WATER INDUCED DISASTER MANAGEMENT IN NEPAL

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2

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Abstract:- *Nepal is situated on active tectonic plate which is characterized by complex structural deformations, geohazards, highly dynamic physical processes and instabilities. Nepal is prone to different disaster among them flood is predominant. Nepal is facing huge loss due to water induced disasters. Among these disasters floods are dominant. Flood occurring every year in Nepal has adverse effect on the civil communities. Nepal has a poor Index for Risk Management (INFORM). There are fluctuations in the recording of death data caused by flood. The Government of Nepal focuses more on the post disaster than pre disaster phase on the preparedness phase of disasters. As a result millions of dollar has been invested every year just to rehabilitate the disaster beneficiaries and same case is repeated every year in recovering the loss but we are still facing same problem. So, the todays need and mandate of SDG and disaster activities for better development of communities. These disasters must be mainstreamed with the development works to avoid future destruction caused by poor construction of infrastructure. Such construction should be properly planned and evaluated to avoid possible effects and consequences from floods. So, this paper has mainly focused on water induced disaster and its management through the various techniques. The paper has attempted to manage the prevalence of these hazards and their associated disasters also seeks to explore the disaster of 2019.*

Key words*:- Geohazards, vulnerability, water induced disasters*

1.Introduction

As the topography of Nepal is rugged and due to the fragile geophysical structure, Rainfall received is all flowed to lower plain areas whose accumulation causes flood. Every year Nepal has been victimized of water induced disasters. Simply, water induced disaster mean problems and damages which occur due to heavy uncontrollable water flow mainly in rivers. Nepal experienced a devastating flood in the terai region which took the life of 1336 people and affected more than 487,534 people in 1993 and 1998 A.D. These disaster caused huge loss of houses, lives and destroyed huge hectares of land causing a total loss of 2 billion rupees. Almost every year Nepal is facing problems due to flood either in small losses or huge losses Disaster Bulletin Reports 1998). According to Flood Forecasting Bulletin Reports In monsoon of 2017 out of 75 districts 37 districts had been affected. Due to continuous rainfall in different parts of the country, approximately 1,00,000 lives had been affected and more than 50 people were killed. According to Nepal Red Cross, a total of 27,861 families had been affected. According to National Planning Commission (NCP) during monsoon 2017 total damage caused by floods was 584.7 million, over 1.7 million people in 35 districts were affected (Nepal Disaster Report, 2017). These disasters damages not only in Nepal but also in neighbouring countries India and Bangladesh. Similarly, ranging from small scale to large scale almost every year Nepal is facing water induced disasters either in large or small scale. The main cause of these problems is poor governing policies of government and flood checking policies. There are not

adequate hydro-metrological stations to check the possibilities of floods in the country.

According to report of Ministry of Home Affairs (MoHA) around 35,000 people were affected by the disasters in the flood of 2019. More than 20 among 77 districts of Nepal were worst hit due to flood. Transboundary issue has arisen every year during monsoon period which creates the conflict between two countries. More than 6000 rivers and rivulets flow down to India from Nepal, dyke-like structures along the border that blocks the flood water from flowing eastern south to India (National Position Paper may 2017). Structures are built in India which inundate thousands of hectares of land in Nepal. The koshi barrage along has 56 sluice gates. Every year Nepal faces huge life and property loss due to flood.

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2. Disaster Induced due to Water in Nepal

Nepal is facing the fury of natural and human induced disasters with greater frequency and intensity. People in Nepal live with hazards, accepting them as the way of life. Disasters are so penetrative in every Nepalese geographic and societal framework that the people are constantly under the threat of a multitude of natural disasters.

Every year Nepal receives about 1500 mm of water(. Rivers like Bagmati, Koshi, Bheri, seti are causing floods every year . Koshi has an average water flow of 2,166 cubic metres per second. During flood it increases as much as 18 times the average. These rivers are flooded every year due to heavy rainfall of a month. Perennial river and river originated from churiya region caused disaster during monsoon period is the main cause of disaster in Nepal as well as neighbouring countries like India & Bangladesh. Terai is victimized by flood disaster every year. In 2019 flood has caused loss of life and property in province no.1 & 2, almost all districts were affected by and flood. Floods have damaged major infrastructures such as electricity towers, roads connecting district headquarters to the affected municipalities; bridges; vehicles; livestock. Though this disaster has caused many damages there is high population density in this area and many people are professionally engaged in Agriculture.

Causes & impacts of flood:

Heavy rainfall is the major cause of floods in Nepal. The water table of a river is the area from which it gathers water, so if an unnaturally high level of water is draining into this area, this will lead to similarly high levels of water in the river. As more and more of the river's tributary streams join the river, this effect is amplified until the amount of water reaches a critical level: the banks or the natural flood plain cannot hold such a volume and it spills over. This often occurs at lower reaches of a river in areas of habitation, causing extensive damage. Flood has great impacts on economy, environment, agriculture, etc. Flooding in key agricultural production areas can lead to widespread damage to crops and leading to loss of life and property. Flooding of urban areas like Kathmandu can result in significant damage to property(Surya Gaire et. Al). Floods has positive impact on maintaining biodiversity, they link the river with land with the land surrounding it, recharge groundwater systems, fill wetlands, increase the connectivity between aquatic lives. Since the water flows in the river from surroundings drowned lands nutrients are carried in river which increases minerals in river and support lives.

Damages due to water induced disaster:

The heavy rainfall began on 11th July of this year and caused huge casualties specially in province 1 and 2. The monsoon rains cause devastating loss of crops and livestock. The communities living there depend on agriculture so their economic condition has become worse and has to depend on government relief fund. Kathmandu, Capital city, is also affected by flood. The electrical poles were fallen on some place due to which electrical supply were cut for some days. Many people lost their life and more than 10,000 people were rescued.

3. Methods in Water induced Disaster Management:

This paper aims to modification of flood and the susceptibility of flood drainage. Flood protection is provided mainly by the levees and flood walls constructed along banks.

- **Straightening and deepening river channel**: In this method, river is made a straight path or river is straighten. This is suitable in terai areas as rivers are meandering and are mostly narrower. During the monsoon seasons when river flows with full of water, its side cut the lands, in the region where soil is weak it causes landslides too in hilly areas.

- **By providing bypass**: By providing bypass channels or additional flood channels, rivers like Bagmati pass through Kathmandu. Banks of

Bagmati river is covered by buildings and settlements and river is filled of non-degradable solid wastes which remain in river which cause obstruction in flow of river. As it is not possible to remove settlements for widening of river. So, to decrease the flow, flood channels can be constructed around the city at reasonable cost

- **Flood forecasting system**: New developed technologies such as automation of data collection and telemetry to base stations, measurement of rainfall, stream discharge, and soil moisture by radar, remote sensing camera and geophysical sensors from air craft and satellites are useful in planning flood control works. Reduction in peak discharge is accomplished by temporarily storing portion of the surface runoff, through a channel in land use which increases the capacity of soil. Reservoirs, beels(saucer shaped depression) can be constructed for the storage of excess water leading to flood.

4.Steps of Nepal Government:

Ministry of Home Affairs (MoHA) is only the Government agency which has been looking over all the disasters of Nepal. The MoHA acts as National Focal Agency on Disaster Management and it is responsible lead agency for implementation of the Natural Calamity (Relief) Act, 1982.Since the year 2000, Government has been initiating different process to mainstream DRR and CCA into development plan at all levels. Almost all districts have now developed District Disaster Preparedness and Response Plans. Department of Water Induced Disaster Management (DWIDM) has been looking over flood disaster management and have prepared different types of geological hazard maps in various districts of the country. Department of Hydrology and Meteorology (DHM), Department of Mines and Geology (DMG), Department of Soil Conservation and Watershed Management (DSCWM) has been monitoring of river hydrology, water sediment, limnology and weather forecasting. The Government has incorporated disaster management subjects in school curriculum since the mid-1990s. Higher studies on flood is included in Forestry. Implementation of National Building Code (NBC) has been made mandatory in all municipalities. Likewise, mason trainings on safe building construction practices as per the NBC are being organized by both government and non-government organizations.

5. Preventive measures for an individual:

- Listen to the radio or watch TV for warnings about intense rainfall or for information and instructions from local officials.
- Be aware of any sudden increase or decrease in water level on a stream or creek that might indicate debris flow upstream. A trickle of flowing mud may precede a larger flow.
- Look for tilted trees, telephone poles, fences, or walls, and for new holes or bare spots on hillsides.
- Listen for rumbling sounds that might indicate an approaching landslide or mudflow.
- Listen to the radio or TV for emergency information.
- Report broken utility lines to the appropriate authorities.

6. Conclusion:

Nepal has been suffering from different types of geohazards and instabilities because of its complex structural deformation. Hazards like flooding and scouring are common in Terai areas whereas rock fall and topple occurs on hilly region. This review paper would be useful in reducing the loss of lives and socioeconomic structures due to water-induced disasters in various vulnerable areas of Nepal. It may also be useful in prioritizing the districts that are prone to floods for interventions and adoption of a new multifunctional law in the country. Policy, programme, activities and institutional arrangement from national to local level have been formulated and implemented for reduction of disaster. Local institutions are active in disaster management activities in the flood prone area of the Terai district. Community based disaster management and early warning system were effective to reduce the vulnerability from flood. Despite the different disaster management policy and programs in Nepal, the quality of governance, at all levels, is likely to be the biggest challenge for effective initiation, integration and implementation of disaster management activities at the local level particularly, for the poor and vulnerable communities. Although post-disaster rescue operations are given priority, and the national law also focuses mainly on the aftermath of a disaster. The management of disasters should be carried out routinely and must be revised in the national law to make it more effective.

References:

[1] https://thehimalayantimes.com/kathmandu/experts-discuss-water-induced-disaster-management/

[2] https://www.researchegate.net/publication/311354241

[3] water induced disaster in Nepal by Til prasad Sharma

[4] Disaster risk profile and existing legal framework of Nepal: floods and landslides by Surya Gaire, Rafael Castro Delgado, and Pedro Arcos González

[5] Hansen A (1984) Flood hazard analysis by Brunden D. Prior DB slope Instability

[6] A textbook of water resource by R.K Sharma

[7] Flood Forecasting Bulletin Reports

[8] A textbook of Engineering geology by Prakash Chandra Ghimire and Mahesh Singh Dhar

[9] A Technical Guideline on Flood Prevention Work,1996, DPTC,HMG, Nepal

[10] WMO. 2009. Integrated Flood Management Concept Paper. http://www.apfm.info/ publications/concept_paper_e.pdf

[11] PRC Ministry of Civil Affairs. 2015. Official Statement from Ministry of Civil Affairs at Third World Conference on Disaster Reduction. Sendai, Japan, 14-18 March 2015

[12] Understanding Disaster Management in Practice: With references to Nepal. Practical action(PRA), Kathmandu, Nepal

[13] Ministry of Home Affairs. (2018). Nepal Disaster Report, 2017: The Road to Sendai, Kathmandu: Government of Nepal

[14] National Position Paper for the Global Platform on Disaster Risk Reduction 22-26 May 2017, Cancun, Mexico

[15] Paschimanchal Campus Library