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Role of Information in Disaster Risk Reduction

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Abstract— **Abstract-India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Natural disasters like floods, drought, cyclone, earthquakes and landslides have been recurrent phenomena. About 60% of the landmass is prone to earthquakes of various intensities, over 40 million hectares is prone for floods, about 8% of total area is prone to cyclone and about 68% of area is susceptible to droughts.**

In decade 1990-2000, an average of about 4344 people lost their lives and about 30 million people were affected every year. The lost in terms of private, community and public assets has been astronomical.

India has experienced most disastrous earthquakes i.e. may 1, 2013 Indo-Pakistani border magnitude is 5.8, April 16,2013 Dibrughar, Assam magnitude is 5.3,April 14, 2012 koynanagar, India magnitude is 4.9 and more. If we look back to the past disaster caused by the energy wave like December 26:2004 mega tsunami. Also the tsunami caused by earthquake in Japan, Indonesia & Nicaragua damage to cities along coastlines has been in the millions of dollar and rupees.

Many of us assume that the knowledge management is about capturing best practices and experiences of people and store it in a database with a hope that it will be useful later, infact this is not true and many of us spend more than ten percent (10%) of our time in searching for a piece of information we know resides somewhere.

World Health Organization define Disaster as "Any occurrence that causes damage, ecological disruption, loss of human life, deterioration of health and health services, on a scale sufficient to warrant an extraordinary response from outside the affected community or area".

Information and Communication Technology (ICT) in the form of internet GIS, Remote sensing, satellite based communication system, it can help a great deal in planning and implementation of disaster risk reduction measures.These technologies have been playing a major role in designing early warning system, catalyzing the process of preparedness, response and mitigation.

Hence it is necessary to make and effective plan for rescue and rehabilitation during seller.

Keywords— Emergency Preparedness Plan, Disaster Mitigation Disaster Prevention, Disaster Risk Reduction, Disaster Response, Hazard Analysis, Rehabilitation and recovery, Vulnerability

I. INTRODUCTION

Disaster can be natural as well as due to manmade activities. Some of the natural disasters are drought, floods, landslides, tsunamis, earthquakes, cyclones, tornadoes, hurricanes, volcanoes etc. Manmade disasters are due to deforestation, fire, terrorism, wars, nuclear, bombs and many more.

Disaster is a serious disruption in the functioning of the society, which causes human as well as environmental losses. In other words it is an ecological breakdown between humans and environment. In such a situation the affected society needs special aid to cope up with the damage.

The consequences faced after the disasters are atrocious. Due to the natural disasters, there are major environmental problems, environmental degradation, loss of animal life and human life. The life under threat can also be lost. The consequences which are faced after the manmade disaster are persistent which means the effect is carried on generations in all forms. All life forms are affected to a major extent, not only men but even plant, animal and aquatic life. Coping after the disaster, it is a major challenge to the victims as well as nature to get back its original form. The humans specially are psychologically worst affected. Disaster also results in loss of money, food, immediately after the disaster and major life loss, due to improper sanitation and disposal, the epidemics take over. The epidemic can be in any form which again takes thousands of lives.

Disaster management looks to that major evacuation and safety measures are taken when informed about the oncoming danger, and it also means that if a particular disaster occurs, how further problems are tackled.

Technology these days is growing at a faster rate. Technology helps in a great way to Manage the disaster related problems and also gives the information of the oncoming disaster management system.

Disaster management as a discipline that involves preparing, supporting and rebuilding society when natural or human-made disaster occur. Individuals, groups and communities manage hazards in an effort toavoid or ameliorate the impact of disasters resulting from the hazards. Its effectiveness relies on the through integration of emergency plans at all levels of government as well as non-government involvement.

Disaster Risk Reduction-

Disaster Risk Reduction (DRR) measures are designed to protect livelihoods and the assets of communities and

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individuals and the assets of communities and individuals from the impact hazards by;

Mitigation: reducing the frequency, scale, intensity and impact of hazards. Preparedness; Strengthening the capacity

Advocacy: favorably influencing the social, political, economic and environmental issues that contribute to the cause and magnitude of impact of hazards.

Mitigation efforts attempt to prevent hazards from developing into a disasters altogether or to reduce the effects of disasters when they occur. The mitigation phase differs from the other phases because it focuses on long-term measures for reducing or eliminating risk. The implementation of mitigation strategies can be considered a part of the recovery process if applied after a disaster occurs. However, even if applied as part of recovery efforts, actions that reduce or eliminate risk over time are still considered mitigation efforts.

In the preparedness phase, emergency managers develop plans of actions for when the disaster strikes. Common preparedness measures include

- Communication plans with easily understandable terminology and chain of command Development and practice of multi-agency coordination and incident command.
- Proper maintenance and training of emergency services.
- Development and exercise of emergency population warning methods combined with emergency shelters and evacuation plans.
- Stockpiling, inventory and maintenance of supplies and equipment.

An efficient preparedness measures is an emergency operation center (EOC) combined with a practiced region-wide doctrine for managing emergencies. Another preparedness measure is to develop a volunteer response capability among civilian populations.

The response phase includes the mobilization of the necessary emergency services and first responders in disaster area. This is likely to include a first wave of core emergency services, such as firefighters, police and ambulance crews. They may be supported by a number of secondary emergency services, such as specialist rescue teams.

DRR is often complementary or integral part of other programmes such as micro-finance, food security, promoting agriculture diversity, or capacity building. On occasions, particularly with preparedness planning and advocacy issues, it can be stand-alone activity. The inclusion of DDR measures in programming does not require a complete departure from Concern's current programme planning approach: it can be included within project concepts notes, programme cycle management and conceptual sits comfortably within the livelihoods model. However, DDR does require the active adoption of a DDR perspective in our contextual analysis and programme planning. This requires undertaking a risk assessment that identifies the probability of a hazard occurring and its likely impacts on a given community. It furthermore requires knowledge of some of the wide range measures that can be included in programmes in order to reduce risk to communities and individuals.

A disaster results when a hazard occurs and impacts on a community, overwhelming its capacity to cope. Disasters affect people, their livelihoods and their environment. The magnitude of impact is directly related to the intensity and scale of hazard and the vulnerability of individual communities.

The aim of the recovery phase is to restore the affected area to its previous state. It differs from the response phase in its focus; recovery efforts are concerned with issues and decisions that must be made after immediate needs are addressed. Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property reemployment and the repair of other infrastructure. it is apparent that the countries in which concern works are particularly prone to disasters, many of them cyclical and of regular occurrence. These include:

Tropical storms – e.g. Bangladesh, India, Haiti, Srilanka

Volcanoes and earthquakes – e.g.Haiti, DRC, Afghanistan, Indonesia, Bangladesh.

Landslides – e.g. Afghanistan, Burundi, Pakistan

Droughts – e.g. Haiti, Ethiopia, Kenya, Somalia, Eritrea, Sudan, Niger, Zambia, Zimbabwe, Timor Leste **Floods** – e.g. Bangladesh, Cambodia, Mozambique, Ethiopia, Kenya, Somalia, Pakistan, India.

Many countries in which concern works are recovering from or still experiencing conflict and insecurity – e.g. Haiti, Sierra, Leone, Rwanda, Burundi, Somalia, Afghanistan, Liberia, and Sudan and the development of many of these countries is affected by poor governance, absent, inappropriate or non-enforced policies, and health hazards such as malaria and HIV.

DRR is a means of bridging the gap between development and humanitarian programs and can be seen as a means of strengthening livelihood security. In countries faced with recurrent crises, development can only be sustained if there is a proper understanding of and response to the negative impact of disasters. DRR interventions seek assist in the development of this understanding to support livelihoods and to protect assets. It is hoped that DRR interventions will reduce community's vulnerability and increase their opportunities of pursuing sustainable livelihood.

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II. DISASTER RISK REDUCTION

Since disasters have the potential to undermine development, measures to prevent, prepare for and mitigate

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disasters should inform every plan and strategy for sustainable development.

DRR needs to be mainstreamed into programme design, project concept notes, and monitoring and evaluation in much the same way as gender and HIV issues have been included and used as reference points, in designing and choosing programmes.

The livelihoods model provides a framework in which DRR can be seen as part of long term sustainable development work. The model can be used to understand how risk reduction measures can be included within regular programme planning. Concern defines livelihood security as: the adequate and sustainable access to and control over resources, both material and social, to enable households to achieve their rights without undermining the natural resource base (Policy on Livelihood Security).

Technology in the form of Internet, Remote Sensing, satellite communication, etc. can help greatly in planning and implementation of emergency services and response action. Remote Sensing is very effective in contributing the identification of hazardous areas, monitoring the planet for its changes and giving early warning to many oncoming disasters. Communication satellites have become vital for providing emergency services in implementation hazardous consequences. Technology can improve the quality and power analysis of natural hazards assessments, guide development activities and also provide assistance in evacuation as well as in epidemic state.

Geological Disasters:

Earthquakes are usually caused due to that movement of tectonic plates and the affected area is comparatively large. Countries like Japan, Indonesia, and Peru etc are under constant threat of earthquakes.

The wireless sensors which special controls called magnetorheological dampers to limit damage from a simulated earthquake load. These are attached to the sides of buildings. These monitor the movement with the shaking. Then they transmit to a computer program that translates the random units read by the sensors into useful units. The computer sends a message or MR dampers which are with in buildings structure to dampen the effect of the swaying on the structure. MR dampers act like shock absorbers for the building. Filled with a fluid that includes suspended iron particles, the MR dampers lessen the shaking by becoming solid when an electric current passing through it, which lessens the intensity of shocks. Remote sensing plays a role of early warning to the approach of the danger, finding the time is impossible. But with the help of remote sensing technology it is possible for authorities to take preventive steps.

The Global Earthquake Satellite System (GESS), has technology called Interferometer Synthetic Aperture Radar (InSAR). Put simply, this technology to some extent allows scientists to detect minute deformations in the Earth's crust.

Space technology also plays role in warning against the advent of tsunamis.

Weather related disasters:

Due to the continuous movement of wind and phenomenon's taking place in the environment and in and around earth, lots of weather changes occur. Some can have devastating results the problems can be in the form of floods and thunderstorms hurricanes etc. technology plays a major role in monitoring the changes and also in warning against such disasters.

Sub audible sound well below range of human hearing has some promise for tornado detection and warning. Range around 1Hz. 0.1 to 10Hz tornadic sound occurs in that range.

Remote sensing after the damage is used to analyse the affected region and the intensity of the damage.

The high-powered Doppler-88D radar, this radar enables meteorologists to measure wind velocities inside storms, which is the key to detecting tornadoes. The development of the weather satellite observing network has also aided in strong thunderstorms detection and movement, especially in areas not covered by Doppler radar.

Weather radios are used as a warning tool for the tornadoes and it is equipped with special alarm tone feature which warns against the oncoming danger.

Man-made disasters:

Disasters that are accidental or sometimes done on purpose and which takes thousands of lives and also plays major role in environmental degradation. The man-made disasters can be chemical explosions, terrorism, war, nuclear explosions, man-made disasters is also a part of advancement in technology when the proper information is misused.

Manmade disasters can also result from improper planning of certain activity, before planning anything, care should be taken that the working place is suitable for that particular work.

This can be done with the help of technology, like examining a particular place for its capability to hold load or weather that the region will be affected by any other disaster. If some of these cares are not taken, can lead to a disaster.Remote sensing helps examining such places.

The nuclear explosion is one of the deadliest of all, it not only takes a life too, but also degrades the environment.

Research is in the process on the development of infrasound techniques that can be used to improve detection, location and discrimination capability for atmospheric nuclear explosions at International Monitoring System (IMS) infrasound monitoring stations in the range from about 500 to 4500kms, this also includes capability for the detection of explosions that occur over the vast open ocean areas.

There are tools like wireless data networks, encryption, powerful miniature computer chips, the global internet, data mining software, and many more. Now that we have these tools it is time to roll them out to make world safer.

III. Relief Activities and Risk Reduction in Disaster Management

Technology not only provides warnings but also plays a major role in relief work and communication after the disaster occurrence. Just after the disaster strike the satellite phones are to be proved to be the best as it doesn't fail, over

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the years the speed is doubled so that information is passed on easily.

Mobile phones also help in a great deal for the spread of information in a crisis situation.

Two UN agencies are in charge of ensuring communication work in disaster affected areas. UNICEF does basic data transmission and WFP does communication in insecure regions.

Satellite monitoring involves the assessment of the damage experienced during the disaster. This technology helps in identifying the escape routes and location for temporary households.

Internet has a significant role in disaster management as it keeps the database of missing person and dead people reported, so that it becomes quiet important to the relatives and friends.

Digital image processing is yet another technology which provide remotely sensed data and thus help in relief activities.

Wireless sensors and communication also plays a major role in data transmission. This also demands help from other non affected regions.

IV. TECHNOLOGY FOR RISK REDUCTION

The challenges of disaster management is reducing the harm disasters cause to the society, the economy, and the lives of individuals and communities. That task requires disaster managers to reduce uncertainty, to calculate and compare costs and benefits, and to manage resources on a much larger scale and at a much faster pace than are supported by methods and means for solving ordinary problems. Making good decisions and taking appropriate actions during extreme events require having access to communications, data, and computational resources that can be used to effectively coordinate a larger number of geographically dispersed participants and assets, to exchange a wide variety of types of information and to evaluate many scenarios and responses-all of which are changing dynamically.

Following is a taxonomical representation of the ways in which the technology can be applied to help control and reduce the damage caused by disasters and in some cases even avert them from happening in the first place, if possible.

V. TECHNOLOGY AS A COMMUNICATION MEDIUM

Establishment of Mobile Ad Hoc networks when other means of communication are not possible.

A Mobile Ad-Hoc NETwork (MANET) is a wireless network set up temporarily without a wired infrastructure (routers, switches, servers, cables, access point, etc.). the wireless nodes in a MANET may move around and each one of them may need to forward packets for other components in the network. Because they can be deployed quickly, MANETs could be used for disaster rescue, battle field communication, sensor networks, etc. this paper focuses on investigating the specific properties that a wireless routing protocol needs to satisfy, evaluating existing wireless routing protocols which model checking, and designing better protocols.

Its dynamic nature makes wireless communication especially suitable for reaching areas not served well by fixed infrastructure, as well as places where the fixed infrastructure has been compromised or damaged.

Phase of Disaster Management it is employed in: Preparedness, Response.

Land Mobile Radio Systems (LMRS) radios.

LMRS is a term that denotes a wireless communications system(s) intended for use by terrestrial users in vehicles (mobiles) or on foot (portables). Such systems are used by emergency first responder organizations, public works organizations, or companies with large vehicles fleets or numerous field staff. Such a system can be independent, but often can be connected to other fixed systems such as the public switched telephone networks (PSTN) or cellular networks. They also called Public Land Mobile Radio or Private Land Mobile Radio.

Phase of Disaster Management it is employed in: Preparedness, Response.

Commercial cellular devices and walkie-talkies

The advent of cellular technology has given people the advantage of being in touch with the rest of the world anywhere, anytime. In case of disasters, it has been observed that the presence of cellular devices like mobile phones have been handy in knowing about the disaster, reaching the victims (sometimes by victims own initiation). Apart from the voice call service, text messaging services provided by today's mobile phones have proven to be a great aid.

Another cellular device is the walkie-talkie, which are devices that resemble a telephone handset, possibly slightly larger but still a single unit, with an antenna sticking out of the top. They are basically hand-held portable, two-way radio transceivers which are used by first responders during invigilation of the site of mishap to co-ordinate their work.

Phase of Disaster Management it is employed in: Preparedness, Response.

VI. TECHNOLOGY AS AN ANALYSIS AID SIMULATION SYSTEMS

Simulation of a disaster scenario is a new technological inroad into disaster management. A disaster that has occurred before is simulated exactly and the various factors involved are studied and applied to real world areas where a similar disaster can happen.

For example, big waves in fierce storms have long been the focus of ship designers in simulations testing new vessels. It has been recently observed, owing to these simulations, that a series of smaller waves –a situation much more likely to occur—could be dangerous.

Similarly, landslide water inundation analysis models that have been developed from simple models to complicated models that analyze hydraulic phenomena of drainage systems in detail. The simulation model is used to assess the flood disaster risks caused by landslide water and rive water. It is also used to carry out research and development of integrated flood fighting support systems, studying integrated structural and non-structural measures to reduce flood damage and can also play a role in studies to plan

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river, drainage systems, discharge control facilities, etc. and methods of opening such facilities.
Phase of Disaster Management it is employed in: Mitigation

Emergency Management Information Systems (EIMS)

EIMS is a computer database for disaster response that provides graphical, real-time information to responders. Four phases of an emergency are Preparedness, Risk Mitigation, Response and Recovery. An EMIS shall enable emergency managers or any emergency stakeholder (affected civilians, police, fireman, Non-Government Organizations (NGO), etc.) and make their required activities in any phase of an emergency in an easy and speed way.
They can help in:

- Preparation of contingency plans for different types emergencies.
- Creating checklists that can easily be reached by any related emergency management stakeholder.
- Resource management
- Determine what the possible risks are and/or risk types. Often supported by a geographical information system (GIS).
- Executing and tracking the contingency plan.
- Cost calculation of the emergency.
- Various kinds of reports (supported by tables, graphs, etc.)

An EMIS interacts with many other early alert systems and communication with many legacy systems.

Phase of Disaster Management it is employed in: Mitigation, Preparedness, Response, Recovery

Technology as a monitor

Space Technology via satellite to monitor nature's activities: the eye in the sky. Earth observation refers to measurement and monitoring of the state of the earth and its processes. An Earth observation system is a system of monitoring networks linked to create data and information for a variety of uses, including the mitigation of natural disasters. They are used in climate monitoring, search and rescue operations, property protection to name a few. There are many components of an earth observation system such as seismology for earthquakes, geodesy for precise measurement of the Earth's surface and shape, geomagnetism for solar storms that can damage billions of dollar's worth of electrical grids and communications assets, and volcano-logy for detecting vertical movement at the Earth's surface and warning of eruptions.
The recent tsunami disaster in the Indian Ocean demonstrated the extent that space technologies can contribute to emergency and disaster reduction. As the global community learnt from the tsunami event, space technologies have also a central role to play in providing early warning to communications that are at risk.

Remote sensing

Remote sensing is the science and art of obtaining information about an object, area or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area, or phenomenon under investigation.

Geographical Information System (GIS)

Geographical Information System (GIS) is an organized collection of computer hardware, software, geographic data & personnel, designed to efficiently capture, store, update, manipulate, analyze & display all forms of geographically referenced information. In other words, it's a powerful set of tools collecting, storing, retrieving, transforming and displaying spatial data from a real world for a particular set of purpose. GIS allows for the combination of the different kinds of spatial data, with non-spatial data, attribute data and use them as useful information in the various stages of disaster management.
A disaster in which these techniques find immense use is

A. EARTHQUAKES.

Earthquake disasters are inevitable and it is almost impossible to fully recoup the damage caused by the disasters. But it is possible to minimize the potential risk by developing disaster early warning strategies, prepare and implement development plans to provide resilience to such disasters and to help in rehabilitation and post disaster reduction.
Remote sensing and GIS provides a data base from which the evidence left behind by a disaster that have occurred before can be interpreted, and combine with other information to arrive the hazard maps, indicating which area is potentially dangerous. Using remote sensing data, such as satellite imageries and aerial photos, allows us to map the variability of terrain properties, such as vegetation, water, geology, both in space and time. Satellite images give a synoptic overview and provide very useful environmental information, for a wide range of scales, from entire continents to detail of a few meters. The vantage position of satellite makes it ideal for us to think of, plan for and operationally monitor the event.
Finally, the impact and departure of the disaster event leaves behind an area of immense devastation. Remote sensing can assist in damage assessment monitoring, providing a quantitative base for relief operation. After that it can be used to map the new situation and update the database used for the reconstruction of an area. It can help to prevent the occurrence of such disasters again in future.

Benefits from the usage of RS/GIS solutions:

Reduction of the human error during the evaluation of the situation and the decision making. Reduction of the time for the preparation of evaluation of the situation using the up-to-date satellite data and the functionalities of GIS.

Possibilities for reaction in a different way towards different conditions and characteristics of the crisis situations Possibilities for optimized and secure usage of resources (means, personnel, equipment, natural resource) Phase of Disaster Management it is employed in: Mitigation, Response, Recovery.

We take a few examples from around the world where space technology has been a boon:

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B. Air pollution and dust storms:

Dust and smoke (Aerosols) are tiny particles suspended in the air, some occur naturally, originating from volcanos, dust, storms, forest and grassland fires, living vegetation, and sea spray. Human activities, such as the burning of fossil prescribed fires, and alternation of natural surface cover, also generate aerosols. All these in large quantities can limit visibility and make it hazardous to travel by air or road. Research shows that this pollution can impact climate and possibly reduce formation of clouds. Via this technology, the environment was scrutinized in the aforementioned geographical region and measures were taken to mitigate the harm.

Drought and desertification:

Drought is by far the most dangerous of all natural disasters. Desertification is land degradation in arid, semi-arid and dry sub humid areas resulting from various factors including climatic variations and human activities. This can be recognized by the following tell-tale signs:

1-Soil water erosion:

Soil water erosion can be recognized in high resolution satellite images, rill and gully erosion forming a special pattern where can be mapped directly from aerospace images. Areas affected by sheet erosion can be recognized because of their lighter Gray colour tone compared with surrounding areas.

2-Soil wind erosion:

Wind erosion forms such as dunes or sand encroachment on infrastructure or cultivated fields may be recognized and aerospace images if the scale and the sensor resolution permit, also sand dunes movement can be monitored moving multi temporal remotely sensed data.

3- Rangeland monitoring:

Satellite images have been used in rangeland monitoring. Much of this work has been done in the arid and semi arid land of the mid-western United States. It was also associated with lands developed for plague – locust monitoring and biomass monitoring. Satellite data are used to produce base maps of overall environmental types within the rangelands. This can be rapidly done and provides for general understanding of the landform types vegetation, zooms, hydrology and geology of the area.

C. Forest fires:

Forest fires cause loss of human life and property, economic disruptions, atmospheric disturbances. This hazard is divided into three phases: Preparedness, detection and response and post-fire assessment.

Preparedness involves risk assessment, which in turn requires the knowledge of such variable as land use and land cover, forest fire history, demography, infrastructure and urban interface. In this regard, remote sensing is used to derive vegetation stress variables, which are subsequently related to wild-land fire occurrence. The detection of forest fires is made possible by either sensing their thermal or mid-infrared signature during day and night, or detecting the light emitted by them at night. In the post-fire assessment phase the most important consideration is the mapping of the burned areas and protection of watersheds as well as other critical resources.

D. Floods and severe storms:

Remote sensing helps in monitoring the cyclones and mapping geomorphic elements and land use, providing meteorological data for hydrological modeling, and contributing to mapping historical events. On a local scale, land surface data on topography, hydro graphic and roughness of fluvial material are needed. Both electro optical and microwave sensor can provide these data. Cartographic updates are a critical aspect of remote sensing. The flood preparedness warning means taking measures to protect human life and property. Plans for possible scenarios need to be identified. Weather and watershed conditions (snow pack, etc) are some of more important factors in predicting and preparing for a flooding event.

E. Landslides:

Landslides are sudden, short-lived geomorphic events that involve are rapid-to-slow descent of soil or rock in sloping terrains – occur worldwide, often in conjunction with natural hazards like earthquakes, floods or volcanic eruptions. Landslides can also be caused by excessive precipitation or human activities, such as deforestation or development that disturbs natural slope stability. Landslide mitigation involves primarily mapping of zones that at risk and their relevant terrain features. These maps can be produced at various scales using stereo aerial photographs, satellite images, and ground surveys. Landslide warning and prediction to prepare for the disaster has been attempted by establishing the rainfall threshold where a landslide triggers.

F. Volcanic eruptions:

Volcanic eruptions are among nature's most spectacular displays, at once both awesome and deadly. Volcanoes can present a major hazard to those who live in the vicinity for a variety of reasons

1. Pyroclastic eruption can smother larger areas of landscape with hot ash, dust and smoke with in a span of minutes to hours.
2. Red hot rocks spewed from the mouth of a volcano can ignite fires in nearly forests and towns, while rivers of molten lava can consume almost anything in their path as they reshape landscape
3. Large plumes of ash and gas ejected high into the atmosphere can influence climate, sometimes on a global scales.

G. Ozone depletions:

The atmosphere is a blue haze that thins as it rises above the curve of the earth's surface. Called the climb, it provides a view of structure of the atmosphere. Orbiting scientific instruments look at the limb to measure how the concentrations of trace gases vary with altitude and monitoring of the ozone hole.

Unmanned Aerial Vehicles

Unmanned Aerial Vehicles, especially when combined with improved network communications, have tremendous promise because they can carry weather and other types of cameras and sensors to places that human responders cannot

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reach safely or at all and transmit the images to emergency forces.

Down here on earth we frequently rely on the services of the unmanned machines we call robots. Conveniently for us, robots can handle tasks that require tremendous manpower, and specialized types can operate skilfully in dark, cramped, remote and dangerous environments.

Japan is rife with natural disasters such as earthquakes, typhoons, and volcanic eruptions. Even in areas where disaster countermeasures by human intervention have been thoroughly studied, rescue forces are expected to rely heavily on the services of disaster-relief robots. As the terrestrial robots do their work on the ground, airborne robots are expected to rescue disaster victims, assist the efforts of relief workers in various ways and secure all-around safety.

Task of a UAV:

1. Capturing images of disaster site
2. Radio wave enemy station

Immediately after a disaster strike occurs, an unmanned aircraft flies at top speed to the disaster site, photographs the state of the disaster and transmits the images to disaster-relief forces (national, municipal, etc.) in almost real time. Next, an airship newly arrived at the disaster site hovers above the photographically survey the evolving disaster conditions and rescue efforts from a stationary position. To exploit the ability of the airship to hover in the air for hours on end, the airstrip is also used as a relay station for areas that cannot be contacted via the community wireless system. Now a days these functions are still provided by disaster-relief helicopters.

Objective

- Aircraft capable of flying even at night and in bad weather.
- East-to-handle small, lightweight and inexpensive aircraft.
- Aircraft should be deployable via hand-thrown takeoffs and parachute landings without runways.
- Airships should be deployable with only a few people to supervise takeoffs and landings.
- The system should be operable even by persons working on a part-time basis without special training, and at low operating costs (including costs for maintenance and management).

Advantages

Disaster-relief forces will be able to grasp the overall conditions of a disaster by surveillance from the air. Detailed images of the specified photographed points will also be acquired. As the operational cost of the system is low, the system may be insulted at a fire station or similar facility on a fulltime basis and it is possible to fly the system immediately after a fire is started. This will be enable the disaster-relief forces to grasp the state of a disaster before the helicopters takes off from heliport and arrives at the site.

Phase of Disaster Management it is employed in: Mitigation, Response, Recovery.

Technology as an information provider

Most information is manually processed today-meaning in practice that most data is ignored and is not analyzed even if it actually contains actionable information. Automation is essential to process, filter, and correct this flood of data, to present it as accurate and actionable information for human decision makers. Improved analysis synthesis and fusion of data will require progress on both the syntax and semantics.

- Several IT giants follow measures to safeguard their database incase disaster strikes, directly or indirectly in their geographical location.

  They have a disaster centre always up and running. Infosys has a big disaster centre at Mauritius. TCS has its centre in South America.
- Daily backup of all the work done throughout the day is kept on disc and tapes and multiple copies are made which are kept at different locations across the companies' domain throughout the world. Best example of disaster management was the WTC attack.
- Even the IT client countries now require companies to be Disaster Management compliant.

  They prefer that the company has distributed centres across a country and not just be concentrated in one city.
- There is a bottom-up followed in companies as part of disaster management training to its employees.

A drill is carried out at regular intervals where the team members working on a project are told to set up the project from scratch if the complete system has crashed. this work has to be completed in a given frame.

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