

Disasters and Emergency Management by GIS Technology

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Abstract: Emergency management system is very necessary to look upon and handle carefully. ESRI now has come up with a great technology called GIS (Geographical information System) which helps all the way to manage emergencies. Emergency management activities are outlined into 5 five phases that area unit connected by time and functions to all or any kinds of emergencies and disasters. These phases also are associated with one another, and every part involves differing types of skills. All the phases of emergency management system depend upon varied information from a spread of sources. The suitable information have to be compelled to be gathered, organized, and displayed logically to see the dimensions and scope of emergency management programs.

Keyword: *GIS, Emergency, Disaster, Planning, Mitigation, Preparedness, Response.*

I. Introduction

Emergency management system may be a terribly effective state altogether quite matter. Here we have a tendency to area unit planning to comprehend distinguishing emergency management activities and describe however geographic information system (GIS) technology plays a critically vital role in it.

Terms outlined

- **Emergency**— Emergency is Associate in nursing act of deviation from planned or expected behavior or a course of events that endangers or adversely affects individuals, property, or the surroundings.
- **Disaster**— Disasters is characterized by the scope of Associate in emergency. Once endanger exceeds the
- potential of the native resources to manage it then Associate in Nursing emergency becomes a disaster. Disasters usually end in nice injury, loss, or destruction.

- **Risk**— Risk is that the chance of Associate in Nursing emergency to occur. as an example, the chance of injury to a town from Associate in Nursing earthquake is high if it's engineered on or adjacent to a full of life earthquake fault.
- **Hazard**—Physical characteristics that cause Associate in Nursing emergency is stated Hazard. as an example, earthquake faults, active volcanoes, flood zones, and extremely ignitable brush fields area unit all hazards.

II. General kinds of Emergencies

- **Human-Caused**— Human-Caused emergencies area unit those unplanned event or accidents that results from human action or human developments. Examples chemical explosion, nuclear radiation escapes, crashes, explosions, and concrete fires.
- **Natural Disasters**— Natural disasters area unit those unplanned events that occur as a results of natural processes like earthquakes, tsunami, freezes, extreme heat or cold, drought.
- **Internal Disturbances**— Internal disturbances embrace those activities planned by a gaggle or individual to designedly cause disruption. Example riots, large-scale jail breaks, and violent strikes.
- **Energy and Material Shortages**— Shortages embrace strikes, price wars, and resource scarceness in time of emergencies.

Emergency management phases

Emergency management activities are outlined into 5 phases that area unit connected by time and functions to all or any kinds of emergencies and disasters. These

phases also are associated with one another, and every part involves differing types of skills.

- Planning— Steps to analyze and document the possibility of an emergency or disaster and the consequences or impacts on life, property, and the environment from that. This also includes estimate the hazards, risks, mitigation, preparedness, response, and recovery needs.
- Mitigation— Activities that truly cut back the chance of a disaster (for example, a full document of a building codes in earthquake prone areas). It conjointly includes long-run activities to cut back of ineluctable disaster (for example, build a replacement society).
- Preparedness— In state part, governments, organizations, and people develop plans to avoid wasting lives and take a look at to attenuate disaster damages (for example, mounting coaching exercises, the way to survive in Associate in Nursing earth quake).
- Response— Activities area unit designed to supply emergency help and provides assurance for victims (for example, search and rescue, emergency shelter, medical aid, and mass feeding).
- Recovery— It includes those activities necessary to come all systems to traditional or higher. It is in 2 sets of activities:

(1) short-run recovery activities offers important life-support systems to minimum want of standards (for example, cleanup, temporary housing, and access to food and water), and

(2) long-run recovery activities could continue for variety of years or a protracted amount of your time once a disaster. Their purpose is to come life to traditional or improved living levels the maximum amount as attainable (for example, legal help, and community coming up with, boost the economic structure).

III. GIS- The Technology for Emergency Management

All the phases of emergency management system depend upon varied information from a spread of sources. The suitable information have to be compelled to be gathered, organized, and displayed logically to see the dimensions and scope of emergency management programs. Throughout Associate in nursing actual emergency it's therefore terribly vital to own the proper information, at the proper time, displayed logically, to reply and take the suitable action against emergency. The careful info regarding pipelines, building layout, electrical distribution, sewer systems, then forth area unit usually ought to take Associate in nursing action. GIS manages all the relevant information along very systematic manner in its information. All departments is connected and may share

info through databases on laptop generated maps in one location by utilizing a GIS product.

- Planning— Emergency management programs begin with locating and distinguishing potential emergency issues. Employing a GIS, officers will signifies hazards and start to judge the implications of potential emergencies or disasters. Once hazards (earthquake faults, fireplace hazard areas, flood zones, etc.) area unit viewed with different map information (streets, pipelines, buildings, residential areas, power lines, storage facilities, etc.). Lives, property, and environmental values at high risk from potential emergency or disaster become straightforward to handle and initiate to require correct action. GIS facilitates this method by permitting planners to look at the suitable combos of abstraction systematic information through computer-generated maps.
- Mitigation— As potential emergency things area unit known, mitigation is determined and prioritized. Within the case of Associate in earthquake, what developments area unit at intervals the first impact zone of earthquake faults? Supported the expected magnitude of Associate in Nursing earthquake, characteristics of soils, and different earth science information, what injury could occur? A GIS product will determine the particular slope classes together with bound a part of Associate in Nursing emergency or disaster. Bound soil sorts in and adjacent to earthquake impact zones is checked by GIS, wherever bridges or overpasses area unit in danger. A GIS product can even determine the doubtless path of a flood supported topographical geo options.
- Preparedness— Activities to organize the desired steps for actual emergencies. . A GIS product can provide answers to the questions such as where should a fire station be located if a five-minute response time is expected? What evacuation routes ought to be designated and what action ought to be taken if a toxicant cloud is accidentally free from a plant supported completely different wind patterns? However can individuals be notified within the time of an emergency? Will the road networks handle the traffic? What facilities can offer evacuation shelters?

GIS will show period of time observance for emergency early warning. Remote weather stations will offer current weather indexes supported location and close areas. It's currently attainable to deliver this sort {of info | of data | of knowledge} and geographic show over the net for public info or the computer network for structure information delivery.

- Response— GIS provides one among the first elements for computer-aided dispatch (CAD) systems. Once the placement is understood then nearest (quickest) response units is designated, routed, associate in sent to an emergency spot. Looking on the emergency, a GIS will offer careful info before the primary units arrive. As an example, throughout a poster building fireplace, it's attainable to spot the nearest electrical panels, dangerous materials, and architectural plan of the building whereas en-route to the emergency. Advanced vehicle locating

(AVL) is incorporated to trace (in real time) the placement of incoming emergency units. The nearest mobile units (law enforcement) can even assist by AVL in deciding to be sent to associate in emergency, as they're set on the map through international positioning system (GPS) transponders.

- Recovery— Recovery efforts begin once the emergency is over however the impact of it. Recovery efforts is in 2 phases :

Short-term recovery stores important services and systems. This includes temporary food, water, Associate in nursing shelter to voters WHO have lost homes in an earthquake or giant conflagration, reassuring out of action persons have medical aid, and/or restoring electrical services through emergency generators, and so on.

A GIS product will add concert with GPS to find every broken facility, determine the sort and quantity of the injury, and start to ascertain priorities for action. Laptop, computers will update the first information from remote locations through a spread of strategies. GIS will show overall current injury assessment because it is conducted through the first information. Emergency distribution center will offer (medical, food, water, clothing, etc.) is assigned in acceptable amounts to shelters supported the number and kind of injury in every space. GIS will show the quantity of shelters required and wherever they ought to be set for cheap access. It will show areas wherever services ought to restore so as to quickly allocate recovery work to priority tasks.

Long-term recovery includes all necessary services to create traditional to higher. A long-run recovery (replacement of homes, water systems, streets, hospitals, bridges, schools, etc.) will take many years. Prioritization of major restoration investments is determined with the help of GIS.

Summary— Emergency management programs area unit developed and enforced through the analysis of correct info. the bulk of data is abstraction and may be mapped. Once the information of the knowledge is mapped and data is joined to the individual map, emergency management coming up with will begin. GIS has brought this opportunity to get all these in a proper way.

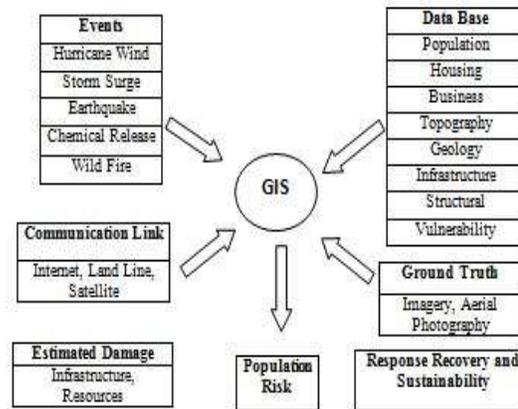


Fig 1 : GIS Technology of Disaster Management

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Conclusion

Throughout Associate in nursing actual emergency it's therefore terribly vital to own the proper information, at the proper time, displayed logically, to reply and take the suitable action against emergency. The careful info regarding pipelines, building layout, electrical distribution, sewer systems, then forth area unit usually ought to take Associate in nursing action. GIS manages all the relevant information along very systematic manner in its information. We can enhanced in future publication with the help of latest trends and technology.

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