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Review Article

Information Technology in Disaster Management

Er. Manoj Kumar Singh[1*]

[1]Assistant Professor, Faculty of Science and Technology, School of Engineering Lekhnath-30 Pokhara, Pokhara University, 43WJ+VWR, Lekhnath 33700, Nepal

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***Corresponding author:** Er. Manoj Kumar Singh
Assistant Professor, Faculty of Science and Technology, School of Engineering Lekhnath-30 Pokhara, Pokhara University, 43WJ+VWR, Lekhnath 33700, Nepal

Abstract

In the present era of technology it has been simpler to deal with the disaster both natural and man made. Disaster Management activities rely upon substantial volumes of precise, applicable, on-time geo information that different organization systematically make and maintain. Information Technology is changing each part of human life. Disaster management desires forceful enhancements in its sources to decrease injury and save the lifetime of individuals. The advanced methods of information technology such as web, remote sensing, satellite communication, GIS, etc. can facilitate in coming up with and implementation of disaster management. Web provides a useful platform for disaster mitigation communications. On GIS is basic as effective preparedness, communication and training tool for disaster management on the other hand Remote Sensing as a tool can very effectively contribute towards identification of hazards areas. Communication satellite have become vital for providing emergency communication and timely help into natural disaster monitoring and mitigation mechanisms is critical for hazards reduction. There should be more emphasis on development of new technologies in disaster mitigation. The disaster preparedness and awareness is the only effective method of mitigating the impact of future disaster. In this paper an attempt has been made to highlight the role of information technology in management of natural disaster in Nepal.

Keywords: Disaster in Nepal, Application of IT in Disaster Management, Warning and Forecasting System.

INTRODUCTION

It could be a well known truth that natural disasters strikes nations, both created and creating, causing large destruction and making human sufferings and creating negative impacts on national economies. Due to different geo-climatic conditions predominant in several parts of the globe, distinctive type of natural disaster like floods, droughts, seismic tremors, violent winds, avalanches, volcanoes, etc. strikes according to the powerlessness of the area.

Nepal is considered as the world's most disaster prone nation. It has seen destroying natural disaster in later past like droughts, surges, tornados, seismic tremors, landslides……

NATURAL DISASTERS IN NEPAL

Nepal is a small and land locked and inclined to a number of natural disasters. Among all the natural disasters that nation faces, river floods are the foremost visit and frequently devastating. The setback within the precipitation causes dry seasons or dry season like stimuli in different parts of the nation. The country has confronted a few extreme seismic tremors causing far reaching harm to the life and property. Nepal incorporates stretch almost 2500 kms. in the east - west direction and they fall under the seismically dynamic zone . Another major issue confronted by the nation is within the frame of landslides and avalanches.

With an increment within the discernment towards spreading a culture of avoidance within the disaster management situation, significant accentuation is presently being put on research and development activities within the zone of information technology for disaster preparedness and prevention. This has brought in a significant positive change even though the multitude and frequency of disasters in the nation has increased as illustrated from water supply project in post-earthquake scenario to building construction (Mishra A.K, 2018; Mishra *et al*., 2021: Mishra and Aithal, 2021). Even occupational safety seems to be taken seriously as studies from building to hydropower transmission line has already highlighted including

industrial safety (Lama *et al*., 2019: Mishra, 2019: Mishra and Aithal, 2021: Mishra *et al*., 2022; Sah *et al*., 2019).

APPLICATION OF INFORMATION TECHNOLOGY IN DISASTER MANAGEMENT

In spite of the fact that it isn't conceivable to totally avoid the natural disaster, but the sufferings can be minimized by making legitimate mindfulness of the likely disasters and its affect by creating a reasonable warning systems, disaster preparedness and management of disaster through application of information technology apparatuses. The changing patterns have opened up a expansive number of logical and innovative assets and aptitudes to decrease disaster risk. There are mainly applications ready to utilize to manage disasters: 1) GIS and Remote Sensing 2) Web.

GIS AND REMOTE SENSING

GIS gives a instrument for compelling and productive capacity and control of remotely detected information and other spatial and non-spatial information sorts for both logical management and policy oriented information. This could be utilized to encourage estimation, mapping, observing and demonstrating of assortment of information sorts related to natural phenomenon. The particular GIS application within the field of Hazard Appraisal are:- Risk Mapping to show seismic tremor, avalanches, floods or fire hazards. Theses map might be made for cities, locale or indeed for the complete nation and tropical tornado Risk Maps are used by meteorological divisions to move forward the quality of the tropical storm warning services and rapidly communicate the hazard to the individuals likely to induce influenced by the cyclone.

Remote sensing makes observation of any protest from a distance and without coming into real contact. Remote Sensing can assemble information much quicker than ground based observation, can cover large area at one time to give a synoptic view.. Remote Sensing comprises Aerial Aerial Remote Sensing which is the method of recording data, such as photos and pictures from sensor on aircrafts and satellite remote sensing system which can be utilized to coordinated natural hazard evaluations into improvement planning studies. They are: Land satellite, SPOT Satellite, Radar System. A few applications of GIS and Remote Sensing in different disaster are as follows:-

A) DROUGHT

GIS and Remote Sensing can be utilized in dry relief management such as early warning of dry season conditions will offer assistance to arrange out the procedures to organize relief work. Satellite data may be utilized to target potential ground water destinations for taking up well-digging software engineers. Satellite data gives profitable instruments for assessing regions subject to desertification. Film transparencies, photos and digital data can be utilized for the reason of finding, surveying and checking deterioration of natural conditions in a given area.

(B) EARTHQUAKE

GIS and Remote sensing can be utilized for planning seismic risks maps in arrange to evaluate the precise nature of risks.

(C) FLOODS

Satellite data can be effectively utilized for mapping and checking the flood immersed regions, flood damage assessment, flood risk zoning and post-flood study rivers configuration and assurance works.

(D) LANDSLIDES

Landslide zonation map contain a outline delineating the extends or zone of shifting degree of expected slant stability or instability. The map has an inbuilt component of estimating and is consequently of probabilistic nature. Depending upon the technique received and the comprehensiveness of the input information utilized, a landslide hazard zonation map able to supply offer assistance concerning area,- degree of the slop range likely to be influenced, and rate of mass development of the slope mass.

E) Search and Rescue

GIS can be utilized in carrying out search and rescue operations in a more compelling way by recognizing regions that are disaster prone and zoning them in like manner to hazard magnitudes.

INTERNET

In the display time of electronic communication, the web gives a valuable stage for disaster mitigation communications. Lunching of a well characterized web sites may be a exceptionally cost-effective means of making an intra-national and international presence felt. It gives a unused and possibly progressive choice for the fast, programmed, and worldwide spread of disaster information. A number of people and groups, counting a few national meteorological services, are testing with the Web for real-time dispersal of weather observation, forecast, satellite and other data. Within the most basic stage of natural disaster electronic communication have given the most effective and in a few occurrences maybe the as it were means of communication with the exterior world.

WARNING AND FORECASTING SYSTEM

An development system of estimating, observing and issuing early warning plays the most significant role in deciding whether a normal hazard will expect disastrous proportion or not. The nation have the taking following forecasting systems:

1. NEPALI METEOROLOGICAL DEPARTMENT (NMD) Department of Hydrology and Meteorology

NMD Provides weather forecasting & cyclone warnings. NMD runs operationally a Limited-area

Examination and Forecast system (LAFS), based on an ideal Translation (IT) analysis and a constrained range Primitive equation (PE) model, to supply numerical guidance. Emergency number are found in practice for the same (Shah and Mishra, 2018).

2. NATIONAL REMOTE SENSING CENTRE (NRSC)

Long term drought proofing programmes on the natural resources of the locale have been incredibly made a difference by the utilize of satellite data received by NRSC. Satellite data can be utilized exceptionally successfully for mapping and checking the flood immersed regions, flood hazard assessment, flood hazard zoning and past surge study of river configuration and assurance works.

3. SEISMOLOGICAL OBSERVATIONS

The number of stations were expanded steadily to make the National Organize comprising of 21 brief period seismic stations in 1998 and 7 accelerometer stations in 2012. The arrange is worked in collaboration with Department of Analysis & Surveillance of Environment (DASE), France. The 21 brief period seismic stations and 7 accelerometer stations involve the Lesser Himalaya and Sub Himalayan landscape of Nepal Himalaya uniformly. The recording is carried out at two centres Birendranagar Regional Seismological Centre (RSC), Surkhet and National Seismological Centre (NSC), Kathmandu. RSC records 9 stations of mid western and far western Nepal whereas NSC records the remaining 12 stations from Puthan to Taplejung.

4. FLOOD FORECASTING

Flood forecast and warning are issued by the Department of Hydrology & Metrology (DHM) ,ministry of Energy, water Resources & irrigation. These are utilized for alerting the people and for taking appropriate measures by concerned regulatory flood hazard mitigation. Data is assembled from the DHM endless organize of forecasting Stations on different rivers in the nation.

FINANCIAL ARRANGEMENTS FOR NATURAL DISASTER IN NEPAL

Arrangement of a Central Natural Disaster Help Support has been made beneath the control of the Central natural disaster Help Committee. The support comprises of: (a) cash and kind provided by Government of Nepal, (b) finance received from the Prime Serve Help Support, (c) cash and kind help received from foregin nations, offices and people, and (d) finance received from other sources. In expansion, arrangement has moreover been made of a regional natural Disaster Help finance, a District Natural Disaster Help Support and a Local Natural Disaster Help Support. These stores comprises of money and kind given by Government of Nepal, money and kind received from Central Natural Disaster Help Support and from other sources. At all, at display, as it were the Prime Minister's Help Finance, the Central Characteristic Fiasco Help Finance and the Locale Characteristic Catastrophe Help Support are into operation. The Central Support discharges budget to the Area Normal Calamity Help Finance agreeing to the require and avocation for prompt protect and alleviation help to the casualties of the natural Disaster. Fire seems to be taken seriously as well (Mishra and Sharestha, 2017 a, b). Many attempts are under process such as operational status in building by Mishra also needs attention for safety. Adhikari *et al*., 2020 founds several causative factors. Mishra *et al*., 2022 and Pokharel, 2021 have given serious insights on safety for smart development of the nation which seems highly applicable.

CONCLUSION

It may be observed that improvement in information Technology within the form of Web, GIS, Remote Sensing, Satellite communication, etc. can offer assistance a awesome bargain in arranging and execution of risks lessening. For greatest advantage, modern technologies for public communication should to be made utilize and characteristic disaster mitigation messages should to be passed on through these measures. GIS can move forward the quality and control of investigation of normal hazards evaluations, direct advancement activities and help organizers within the determination of moderation measures and within the execution of crisis readiness and reaction activity. Remote sensing, on the other hand, as a device can exceptionally successfully contribute towards distinguishing proof of dangerous zones, screen the planet for its changes on a genuine time premise and provide early caution to numerous looming disasters. Communication satellites have ended up crucial for giving crisis communication and convenient help measures. Integration of space development inputs into natural disaster checking and mitigation mechanisms is basic for hazard reduction. It is completely vital to make awarness amongst the public as well as choice creators for designating resource for suitable speculations in information technology. Awarness and training in information technology in a much grater degree is required to develop human resources, especially within the creating nations, who are chronically endure from natural disasters. The disaster usually happen within the well-defined regions, indeed in spite of the fact that the community does not know the adapting instrument for the calamity. The disaster mitigating programs must be broadly taken up covering different angles at national level to limit the disaster damages. There should be a more emphasis on improvement of modern technology in disaster mitigation. The disaster preparedness and awareness is the only effective way of mitigating the effect of future disaster

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