

TO ENSURE A LIFE WITH DIGNITY

Protecting our environment from disaster and assuring the safety of human life and property is the basis for an affluent way of life for the citizens of the environment. Disaster till recently were viewed as an isolated incident and considered emergencies with little focus on prevention, preparedness, reduction, mitigation and effective and appropriate early warning systems. Therefore as vulnerability to disasters increased, we are now beginning to realize that greater attention has to be directed to reduce risks associated with them through improvement in operational capabilities and mitigation measures. It has now become more necessary and important for us not only to supplement, but also to play a positive role to prepare us and community around for all types of disasters both natural and man-made.

Natural hazard is a result of a natural processes within the environment. It can be categorized as climatic, Geomorphic and geological and biological. Therefore, the natural hazards are different from environmental disasters, which include desertification, ozone depletion, and acid rain, which are caused by human activities and the mismanagement of environment. Very important point here is to understand the natural hazards and hazard event, because hazard event is the cause of the damage. And also natural hazard have the potential to affect people and environment. But the hazard event only becomes a hazard if it affects, or threatens, people and property.

Flash back to the history of the earth formation is amazing ! How does a supercontinent begin to rift and how do the pieces move apart ? What effects do such movements have on the shaping of the continental landscapes on hot climates and ice ages, on the evolution of life in general and on humanity's relationship with the Upper-crust of the earth in particular is far beyond our understanding. Nigel Calder in one of his texts named as "Restless Earth" explains that the above mentioned natural process distorts the surface of our planet, emphasizing more recent events. According to him the biggest disaster, the break-up of the last supercontinent was in progress. He described the mother earth as a lady of 46, if her years are megacenturies.

Geologists have produced a time chart or geological timescale and they have made progress in describing and accounting for the major changes in the earth surface. Plate tectonics have influenced in formation of major landforms and relief features around the globe. For instance Canadian Shield, Brazilian Shield and Folded mountains such as Rockies, Andes, Drakensburg, Himalaya, Dinaric Alps, Ural mountains, Caucasus, Apennin, and Atlas, transform faults and deep sea trenches such as Aleutian Trench (7391 m) Chile-Peru Trench (8050m), Milwaukee Trench (9200m) and volcanoes. However the aforementioned events have not effected the people to the extent of considering those events as natural calamities. But these evidences are sufficient for one, to understand these changes are natural and could occur on the surface of the earth at any time during the geological time.

However the general finding is that hazard-prone occupancy appears to be increasing both in developing and developed countries, despite improvements in hazard prediction technologies and in the organization of relief agencies. The global information indicates that loss of life and limbs seems to be much greater in the poor countries, specially those seem to be much greater in the poorer countries, especially those at midstage in economic development, while the richer nations suffer more from economic losses due to property damage and disruption of the economy. However the developing countries suffer more than the richer ones from both hazard inflicted death and hazard caused economic damage. The implication here is that the forces encourage hazard-prone-ness.



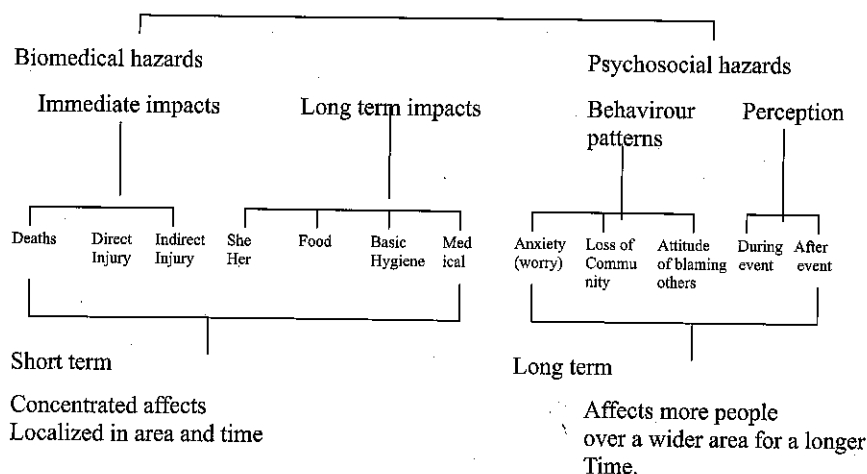
Floods by rivers is a natural event, as Sunshine and Snowfall, and Flooding will take place without any human intervention virtually every year. However flooding has become a hazard, because people often choose to live in flood risk areas. As I noted earlier, the natural changes become a hazard when it affects or threatens people and property. People should have strong arguments within them before they choose living in flood-risk areas. Until recently major floods occurred every 5 – 10 years and a serious and extreme flood occurred approximately once every 40 years. But today such floods occur once or twice in every year, irrespective of its location due to ESNO (ELNINO SOUTHERN OSCILLATION) that occurs periodically perhaps every 4 – 7 years.

Further I would like to account for the slope failure occurring in the form of either mudflows or landslides. All slopes are affected by gravity and consequently, by several mass movement processes the weathered material is transported downhill. In slopes of about 5%, the movement of materials is slow and has relatively little effect upon property or life. Although the slope failure is a natural event, it can become a natural hazard, because of the unauthorized settlement structures and their activities. Thus, when slope failure occurs in populated areas, it becomes a dangerous natural hazard. However, the slope instability and risk of slope failure may be increased by the extraction of natural resources and construction on slope gradient more than 60%.

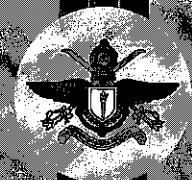
Apart from the above mentioned incidents which occur very frequently in Sri Lanka and India, there are biological hazards e.g. poisonous plants, fungal diseases infestations, malaria, bird flue, chicken gunya etc.

However, until recently, the people described these incidents as just natural disasters and analyze the number of deaths, severe damage of properties and infrastructure, disruption of livelihood and disruption of services, and also about essential relief work, setback of livelihood and need of repairs to services etc. (major socio-economic effects). The learning experience of the past has further refined the knowledge of natural disasters among the people, for preparedness and relief co-ordination.

Before we discuss about the preparedness and co-ordination, it is important to know how people responded to the hazard event. Chris Park in his Theory on types of responses adopted in 1991, has divided human responses during and after any hazard event into two categories. The following figure explains the divisions on short and long term temporal Scale.



Type of response, adapted from Chris Park – 1991.



With the past experience most of the interested groups in disaster management identified that the problem arising during the time of disaster is the lack of co-ordination. The proper coordination can be done according to its impact (immediate and long term), behavioral patterns, perception etc. But the coordination part of the disaster management process is in the second phase. But, nowadays much improved records are kept of natural disasters. This in itself is a notable achievement for it requires international collaboration and a sustained commitment from a host of official and voluntary bodies involved with disaster prediction and preparation and postdisaster relief. But awareness of the changes of the earth surface, which in turn can become a natural hazard is very much important. Hence, the human kind should organize themselves with the existing knowledge with regard to the same. However vulnerability to natural disasters is emerging around the world. This is not only a humanitarian issue, but also an issue of economic concern, basically due to population density and urbanization, development of settlements in hazard prone areas, and poor natural resource management. Hence the co-ordination of developmental agencies and civil society organizations for humanitarian crises is an urgent need; preparedness, relief co-ordination and integration.

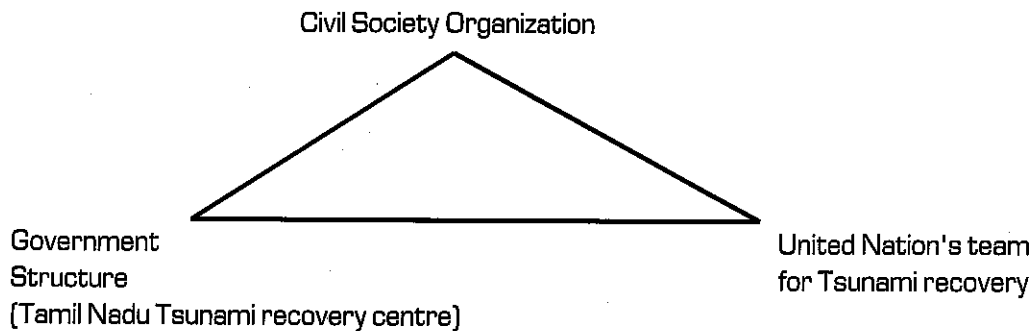
"Preparedness" as a state of sufficient preparation especially for war" is the connotation given in the "Riverside Webster's II" dictionary. Natural disaster is an unpredictable situation needs sufficient preparation before the incident. "Co-ordination" is explained as "bringing in to a proper relation, cause to function together efficiently. So, when the disaster occurs, there are certainly a segment who seeks assistance to get back to their livelihood. In order to bring about the unstable situation to a stable condition there must be a well organized co-ordination system in disaster management, integration and alignment as well. For instance, in India four levels have been identified as levels of understanding the requirement for preparedness 0 - Peaceful, 1 - Local disaster, 2 - Handled by the state with local facilities, 3 - National Level disasters. What may be needed and how much may be needed are two important questions to be addressed. This requirement may depend on the type of response by the victims, either biomedical or psychosocial response. In short and long terms Doctors and paramedics, handsome network of NGO's business protocol formulation, multi layer structures, multi stakeholders between the sectors, are the essence of co-ordination.

The co-ordination cannot be done in isolation. An example is the US - India co-operation. It makes it tight in co-ordination. Following are the elements of US - India co-operation.

1. Incident Command System (ICS)
2. Institution Building (IB)
3. Emergency Operation Centers (IOC)
4. Search and Rescue Centers (SRC)
5. Climate Forecasting System (CFS)

Secondly, India-UNDP Disaster Risk Management program initiated earthquake safety measures. Among them information sharing occurs on disaster resistant Construction, retrofitting of Critical facilities, non-structural mitigation, collaboration between UNDP and Indian counterparts. Ex. Tsunami recovery program and city planning in Tamil Nadu, and Pondieherri. Tamil Nadu Tsunami Resource Center, joint initiatives of UNDP have identified Preparedness Centric Approach (PCA) than Rescue Centric Approach (RCA)

Preparedness Centric Approach (PCA)



The areas to be considered by Government and Non-Government organizations are shelter, livelihood, child protection, Community Based Disaster Risk Management (CBDRM), Social equity and infrastructure.

WAREHOUSING PREPAREDNESS AND RESPONSE AT THE TIME OF DISASTER

Warehousing preparedness, logistics and transportation co-ordination are essential parts of the disaster management. Pre identification of infrastructure such as aerial platforms, highway routes, warehouse types and condition are important. Thereby the distribution network can be ready in advance. GIS technology could also be used for this analysis. This also can be done by a body of National Emergency Resource Fund Special Task Force of a particular Country. Warehouse quality and commodity tracking system should be identified properly due to the fact that as the non-governmental organizations involved with the emergency operations are accountable, to the donors. However it's essential to ensure the availability of resources and securing the continuity of the supply at the time of disaster.

Logistics and Resource mobilization should have special attention during disaster. Disasters are unpredictable. To have a global discussion on disaster, all the countries should get-together for a dialog, and also have a Global Logistic Strategy. This in turn will help to draw a framework agreement for emergency, to analyze the advantages of using framework agreements among the nations to the available courier services which could help humanization of the logistics movement. For example in DHL, 280,000 employees and more than 400 air-crafts are available. Management of loading, warehousing, customs clearing during disaster situation are some of their social obligations. They attended these during Tsunami disaster in Sri Lanka, in December 2004.

IMPACT OF PROPER CO-ORDINATION AT THE TIME OF DISASTER

Proper co-ordination and communication influence in mitigating the problems at the emergency situation. National Disaster Co-ordination System should be adopted, through mapping vulnerable areas using satellite images, aerial photography and GIS systems. Series of co-ordinated efforts taken to mitigate the aftermath of any disaster is called Consequence Management. Mitigation effort focusses on alleviating suffering, damage, loss and hardship. Most important areas of consequence Management



operations are ensuring the survival of the maximum number of people through prompt decontamination and medical treatment, providing and supporting emergency assistance to affected governments, infrastructure and individuals, containing, cleaning up and disposal of contaminated material and debris, Reestablishing self-sufficiency and essential services as quickly as possible, and Replacing or Repairing damaged infrastructure and regenerating economic activities.

CIVIL MILITARY CO-ORDINATION.

Another important aspect of co-ordination is civil-military co-ordination. At the very inception of the disasters some community based components of the Society are directly involved with the rescue work. In the second phase of the process the military forces involvement in rescue operations is very high, especially at the time of logistic requirements. The rules and regulation [Administrative and Financial regulations] pertaining to respective organizations are hindering the logistic related matters. Also the civil military relationships should further strengthen at the time of disaster. However, all these components, military, civil organizations, non-governmental organizations, and government must have strong co-ordination and link during the first and the second phase of the disaster situation.

SOME SOLUTIONS TO MITIGATE THE DAMAGE BY DISASTER

Solutions for the disaster occur in the background of the need to understand mechanisms for the reduction of hazards related to disasters. The United Nations International Decade for Natural Disaster Reduction (IDNDR) 1990 – 1999 was dedicated to promoting solutions to reduce risk from natural hazards.

PREPAREDNESS AS THE BEST SOLUTION AND INSURANCE

One of the most determinant factors in any episode of disaster response is the level of advance preparedness of any community. There are key functions for civil – military responders. All functions must be integrated for effective response.

Police : Security of incident site and surrounding area, investigation intelligence and analysis.

Fire Department : Incident Command, fire hazards-supervision, search, rescue and hazardous material control.

Emergency Medical Services : Ambulance Service including pre-hospital treatment, initial emergency, decontamination and transport.

Hospitals : Mass Casualty management and treatment, mass decontamination and specialized treatment.

Public Health Agencies: Contamination and disease surveillance, epidemiological intelligence and laboratory analysis.

Coroner (medical examiners): Decontamination, identification management of human remains.

Clergy : Comfort and counseling to casualties, families responders and community.

Emergency Management : (Civil Defence Command and Control) Alert warning, food, shelter, evacuation and information management.

Civil Government : Supervision of other agencies through emergency ordinances and authorities.

STRUCTURAL MITIGATION SOLUTIONS:

Nearly half of the lives lost in most disasters are, of children. Hence the structural mitigation solutions can be adopted to the school buildings before an incident. Safe school building structures must be promoted to reduce the death rate among the school children at the time of disaster. School facilities, buildings in particular must meet tough performance standards to withstand disasters and at the same time become models of risk reduction practices in the community. Children must be taught to react naturally to disasters. On the other hand the vast gap that exists between knowledge and practice must be bridged. Training and organizing skilled labour, especially masons, creation of demand for the disaster resistant buildings in the community and risk communication are some of the key areas of work.

INTERNATIONAL CO-OPERATION

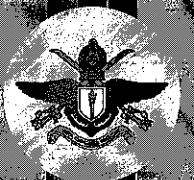
Experiences in community level disaster management need to be shared among nations. These provide fresh inputs and learning for local organizations working with communities. Further this co-operation in turn is beneficial for building national capacity in management. It enables a community based recovery program.

SOME OF THE TECHNOLOGICAL ADVANCES IN DISASTER MANAGEMENT

Tsunami in 2004 proved that our state of preparedness in case of natural disaster was inadequate. However, it also must be borne in mind that man must not try to compete with nature but rather strive to live in harmony with it. Through technology has an important role to play in disaster management, the role of technology is limited. It must be our collective endeavour to reduce the pressure exerted on natural resources to the extent possible. However, in spite of all, the technological advancement is playing a pivotal role in disaster management. They are:

GEOPHYSICAL SURVEY SYSTEM

Ground Penetration Radar [GPR] System for subsurface investigations is one of the innovations with applications in examination the infrastructure of roads, bridges and structures and to locate, bedrock, pipes, tanks, sink holes and other underground voids, strata and other such utilities. And also the technology developed in different types of shallow as well as deep Geophysical survey instruments for seismic survey, Resistivity, Geophysical logging, Groundwater survey, Oceanographic survey, Landslides and Ground kinetics observation systems and well above Images. The Geophysical and Geotechnical equipment offer a range of instrumentation which includes Resistivity, Induced Polarization, Electromagnetic and Magneto telluric instruments which in turn are applied in the fields of ground water environment, Civil engineering, Mining,



Geothermal exploration, Geological mapping and Geo-technical engineering.

Sycom instruments are used for strong-motion monitoring and vibration measurement systems. This has wide applications viz. site evaluation and seismic Re-qualification (Building bridges, towers etc) construction, monitoring, subsoil characterization, traffic induced vibration measurement (railway, highway and subway) sensitive equipment and industrial vibration measurement, long term monitoring of blasting and as well as earthquake monitoring applications.

The casualties in a disaster such as an earthquake or cyclone can be drastically reduced by having a Disaster management team with the right products and right personnel backed by a Disaster Management plan in place. Not only can such calamities cause an alarmingly high loss of life in densely populated areas, it could derail all "Disaster Management" plans if the "Disaster management" plan itself does not have sufficient safeguards against such attacks.

Among the technical equipment are: At first Victim Location Systems which enable to locate and communicate, trapped victims even through a small 1.75" hole; Secondly a Life Detectors – seismic acoustic listening device designed specifically to detect and locate trapped life victims in collapsed structures caused by earthquakes, explosions, landslides, mine-disasters or construction cave-ins. This detector converts the entire collapsed structure in to a large sensitive microphone to pinpoint signals from the entombed victims. Thirdly, a range of decontamination showers and ancillary equipment for use in case of disaster or attack involving chemical nuclear or biological agents is called 'Porta Flex' Fall protection" ensures an automatic locking in event of fall. The life locators, have been developed to detect trapped living victims in building debris, mud slides, avalanches and disaster wreckage. Search and Rescue teams have always needed a fast, effective way to detect people who are alive but buried in building debris or other materials. With this advanced technology, search and Rescue teams can quickly locate trapped victims who are moving or breathing, and allow recovery work to be managed more effectively.

Nothing works when the basic needs of food and drinking water are not met. One of the solutions is individualized water purification systems. It has been developing water filters, chlorine and silver- based sterilization agents and mobile declinators. Numerous armed forced and relief organizations around the world use them for survival and life saving. In addition to drinking water solutions there are light weight meals with freeze-dried ingredients among the disaster management preparedness products.

PSYCHOLOGICAL SUPPORT DURING SUDDEN ONSET OF EMERGENCIES

Psychological support is part and parcel of the preparedness program. In India recently two major organizations have proposed guidelines for psychological support as a part of the preparation and response services to disasters, World Health Organization (WHO) and International Federation of the Red Cross (IFRC) Eg. As result of the Gujarat earthquake in 2001, the American National Red Cross sent a psychological delegation to assist the Indian Red Cross Society (ICRS) to develop and implement a national psychological program, with emphasis on support to state branches in disaster-prone areas.



The past twenty five years have witnessed the emergence of a new field within the rubric of mental health care. Psychological support has become an important component of the disaster preparation and response repertoire.

CONCLUSION

The preceding discussion looks at the achievements in reducing the Social and Economic losses associated with natural hazard and environment risk. Despite increasing investments in hazard prediction and prevention, the cost in lives lost, property damaged, and injury to body or mind are still growing. Nevertheless, information about the likelihood of danger is now much better developed and co-ordinated among international and national relief agencies. Since poverty and hazard cannot be separated, any improvements in coping strategies must involve some transfer of resources from rich to the poor, and from powerful to the powerless. International support is needed therefore to develop their own patterns of response.

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