Chapter 6
Preparedness

Preparedness is perhaps the most important component of a disaster risk management programme; it includes activities and measures taken in advance to ensure an effective response to the impact of hazards. Disaster preparedness plans and procedures guide rapid response and recovery actions. Preparedness lessens the severity of disasters by preparing people or communities for disaster, developing contingency plans to ensure an effective response and recovery, and training communities to implement plans after a hazardous event occurs.

Pre-flash flood management activities primarily include:

- risk assessment
- hazard/risk mapping
- preparedness activities
  - community mobilisation and awareness building
  - demonstration
  - forecasting and early warning
  - structural mitigation
- emergency relief (contingency) planning

6.1 Risk Assessment

Risk assessment is the process to determine the nature and extent of potential hazards and vulnerabilities. Risk assessment comprises gathering information related to the hazard (e.g., rainfall, slope, stability, potentially dangerous lakes), vulnerability (e.g., people, exposure to hazard, susceptibility, coping capacity), and the value of elements exposed to the hazard. Risk assessments should take into account the changing nature of the physical, natural, and social environments. This is a basic step for any kind of mitigation planning. Figure 13 illustrates the framework for risk assessment and risk management.

The flash flood hazard, vulnerability, and capacity of communities living within the impact area, and the level of exposure of various elements located within the area, are used to define the flood risk. Hazard assessment is conducted to analyse the nature and mechanisms of flooding, including frequency, velocity, magnitude, and hazard. Similarly, the capacity and resources of the community to prepare and cope with the impact of flood hazard and people's skills and abilities to make them resilient are highlighted.

6.2 Social Flood Hazard Mapping and Assessment

Social flood hazard mapping is a tool practised by the CFFRMC through a participatory process of collecting baseline data and information and plotting them on a map to help the planning team analyse the strengths (resources/opportunities available) and risks (exposures and vulnerabilities) in the unit area (cluster, district, ward). The baseline information incorporated in the map details the geomorphology, demography, and other crucial conditions including critical facilities. Social flood hazard mapping is carried out by the CFFRMC or an external competent organisation with the active participation of the CFFRMC.

Social flood hazard mapping is the symbolic reflection of the conditions and location of a certain area. A flood hazard map shows the location of houses, assets, problems, services delivery organisations, infrastructure (roads, schools, hospitals, bazaars), and so on using symbols.

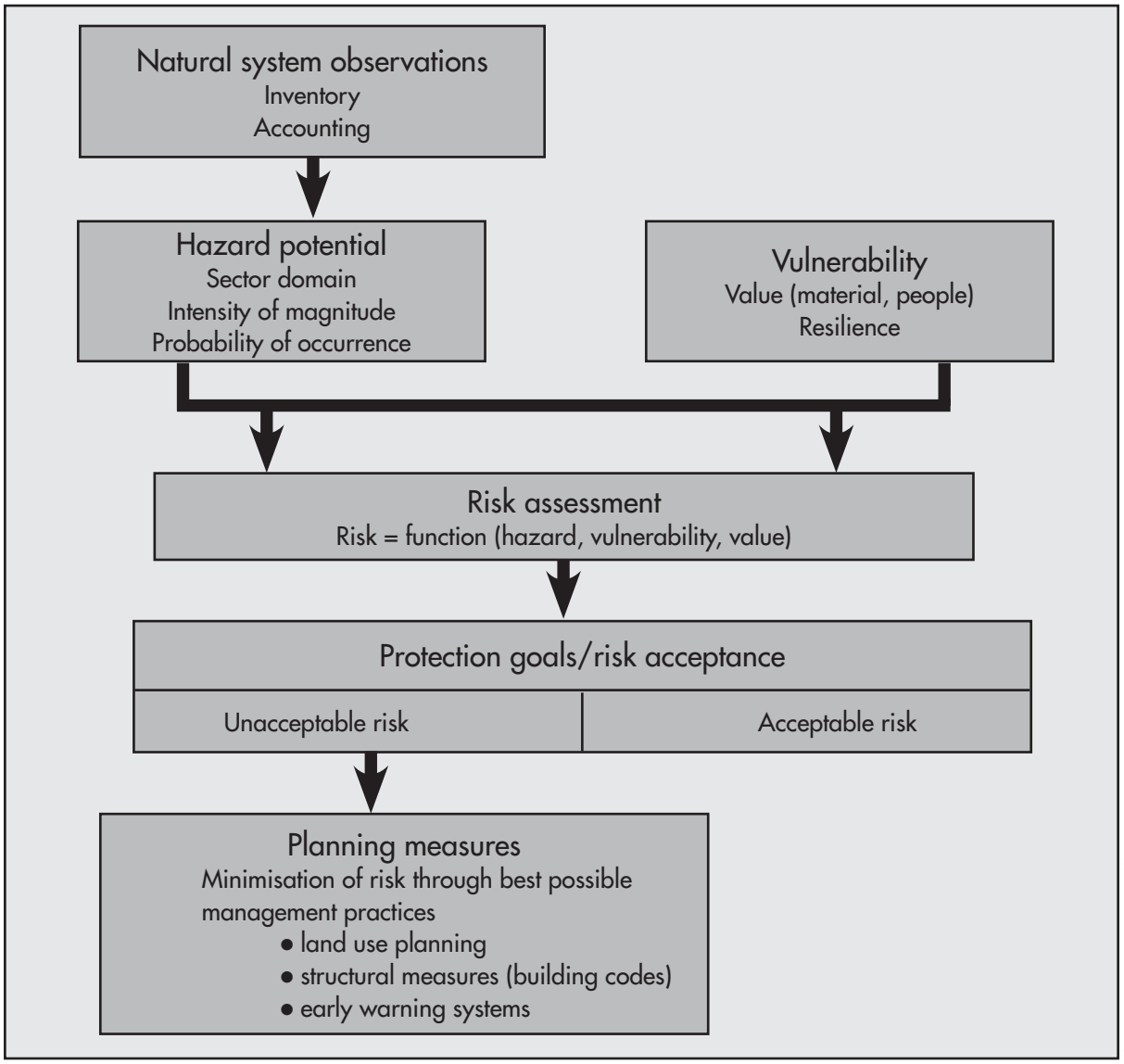

Figure 13: Framework for risk assessment and management

Social flood hazard mapping highlights resources as the basis of discussions about the location of social resources and helps in analysing local risks and identifying possible damage. It also helps in identifying vulnerable groups (people with disabilities or those with special needs) who need special consideration during emergency rescue and relief. As it incorporates all possible local resources, it helps in searching for opportunities, like measures that can lessen the magnitude of loss, the safest path for evacuation, and safe places for temporary settlements.

It is vital for the CFFRMC to train volunteers to develop map sketching and map reading skills through a participatory approach. During the community training sessions, a practical demonstration of social hazard mapping needs to be done (Figure 14). If needed, the CFFRMC should seek help from government officials in preparing a social flood hazard map.

Some tips for preparing a social flood hazard map

- The top side of the map indicates the north. Boundaries of wards and villages should be marked. It is desirable to provide the map's distance conversion factor.
- Give the location of every cluster of households, markets, and public buildings.
- Give the location of structures like canals, weirs, roads, and railway tracks, airports, bridges, the river path, highlands, and lowlands.

- Vulnerable areas of the ward should be marked specially.
- Evacuation routes, safe havens, emergency volunteers' set-up, the formation and structure of houses, and infrastructure should be shown on the map to indicate their availability, as well as vulnerable areas, safe structural constructions, hazard-prone houses and infrastructure, and the locations of the most vulnerable (elderly, pregnant women, children, and people with special needs).
- Public safety and security: Show civil defence installations, communications centres, emergency management centres, fire stations, hospitals and other medical facilities, mass emergency shelters, police stations and other installations for public security, stockpiles, and community emergency organisations.

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Figure 14: Preparation of a social flood hazard map, Chitral, Pakistan

- Utilities: Clearly mark communication lines, printing presses, relay points, and antenna complexes.
- Agriculture: Show food-storage and processing facilities, irrigation systems, impoundments and reservoirs, levees, and dikes.

Annex 3 provides an example and steps for preparing a social flood hazard map[10].

Emergency actions by individuals

Communities must be prepared for flood hazards, and each member of the hazard-prone community should be aware and have prepared the following:

- emergency supplies and important items (such as medication, money, bank information)
- stockpile of food, water, and fodder for livestock
- stockpile of cooking utensils and fuel
- be aware of safe refuges in case of an evacuation
- emergency flood-proofing measures (sandbagging and boarding)
- plans to move vehicles and livestock to higher land

6.3 Planning Emergency Relief

The intensity and magnitude of potential flash flood risk needs to be determined in advance by the CFFRMC together with the community. During an actual emergency, quick and effective action is required to evacuate and provide relief to the affected people according to their requirements. Preparing a contingency plan to cope with the devastation is called emergency relief planning.

A comprehensive risk analysis for flash floods in terms of intensity, magnitude, and impacts on vulnerable human lives and livestock needs to be conducted in advance so that plans can be made for emergency shelter sites, evacuation routes, and emergency water sources; volunteers and responding personnel can be trained; and people educated about what to do in case of an emergency. Rapid onset disasters like flash floods do not allow enough time to collect secondary information. It is very important that the CFFRMC has collected such information well before the onset of the flash flood.

[10] Annex 3 was prepared based on the experiences of the Asian Disaster Preparedness Center (ADPC), Bangkok.

In a preliminary plan, planning will have to be realistic and relevant even though the details of a hazard may be uncertain. Emergency relief plans need to be culturally friendly and consider ethics and religion so that no disputes arise at the time of relief actions. The plans must be comprehensive and look at the needs of the local population. The only way of ensuring this is by maximum participation from all corners of the community.

Emergency relief planning involves the following:

- Identifying the resources needed for emergency relief.
- Setting clear roles and responsibilities for CFFRMC members, team leaders, and volunteers.
- Preparing clear policies and procedures.
- Ensuring the participation of beneficiaries (including women and other vulnerable groups) in planning.
- Planning activities to ensure timely disaster relief.
- Ensuring accountability and transparency.
- Ensuring availability of emergency stockpiles at each cluster level for use during the emergency. These include emergency first aid boxes, search and rescue equipment (ropes, D-rings, picks, shovels, etc.), shelter items (waterproof tents and blankets), and food (Figure 15). The collective ownership will be with CFFRMC; the stockpile will be maintained by the CFFRMC members and provided to affected community members during an emergency.
- Identifying safe places for evacuation of the community during flash flooding and having a flood evacuation plan in place.
- Planning for the specific needs of children, women, and people with special needs during the relief phase (e.g., milk and nutrition for children under five, dietary needs of pregnant women, health and hygiene needs).
- Keeping an inventory of the trained human resources available in case of an emergency.
- Developing the capacity of the CFFRMC in rapid disaster needs assessment at local level.

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Figure 15: Emergency stockpiles

- Planning for camps and shelter management.
- Having communication mechanisms in place during the relief phase to avoid duplication and overlooked populations.
- Establishing an emergency operation centre (i.e., control room) at unit level (district, ward, cluster, etc.) which operates 24 hours a day during an emergency (see below)
- Identifying locations which can be used for warehouses in case external relief is required; in addition to this, a transportation system needs to be organised for timely distribution of relief material
- Ensuring security, transparency, and accountability in relief distribution

6.4 Preparedness Activities

Community mobilisation and awareness

Maximum community involvement is essential for effective preparedness towards mitigating flash flood risk. The CFFRMC is responsible for coordinating and uniting the whole community and distributing the responsibilities according to the plan.

Awareness must be created about the hazard and existing resources. Various awareness campaigns can be done to inform and unite the community. Methods to influence people can include:

- posters
- brochures
- songs/dramas/street dramas
- school arts and essay competitions
- audio-visual methods
- training and demonstrations
- regular drills
- promotion by local celebrities like singers, leaders, and actors

The objective of community mobilisation is to increase the resilience of communities to natural hazards.

Demonstration

In addition to all the preparation measures, drills are very helpful. CFFRMCs must conduct these exercises and prepare communities to act in an emergency. These drills must include all levels of the community, including women, children, and older people. CFFRMCs can organise occasional drills on evacuation to safe ground through marked escape routes and training on safety measures, and prioritise the things people need to carry during an evacuation.

Drills, simulations, demonstrations, and so on are necessary for efficient disaster preparedness. Exercises and demonstrations may include orientations to provide general information on evacuation plans. Drills also serve to verify the plans and their effectiveness (ADPC/UNDP 2005).

Flood forecasting and early warning

Although flash floods are an instant phenomenon, communities must still use different forecasting methods to help minimise losses. The key to effective forecasting and warning systems is communication and dissemination of understandable information to a mass audience.

Radio and TV broadcasts provide weather data such as rainfall and its magnitude and location. This information can be useful in forecasting flash floods. Therefore, during the monsoon season, these news broadcasts should be watched and listened to carefully. The CFFRMC and the early warning and communication team can even designate a volunteer or a person from the community to analyse the hydrology of the

catchments and water levels in the river, if such capacity exists. Observing clouds in the upper catchments, changes in the water flows (e.g., rising levels of water, river water mixed with mud, leaves floating on the water), increasing numbers of fish in the river, unusual sound/smell of river, unusual behaviour of animals, and so on also provides clues on which a flood warning can be based. Similarly, continued rainfall in the surrounding areas or in the upper catchments of the stream often provides clues as to likely flood events. The CFFRMC through volunteers may set up a network of rain gauges and means of communicating the amount and intensity of rainfall. Ice avalanches and glacial calving cause loud noises that can serve as early warning signals.

Chapter 4 provides a comprehensive description of local knowledge relevant to flash flood early warning. CFFRMCs should recognise local knowledge and incorporate it in preparedness plans and early warning systems. The committee should also communicate the communities' local knowledge to external agencies.

According to the severity of the flash flood, different warning levels should be applied to different parts of the community. CFFRMCs should make proper arrangements to disseminate the forecast and corresponding warnings to the people. Various media can be utilised to issue warnings (see Box). CFFRMCs should also communicate the situation to the concerned agencies outside the community for possible help and rescue operations.

Some ways to communicate warnings

- warning flags
- radio broadcasts
- loudspeakers
- police
- interpersonal communication
- telephone – landline and mobile

Often communities have their own ways of transmitting news through various media. A typical method of conveying messages and monitoring the upstream climate in Chitwan District, Nepal, is shown in Figure 16. A person from the community keeps an eye on the upstream watershed condition from this tower and if the water level rises beyond normal, either shouts a warning or creates some sounds to warn the community.

G. Gurung, Practical Action, Nepal

Figure 16: Community-based early warning system, Chitwan, Nepal

Mirror and traditional fire systems: These traditional systems were practised in Chitral, Pakistan. One system uses a mirror as a visual signal system. Locals use the reflection of the sun on a mirror to convey warnings to other people and villages. Alternatively, creating large fires on hilltops warn downstream communities of impending danger, both of flash flood and of enemy attack (Itturizaga 1997; Itturizaga 2005; Xu et al. 2006).

Herder system: This traditional method formerly used in rural Pakistan is now extinct (Dekens 2007b). Each clan within Chitral district used to have a herder in charge of taking livestock to the pastures during the rainy months from June to August. The herder was a person from the village itself and had strong socioeconomic ties with the community. If a herder noted a threatening event and was in the right position to communicate, he or she would shout a message to another herder in a lower pasture or to the nearest village in a chain system. Different herders would choose different places in order to spread the flocks evenly on the available grazing space. This way, they could also warn each other. A few of them also knew

how to blow the booq, a trumpet-like instrument made from the horn of a yak or a wild goat. Rhythms and tunes would vary from valley to valley, village to village, and herder to herder, conveying different meanings. For instance, a certain tune could indicate that the herder was ready to take the livestock up to the pastures and that villagers should release their animals; another tune would indicate the return of the flock to the village. In some cases, specific tunes would also warn of the danger of predators and of the danger of floods and avalanches.

Different warning systems are required for different environments. In some places and contexts, one warning signal will work more effectively than another according to the nature of the hazard, the distances between the lower and higher pastures and between villages, day time or night time, and so on. Traditional warning systems were well adapted to and in tune with the local socio-cultural context, ensuring some level of acceptability, trust, and cost effectiveness (e.g., use of the mosque loudspeakers).

Interpretation of warnings is done according to the landscape and history of past flash floods.

Structural measures for hazard mitigation

To properly address hazards, some community-level structural measures should be implemented. A comprehensive description of possible structural measures is beyond the scope of this manual. Taking into account past history and technical assistance, the community should set their households to minimise damage during flash floods. This can be done by:

- embankments along tributaries that are subjected to flash flooding and backwater effect of the main stream
- minor drainage works to pass the flood and avoid inundation
- irrigation canals diverting water to agricultural fields
- provision of culverts and floodways
- submersible embankments in deeply flooded wetlands, designed to protect winter paddy from early floods and allow them to be overtopped by floodwaters
- houses, villages, and roads built on raised land or embankments
- polders enclosing houses, fields, food supplies, or animal fodder
- construction of public places like schools or auditoriums, where a whole community can stay during the flood period, on uplands; such buildings should provide for adequate safe drinking water and sanitary facilities

Structural measures have their limitations and often give a false sense of security. These structures should be implemented in close collaboration with the concerned government authorities. CFFRMCs should emphasise small-scale, community-manageable structures.

6.5 Control Room

To be effective, the CFFRMC should monitor relevant activities including liaising with government departments and other agencies for timely help in respect of flood forecasting, issuing flood warnings, round-the-clock vigils on embankments and vital installations, rescue and relief operations, and establishing communication links with relief agencies and NGOs. An effective and well-equipped central point is needed under the management of the early warning and communication team to smoothly carry out these activities. A control room should be created at a convenient and easily accessible location in the village. Such a control room should become operational a few days before the flood season and work on a 24-hour basis during the occurrence of a flood.

The control room will not only act as centre for information dissemination, it will also undertake preparatory measures with the involvement of the community. It will set advance contingency plans; instigate rescue drills; allocate duties during a flash flood to members and volunteers; train the volunteers; and acquire, repair, and maintain all equipment in the control room so that it is in good working condition.

The control room may vary depending on the location, the communication facilities, and the human and financial resources available. Some suggested features of a control room are listed below.

- It should be located in an easily accessible and convenient location, safe from potential flood waves.
- An enquiry counter and an information display board should be located in the front of the premises.
- It should be provided with communication links such as landline telephone/fax, mobile phone, mini-transistor radio, walkie-talkie set, HF/VHF, wireless set (subject to availability).
- It should have up-to-date information readily available, with telephone numbers of all emergency services at the village and district levels.
- It should be responsible for keeping an updated inventory of rescue items like ropes, ladders, torches, and loudspeakers.

The functions of the control room are listed below.

- A CFFRMC can make arrangements to receive forecasts of weather conditions, after which it will identify level of risk and disseminate the same to the community and local NGOs through available means like telephone, loudspeakers, or drum beating.
- It will identify zones for air dropping of relief materials in consultation with the district administration and army personnel. It will keep villagers informed about the possible air dropping sites.
- It will act as a centre for collecting messages from every corner of the affected area and give messages to the higher authorities in time.
- Following a flash flood, the control room will collect information of losses to be used in distributing relief items.