

Water Induced Disasters in Nepal and Its Management

Nepal, with a land area of 1,47,181 sq. Km. and 23 million population. It lies within the sub-tropical to the mountainous region at 26°22' to 30°27' N latitudes and 80°4' to 88°12' E longitudes, with an altitude that ranges from 90 m to 8,848 m. The country is landlocked and is bordered by India in the East, West and South, and China in the North. Administratively the country is divided in five-development region and seventy-five districts.



Lekh Nath Pokarel
Ministry of Home Affairs
Dept. of Narcotics Control
and Disaster Management

Remote, rural, rugged and fragile geophysical structure of the country, unplanned settlement, population pressure, weak economy, low literacy rate and lack of public awareness are the main contributing factors of natural disasters in Nepal. Every year, landslides, floods, fire, avalanches, storm, heavy rains, epidemics and various other natural and man-made disasters cause the loss of thousands of human lives and the destruction of physical property worth billions of rupees. Thus, Nepal is facing an acute problem in the form of natural disasters, which adversely affects her development efforts. Albeit, natural disasters cannot be stopped, the magnitude of their impact can be considerably reduced by adopting adequate preventive measures. Proper, prompt and efficient response with anticipatory approach to natural disaster and timely rescue, relief and rehabilitation operations to mitigate its effect can help in disaster risk reduction. Nepal experienced great water induced disasters landslide and floods of, 1985,1989,1993 and 2002, Avalanche of 1995 and 1999, which claimed numerous human lives and caused irreparable damages of public property.

Natural disaster may be defined as a sudden or progressive calamity or misfortune causing destruction or damage to physical construction, and leading to the disruption of normal pattern of life. As a result, the affected people need help to redress and situation in one way or the other.

According to the Natural Disaster Relief Act (NDRA), 1982, Natural Disasters include earthquakes, fires, storm, floods, landslides, heavy rains, drought, famine, epidemics etc. It also includes industrial incidents or accidents caused by explosions, poisoning and such other kinds of disasters.

The Act defines Natural Disaster Relief Work as any relief work to be carried out in the area affected or likely to be affected by the natural disaster in order to remove the grief and inconvenience caused to the people, to rehabilitate the victims of the natural disaster, to protect the public property of the people, to control and prevent the natural disaster and to make advance preparation there of.

According to the Natural Disaster Act, 1982 Central Disaster Relief Committee has been constituted under the chairmanship of the Home Minister in order to formulate and implement the policies and programmes relating to the natural disaster relief work and to under take other necessary measures related there of. Moreover, the central committee prepares specific norms of relief assistance to be given to the disaster victims of the affected area in case of relief materials through the district disaster relief committee.

Climatical threat for disasters in Nepal:

Nepal lies within the subtropical monsoon climatic system. Due to its varied topography there is a wide climatic variation. With altitude being a guiding factor in climatic classification, five different types of climates are present in Nepal. They include sub-tropical monsoon, warm and cool temperate, alpine, and tundra climate.

The Terai and the Siwaliks experience subtropical climate, while the northern mountainous regions have cold, dry continental and alpine winter climate. The main source of precipitation is the summer monsoon (late June to September) of which 80 per cent falls during this period, 15 per cent during the post-monsoon (October) and pre-monsoon seasons (April to May), and the remaining 5 per cent during the winter (November to February) periods. The precipitation varies from place to place and ranges from 250 mm to over 5,200 mm per annum..

The climatic and physiographic conditions generate environmental problems such as soil erosion ,floods and landslides. Loss of nutrient rich topsoil in the uplands affects the downstream ecosystem and the farmlands, indicating a close link between the uplands and the lowlands. This problem, partly natural in character, is further accelerated by human activities. This indicates that any problem in the uplands will have cumulative effects on the people living in the plain areas.

Major types of Water Induce Disasters:

a) Flood and Landslides

Floods and landslides are the most destructive types of water-induced disaster in Nepal. Three quarter of the total land area of Nepal is hilly and many villages are situated on or adjacent to unstable hill slope. 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 environment. On the other hand, the landslides add enormous load to streams and rivers causing flood and debris low downstream. Every year, such types of disasters cause the loss of a number of human life and immense damages to agricultural land, crops, human settlements and other physical property. In July 1993, Nepal experienced a devastating flood in the Tarai region, which took the life of 1,336 people and left 487,534 people homeless. In 1999 flood and landslides killed 113 while 47 people were reported missing and 91 seriously injured. 8,844 families were affected, 3,507 houses and cattle sheds were destroyed and 177,32 hectares of land and agricultural crops were ruined in



that year's flood and landslide. The disaster caused a total loss of NRs. 3.6 million. In July and August 2002, Nepal experienced another landslides flood in the Eastern and Mid region, which took the life of 451 people and left near about 55,000 family affected.

Landslide at Ryale VDC, Kavrepalanchowk

b) Glacier Lake Outburst Flood

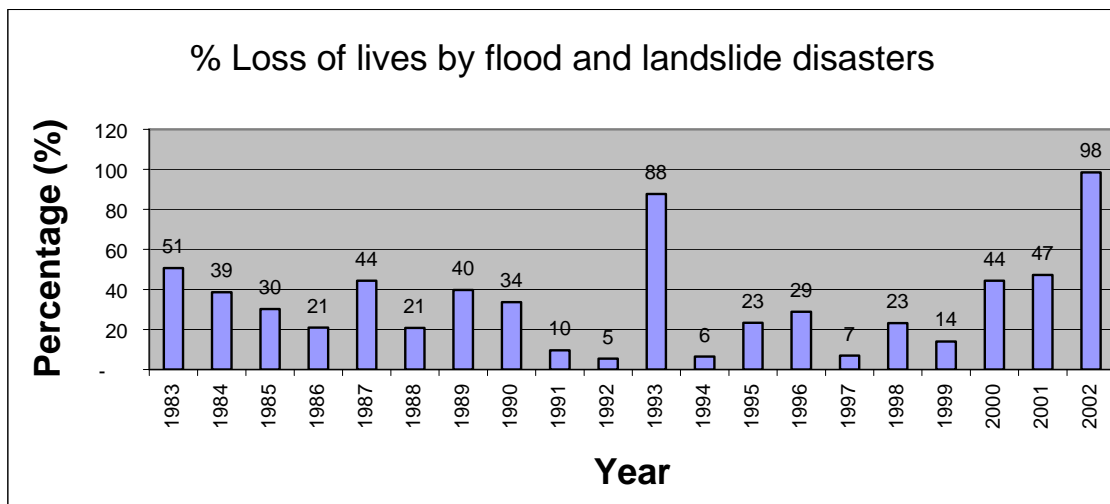
A glacier lake is huge flowing ices mass. In the Himalayan region of Nepal glacier lakes are common. Mainly there are two types of glacier lake in Himalayan region, one is debris covered and next is clean type glacier free from debris on the glacier surface. A total of 159 glacial lakes have been found in Koshi basin and 229 in Tibetan Arun basin. Among them 24 are potentially dangerous. The areas like: Upper Barun, Lower Barun, Chamlangtsho, Tsho Rolpa, Sabou, Dudh Kunda, Majang, Inja, Thulari have potentially dangerous glacier lakes. These lakes contain huge volume of water and remain in unstable condition, as a result, they can burst any time and a natural catastrophe may cause loss of life and physical property. About 14 such glacier lake outburst flood have already been experienced between 1935 A.D. to 1991 A.D. In the world context, global warming is one of the most challenges for Glacier Lake Outburst flood.

C) Avalanche

As the northern part of the country is covered with snow peaks, avalanche is very common and sometimes it claims the life of human being as well. The avalanche of November 1995 killed 43 people including some foreign trekkers at Khumbu and Kanchanjungha areas. In 2 January 1999 A.D. 5 people were swept away by the avalanche that occurred in Chunchet Village Development Committee Ward No. 8 of Gorkha district.

Past Disasters Scenario:

The following graphs show the loss of life in water-induced disasters (specially flood and landslides) from 1983 to 2002.



Organizations Involved in Water Induced Disasters:

The Ministry of Home Affairs is the focal agency in relation to disaster management in Nepal. The vital function of the Ministry are the formulation of national policies and their implementation, preparedness and mitigation of disasters. It carries out immediate rescue and relief works in the event of natural disasters through the Department of Narcotics Control and Natural Disaster Management and it has its network through out the country. The main function of the department is to carry out disaster management activities with the concerned agencies more actively and efficiently. The Department of Narcotics Control and Natural Disaster Management coordinates in the matter of disaster related programmes with related organizations.

Department of Water Induced Disaster Prevention

This Department of Water Induced Disaster Prevention was established in 1991 as the Water Induced Disaster Prevention Technical Center, being joint undertaking of various concerned Government agencies with the Ministry of Water Resources as the lead agency. In 7th February 2000, His Majesty Government of Nepal established the Department of Water Induced Disaster Prevention. Now, this department is implementing the disaster rehabilitation and management activities in the country in different rivers as well as water-induced disaster management activities in the country. The main strategies and policies of the department are as follows;

- Prepare and implement a water induced disaster management policy and plan.
- Carry out hazard mapping and zoning.
- Strengthen the disaster networking and information system.
- Establish disaster rehabilitation system.
- Carry out disaster related public awareness programme at community level.
- Prepare and implement a flood plain action plan.
- Strengthen institutional set-up and capacity.
- Implement disaster reduction measures.
- To develop disaster database, GIS and DIS system.

Department of Soil Conservation and Watershed Management

The Department of Soil Conservation and Watershed Management contributes to flood mitigation through soil conservation and watershed management, which are critical in promoting flood mitigation. It is the main implementing agency for the "Watershed Development Policy".

Department of Hydrology and Meteorology

Presently, the Department of Hydrology and Meteorology is operating a total of 121 river gauging stations, of which 40 stations are classified as regular and the remaining 81 are secondary stations. The Department has, since 1996, initiated sampling of suspended sediment through 17 sampling stations. It has 267 hydro meteorological stations in operation, of which 15 are classified as aeronautical and synoptic, 22 agro-meteorological, 61 climatological and 169 precipitation. The DHM has established a Glacier Lake Outburst Flood (GLOF) warning system for the Tsho-Rolpa Glacier Lake using the meteor burst system. It has engaged in mitigation activities by draining the Tsho-Rolpa Glacier Lake through trench evacuation. The DHM has been working on developing GIS based databases on flood zones for the southern rivers. Such studies have already been carried out for the East Rapti, Tinau, Bagmati and Lakhandehi. The DHM is currently working on a flood forecasting based on a real time data collection and transmission system by satellite and GIS tools.

Department of Irrigation

The Department of Irrigation under the Ministry of Water Resources is responsible for flood mitigation and river control. The DOI has District Irrigation Offices in all 75 districts of the country, which are coordinated by 5 Regional Irrigation Directorates. The DOI manages its own river and flood control portfolio through its River Training Division. The Division directly operates national level river control projects, while local level projects are handled through the DIOs.

Relief Assistance system;

The Central Natural Disaster Relief Committee has formulated some norms for immediate relief assistance to the victims of the natural disaster in cash and/or in kind. The amount and quantity of such assistance may be revised by the CNDRC from time to time. According to the present norms specified by the Central Committee, Rs. 10,000.00 (Ten Thousand) shall be provided as relief assistance to the family of a dead victim. Injured persons shall be provided the facility of treatment in the nearest hospital or health post. Seriously injured people will even be airlifted and taken to the well-equipped hospital, if necessary. If a house has been destroyed in a natural disaster, then up to Rs. 4,000.00 shall be provided to the owner of the damaged house. If there is the threat of disaster or the house is not safe to live, then up to Rs. 3000.00 shall be provided to the owner of the house for the arrangement of temporary settlement. Homeless families shall get 7 kilos of rice or Rs. 125.00 per head as foodgrain assistance and Rs. 500.00 shall be provided for the clothing and utensils.

Those who have completely lost their land and crops and have nothing to eat, shall get an amount of Rs. 500.00. Those victims whose house has been destroyed in a natural disaster shall get 50 cu.ft. timber at concessional rate to construct a house. Generally, all the above-mentioned relief assistance are to be provided through the District Natural Disaster Relief Committee.



Victims — after receiving relief materials

Conclusion:

Not only in Nepal, natural disasters happen almost all over the world all of a sudden causing heavy loss of human life, destruction of infrastructure and properties. Usually natural disasters can not be stopped. However, the magnitude of disasters can be reduced if preventive measures be taken in due time for which pragmatic government policies and public awareness are of utmost importance. This is especially true if the government; community and the people work together to this end. The effects of natural disasters have shown the necessity to intensify international cooperation for natural disaster mitigation.

Despite of the various challenges in disaster management, appropriate policy measures could help to solve the problems. As public awareness is one of the vital problems in managing the disaster in Nepal, it is felt necessary to work at increasing the literacy rate. Moreover, disaster management course should be included in the school and university curriculum. It is also necessary to train schoolteachers, selected students, women leaders, health workers and social workers to educate others in measures to prevent or mitigate the natural disasters. Such types of programmes may convince people to believe that natural disasters are not an act of God. To attain all this, there is the need of the strong political determination, pragmatic policy formulation and quick decision-making. Moreover, active people's participation is also very necessary. On the other hand it will be better to include disaster management component in the development plans and programs of concerned agencies for the effective implementation of disaster mitigation programs. It is also needed very much to improve road infrastructure, transportation and communication facilities to carry out rescue and relief works effectively and efficiently.

JICA Nepal, Asian Disaster Reduction Center and Asian Disaster Preparedness Center could help greatly to redress the situation by means of collecting and disseminating information and conducting trainings and organizing meetings. Gatherings and sharing own experiences at international, regional and sub-regional basis will promote international cooperation, mutual understanding and help among the countries by exchanging ideas and sharing experiences between the fellow participants.

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