

An Emerging Valuation of Disaster Management Using GIS and Remote Sensing

N.Claudia, I.Serilda

Research Scholars, Department of Geology,
Jawaharlal Nehru Avenue, Durgapur, Paschim Bardhaman, West Bengal, India

Abstract

From the modern years, remote sensing and GIS plays an important role in disaster management with the country emergency policies and also it has been a main interest in the field of technology. In the recent centuries, the recurrent normal natural disasters has been provided some provisions to propose a detailed plan for threat demonization by using initial alert system and to moderate the further disaster effects. GIS in the country like India plays a vital role in the disaster management. The authors also deliberate that Geoinformatics as a tool of Intellectual Assessment Sustenance System, Knowledgeable system and Earth Surveillance System. So it can play a most important role in Disaster Management and can ecologically subsidize near nation's defensible growth. In this proposed system, it is being discourse the subjects concerning current works on part of GIS in disaster Management. It also gives an assessment of some fascinating and revolutionary exploration work agreed so far on the framework of disaster management.

Keywords: GIS, remote sensing, disaster management.

I. INTRODUCTION

Over recent times, the work of global observation has perceived significant improvement as a result of the aggregating excellence of the technology and the aggregating number of functional satellites propelled by several space organizations and corporations around the world. The increasing number of solicitations of the accessible remote sensing data is in chance nourishing the desire for new and enhanced technologies.

However remote sensing made huge development over the last years in relations of improved determination, data availability and public concentration, a vast popular of claims rely on elementary image processing concepts established in the classification of information in a multi-dimensional feature space. Subsequently the principal Land sat Multispectral Scanner System was hurled which instigated the current period of land remote sensing from space, large capacities of satellite image data have been composed, which are priceless to many uses containing ecological valuation and

observing, agriculture, renewable natural possessions, and planning.

On every occasion, the geo sphere fluctuations its configuration owing to various geological causes, the outcomes are natural disasters. Maximum number of the periods, these natural disasters destructs natural assets, possessions and destroy living things life. Such natural disasters are suitable a great task for the existence of human beings in the exaggerated area. It is progressively renowned worldwide that the overwhelming effects of natural disasters is related to limitations of development strategies. Thus provoking disaster concerns in a methodical and intelligible fashion is suitable an unambiguous objective of expansion approaches.

Such a condition permits the Administration to pledge idealistic steps to make the country robust and a harmless place to live. A technical consideration of the whole scope of disaster management would go an extended way in alleviating the effects of a natural disaster. Therefore the Management aggressively comprises the country geological survey department, one of the foremost scientific organizations, in the practices of natural catastrophe risk assessment and justification as a part of its contract of duty. Regardless of several evil belongings on the human life, natural disasters are deliberated as an improvement concern when sufficient engagements of recognized tools for disaster risk valuation, vindication and supporting occur. Pre disaster valuation and synchronization with the GSI openly aspects in the development accomplishments and thus the part of geo informatics. In this generous of joint project, creating the life of people contented and normal in disaster prone area is one of the admirable realizations. In geographic information systems, the aerial imagery has been one of the normal data cradles for more than several years. Furthermost, spatial features in the system can be taken out habitually from descriptions. Path data in GIS are of foremost prominence for applications such as traffic control, conveyance flow exploration, vehicle steering, travel supervision, and fire or medicinal emergency amenities. Construction data in GIS are also significant for safety perseverance. Consequently, procurement of truthful and latest road network information erection withdrawal from aerial imagery is needed. Spontaneous road abstraction

from digital descriptions has been a most important investigation concentrate in the photogrammetric and computer vision fields. Open Aerial pictures principally of municipalities, fields usually contain symmetrical facts representing constructions, highways, field restrictions, and car parks. To be

aware of those real entities from such images it requires a contrivance which will identifies geometrics statistics of such objects from the imagery. This information is much cherished principally in measurements, population concentrations, etc. type of geometric data.

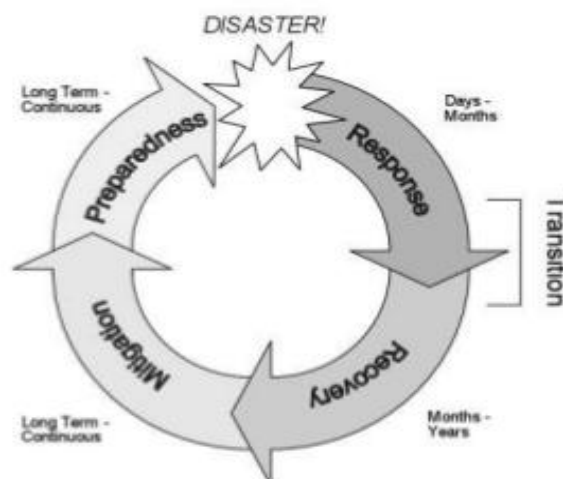


Fig.1: Basic process in Disaster Management

II. BASIC PROCESSES IN DIASSTER MANAGEMENT

Disaster management accomplishments are concentrated on three primary intentions. These intentions are safe guarding life, belongings, and the surroundings. With the purpose of achieve these ideas; the following basic progressions are essential.

A. Planning

Disaster management programs instigate with detecting and recognizing potential emergency complications. Using a GIS, representatives can located angers and begin to estimate the significances of potential tragedies or catastrophes. Before an operative disaster management program can be applied, thorough investigation and scheduling must be done. GIS enables this process by permitting developers to view the suitable mixtures of spatial data through computer-generated maps.

B. Mitigation

As possible disaster conditions are recognized, mitigation requirements can be determined and highlighted. A GIS can recognize particular slope kinds in mixture with certain types of incendiary vegetation near homes that could be endangered by wildfire. It can detect convinced soil types in and contiguous to earthquake impact zones where bridges or flyovers are at threat. A GIS can classify the expected path of a flood founded on topographic features or the extent of a coastal oil spill based on tides and wind. More prominently, human life and other values at danger from these difficulties

can be rapidly recognized and directed for protecting action.

C. Preparedness

Preparedness consists of those actions that formulate for actual disasters. GIS can demonstrate real-time monitoring for crisis early threatening. Remote weather situations can offer current weather directories based on position and nearby areas. Wind direction, temperature, and comparative moisture can be presented by the recording weather station. It is now potential to distribute this type of data and geographic display over the Internet for public information or the Intranet for administrative information distribution.

D. Response

GIS can suggest one of the principal constituents for computer-aided dispatch (CAD) systems. Disaster response units based at stable locations can be designated and directed for emergency response. The flanking response units can be nominated, transmitted, and transmitted to a crisis once the location is known. Depending on the emergency, a GIS can provide thorough information before the first units arrive.

Disputes in Geo Informatics

Geo information expertise suggests an occasion to sustain disaster management. Disaster management is subject to on large volumes of exact, appropriate, on time geo information that numerous

organizations analytically generate and uphold. Remote Sensing is suitable to observe a large area in a reasonably short time. It inhibits proficiency and usefulness. It is a thrilling, stimulating impression for the assessment field and the research expert. It plays a significant part in earth quake extrapolation, seismic micro zonation and post-earthquake disaster management. The major restrictions of remote sensing centered earth quake studies is attributed to rare confirmation of satellite based measurement with earth data and the lack of reliability in fashion in the dealings of detected irregularity with the earth quake. Remote sensing has been extensively used in the earth quake research from early periods with the obtainability of satellite images. In the field, primarily it instigated with the essential biological and geo morphological studies. Successively environmental valuation was carried out using the satellite data; it distributed a Seismo-tectonic Atlas of the amended area and its surroundings, grasping the speckled phase of geology configurations, tectonics, seismology and its related investigation. It contains study on normal disaster risk valuation, disaster risk declination and contributing in disaster management idea and the also it communicates to preparation capability Building. Thus geo informatics is aggressively partaking in nationwide ecological development programs.

III. EMERGENCY RECOVERY PLANNINGS

During emergency situations such as forest fires, mudflow, landslides, earthquake in different localities, a GIS can demonstrate the modern emergency unit settings and allotted tasks to tolerate complete circumstances status. If the emergency develops a catastrophe and reaction units attain from outer the local area, they can be added and demonstrated. Rescue determinations instigate when the emergency is over when an instantaneous risk to life, assets, and the surroundings. Reclamation efforts are frequently in two phases, short term and long term.

A. Short Term Recovery

Short-term recovery renovates dynamic amenities and methods. This may consists of transitory basic needs such as food, water, and shelter to populations who have missed households in a storm or enormous wildfire, guaranteeing wounded persons have medical care, and reestablishing electrical services through backup generators, and so on. The things of the emergency services may be

endless and continuing, but the instantaneous dangers are paused and basic facilities and essential requirements are renovated. A GIS can play a significant role in short-term reclamation exertions. One of the most problematic jobs in a catastrophe is destruction valuation. It efforts in performance with GPS to detect each smashed capability, classify the category and extent of destruction, and instigate to establish significances for deed. Laptop computers can appraise the principal requirement databases from remote localities through a selection of methods. It also display complete recent an annihilation assessment as it is accompanied. Emergency dissemination centers' goods like medical, food, water, clothing, etc. can be dispensed in applicable quantities to accommodations based on the volume and kind of destruction in each area. GIS can exhibits the number of accommodations required and where they must be situated for sensible access. It may also present zones where amenities have been reinstated in order to rapidly rearrange reclamation work to precedence responsibilities. Action tactics with maps can be published, delineating work for each particular area. Accommodations can appraise record databases permitting the primary appreciation center to amalgamate supply orders for all shelters. The instantaneous retrieval exertions can be visually exhibited and quickly rationalized until short term recovery is complete. This pictorial status map can be retrieved and observed from remote localities.

This is predominantly useful for large dangers or catastrophes where work is continuing in different locations.

B. Long Term Recovery

Long-term recovery renovates all amenities to regular or better. Long-term recovery such as replacement of accommodations, water structures, lanes, hospitals, bridges, schools, etc. can yield more than a few years. Long-term plans and progress can be showed and followed employing a GIS. Arrangement for major re-establishment savings can be made with the support of GIS. As long-term renewal is accomplished, it can be recognized and visually pursued through GIS. Book-keeping for catastrophe expenses can be problematical. As funds are assigned for maintenances, accounting data can be documented and related to each locality. Long term recovery expenditures can be in the millions for large disasters. Accounting for how and where funds are allocated is demanding. A GIS can ease the burden of this task.

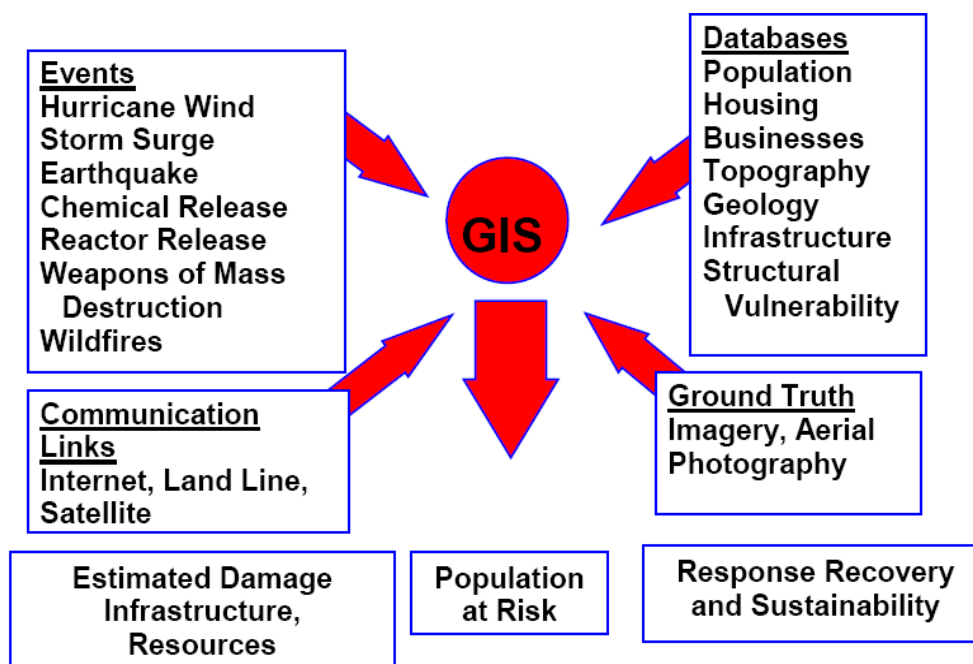


Fig.1: GIS in Disaster Management

IV. CHALLENGES IN DISASTER MANAGEMENT

Disaster Management is a worldwide concern. The concentrated collaborations between people and nature which is so long desperately demoralized the health of the latter, are currently enchanting an even better toll on the survives of the earlier. Hence there is a crucial terrible essential for a practical depiction of how disaster connected concerns can be recognized using GIS. This Geomorphic Planning with environment exploration using remotely sensed data with inadequate ground checks is beneficial in

- Vulnerability zonation
- Thoughtful neo-tectonic activities
- Beneficial in flood control studies
- Convenient in transmission and transport networks
- Suitable for river connecting projects
- Land use policy resolutions

A revolutionary appearance on the complete disaster management role of the system in its task based on the Geoinformatics Tactic on Disaster Management is intended towards incorporation of accomplishments with Disaster Management Group and connection with state Disaster Management Consultant. One of the prospect tasks of the Geological Survey is Natural Threats, Risk and Flexibility Assessment through group of information from modern Earth Surveillance Networks. The GSI in cooperation with ISRO is training manpower on Earth Scrutiny Networks.

V. RELIEF EFFORTS FOR A DISASTER

Many countries have established advanced techniques of suggesting public intellectual health amenities. These exertions should be fortified. Simultaneously, the influence of these facilities should be accurately evaluated and modifications made as essentially. The interpolations directly following a disaster happen in four phases:

A. Rescue phase

This is the period instantaneously after the occurrence and lasts about two weeks. On a sensitive scale, this is also denoted to as the 'Valiant Phase'. People, targets and others similar, join hands to do of any kind they can avoid damage of life and assets in an unstructured display of humanity. There are many interpretations of people who have been in the forefront of relief work, often working several hours at an expanse, and have every so often exposed personal injury and travail to support save lives of others. However, there is a dark side to release exertions too and care must be taken to certify that there is no robbing, marauding or misuse of the susceptibility of the fatalities.

B. Relief phase

This is a period enduring nearly one third of the year after the disaster occurs. This is the period when a massive expression of relief provisions and maintains from the community, controlled assistances, and management result in a high level of assurance about difficulties being distributed with and the situation civilizing. There is a tendency of consideration, generosity, and care.

C. Rehabilitation phase

This phase endures up to one to two years or more after the catastrophe. Disappointment about the effectiveness of the relief determinations sets in at some point in time during this period. Administrative interruptions and permissible obstructions in providing liberation and possibilities that are not reserved or those that fall short of prospects can lead to thwarting. Fatalities are aware of that they have to transfer the delay for support and explain their own complications.

D. Rebuilding phase

This may perhaps end a years and occasionally even endure for lifetime fully. Disaster awareness, particularly for high-risk and susceptible parts, is also an essential part of this stage. Personalities and societies work together to reestablish regularity. People inaugurate to live life on their own expressions and move on.

VI. CONCLUSION

Disasters have significant social and mental influences that are redirect not only the effect features such as magnitude and severity but the pre-existing communal and commercial susceptibilities, which strengthen the loss and interruption. Operative disaster management required to confirm that the various interests and imports of mutual life are assimilated into scheduling and reaction, specifically those of susceptible individuals and collections. Simultaneously, it is essential to take into contemplation the emotional possessions of disasters, predominantly in relation to reaction tools and progressions. The improved accessibility of Remote Sensing data and GIS during recent periods has generated prospects for a more comprehensive and prompts exploration of natural vulnerabilities. Disaster Management can be very proficiently and cost effectually held by using improvement in the technology. This can assists us to decrease the victims and reimbursements caused by disasters.

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