roads constructed recently in and round the area obstruct drainage path. The time of stagnation is becoming longer as the construction activities are on the rise.

2.4 Causes of flood

The area has high water table and is composed of loamy soil having slow infiltration rate. The rainfall occurring locally in the area cannot infiltrate into the ground and so creates large surface runoff. The area being flat and drains being congested, the runoff water cannot get out of the area quickly and thus starts spreading. Growing urbanization associated with construction of houses and roads further add congestion to the drainage system. The flood plains are being encroached by settlements and river training works are done without considering the drainage

requirement. These activities have reduced the floodway considerably over years. The result is longer duration of inundation over wider area of coverage as the time passes. The construction of embankments is being taken up by the government to the check spillage from these rivers. As the construction is not yet complete, inundation from the spills will continue for some years. Once the construction of embankment is completed, the area will be within the embankments on all sides. In this case, the drainage of the local storm water will continue to remain a problem and the whole area will remain under threat of flood due to embankment breaches. The relevance of non-structural measures involving the community will be greater even if the area is protected with embankments.

The Churia range is geologically younger and fragile. The degrading forest in the range has increased erosion and consequent increase in the sediment in the river. The sediment is carried by the rivers and is deposited in the stretch where the study area lies. The result is bed rise and instability of the river system. The rivers are observed to be changing their courses eroding banks.

3 Damages caused by recent floods

The 1993 Bagmati flood was the most devastating flood in the recent decades. The extent of damage due to this flood was over a wide area beyond the study area. The most affected ones were Rautahat and the adjoining Sarlahi districts. The flood damaged a barrage built upstream of the study area and caused widespread damage to the canal system serving some 20,000 ha. The rehabilitation works amounting to about Nrs. 300 million were done over three years to restore the irrigation system. In and around the study area the flood washed away thousands of hectares (ha.) of cultivable land, 100 persons died and many families became homeless. In Rautahat district, it is estimated that around 895 ha paddy land was covered with sand, 935 ha paddy land was eroded and 25,650 ha standing crops, 1982 ha seasonal vegetables and 47 ha fish farms were partially damaged by the flood.

The flood of 2002 is considered as the second heavy flood after 1993. Around 1,250 ha of standing crops, 142 ha of seasonal vegetables and 10 ha of fish farms were damaged and around 87 cattle were swept away by this flood (Source: DADO Rautahat). In the flood event about 62 families were displaced, 631 houses fully damaged, 4,450 families moderately affected, 4 persons were injured and 3 died (Source: PRA 2002). Similarly, in the municipality area, 78 households were fully damaged, 815 families affected and 1 person died from the flood (Source: Red Cross Rautahat). It is to be noted that these recorded damages are not mutually exclusive.

In July 2003, the study team also observed occurrence of a flood in the area during their field visit. The depth of inundation was observed to be about 90 cm and extent of damage to settlement, houses and crops were visible.

4 Existing coping practices

4.1 Pre- flood situation

Many people in the community store some of their food grain on the first floor of those having multistory and permanent building. Some have built small temporary sheds in elevated places from which they can watch the crops against birds which is also used for taking refuge during flood. Some people have made wooden benches on which they stay above water while the inundation goes on beneath the benches. Some people have made provision of plastic for use during flood. Many people keep provision of dried and precooked food for about two days. This includes beaten rice and noodles. The plinths of permanent houses are kept high above the ground. Most of the affluent people in the flood-prone areas arrange for the temporary migration of their children, pregnant woman, old and sick people to their relatives' houses in the flood-free areas. The community has no organized institution for flood fighting and the above-mentioned flood-response-strategy is practiced on individual basis, not in the collective form.

4.2 During flood situation

People in the two locations of the study area seem to have their own system of flood warning being practiced over years. In Brahmapuri area, where flood is expected from Bagmati River, some of the experienced people in the community never miss a radio-report on weather to know the monsoon-conditions at Kathmandu. They also keep watching the sky over Churiya Range to assess whether it is raining heavily or not. If the rainfall in Kathmandu is more than 60 mm any day, they remain alert and get ready to evacuate in order to shift to safe places. They have experienced that 12 hours time is taken by the rainwater to traverse the distance from Kathmandu to their localities; flooding begins in Rauthat in about 12 hours, and in about 18 hours, the flood inundates their residential areas. In general, the flood warning is disseminated through person to person communication.

In case of Banjaraha, a rain gauge station is established at Nijgadh which is about 30 km north and upstream of the area with the effort of Red Cross. In case of heavy rain in Nijgadh area, the person reading the rain gauge conveys the message through telephone to the Red Cross Office at Gaur. The Red Cross Office at Gaur in turn transfers the message to Banjaraha VDC preferably by telephone. If the telephone is out of order, it uses other means such as using wireless network of Police or sending some one on a bicycle carrying the message.

When water level starts rising in the residential area they start to shift their livestock to uplands like embankments and higher roads. This is based primarily on previous experience and direction of the elders. Thereafter, the people shift themselves and also help the neighbors. They take refuge in neighboring permanent houses, public houses and places on high lands. During a flood situation, there is no

practice for flood coping in organized ways; there is no mechanism either. In some particular cases the people seem to help their neighbors in the rescue operation during flood situation.

4.3 Post- flood situation

Generally, there is no practice to involve the community collectively for relief and reconstruction. Some comparatively richer people help the poor ones, whose houses are damaged partially or fully, provide the scanty locally available resources, like bamboos, etc., to rehabilitate them.

Flood victims usually approach concerned institutions to ask for relief material like tents, clothes, utensils, medicine, etc.

At the district level, District Natural Disaster Relief Committee (DNDRC) has been formed under the chairmanship of Chief District Officer. Other institutions involved in the relief activities are DADO, DDC, DWIDP, Red Cross, Police and Military. There are some NGOs and INGOs also that have provided relief in the area. Coordination of the relief operation among these agencies and joint planning is lacking. Many of them seem to work on ad-hoc basis and independent of each other.

5 Institutional involvement and assistance offered

The DNDRC held preparatory meetings just before the start of monsoon, specially focused on flood fighting in the flood prone area. Concerned line agencies, Police, Military, NGOs and INGOs take part in the meeting. This meeting usually takes stock of the disaster situation in the previous years and draws tentative action plan for the forthcoming monsoon flood. The provisions made by various agencies are minimal at the district level.

Emergency flood fighting through structural measures in the case of riverbank cutting/erosion and embankment breaches goes on under the DWIDP district based office. Emergency fund is allocated to the central organization DWIDP. The DWIDP releases emergency fund as and when the need arises, on the basis of the damage report submitted by their district based office. During the site visit, the study team observed an emergency work continuing on the right bank protection of the Bagmati river near Bramapuri VDC and left bank protection of the Lalbakaiya river near Tikulia.

District agricultural development office (DADO) has no approved yearly program for flood management related activities. However, it usually distributes mini kit of some vegetables and crops when the need arises.

Municipality allocates Rupees 30 to 35 thousand budgets in its yearly program to provide the flood relief packages especially within its boundary.

The Red Cross has provided support for the flood warning system in Banjaraha VDC. It has also conducted an awareness education to manage disasters in the

area. It also distributes relief packages for the flood victims and provides them training for income generation.

Local Police and Military generally respond to the rescue and relief work immediately after flood occurrence.

There are some NGOs and INGOs reportedly involved mainly in relief activities and a few in rehabilitation activities.

However, coordination and cooperation seems weak among the services agencies.

Red Cross distributes relief packages for the flood victims as per the availability of the resources with them in the post flood situation. Moreover, other outsiders also sometimes help the victims with relief packages after the flood occurrences.

6 Risk Assessment

The risk data were obtained through the report prepared by the Red Cross for Banjaraha VDC, by DDC for Bramapuri VDC.

- Life and household risk

Location	Households	Population
Banjaraha	310	2,369
Bramhapuri	312	1,262

- Crop Risk–-monsoon paddy:

Location	Area (ha)
Banjaraha	270
Bramhapuri	270

7 Potentialities for community approach to flood management

The communities in Brahmapuri and Banjaraha are found committed to make efforts from their side to adopt required preventive measures regarding the flood management in organized way through the participatory approach. Some non-structural measures along with the structural ones preferred by the communities are as follows:

- Identification of flood shelter and relief camps
- Awareness creation on flood fighting through training, drills and campaign
- Establishment of forecasting and warning system regarding the impending flood
- Arrangements of first aid and necessary medicines for mainly waterborne diseases and provision of fast foods like beaten rice
- Formation of Community Flood Management Committee (CFMC)

- Immunization provision for both humans and animals
- Spray of insecticides after flood to protect the community from epidemic waterborne diseases like diarrhea, dysentery, cholera, typhoid, pneumonia, etc.
- Coordinate the works being done by the different helping agencies
- Arrangement of training to local teachers, VDC and NGO personnel
- Introduce community flood management course in school education

8 Adopted study methodology

The study team consisting of an engineer and a sociologist visited the field during the flooding time and observed the current situation through the transect walk along the Bagmati and Lalbakeya rivers. During the visit, discussions were held with the various communities. Information regarding the floods in the study areas was gathered. The study team conducted Focussed Group Discussion (FGD), community meetings, observations and PRAs in the flood affected area of Brahmapur and Banjaraha. Some key informants were also interviewed while collecting the additional information about the flood and its effect on the community. Similarly, the study team visited offices of the District Development Committee (DDC), Local Development Officer, Chief District Officer (CDO), and Local Office of the Department of Water Induced Disaster Prevention, Gaur Municipality, Water Supply and Sanitation Division, Red Cross, District Agriculture Development Office in Rautahat district. Discussions were held with these offices on the flood-affected community and on activities carried out by the various agencies on flood mitigation, relief and rehabilitation.

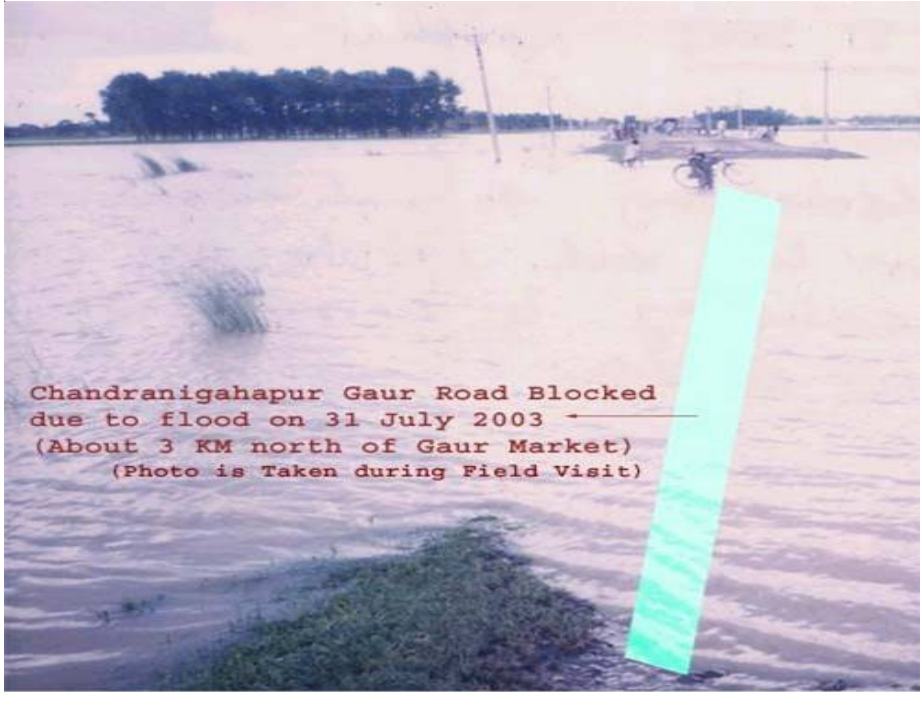
In order to orient the community to form organized groups for flood management activities, a model constitution of the committee was distributed and read in the community gathering.

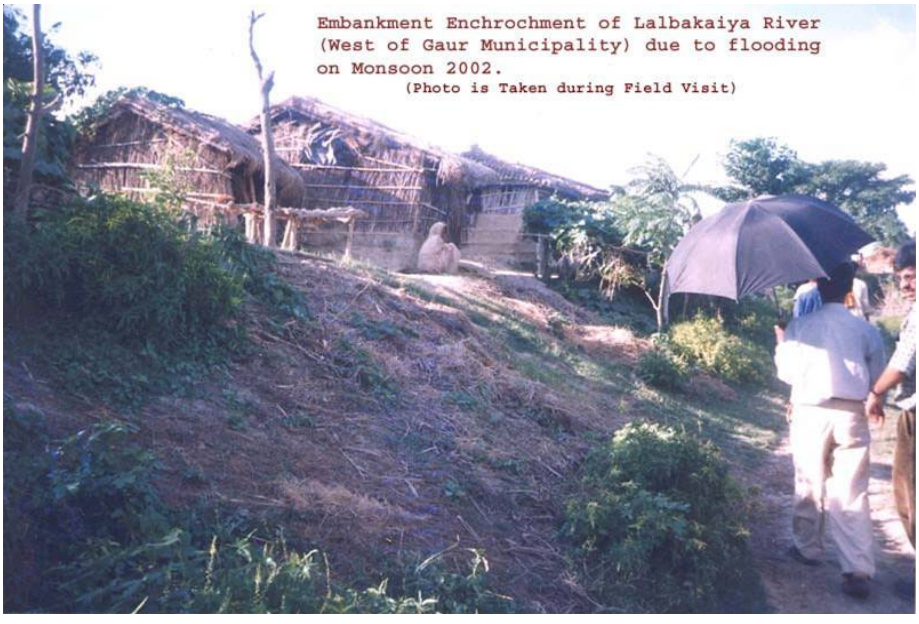
9 Field study findings

- The communities in Brahmapur and Banjaraha are practicing their own system of flood forecasting and warning.
- People temporarily shift to neighboring permanent houses, high lands, public places, schools, embankments, etc during floods.
- The communities have no collective pre-coping mechanism. All the activities are done on individual basis.
- Many people keep provisions of food and shelter for use during flood.
- Proper coordination is lacking among the agencies involved. The external support provided to the affected communities is inadequate and inequitable.

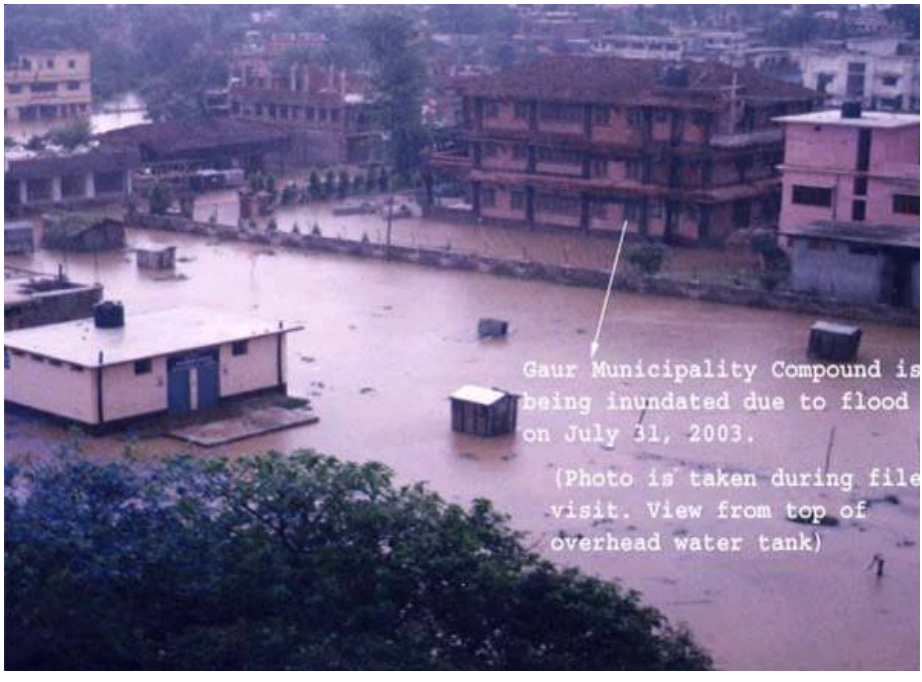
- Rivers are unstable causing threat of flooding in the future.
- Although government is about to complete embankment to stop water spilling the banks of Bagmati and Lalbakeya, the threat of flood damage will remain the same.
- Increasing urbanization and increased network of roads and infrastructure are increasing the drainage congestion and the depth and duration of inundation are also on the increase.
- The Red Cross has made some efforts to mobilize the youths of Banjahara VDC on organized basis in disaster management and has provided them training.
- There is no permanent flood management committee in the communities. However, they seem to be eager to form such committee if external support is made available.
- Strong confidence in self-help is demonstrated by the communities, but scarcity of fund remains a major constraint

Photographs




Embankment Enchrochment of Lalbakaiya River
(West of Gaur Municipality) due to flooding
on Monsoon 2002.
(Photo is Taken during Field Visit)


Inundation due to flood
on 31 July 2003.
(Photo is Taken during Field Visit)



Cattle are shifted on roadside during flood.

Bramhapuri VDC Lower secondary school on Bagmati river bank. It was swept away on 31st July, 2003 Flood.

Annex III

English translation from the Nepali language (of model Constitution)

Constitution of (.....) River Community Flood Management Committee 2004

Preface:

Originating from the Siwalik/Mahabharat hills in the .....zone, ... District, Constituency number ..... and ..... VDC; having confluence in the ..... river and flowing through ..... VDCs; the river ..... is causing heavy loss to human lives and property, causing damage to crops and cutting hundreds of hectares of land. As proper management of this river has not been undertaken by any government or non-government organizations to cope with problems caused by this river, the Constitution of Community Flood Management Committee-2004 is framed to train the river properly, to involve the local people in the overall management and flood management of the river and to minimize the damages caused by the river.

Article - 1

Brief Name and Commencement:

a) The name of this committee will be ..... and in brief .....
b) The constitution of this committee will be effective from the date of approval of the related office.
c) Address and office of the committee: The office of ..... VDC will be used as the office of this committee.
d) There will be a consultation committee to provide necessary consultation and suggestions to the committee.

Article – 2

Definitions:

Unless the context otherwise requires, in this constitution:-

a) 'River' means ..... River originating from the Siwalik/Mahabharat hills in the ..... Zone, ... District, Constituency number ..... and ..... VDC; having confluence in the ..... river and flowing through ..... VDCs from North to South.
b) 'Management' means activities undertaken before, during and after the occurrence of flood, to protect loss of lives and property in the community from the fury of flooding every year.
c) 'Control' means any activities undertaken to protect erosion, flooding and cutting of agricultural land and settlement, deforestation etc. through river training.
d) 'Coordination' means mediation between this community and any governmental, non-governmental, national, international organization, persons, groups, communities etc. and providing training to the community in flood management.

e) 'Committee' means ..... member '..... River Community Flood Management Committee' nominated from ..... VDCs.

f) 'Member' means official members, general members and representatives of this ..... River Community Flood Management Committee.

g) 'Working Committee' means committee of all members of this committee.

h) 'Officials' means the chairman, vice-chairman, secretary, joint-secretary and treasurer of this committee.

i) 'Concerned office' means Office of the District Development Committee or the office which has the right to register this committee.

j) 'Founder VDC' means ..... VDC.

k) 'Officer' means the official of the office having the right to approve this constitution.

l) 'Consulting Committee' means the committee consisting of the chiefs of district offices of His Majesty's Government.

Article – 3

Seal:

This committee will have a seal for its identification.

Article – 4

Office:

a) The main office of this committee will be situated in the office of ..... VDC of ..... District of ..... Zone.

b) The office can be transferred to another place or a liaison office can be established giving prior notice to the concerned office.

Article – 5

Legal Viability:

a) This will be an organized committee to work on ..... river management works and can frame its own rules and regulations.

b) This committee can file a case against anybody and anybody can file a case in its name in the court.

c) Like an individual, this committee can establish fund, can earn fixed and movable assets and can mobilize and sell the property.

Article – 6

Objectives:

a) Manage any type of works in the long term relating to river management with a view to stopping or minimizing the flood hazards in ..... river.

b) Initiate works to stop soil erosion and deforestation in the hilly reach and other vicinity of this river, and coordinate with His Majesty's Government or

concerned organization to manage the uncontrolled and unmanaged transportation of the river aggregates in the river.

c) Manage tributaries of this river and other branches of this river.

d) Manage different resources like education, health, forestation, different income generating activities in the vicinity of this river.

e) Help reduce hazards from river by raising awareness among the people and remove the problem of deforestation.

f) Manage flood in the ..... river by coordinating with different governmental, non-governmental, national, international organizations and institutions and if necessary reach an agreement with them.

Article – 7

Scope of Work:

The committee will implement the following works in the ..... committee.

a) Flood management before, during and after the occurrence of flood.

b) Watershed conservation.

c) Construction of embankments.

d) People's awareness programme for forest conservation.

e) Afforestation – (Green Belt).

f) Alternative agricultural income generating program.

Article – 8

Membership:

A qualified Nepalese citizen will be the member of working committee to manage flood of ..... river of VDC

1. Types of membership:
   a. Working committee member.
   b. Representative member appointed by the committee when necessary to fulfill the allocated work.
   c. The committee may award honorary membership to any national or foreign citizen and to the organizations providing special assistance as per its objectives.
2. Working committee can nominate experienced and skilled persons as additional members from ..... VDC as per its requirements.

Article – 9

Qualifications and Charges for Membership:

a. Qualifications of the member:

i) Nepalese citizens who have attained 16 years of age
ii) Free from any criminal charges

iii) Not mentally retarded

iv) Resident of ..... VDC But this clause will not be applicable in case of representative members

b. Membership charge – As per the decision made by quorum of committee

Article – 10

Expiry of Membership:

The membership will be considered expired in the following cases:

a) If resigned through a written notice

b) If the member is dead

c) In case of absence in three consecutive meetings without reason or prior notice, membership could be cancelled

d) If proved to be indulging in activities against the interest of the committee for personal benefit

Article – 11

Formation of Working Committee:

a) A 13 member executive committee will be formed comprising of flood affected and elected persons of ..... VDC

b) Executive committee will choose the chairman, vice-chairman and the treasurer from among its members.

c) The tenure of the executive committee will be of 5 years.

Article – 12

Work, Duties and Authority of Officials:

1) Chairman

a) Call the meeting of the executive committee

b) Take initiative for necessary agreements

c) Control and look after all types of works relating to flood management

d) Implement the decisions made by the committee

e) Assume the chairmanship of the committee and give deciding vote in the meeting

2) Vice-Chairman

a) Help in the work of chairman

b) Perform all types of work done by the chairman in his/her absence except important agreements to be concluded by the committee

3) Secretary

a) Keep records of meetings passed by the committee

b) Make agenda of meetings for their approval

c) Coordinate with other organizations, institutions, or persons and chairman of the committee and work accordingly

4) Joint Secretary

a) Do all the works of secretary in his/her absence except in respect of important decisions

5) Treasurer

a) Keep record of financial transactions
b) Keeping up-to-date record of income and expenditure of the committee
c) Give and take necessary directions in controlling the financial activities

Article – 13

Consultant Committee:

1) There will be a consultant committee to give necessary suggestion to this committee
2) The chiefs of the following district level offices of HMG will be the members of this consultant committee:

Chairman of District Development Committee

Chief District Officer

District Agriculture Development Officer

Local Development Officer

District Forest Office, Chief

District Soil Conservation Office, Chief

Division/Sub-Division Irrigation Office, Chief

Chairman of Nepal Red Cross Society, District Committee

Hon'ble Member, House of Representatives, Constituency No....

Hon'ble Member, House of Representatives, Constituency No....

Article – 14

Financial Arrangements:

a) The committee, to execute its work, can raise a fund and make rules to operate such a fund.

b) The following types of amounts will be deposited in the fund:

i) Fund available from the founder VDC

ii) Fund received from HMG, non-governmental organizations, individuals, groups, community or any other sources

iii) Fixed or movable assets of the committee or amount received from it

c) The working committee will make rules to operate the bank account of the fund.

Article – 15

Audit:

a) The accounts of the committee will be audited every year by the auditor recognized by HMG.
b) Every year the committee will submit the report of the audit to the concerned authority on the basis of report from the treasurer of the committee.

Article – 16

Provision of Election:

a) The working committee will make necessary provisions and rules to conduct election of the committee.
b) The committee will give notice of such provision to the founder VDCs.

Article - 17

No Confidence Motion:

a) A written complaint from a member of the committee specifying that any member or official is working against the interest and objective of the committee with proof and ratified by two-thirds majority of the committee will be sufficient for the dismissal of a member or official of the committee. The notice of such dismissal should be given to the concerned official and VDC.

Article - 18

Right to Frame Rules and Guidelines:

This committee will have the right to make rules remaining within the limits of this constitution, Institutions Registration Act-2034 and prevailing laws of Nepal to fulfill the objectives of the committee.

Article - 19

Amendment to the Constitution:

a) With the application of a member of the committee for the benefit of the committee and remaining within the preamble of the committee, the constitution can be amended or extra article can be added with the ratification of two-thirds majority of the committee.
b) The amended constitution should be approved by the concerned official.

Article - 20

Dismissal of the Committee:

The committee will be automatically dismissed with the decision from the votes of all the voters of the working committees of all the .....VDCs that the committee is no

longer necessary. The notice of such dismissal should be given to the concerned official.

Article - 21

Explanation and Special Provision:

The explanation of this constitution will be done by the committee. Special provision if required will be made on the basis of majority of the committee.

Article - 22

Repeal and Retention:

Articles of this constitution of.....River Community Management Committee will be automatically cancelled to the extent of contradiction if they contradict the prevailing laws of Nepal.

Annex- IV

LIST OF RELEVANT ORGANISATIONS/PERSONS

Directory of Contacts

Name of Office	Address	Office Contact		Contact Person		
		Phone	Fax	Name	Phone (Office)	Phone (Home)

** Please write down the names of organizations/persons that may be useful for you in the area.

Annex-V

RISK AND DAMAGE ASSESSMENT FORMS

Form 1

Risk Assessment Form

District:……
VDC:……..…
Ward No:…….

S.No	Name of House-hold Chief	Number of Family Members				Total	Cattle		Food Grain	Crops	Type of House	Depth of Water
		Old	Women	Child-ren	Young		Big	Small				

Form 2

Damage Assessment Form

District:……
VDC: ……..
Ward No ……., Village…….

S.No.	Name of Person	Type of damage					Value Rs	Remarks
		Houses	Crops	Cattle	Land	Other		

Annex-VI

INTERACTION PROGRAM ON COMMUNITY FLOOD MANAGEMENT APPROACHES IN NEPAL

PART A: SAPTARI

1 Introduction

A team consisting of an engineer, a sociologist and an association organizer visited the Launiya and Tilathi VDCs of Saptari District from February 28 to March 6, 2004. These are the flood-affected areas of Khando River. The main objective of this visit was to introduce the draft manual 'Community Approach to Flood Management in Nepal' to the community people and different stakeholders in the district. The manual was introduced by organizing interaction programs in the community and among the stakeholders. First interaction program was conducted in the Launiya VDC on March 2, 2004 and the second was conducted in Tilathi VDC on March 4, 2004. Similar interaction program with the stakeholders was conducted in Rajbiraj, the district headquarters of Saptari district on March 5, 2004.

2 Interaction with the Community

2.1 Interaction at Launiya

The program was organized in the Launiya VDC where more than 150 people participated. The program was initiated with the welcome speech and by giving introduction of the program by Danda Pani Jaishy(River Engineer). Mr. Hari Narayan Mandal of Launiya VDC welcomed the study team and praised the work of the team by delivering opening remarks on behalf of the community. Mr. Danda Pani Jaishy and Mr. Roshan Subedi(Sociologist) presented the contents of the manual to the audience. After the presentation of the manual the floor was opened for discussion where many useful suggestions and comments were made by the participants which are as follows:

Mr. Khagendra Mandal, Launiya VDC

- Most of the villagers are illiterate and poor and do not have proper understanding of the flood situation which causes much damage to the life and property of the people.
- It is very difficult to implement a community approach in such a place without proper help from outside.
- Many governmental and non-governmental organizations came to this place

in the past, for survey/research work and never returned to the place again to help the downtrodden people. So he doubts about the future programs of this group too.

- Proper coordination with line agencies is required to deliver required service.
- The Government does not allocate sufficient budget for the embankment construction of Khando River.
- Concerned line agencies should be prepared at least for the three months of the rainy season to help the flood affected people.
- There is not sufficient waterway within the two embankments. Proper waterway should be maintained by giving proper compensation to the landowners and acquiring the required land for the embankments.

Mr Shiv Saran Mandal, Launiya

- The presentation is excellent and the efforts made to organize the flood affected community are praiseworthy.
- We have a history of fighting with the flood and will continue to fight it.
- Structural measures are the proper methods to control flood in this community

Pradeep Kumar Mandal, Ex Vice Chairman Launiya VDC

- Our ancestors fought the flood of Khando themselves but now we are receiving some help from different government and non-government organizations.
- We are participating voluntarily in the flood fighting and other activities during the flood.
- There are 11 VDCs which are affected by the Khando River, Launiya being the most affected among all.
- Problem of flood in other VDCs originates from Launiya. Hence, flood control activities should be concentrated mostly in this VDC

Hari Narayan Mandal, Launiya VDC

- All the past river training activities done by different NGOs/INGOs and government agencies are not based on any technical grounds, hence the flood situation is worsening every year. Most of the construction works were done without proper survey and design work.
- The situation is not improving although different agencies are investing a large sum of money to control the Khando River.
- Technical soundness of the work is more important than plainly delivering the service for cheap popularity and vested interest.
- The proposed community approach will become successful only if external support to the community is continued for certain years thus making it self sustainable.

2.2 Interaction Program at Tilathi

Similarly, interaction program was organized in the Tilathi VDC too, where more than 20 people participated. After the presentation of the manual, the floor was opened for discussion. Suggestions and comments made by the participants are as follows:

Pradeep Narayan Jha, Tilathi VDC

- There should be a contact office within the reach of community to make regular contact for flood management before, during and after the flood.
- Criteria for membership of a sub-committee should be clear.

Amir Jha, Ex. Vice–Chairman,Tilathi VDC

- Financial resource should be made available for flood management activities.
- Relief package distribution is not a solution. However, this is a very common practice during flood.
- Proper design and construction of river training activities are required to solve the flood related problems.
- Relief packages should be distributed fairly to needy people.
- Although most of the study focuses on Terai areas, construction works have been done in uphill Chure area. Information regarding the construction is lacking.

Dev Narayan Yadav, Ex-Area Member of DDC,Tilathai VDC

- All the VDCs within the Constituency no 2 are equally affected by Khando khola. So, the community based program should be conducted in all the affected areas to minimize the problems.

Dayananda Mishra, Lecturer, Vindeshor Multiple Campus, Saptari

- Real situation should be analyzed and flood management should be carried out with the involvement of the community.
- Community Flood Management concept would be effective in flood affected areas as these are the people to respond first during the flood.

3 Interaction Program with Stakeholders

After the community level interactions, stakeholders' interaction was conducted at Rajbiraj on Friday, 5th March, 2004. Representatives from different line agencies of the government, NGOs, Red Cross Society, journalists of different national and local newspapers and representatives from the two communities took part in the interaction. Mr. Roshan Subedi welcomed the participants and Mr. Danda Pani

Jaishy shed light on the objectives of the program. Mr. Bhup Nath Sharma, Local Development Officer, presented the inaugural speech. Mr. Sharma gave valuable suggestions such as inclusion of the chairman of Nepal Red Cross Society of the concerned district in the consultation committee. He expressed his doubt on the continuity of community based flood management program without firm government support. He further stressed that a coordinated effort will certainly help minimize flood hazards of the community if not completely eliminate such hazards.

Mr.Danda Pani Jaishy and Roshan Subedi presented the objectives of the program and contents of the manual to the participants. After the presentation of the manual the floor was opened for discussion. Major suggestions and comments received during the interaction are as follows:

Dr Nareswor Prasad Singh , NRCS-Saptari, Lions Club Saptari

- The Draft Manual entirely focuses on the non-structural measures such as training, awareness campaign, preparedness activities etc. Hence, it is suggested to include structural preventive measures as well to minimize the flood problems.
- More coordination is needed among the concerned agencies.

Dhruva Dev, Chairman, NGO Federation, Saptari

- Available fund should be used judiciously and NGOs would be useful partners for community flood management programs.

After the presentation, the participants were divided into three groups and each group presented their own findings to the plenary. The groups were divided as follow:

Group I – Pre-flood Preparations

Group II- During Flood Responses

Group III- After Flood Actions

Mr. Amir Jha, Ex-Vice-Chairman of Tilathi VDC presented the outcome of Group-I to the plenary session. He was assisted by Mr. Bhusan Rai, Social Development Officer of DDC, Saptari. The main suggestions presented by this group are as follows:

- There is urgent need of preparatory works before the onset of monsoon to minimize the loss of life and property of the community as described in the manual.
- A coordination committee of different flood management committees within the flood affected zone of a river is necessary to coordinate the necessary activities with different line agencies.
- The chairman of Nepal Red Cross Society, District Committee should also be included in the consultation committee of the committee as mentioned in the constitution(Annex-III)

- Certain spelling mistakes and language of some sentences in the manuals should be corrected.

Ms. Sunita Mishra, Vice-President of Women Development and Child Care Foundation, Saptari, presented on behalf of group-II. This group focused on what should be the responses of the community during the period of flood. The main outcomes of the group are as follows:

- Activities mentioned in section-4 of the manual are good enough to minimize loss of life and property by the flood
- Rescue operations, which are carried out on community basis, are comparatively better than those carried on individual basis.
- Aged people, women, children, disabled and sick people should get priority during evacuation and rescue operations.
- Pregnant women and pregnant animals should get due care during the flood.
- Care should be taken to control any outbreak of epidemics from drinking contaminated water.
- Care should be taken to save cash and other valuables.
- Food, medicines and shelter materials should be distributed to the needy

Mr. Dhirendra Prasad Shah, local correspondent of the National Daily 'The Himalayan Times' presented the outcome of the discussion on behalf of group III. The group identified the following activities for the post flood situation:

- Keeping record of the damage caused by the flood
- Manage provision of drinking water, shelter, food and health care to those affected by the flood
- Manage systematic shelters against the random settlement after the flood
- Minor repair and maintenance work from the local material available
- Public awareness program to save the people from the fury of flood
- Take initiatives for a permanent flood control work
- Take an account of the works done in the preparation stages
- Start income generation programs with the help of concerned line agencies

At the end of the interaction, the participants were asked to mention the positive and negative parts of this interaction. The response was as follows:

Positive

- Non-structural measures are equally important to minimize the flood hazards.
- The manual is comprehensive and is helpful to minimize flood hazards if practiced by the community properly.

- Individual efforts are not sufficient to manage a flood. Hence, a coordinated effort is necessary.
- Such gatherings from time to time bring together different groups in one platform, which is helpful to know the sufferings of the flood affected people.
- Flood hazards can be minimized with proper preparedness before flood.
- Transparency in the work is the key to success for any community organization.
- This interaction meeting worked as an eye opener to the participants.

Negative

- Such meetings which are conducted in the headquarters, generally fail to fulfill the immediate requirements of the rural people. Hence, they should be conducted in the affected area itself to gain support of the people.
- There is no guarantee of continuation of this program in the future.
- The actions mentioned in the manual should be implemented with necessary physical and financial support which the study team is requested to facilitate.

PART B: RAUTAHAT

1. Introduction

A team of an Engineer, a Sociologist, Social Organizer and a support staff visited both the flood-affected locations i.e. Bramapuri VDC which is affected by Bagmati river and Banjaraha VDC affected by Lalbakaiya river of Rautahat district from February 23 to March 1, 2004. The main objective of this visit was to disseminate the manual prepared to the community of those VDCs and various district level stakeholders and collect suggestions and comments so as to refine the manual further and identify further course of action to be taken. The district level interaction program of stakeholders was conducted on February 27, 2004, whereas the community level interaction was organized on February 28, 2004.

2 Interaction with the Community

The community level interaction program could not be conducted at the study site due to security problem. Upon the suggestion of the security personnel as well as community people the venue of interaction program was set within the municipality area at Tikuliya High School in Gaur municipality. People from both the locations gathered at the school for interaction. In spite of some inconvenience, more than 50 people of different strata participated. The program was initiated by delivering the welcome speech and introduction of the details of the interaction program by Ram Chandra Dangal (River Engineer) on behalf of JVS. Similarly, Mr. Narayan Das the then vice-chairman of Bramapuri VDC and Mr. Tej Narayan

Singh the then vice chairman of Banjahara VDC welcomed the participants as well as the study team on the behalf of their respective communities. After the welcome addresses Socioligst Mr. Rajendra Kumar Pandit and River Engineer Mr. Ram Chandra Dangal presented the content of the draft manual to the participants. Then, the floor was opened for in depth discussion. The following section depicts the outcome of the discussions.

Mr. Tej Narayan Singh – the then Vice Chairman Banjahara VDC

- It is praiseworthy to develop a flood management manual; however the manual has discussed only non-structural measures, which is not the immediate solution of the recurring flood in the area.
- If the interaction was conducted jointly with other stakeholders, cooperation and coordination issues raised in the manual could be discussed in detail. This would have cleared the role and responsibility of the concerned agencies too.
- The manual is silent on indicating the responsible agency to implement this manual.

Mr. Narayan Das-the then Vice Chairman Bramapuri VDC

- The community is mainly suffering from riverbank cutting. Hence, the immediate need of the community is protection through embankment construction. The manual is silent on structural measures; therefore, structural as well as non-structural measures should go side by side.
- The concept of the community management committee is very good; however, external support is extremely needed to make such a committee sustainable in the long run.
- The manual has discussed and attached the sample constitution of the community flood management committee; however, it is not clear who would facilitate registration of such a committee.
- Various training programs and income generation activities are proposed in the community in the manual, but it is not clear who will initiate these endeavors.
- The preparedness plan is very ambitious regarding fuel and food storage, because, majority of the community people are suffering from day to day needs. Therefore, there must be an external support available for such provisions.
- The manual has mentioned that the aged people, women, disabled and sick people should be given priority during evacuation.
- There are delays in the construction of river training works on Bagmati River which will protect Bramapuri VDC from flood, hence it is suggested that the works should be completed as soon as possible.

- The constructed Lalbakeya embankment has no provision of drainages and therefore it takes more time for the inundating water to drain properly causing a lot of inconvenience to the people in Banjaraha VDC after flood.
- In the manual, it is mentioned that there should be permanent public buildings in the community for immediate evacuation of the flood-affected people. But in fact the existing public buildings like school, health post, VDC are also located in flood areas. Hence, those facilities are not so useful for emergency evacuation.

3. Interaction with the Stakeholders

Stakeholders interaction program was organized on Friday, 27th February 2004. District natural disaster committee members, representatives from various government line agencies, NGOs and Nepal Red-Cross Society, teachers, district level social activists, political leaders, civic society and journalists of different national and local newspapers participated in the program. At the beginning of the program, the draft manual was distributed to each of the participants. Sociologist Mr Rajendra Kumar Pandit welcomed the participants on behalf of the organizer. The session was chaired by Chief District Officer of Rautahat District. In his inaugural speech, he shed light on the need and significance of community flood management manual. Then, the draft manual was presented by Mr. Ram Chandra Dangal (River Engineer) and Mr. Rajendra Kumar Pandit (Sociologist). Immediately after the formal session was closed, the floor was opened for comments and observations of the participants.

Chief District Officer - Mr Mohan Pd. Acharya

- The contents of the draft manual should be highly appreciated and the manual will be helpful to the flood affected community. This study is very good and covers all aspects of community flood management.
- The manual could not explore the causes of the flood in the particular case of Rautahat. Addressing these causes may be helpful in reducing the adverse effect of the flood. This should also be incorporated in the manual.
- The provision of community flood management committee is good and any one of the two procedures for its formation suggested in the manual may be adopted as per the specific local condition.
- It is suggested that DWIDP should take the lead role in making use of this manual with coordination and cooperation from the concerned communities.

Teacher- Mr. Bijaya Keshore Jha

- Minimization of flood intensity is not incorporated in the manual.
- An afforestion program should be launched along the riverbank on both sides as well as in the catchment area.

Mr. Sita Ram Mudvari

- The manual is very good; however, it is silent on implementation aspects. Hence, the manual should be tested practically in the field by actions following the manual.
- Minimization of flood intensity is not incorporated in the manual.
- The sand in the riverbed should be removed each year to protect settlements from the floods.

Genaral suggestions made by various participants

- More fruitful comments could have been made if the manual was distributed 15 days ahead.
- The community should take care of the local existing embankment and river training works which should be mentioned in the manual.
- Actions suggested in the manual should be implemented on pilot basis and the manual should be improved based on such implementation process.
- The manual has spoken about transparency; however, it is not specific on how transparency can be implemented.
- The Government should be persuaded to adopt laws and regulations appropriate for flood prone areas such as building byelaws and norms for construction of roads and multipurpose public areas for shelters, for which it may be necessary to have greater public debate.