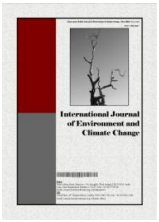

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Use of GIS and Remote Sensing as Risk Reduction Techniques in Disasters with Special Reference of India

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Authors' contributions

This work was carried out in collaboration between both authors. Author SM designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author PB managed the analyses of the study. Both authors read and approved the final manuscript.

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ABSTRACT

Management in Disaster may be a dynamic method. It includes the classical management functions of turning out with, organizing staffing, leading and dominant. A hazard involves several organizations, that should work along to prevent mitigate, inure, answer, and recover from the results of disaster. Disaster management would so embrace immediate response, recovery, prevention, mitigation, state, the cycle goes on. Asian country is that the country wherever varied varieties of natural disasters overrun once a year, eg. Floods, drought, earthquakes, cyclones and landslides etc. In Asian country uncountable folks are affected every year and additionally the economic losses caused by varied disasters quantity to a big share of the Gross National Product. Natural Disasters are large economic burdens particularly on economically developing countries as Asian country. Every year, large quantities of resources are mobilized for rescue, relief and rehabilitation works following natural disaster occurrences. In India, a far better analysis of what transforms an event into somebody's and economic disaster reveals that the essential issues of

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development that the country faces are the precise same issues that contribute to its vulnerability to the harmful effects of natural hazards. This text aims to focus on the importance of GIS and remote sensing that how to boost the presently practiced disaster management programs victimization these techniques.

Keywords: GIS; remote sensing; risk reduction techniques; disaster management.

1. INTRODUCTION

Natural Disasters area unit the catastrophe which might return anytime in any a locality of the planet with none previous indications. To stay with World Health Organization "Any incidence that causes hurt, economic destruction, loss of life and deterioration in health and health service on a scale adequate to warrant an additional commonplace response from outside the settled community or area" stated as Disasters. The record of natural disaster at intervals the recent past shows that spasmodic and spiritless tries at responding to the disaster have entirely semiconductor device to confusion adding a lot of to the suffering of the disaster victims.

We tend to won't stop disaster to happen but will really take some measures to chop back its devastating effects. Disasters area unit attending to be of various forms like earthquake, floods, cyclones, droughts, etc. An increasing style of disasters every natural associated artificial with an out sized style of victims and vital social and economic losses area unit determined at intervals the past few years. Though express events can frequently be attributed to fate, it's raising the disaster management that has to contribute to decreasing damages and making sure correct beware of voters in affected areas. style of the teachings learned at intervals the last a few years give clear indications that the supply, management and presentation of Geo-information play an important role in disaster management.

However, all the management techniques that area unit being developed area unit understood by, and confined to the intelligence community and so lack mass participation. Awareness of the disasters is that the only effective approach throughout that one can induce mass participation. Hence, any disaster management is winning entirely the overall public has some awareness concerning the disaster. At intervals the look of such awareness program, intelligent mapping through analysis and data sharing in addition plays a really vital role. The analytical capabilities of GIS support all aspects of disaster management: bobbing up with, response and recovery, and records management.

1.2 Objectives

The following objective has been decided for the study.

- To evaluate the present status and policies of disaster management in India
- To understand the role of GIS maps in disaster management
- To describe how maps provide geographic context for disaster management.
- Be familiar with the concept of situation awareness.

2. DISASTER RISK REDUCTION

In general Disaster Risk Reduction could be a systematic approach to distinctive, assessing and reducing the magnitude relation of risks throughout the disaster. The aims of reducing risk square measure to cut back socio-economic vulnerabilities throughout natural disaster yet as managing the environmental and alternative hazards that trigger them. Here it's been powerfully influenced by the mass of analysis on vulnerability that has appeared in print since the mid-l970.It is the responsibility of development associate degreed relief agencies alike and it ought to be an integral a part of the means such organizations do their work, not an add-on or one-off action. Disaster risk management is incredibly wide travel, so its scope is far broader and deeper than standard emergency management. There's potential for Disaster risk management initiatives in barely regarding each sector of development and humanitarian work. per UNISDR and UNDP: "The abstract framework of parts thought of with the chances to attenuate vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, at intervals the broad context of property development.

3. POLICIES AND STRATEGIES IN INDIA

In the post-independence era Disaster Management was thought-about as a post-disaster activity, focusing chiefly on relief, rescue and rehabilitation. Within the recent past there has been a paradigmatic shift in India's approach to Disaster Management. The new approach is multi-disciplinary, multi holistic and proactive, process. This new approach has been incorporated into national disaster framework or map ready by National Disaster Management division of Ministry of Home Affairs. The framework is comprised the eight parts that are.

- Institutional mechanisms
- Disaster mitigation
- Legal policy framework
- Preparation and response
- National network of emergency operation center
- Early warning systems
- Human resource development and capability building
- Analysis and information management.

4. USE OF GIS AND REMOTE SENSING FOR DISASTERS MANAGEMENT

Geographical data system (GIS) may be a terribly helpful and necessary technique for hazard zone mapping throughout emergency conditions for mitigation. GIS and Remote sensing techniques square measure a lot of helpful in mitigation ways and preparation plans. Real-time geographic knowledge will improve the allocation of resources for response. GIS technologies are often a lot of helpful in modeling of disaster risks and human variations to hazards. it conjointly provides call network in disaster management. Integrated use of area technology applications like satellite communication satellite-based mostly positioning satellite meteorology and remote sensing is progressively being adopted within the region for established of the required infrastructure and operational systems for natural disaster mitigation. The foremost necessary application of area technological is in detection and delivering early warnings of at hand disasters and in distributive this info to folks probably to be affected. Use of satellite meteorology has been triggered by the necessity to enhance weather and climatologically info and to initiate a detailed weather go over a district prone to natural disasters. the employment from fixed fifty two meteorological satellites has been triggered to produce real-time or close to real-time information on cyclones and to help in prediction the movement of tropical cyclones 24- forty eight hours before at the present china, India, Japan and also the Russian Federation have operational artificial satellite systems in polar and fixed orbits. Whereas over thirty countries within the region have ground reception facilities with such infrastructure mush countries within the region within the application of science satellite knowledge.

A good control system depends on timely availability of correct info on precipitation, inclement and different knowledge, in several cases over inaccessible areas. Knowledge from satellites is wide wont to improve precipitation calculable in China, India, Mongolia and also the Central Asian republics victimization remote sensing knowledge. In many countries, notably Asian nation, China, India, Japan, Malaysia, Pakistan, Thailand, and Vietnam, and within the Mekong basin, the applying of area technology has improved flood prediction and disaster warning efforts. Remote sensing knowledge has conjointly been wont to establish and map flood risk areas furthermore on assess flood harm. There square measure many areas of doable cooperation in enhancing the employment of area technology for disaster management. Early warning and high-speed communications, in conjunction with effective and economical satellite communications technologies expedited by regional cooperation, square measure very important for disaster bar, preparation and response operations for floods, earthquakes, droughts and geological process. The presently accessible wealth of area assets indicates the potential for sharing knowledge.

Among the users. However, there's an Associate in nursing empty element in terms of a terrestrial infrastructure comprising low-priced systems furthermore as acceptable protocols which will allow the linking of existing area resources in support of disaster bar and preparation.

4.1 Steps for Disaster Management Using GIS and RS

Disaster managers will take actions from completely different state, city, village level victimization GIS info for disaster coming up with. GIS info with numerous themes is useful to disaster managers in method} process once harmful event occur. Following steps may be

taking victimization GIS and RS techniques for Disaster management.

- readiness and coming up with of disasters
- prediction and early warning of calamitous event
- For relief management, rescue operations

4.2 Coming Up with and Analysis

GIS is that the most helpful and really data system for modeling, analyzing spatial information and displaying community vulnerability throughout establish hazard locations with vital infrastructure. Models created by GIS techniques may be used for determination of event impact and necessary mitigation demand. Preparedness may be a vital step when a disaster occurs.

4.3 Situational Awareness

Disaster and emergency management in situational awareness is an extremely common issue. GIS techniques play terribly huge and necessary role to produce location info of the place, wherever the event happened and what happening specifically in real time. Conjointly by linking folks, processes spatial info situational awareness established. Victimization GIS-based mostly map conditions may handle additional easily.

4.4 Information Management

Data management method is to realize of readiness, gathering information and its advance data storing. Victimization GIS techniques, integration of data from different sources is feasible. Correct cataloging of GIS information provides recent and helpful info in emergency conditions throughout disasters.

4.5 Field Operations

Role of field information is extremely necessary in victimization GIS applications. Mobile GIS provides US crucial info. Victimization GIS techniques the sphere team captures info and sent back to user. So ground info helpful for recognizing actual event conditions. Then new information may be sent to operation groups in the affected field, so that they have the knowledge attainable for shielding lives and providing safety to folks.

4.6 GIS Based Mostly Whole Data in Disaster Management

- Use of assorted satellite imageries (Remote Sensing data) ex. Quick bird, SPOT, IKONOS for GIS information creation.
- Preparation of base map of assorted themes pattern satellite imageries.
- Thematic maps like a hydro morphologic map, slope map, parcel map, and DEM generation in GIS. It's used for disaster coming up with.
- Macro and little level maps used for distinctive vulnerability and threat condition.
- Identification of safe locations and zones for rehabilitation
- Road and website maps used for locating alternate routes, shelters and locations.
- Coming up with of evacuation and operation
- Management of Rehabilitation and post-disaster reconstruction.
- Applicable locations distinctive scientifically for construction of homes and shelters.
- No construction areas acknowledged and rehabilitation of existing people is completed.
- Hospitals and medical facilities identification for bruised people.

4.7 Benefits of GIS and Remote Sensing Throughout Disasters

- GIS technique cannot exclusively be useful for observance historical sites of earthquake but to Response & information management for recovery collectively.
- This technique can use for Impact assessment.
- Pattern GIS Flood mapping from Macro to tiny level is finished merely.
- Flood Zone mapping will even be done by GIS.
- We have a tendency to area unit able to Deduct Potential computer of arrive reference with downfall pattern GIS.
- Effective Elevation Mapping is completed by GIS.
- Response map is ready merely to manage things once flood.

5. CONCLUSION

India is taken into account because the world's most disaster prone country, like several different countries during this region, with natural hazards changing into additional frequent and severe, disaster risk reduction is that they want of the hour. World governments and GIS corporations ought to add tandem bicycle to {plan to plot} innovative tools & ways to plan a good disaster management strategy and create the foremost of the geospatial technology. GIS and Remote sensing techniques are abundant helpful in mitigation methods and preparedness plans throughout disasters. The important time geographic information will improve the allocation of resources for response. GIS technique may be additional helpful for modeling of disaster risks and human variations to hazards. It additionally provides call network in disaster management.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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