2   DISASTER MANAGEMENT CYCLE

Structure

2.0   LEARNING OUTCOME

After studying this Unit, you should be able to:

● Understand Disaster Management Cycle with the objective of illustrating the different situations and actions required before, during and after a disaster, and in non-disaster times;

● Discuss preparedness, mitigation, response and safe development principles; and

● Appreciate the need for a multi-sector approach to disaster management, and the importance of disaster mitigation and preparedness for reducing disasters.

2.1   INTRODUCTION

The concept of Disaster Management Cycle has entered disaster management efforts over the past few years, especially since the Yokohama Conference (1994). Hitherto, disaster management had been perceived as a short-term relief undertaking, which lasted till some time after a disaster. Other purposive activities undertaken in the *pre* or *post*-disaster stages on the part of civil society or the government towards mitigating the impact of disasters or tackling long -term vulnerabilities and dealing with newer threats in the wake/ aftermath of a disaster were not included in disaster management activities. They were rather classified, developmental activities or 'social action' on the part of civil society actors(s), motivated by philanthropic concerns. The concept of Disaster Management Cycle integrates isolated attempts on the part of different actors, government and non-government, towards vulnerability reduction or disaster mitigation, within the enveloping domain of disaster management, *as phases* occurring in different time periods in *disaster management continuum*, though essentially relating to/comprising disaster management. This has facilitated a *planned approach to disaster management* in that post- disaster recovery and pre -disaster mitigation planning are perceived as integrated/related activities

and not separate. Thus, prevention, mitigation and preparedness form pre-disaster activities in the Disaster Management Cycle and, response, comprising relief, recovery and rehabilitation are *post-disaster activities*. Whilst emergency relief and rehabilitation are vital activities, successful disaster management planning must encompass the complete realm of activities and situations that occur *before, during* and *after* disasters. These phases can best be represented as a cycle, which if followed through public policy can obstruct future development of disasters by impeding the vicious cycle of cause and effect. These activities are implemented at specific times, the length of any one phase depending on the type of disaster, its breadth and scale. Therefore, one of the key issues in disaster management planning is the allocation of resources at all stages of the disaster cycle, which optimises the total effectiveness of risk reduction activity and maximises the overall impact of disaster management.

This approach has imparted a more holistic perception to disaster management and has served to integrate disaster management with development planning in that most pre-disaster activities, involve activities for vulnerability reduction like poverty reduction, employment provision etc. which are also mainstream development concerns. *Thus disaster management cycle implies development is essentially/conceptually related to disaster management.*

Disasters and Development

Another significant consequence/effect of this concept relates to understanding the inherent correlation between disasters and development. Development had proceeded with relative unconcern for environmental issues. The result has been newer vulnerabilities/risks arising as a result of indirect/direct consequences of development strategies. For example, air pollution has been caused due to uncontrolled emission of green house gases, water pollution due to unregulated working of industrial enterprises as also agriculture, leading to adverse impacts on the environment.

Short- terminism has prevailed in public policy in that long-term impacts have not been considered at the policy formulation stage. The concept of disaster management cycle is expected to impart the much needed long-term persepcive /viability to developmental policy since vulnerability reduction would be factored in mainstream planning to reduce costs on response efforts when disasters strike. Also, the process preceding policy formulation, that is deliberation with involved stakeholders nad citizen groups, is likely to get more particpatory and inclusive of disaster related concerns(Guzmann, 2005).

Impact of disasters has been debilitating, both in terms of economic cost and loss/injury caused to human life and livestock, and the environment. According to the United Nations, in 2001 alone, natural disasters of medium to high range caused at least 25,000 deaths around the world, more than double the previous year and economic losses amounting to over US$ 36 billion. These figures exclude many small, unrecorded disasters that have hit various parts of the world. Chief recorded disasters in recent years have been devastating earthquakes in Gujarat, El Slavador and Peru; floods in parts of Asia, Africa, droughts in Central Asia, including Afghanistan, Central America and Africa. What are chiefly disturbing are the unabated nature of these disasters and the inability of governments to check their onset or their impacts. There has been increasing resultant loss of life and property, recurrence of disasters, which is largely unexplained, though climate change suggestions have been attempted, which are at best tentative. There is, however, increasing belief in human causation behind disasters.

There is increasing realisation, as also explained earlier, of a cause-effect relation between disasters and development in that development has not factored environmental concerns sufficiently in mainstream policy and has been predominantly productivity centred. For example, as brought out in the India Disasters Report, 2005, (Parasuraman and Unnikrishnan, 2005) excessive use of chemical fertilisers has led to salinisation of water in Punjab, water-logging and groundwater contamination. Elsewhere, large dams have displaced communities, heightened seismic risk, such as in Koyna, Maharashtra. Large scale felling of trees has led to desertification of large stretches in Gujarat and Rajasthan and environmental degradation in upstream areas of Uttar Pradesh and Bihar.

The World Disasters Report, 2002 categorically states that International development targets set for the year 2015, such as reducing world poverty and hunger by one half, will not be reached unless the heavy toll of disasters on the poor is reduced through effective measures.

In its tenth year, the report published by the International Federation of Red Cross and Red Crescent Societies, calls for disaster risk reduction targets to be added to the international development goals for 2015 and beyond. These targets include reducing by one half, the number of people killed and affected by disasters and increasing the number of governments with dedicated plans and resources for risk reduction programmes (IRCRS, World Disasters Report, 2002).

Logically, since/if disasters have human causation, their impact could be minimised by planned human intervention. These efforts comprise immediate control of the situation in the aftermath of a disaster, implying *disaster response*, long-term planning with a view to curtailing its frequency and impact and curbing its disaster potential, hence losses when onset, implying *mitigation*, and *preparedness,* which is explained/understood as a state of readiness on the part of administration to swing into action.

2.2 STAGES IN DISASTER MANAGEMNET

Disaster Management efforts are geared towards *disaster risk management.* Disaster Risk Management "implies the systematic process of using administrative decisions, organisation, operational skills, and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impact of natural hazards and related environmental and technological disasters. These comprise all forms all activities including structural and non- structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects to hazards" (UNISDR, 2004).

There are three key stages of activities in disaster management:

1) **Before a disaster**: to reduce the potential for human, material, or environmental losses caused by hazards and to ensure that these losses are minimised when disaster strikes;

2) **During a disaster**: to ensure that the needs and provisions of victims are met to alleviate and minimise suffering; and

3) **After a disaster**: to achieve rapid and durable recovery which does not reproduce the original vulnerable conditions.

Common perception of disaster management, as explained earlier, is limited to emergency relief and post- disaster rehabilitation. This is so because these two elements are by far

the strongest in terms of high profile visibility, political support and funding provision. Instead of allocating funds before an event to reduce future disasters, action normally only takes place after an event has occurred. The situation is similar to that of preventive health care where curative medicine is relatively well funded whilst preventive medicine is not.

The focus on emergency relief also depends on *risk perception*; that is, whether there is belief that disaster could be avoided. If disasters were believed to be of such a scale that it is believed, nothing could be done to reduce either the phenomenon or the risk involved, and risk mitigation would not be pressed for/attempted. However, once belief develops that disaster losses are exacerbated by human agency, and could be curbed thereby, disaster risk mitigation would be attempted.

2.3   THE DISASTER CYCLE

The different phases of disaster management are represented in the disaster cycle diagram overleaf. The Disaster Cycle consists of three stages:

I)   The Disaster Event

This refers to the real-time event of a hazard occurring and affecting the 'elements at risk'. The duration of the event will depend on the type of threat, for example, ground shaking may only occur for a few seconds during an earthquake while flooding may take place over a longer period of time. Disasters have tremendous modifying impact on the physical landscape. Within a few minutes, an entire region is reduced to rubble in the event of an earthquake. The recent Tsunami has permanently altered the physiography of affected coastal areas in Sri Lanka, Andaman and Nicobar islands. The impact leads to loss of life and property in affected areas; losses being directly correlated to the vulnerability of the region, physical and socio-economic. Physically weak structures, especially in illegal/informal settlements give way easily and cause large-scale losses. Vulnerability is also socio-economic. Weaker sections of society, viz. women, children, aged and handicapped, mentally infirm, etc., suffer a lot more than their stronger counterparts. Studies have also unearthed positive correlation between poverty and vulnerability. The poor inhabit the most hazardous physical areas because they are easier to procure and offer added advantages, like proximity to sea for fishermen or fertile soil for farmers near flood prone areas etc., that makes them prone to losses, both of assets and life. The poor also lack the resilience to recover from shock in the aftermath of a disaster. For example, fishermen loose their boats, street side vendors, the homeless, orphans, widows and beggars fall easy prey to epidemics and insidious activities of unsocial elements like thieves, robbers, pimps, etc.

This brings to light the need for multi-faceted response to disasters, which takes account of all social political and economic ramifications. Issues to be addressed range from physical, relating to damaged structures and physical vulnerability of areas and infrastructure to social and economic vulnerability of weaker sections that suffer more relative to other, better placed. The following diagram is a vivid description of the disaster cycle.

The Disaster Cycle

II) Disaster Response

A Disaster is a cataclysmic event that has severe modifying impact. Consequences are both physical and social/ human. Communication is disrupted; infrastructure is affected adversely, many buildings giving way completely, critical facilities are disturbed, economic losses accrue, loss of employment, ranging from temporary to permanent occurs, development is rendered a severe set-back, law and order situation worsens, social fabric is disturbed, in that parochial tendencies are seen to come forth, such as on caste, communal, linguistic *et al* lines, and most importantly, people lose lives. Disaster Response has to tackle all aforesaid challenges. Disaster response entails restoring physical facilities, rehabilitation of affected populations, restoration of lost livelihoods and reconstruction efforts to restore the infrastructure lost or damaged. There are inherent important lessons to be learnt from disaster response. Retrospectively, it brings to light flaws in efforts pertaining to policy and planning with respect to location and type of infrastructure and social schemes to improve the social positioning of the under privileged, particularly with respect to access to resources of the underprivileged. Disaster aftermath is evaluation time for the administrative set up in that disaster response exposes system weaknesses. Disaster is the ultimate test of administrative efficiency, in the sense of positive impact on the environment, preparedness, procedural simplicity, logistics, speed and expertise. There are inherent important lessons to be learnt for the future. Strong infrastructure and service support base is the fundamental and the most important requirement, which is often found wanting in poor third world countries. Disaster event simply exacerbates the losses that accrue almost every time/ unabated due to poor health and hygiene arrangements in vulnerable pockets, inefficient municipal administration, top-down orientation in policy making and administration, poor institutionalisation of development planning and administration at the local level, implementation bottlenecks, unchecked poverty, unresponsive administration, poor informational and logistical arrangements *et al.*

Such critical evaluation as also articulation of displeasure on the part of the people through the electoral mechanism is not as effective in third world countries where elections are fought less on 'rational' criterion and more on ascriptive 'traditional'/ 'charismatic',

criteria, which shifts attention/ focus away from performance to *rhetoric* which are designed to excite inherent social differentiations based on caste, language or community, etc., which is political demagoguery. Disaster event brings to the fore such inherent failings of a system; hence is explained the reliance on outside aid which is often found misdirected and misused due to lack of familiarity with local circumstances in recipient countries and rampant corruption in disbursements due to poor administrative infrastructure. Since Risk Perception of disasters is low in developing countries, pressure for policy in this regard is not strong enough. Hence, pressure for disaster management policy/planning in developing countries is articulated externally, that is, on the part of external/ international bodies like the International Red Cross and Red Crescent Societies, and the UNDP, the ISDR etc., based in the United Nations which may not always be guided by local concerns.

Hence, proactive planning for disaster response on the part of governments, especially in developing countries with regard to administrative reforms is imperative to protect development and/by lessening the disaster potential of a catastrophe, natural or man-made or otherwise by way of policy interventions to ensure:

- Better institutional preparedness;

- Countering contrary pulls such as lack of social cohesion owing to irrational differentiations that effectively impede response, in the sense of self- help and 'communitarianism'; and

- Long- term mitigation policy to counter vulnerabilities, structural and non- structural by enabling legal provisions and honest implementation of the same.

Significance of Response

Response has immediate mitigation impact. Disaster losses can be minimised to a large extent by effective response on the part of government and civil society. Sheer impact of disasters on life and property endorses the significance of response. Globally, natural disasters account for nearly 80 per cent of all disaster-affected people. The insurance industry estimates that natural disasters represent 85 per cent of insured catastrophe losses globally (World Disasters Report, 1997).

World Disasters Report (2003) focuses on *ethics* in humanitarian aid. It looks at how humanitarian agencies and governments can best help disaster-affected communities to recover, to become stronger and more resilient. It addresses issues like how the gaps between short-term relief and longer-term recovery can be bridged. There is growing concern over politicisation of disaster relief. "Millions of the world's most vulnerable remain beyond the reach of humanitarian assistance and protection. Saving lives alone is not sufficient. Respecting people's dignity and livelihoods is equally important. Humanitarian organisations bear two responsibilities. They must operationalise humanitarian principles by developing field indicators to put principles into practice and disseminate good practice in humanitarian judgement." Acting in tandem with local communities, particularly the vulnerable segments, this could be done.

There is also criticism of over-reliance on high-profile aid operations to save lives when long-term investment in disaster mitigation at the local level has proven to be much more effective. No international aid effort was necessary when the worst hurricane since 1944 hit Cuba in 2001 but only five people died. Local mechanisms were in place to evacuate 700,000 people from Havana and other threatened areas. Of the 53,000 people rescued

from the flood waters in Mozambique's two great floods, *local people* saved 34,000(IRCRCS).

In 1996, 40 million disaster-affected people depended on humanitarian assistance, a 60 per cent increase over the average figure of 25 million in the 1980s. In the first half of this decade, over US$ 30 billion was spent on humanitarian assistance. The average cost of natural disasters over the past 25 years stands at over US$ 87 billion a year (CRED, 1999) The average amount spent on humanitarian response is US$ 3 billion a year. Compared to expenditure on disaster mitigation, the average annual global military spending is around US$ 780 billion (UNDP, 1998 *in* India Disasters Report, 2005).

The World Disasters Report of 2002 states that thousands of lives are lost and millions of people left weakened each year because of donor reluctance to invest in measures that *reduce the impact* of disasters. Last year alone, the lives of 170 million people worldwide was disrupted by disasters.

Investing in mitigation issues like building long- term resilience of vulnerable communities would better serve the purpose of disaster management. There are reports of widespread corruption/leakage in disaster relief disbursements. Besides, business interests press on public policy, as there are huge profits involved in reconstruction activities.

It is also asserted that disaster mitigation as part of the development process can minimise economic losses from disasters. However, Disaster Mitigation refers to a future perspective of development. Immediate concern of minimising disaster losses can be attended only by efficient and quick disaster response.

Governments have been known to suffer political losses in the follow- up elections after a disaster. For example, the Polish government suffered terrible election loss after alleged disastrous handling of the disaster situation, following extensive flooding of Central Europe in 1997. Unprecedented downpour lasted two weeks from July 5 onwards and affected large masses of people in Poland and the Czech Republic. In total more than 100 people were killed, countless rendered destitute and about 160,000 people in Poland and the Czech republic, respectively had to be evacuated. While the Czech and Polish governments were cash starved, Germany's handling of the situation was much better due to its better financial position (Parasuraman & Unnikrishnan, 2005, India Disasters Report). Hence, preparedness, understood as readiness of the administrative apparatus in terms of logistics such medical supplies, hospitals, doctors, temporary shelters etc. is crucial for disaster response.

Issues in Disaster Response

The key word in disaster response is coordination between actors involved, viz. the government and civil society, including international donor organisations. For effective coordination, local government infrastructure has to be strong as response effort is channelised/ concentrated at the local level. Unfortunately, local governance has not been sufficiently institutionalised in India. That makes service delivery inefficient. Common administrative problems, like, maintenance of health and hygiene in their respective areas, good drainage, open spaces in settlement vicinities, largely go unattended. This creates vulnerability to disease owing to system failure; manifested as water accumulation following floods, physical vulnerability of informal settlements wherefrom most deaths are reported during catastrophes like earthquakes etc. Coupled with institutional failure, are *negative sociological dynamics* like rural to urban migration, which exacerbate problems like

congestion and poor basic services in urban areas and possibly, ethnic and communal tensions.

Civil society is contributing significantly to all aspects of disaster management cycle, particularly, relief. Civil society is the new hope of the new world order in the face of state and market failure in different respects. It is being seen as the answer/alternate / counterpoise to globalisation and weakening states. Civil society is hence, the buffer against state excesses and the market; the latter now developing in collusion with state governments, hence sharing interests with it, especially in the third world. In the newfound nexus, citizen could be a mute spectator, unless there are optional protection mechanisms. Civil society, in this respect offers new hope in that it has fought successfully for human causes round the world, such as landmine ban, protection of environment etc. It has also successfully challenged arbitrary political regimes such as Marcos's in Philippines. However, there is the darker side, which should not be overlooked. The civil strife in Rwanda involved civil society organisations in a negative way (Rieff, 1999). Besides, civil society is an inseparable/organic entity of a culture; the members therefore could be as indoctrinated as any with flawed perceptions. Also, perceiving civil society as an alternative to State (roll back of state) would be a fundamental error, as all said and done, State remains the principal agency for citizens' welfare and it is to it that people turn in distress situation. Also, civil society organisations work systematically only under the aegis of the state. Left alone, they are an amorphous entity; potentially perhaps, chaotic. Also, their international linkages/origin make them suspect with regard to national security. Behavioural aberration on their part in the sense of being generally non-cooperative with and distant from the state is also discomfiting. During the Marathwada earthquake, non-government organisations were seen to leave work midway and withdraw. They were also not organised and systematic to the desired degree. They even messed up, creating unnecessary chaos in the recent Muzaffarabad earthquake. As articulated in the India Disasters Report, 2005, crises in Marathwada and other places in India showed that the involvement of local people and civil society groups in rescue and relief was not a clearly defined process. According to Parasuraman and Unnikrishnan in the India Disasters Report, (2005), the specific arenas where civil society participation is desirable should be specifically laid down to avoid chaos and confusion in emergency situations. Those are; training project staff, information dissemination, programmes monitoring, housing, and social and economic rehabilitation measures. They, in turn, must be given adequate room to explore and innovate. The agencies must submit a time-bound plan of action, outline their approach unambiguously, clearly defining their specific roles, articulating a programme management strategy, and must establish that they have the necessary resources to see the things through.

The converse picture is equally important. Attitudinal change on the part of the governments to reinforce participation is also required. The response in the Marathwada earthquake exhibited that the government views rescue and relief work as a piecemeal business; the responsibility of its revenue department, and therefore, public support need not be factored into it. In the absence of a well-defined process of involving people, spontaneous involvement has often gone misdirected and is viewed as *obstruction* by the authorities. The overall perspective of the administration is to view people as passive recipients of government largesse rather than as valuable partners in any undertaking. This is retrograde and undemocratic. The general perception is that people impede disaster response, not facilitate it. The result is too many isolated, ill- coordinated efforts on the part of individuals and government and non-government agencies with lack of proper coordination between them. Institutionalisation/strengthening *social capital* during normal times to be

tapped in readiness during emergencies in the form of *organised collective effort* at the level of the society is the right policy stance in this regard. The desideratum of the discussion is that government and civil society and the private corporate sector should operate in tandem for effective disaster response.

The most desirable virtue in 'good governance' that is often asserted/reiterated in public administration literature, is peoples' participation. But it is rather confusing as to participation, in what way? Studies suggest that participation succeeds only when it is invoked by the state, such as, government planners eliciting people's opinion on choice of site for relocation, or local craftsmen's in structure design and/or implementation. Even where major effort is on the part of people in the form of self-help, catalytic state role would be no less significant. One cannot even say with any degree of assurance that the state has in fact weakened since the 'roll back' got underway. Hence, guarded optimism with regard to civil society activism is needed. It is a welcome development but needs to be tempered with justifiable criticism.

III) Recovery

The recovery phase involves implementation of actions to promote sustainable re-development (reconstruction, rehabilitation) following a disaster. It covers long-term measures like, rebuilding of houses, assets, infrastructure, school building, hospital buildings, and other public buildings. It is a process undertaken by a disaster-affected community to fully restore itself to pre-disaster level. Recovery is the activity that returns infrastructure systems to minimum operating standards and guides long-term efforts designed to return life to normal or improved levels after a disaster. Recovery is also sometimes used to describe the activities that encompass the three overlapping phases of emergency relief, rehabilitation and reconstruction.

The chief behavioural attribute required in recovery is resilience. As highlighted in the World Disasters Report, 2004, community resilience is a big factor in disaster recovery. Recovery is used to describe the activities, which encompass the three overlapping phases of emergency *relief, rehabilitation* and *reconstruction*.

1) Emergency Relief

Emergency relief refers to the period immediately following the disaster when steps are taken to meet the needs of survivors with regard to shelter, water, food and medical care. Activities undertaken during and immediately following a disaster, include, immediate relief, rescue, damage and needs assessment and debris clearance. Rescue and relief are critical elements of response. As expressed in the India Disasters Report (2005), voluntary effort on the part of people, if recognised and institutionalised as supplementary to official government effort, could substantially minimise loss of life if not property to that extent. This would necessitate institutional/ organisational improvements by way of better delegation to field agencies, improvements in decision-making and communication processes, incorporation of indigenous traditional knowledge on warning signs, a cartographic knowledge of safe and unsafe areas, survival methods, and traditional forms of insurance built around kinship and families. The most crucial aspect in relief and rescue is communication across involved agencies. Disaster zone is often equated with a war zone, where communication is the critical factor, often, crucial, in fact, the deciding factor between success and failure.

2) Rehabilitation

Rehabilitation implies activities that are undertaken to support the victims' return to

normalcy and re-integration in regular community functions. It may include the provision of temporary housing and public utilities as interim measures to assist longer-term recovery through permanent housing and infrastructure. Besides physical elements, rehabilitation programmes also include economic rehabilitation through livelihood recovery and support actions and finding alternate employment options for those who cannot get back to their original occupations due to irreparable damage. Rehabilitation also includes psycho-social rehabilitation for those who are badly traumatised and need support in terms of psycho-social counseling or even medication in some cases.

Rehabilitation therefore includes the provision of temporary employment and restoration of lost livelihoods. Actual strategy adopted in rehabilitation would be dictated by circumstances, condition of the physical landscape, state of economic activity, whether relocation of affected communities is necessary, or whether resumption of normal life could take place in that region itself. It is important to incorporate past lessons in rehabilitation. Vulnerability mapping is recommended for identifying areas where access is to be completely restricted and the safe areas for viable construction activity.

Rehabilitation policies suffer due to short-term perspective, in that they are pursued as unplanned, ad-hoc measures. Rehabilitation is not factored in wider development strategy. A study conducted by the UNDP in the 1980s which focused on disaster mitigation efforts in Bangladesh, Ethiopia, and Ecuador, concluded that disaster preparedness and prevention is most effective only when it is built into the larger scheme of sustainable development, which enhances social opportunity and economic growth (India Disasters Report, 2005). Desired approach was followed in Marathwada with conspicuous benefits. Those affected by the later Uttarkashi earthquake, or the even more recent Jabalpur earthquake suffered for lack of policy in this regard. (India Disasters Report, 2005)

Also, people are expected to access regular government welfare schemes for relief in disaster situations, which is difficult, given the exigent circumstances.

Crucial factor in rehabilitation as borne out by experiences from past disasters is training of personnel in various aspects of rehabilitation, such as, special concerns of widows and orphans, with respect to health and livelihood requirements besides community participation in damage and loss assessment and vulnerability analysis

3)   Reconstruction

Reconstruction attempts to return communities to improved pre-disaster functioning. It includes the replacement of buildings, infrastructure and lifeline facilities such as roads, bridges and communication links, so that long-term development prospects are enhanced rather than reproducing the same conditions which made an area or a population vulnerable in the first place. Mitigation measures can effectively be incorporated into reconstruction since there is generally"openness" to change and improved safety following a disaster event. Hence, this is mainly the technocrat's arena of function/action.

Post-modern thinking, as also referred earlier, is impacting urban planning in a major way. Instead of 'modernist' emphasis on uniformity, diversity is being lauded as the desired virtue. Accordingly, indigenous knowledge is being incorporated in modern engineering technology to produce viable structures in earthquake, flood and cyclone prone areas. Physical vulnerability of structures causes maximum disaster casualties. Hence, stress is also on retrofitting old structures with a view to making them disaster-resistant besides making new ones with disaster-resistant technology. Also, instead of the *old cluster*

approach to housing which, as more in consonance with industrialisation would be changed for more *differentiated housing and open spaces*, which would provide for more aesthetic and safer cities. From a social perspective, modern cities have increased isolation and alienation of human beings. This has led theorists in the West to talk about 'social capital' as it is increasingly getting scarcer in modern societies that are getting 'atomised'. Social capital is an intangible resource that invests in social ties, which proves an invaluable resource in recovery during emergences. In simple terms, it means people reaching out to each other and helping rebuild lives. Isolation is counter- effective of social capital.

IV) Development

The inclusion of development as a phase in the disaster cycle is intended to ensure that following the natural disaster, societies factor hazard and vulnerability considerations into their development policies and plans in the interest of overall progress. The rationale behind the use of the expression 'disaster management cycle' is that disaster and its management is a continuum of inter-linked activities. It is sometimes also referred to as the 'disaster-development cycle', implying that disasters are periodic phenomena and occur regularly in such a way that there is development, followed by a disaster, then back to development till the next disaster. Yet, such expressions are slightly deceiving in that they suggest that the periodic occurrence of disasters is something inevitable, always requiring the same response. On the contrary, if effective prevention and preparedness measures are implemented, natural disasters may be avoided by limiting the adverse impact of inevitable natural phenomena.

Sustainable development is another term that is useful in this context, implying development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts of 'needs' in particular, to the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet the present and the future needs.

Illustration of Disaster Cycle through Case Study

The processes covered by the disaster cycle can be illustrated through the case of the Gujarat Earthquake of 26 January 2001. The devastating earthquake killed thousands of people and destroyed hundreds of thousands of houses and other buildings.

The State Government as well as the National Government immediately mounted a large-scale relief operation. The help of the Armed Forces was also taken. Hundreds of NGOs from within the region and other parts of the country as well as from other countries of the world came to Gujarat with relief materials and personnel to help in the relief operations. Relief camps were set up, food was distributed, mobile hospitals worked round the clock to help the injured; clothing, beddings, tents, and other commodities were distributed to the affected people over the next few weeks.

By the summer of 2001, work started on long-term recovery. House reconstruction programmes were launched, community buildings were reconstructed, and damaged infrastructure was repaired and reconstructed. Livelihood programmes were launched for economic rehabilitation of the affected people.

In about two year's time the state had bounced back and *many of the reconstruction projects had taken the form of developmental programmes* aiming to deliver even

better infrastructure than what existed before the earthquake. Good road networks, water distribution networks, communication networks, new schools, community buildings, health and education programmes, all worked towards developing the region.

The government as well as the NGOs laid significant emphasis on *safe development* practices. The buildings being constructed were of earthquake resistant designs. Older buildings that had survived the earthquake were retrofitted in large numbers to strengthen them and to make them resistant to future earthquakes. Mason and engineer training programmes were carried out at a large scale to ensure that all future construction in the State is disaster resistant. Since the state is also drought and cyclone affected, building construction for cyclone resistant housing was propagated in the coastal areas, and water harvesting systems were given a thrust for drought mitigation.

A preparedness programme was taken up in earnest by the government and the NGOs. Community awareness campaigns were carried out on *dos* and *don'ts* for different kinds of disasters. These told people what to do and what not to do before, during and after a disaster. School safety programmes were taken up under which, teachers, students and parents were trained on how to prepare for a disaster and how to respond to one. Disaster management plans were prepared for the state, districts, local areas and schools. A system of drills and plan updating was established. All of this contributed to a higher level of preparedness in the state.

Subsequently, hazardous events struck the state again. There was a cyclone warning in 2004, which was responded to with a very efficient evacuation implemented by the government and the NGOs. The community was already aware of the evacuation plan and was trained how to react. Similarly, major floods hit the state in June-July 2005. Once again, the role allocation was clear to all the concerned stakeholders in the government as well as the NGOs and the community too knew how to help the relief teams help them. Losses were minimised, and the relief and rehabilitation process went off smoothly.

This case study shows how there was a disaster event during the earthquake, followed by immediate response and relief, then by recovery including rehabilitation and retrofitting, then by developmental processes. The development phase included mitigation activities, and finally preparedness actions to face future disasters. Then disaster struck again, but the impact was less than what it could have been, primarily due to better mitigation and preparedness efforts. The disasters were again followed by response and recovery, and the cycle goes on.

Risk Reduction: Mitigation And Preparedness

The Risk Reduction is chronologically the latest paradigm for mitigating the impact of disasters. The precursor to the Risk Reduction approach is the *Total Disaster Risk Management Approach (TDRM)*. Guzmann (2005) explains the essentials of the approach. The TDRM approach is the immediate forerunner of the *Risk Reduction Framework*, which is currently being emphasised. In the Isephan Typhoon in 1959, Japan suffered heavy losses. A ferryboat sank in Bangladesh in a cyclone on May 3, 2002, killing 450 passengers. These disasters could have been prevented if close cooperation between concerned organisations had been achieved.

The TDRM Approach

The strategic objectives of the TDRM Approach as explained in the Regional Workshop on TDRM, held in 2001 at Kathmandu, organised by the Asian Disaster Reduction Centre (ADRC) and OCHA, Kobe are as follows:

1) "To address holistically and comprehensively the various concerns and gaps in the different phases of the disaster management cycle by considering the underlying causes of disasters (that is, the conditions of disaster risks) and the contextual factors in disaster risk and its management.

2) Enhancement of local capacity and capability, especially in disaster risk management as part of a decentralised approach and build reliable database for policy reference.

3) To promote multilevel, multidimensional and multidisciplinary coordination and collaboration among stakeholders in disaster reduction and response. This broadening involvement of various sectors previously less concerned with disaster reduction and response is a positive development."

The proposed implementation strategies for the TDRM Approach are the following:

1) Achieving effectiveness in disaster reduction and response through *multilevel, multi-dimensional and multidisciplinary* cooperation and collaboration, engaging all concerned stakeholders/organisations and political actors. Emphasis is on *networking* which can harness positive organisational potential by complementing in strategic areas and bridging knowledge gaps.

2) Making decisions based on reliable disaster risk information derived from hazard mapping and vulnerability assessment. The TDRM Approach attaches great importance to hazard mapping and vulnerability assessment as a fundamental tool for generating reliable disaster risk information, which serves as basis for making decisions on disaster reduction and response interventions, including the best use of limited resources.

3) Enhancing coordination and integration of stakeholders' action through good communication and efficient exchange of relevant and reliable information exchange of critical disaster risk information, which could enhance coordination and integration of stakeholders' actions in disaster reduction and response. However, ensuring the availability and accessibility of accurate and reliable disaster risk information when required entails an efficient system for information sharing. In this regard, an efficient disaster risk management information system is important. Moreover, it should be effectively linked to local early warning systems, local authorities and the media, to ensure effective use of disaster risk information for public awareness and education, among other important activities such as strategising for quick response.

4) Ensuring that appropriate enabling mechanisms are in place, including policy, structure, capacity building, and resources.

The following enabling mechanisms support the successful implementation of the TDRM Approach:

1) *Policy*: Establish clear and comprehensive policy that defines the objectives and commitment of the government, organisation, or community to disaster reduction and response efforts. This may assume the form of a law, policy guidelines, promulgated

plans, or protocols. A policy developed through a strategic and consultative planning process could effectively address the identified gaps in the disaster management cycle.

2) *Structures and systems*: Establish organisational structures and systems that facilitate and ensure coordination of stakeholders' action and puts contributions in place. This involves the establishment and strengthening of focal points and coordination bodies.

3) *Capacity-building*: The enhancement of national and local capacity to establish and implement disaster reduction and response measures, especially for vulnerable sectors and communities. This is a regular undertaking.

4) *Resources*: The identification and provision of resource requirements, including funds and trained human resources. This includes the means to access and use authorised fund appropriations for disaster reduction and response. These enabling mechanisms are more effective when sustained by institutional enthusiasm, political commitment, focal points and committed advocates in government.

5) *Implementation*: Implement the disaster risk management process from the national level to the community level in continuation. The disaster risk management process is a process for good decision-making and for ensuring the best use of limited resources. It applies standard principles, process and techniques of risk management to disaster management. The process presents a framework and a systematic method for identifying and managing disaster risks in six systematic steps, as under:

1) Establish the disaster risk context

2) Identify the disaster risks

3) Analyse the disaster risks

4) Assess and prioritise the disaster risks

5) Treat the disaster risks

6) Lastly, monitor, review and communicate.

In general, this process aids decision makers in determining possible outcomes of risks and undertake appropriate measures to control or mitigate their impact based on reliable information and the available resources. In this regard, disaster risk management promotes good disaster management practice, and therefore, should be implemented in all sectors.

Pertinence of TDRM for Disaster Management Cycle

Based on the above explanation, the TDRM Approach is a *purposive approach* that addresses *holistically* and *comprehensively,* the various concerns and gaps in the different phases of the disaster management cycle. It focuses on the underlying causes of disasters, the conditions of disaster risks and the vulnerability of the community. It also emphasises multi-level, multi-dimensional and multi-disciplinary cooperation and collaboration in achieving effective disaster reduction and response. This approach intends to integrate, complement, and enhance existing disaster reduction and response strategies. Moreover, the TDRM Approach could serve as a framework for policy action in identifying and addressing the gaps in existing policies, programs, structures, systems and resources towards more efficient and effective implementation of disaster reduction and response activities. Of fundamental importance in the TDRM Approach is hazard mapping and

vulnerability assessment. This diagnosis helps ensure good decisions in choosing appropriate interventions and in ensuring the best use of limited resources.

Overall, the TDRM Approach presents a creditable disaster management strategy by way of enhanced efficiency in disaster reduction and response, and cost effectiveness through sound allocation of limited resources. The challenge at hand is to explore opportunities and initiatives to pilot the TDRM Approach at the provincial and community levels. It is also crucial to build consensus and political commitment at the highest level for adopting the TDRM Approach as a strategy to address effectively, the prevalence of disaster risks, the current state of disasters, and the existing gaps in the disaster management cycle. Reducing the risk of disasters involves activities, which either reduce or modify the scale and intensity of the threat faced or by improving the conditions of 'elements' at risk. Although the term 'prevention' is often used to embrace the wide diversity of measures to protect persons and property, its use is not recommended since it is misleading in its implicit suggestion that natural disasters are preventable. The use of reduction to describe protective or preventive actions, which lessen the scale of disasters, is therefore preferred. Even with effective preparedness and mitigation measures being in place it is realistic to expect some level of damage from extreme natural forces.

Risk Reduction is the *end* to which the TDRM is geared. Chronologically, the earlier approaches to disaster management have been the *comprehensive approach*, based on factoring articulated risks in public policy; the *integrated approach*, stressing inter-sector administrative coordination and organising work, within organisations, with a disaster management orientation, through required modifications in structure, such as, rearranging hierarchy to promote team work, specialist expertise, etc.; the *prepared community approach,* stressing harnessing social capital to build disaster resilience through training workshops, organising volunteer effort *et al* and the *developmental relief* approach, implying administering relief with a long-term development perspective, such as, building *pucca* roads, where communication is found wanting and not some temporary arrangement as a *kuccha* pathway. The TDRM incorporates all articulated concerns and gears it towards the 'end' objective of *Disaster Risk Reduction*.

Risk reduction can take place in two ways:

1) **Long-term Mitigation**

Mitigation embraces all measures taken to reduce both the *effect* of the hazard itself and the vulnerable conditions in order to reduce the *potency* of a future event. Therefore, mitigation activities can be focused on the *hazard itself* or the *elements exposed* to the threat. Examples of mitigation measures which are hazard specific, include; modifying the occurrence of the hazard, for example, water management in drought prone areas, avoiding the hazard by siting people away from the hazard and strengthening structures to reduce damage when a disaster occurs.

In addition to these physical measures, mitigation should also be aimed at reducing the physical, economic and social vulnerability to threats and the underlying causes for the same. Therefore, mitigation may incorporate addressing issues such as land ownership, tenancy rights, wealth distribution, etc.

Some common mitigation measures are:

- Hazard Assessment

- Vulnerability Analysis

- Risk Assessment

- Vulnerability Reduction/mitigation strategies (structural and non- structural)

- Integration of disaster risk reduction activities in all development activities

- Disaster-resistant buildings and infrastructure

- Awareness among the community

- Preventing habitation in risk zones.

2) **Short-term Preparedness**

This protective process embraces measures, which enable governments, communities and individuals to respond rapidly to disaster situations to cope with them effectively. Preparedness includes the formulation of viable emergency plans, the development of warning systems, maintenance of inventories and training of personnel. It may also embrace search and rescue measures as well as evacuation plans for areas that may be 'at risk' from a recurring disaster.

Preparedness, therefore, encompasses those measures that are taken before a disaster event, which are aimed at minimising loss of life, disruption of critical services, and damage when the disaster occurs. All preparedness planning needs to be supported by appropriate legislation specifying clear allocation of responsibilities and budgetary provisions for specific activities.

Some common preparedness measures are:

- Forecasting and warning systems for different disasters

- Emergency management plans for responsible agencies (for monitoring, alert and evacuation, immediate disaster assistance, deployment of search and rescue teams and distribution of relief material, etc.)

- Community awareness and education

- Preparation of disaster management plans for the community

- Mock drills, training and rehearsals.

2.4 SHIFT TO MITIGATION AND PREPAREDNESS PLANNING IN INDIA

The DMTP (Coburn *et al*, 1994) defines Disaster Mitigation as "a collective term used to encompass all activities undertaken in anticipation of the occurrence of a potentially disastrous event, including preparedness and long-term risk reduction measures." Disaster Mitigation measures entail planning and implementation of risk reduction measures based on vulnerability and risk assessments and political decisions based on acceptable risk and the level of risk perception in society.

The Yokohama Message

Alarmed at increasing disaster losses all round the world, world leaders assembled at

Yokohama in May 1994, to meet the challenge collectively, since environment is an international concern. The message was to factor disaster mitigation in development policy. It marked a paradigm shift, since disaster management had been conceived more in terms of response, post-event, not as something, which could be tackled in initial stages with policy intervention. The Yokohama principles (1994) for risk reduction are as follows:

1) Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies and measures.

2) Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief.

3) Disaster prevention and preparedness should be considered integral aspects of development policy and planning at national, regional, bilateral, multilateral and international levels.

4) The development and strengthening of capacities to prevent, reduce and mitigate disasters is a top priority area to be addressed so as to provide a strong basis for follow-up activities to IDNDR (International Decade for Natural Disaster Reduction).

5) Early warnings of impending disasters and their effective dissemination are key factors in successful disaster prevention and preparedness.

6) Preventive measures are most effective when they involve participation at all levels from the local community through the national government to the regional and international level.

7) Vulnerability can be reduced by the application of proper design and patterns of development focused on target groups by appropriate education and training of the whole community.

8) The international community accepts the need to share the necessary technology to prevent, reduce and mitigate disasters.

9) Environmental protection as a component of sustainable development consistent with poverty alleviation is imperative in the prevention and mitigation of natural disasters.

10) Each country bears the primary responsibility for protecting its people, infrastructure, and other national assets from the impact of natural disasters. The international community should demonstrate strong political determination required to make efficient use of existing resources, including financial, scientific and technological means in the field of natural disaster reduction, bearing in mind the needs of the developing countries, particularly the least developed countries.

Post-Yokohama, there is an increasing awareness of 'factoring' disaster mitigation concerns in mainstream development planning, especially at the local level. Disaster Management in India, therefore, has now been imparted a development perspective following realisation of the imminence of such effort to sustain development achieved in /over the years. Traditionally, disaster management had been treated as a contingency expenditure, which could be conveniently classified, non- plan. There is an unfortunate tendency on the part of policy makers to look upon non-plan expenditure as relatively unimportant, when that is a grievous error from a development perspective. A plan item in a particular year would be non-plan in subsequent years, when expenditure has to be incurred on maintenance.

Hence, it is illusory to assume that the significance of non-plan expenditure is any less than plan. Nevertheless, disaster management has been treated "calamity relief," and therefore, non-plan. Indirectly, though there are plan schemes for subjects like drought proofing, drinking water, and afforestation etc., which concern disaster management. Henceforth, however, there would be renewed commitment and greater role on the part of the Planning Commission towards disaster mitigation. Need for the same has been envisaged/endorsed by the Eleventh Finance Commission and the High Powered Committee on Disaster Management(2001). The attempt/emphasis would be on planning for "safe national development".

As articulated in the Tenth Plan, disasters set back development and reduce new investment, further constricting the growth of the region. Besides, response is a lot costlier than risk reduction or mitigation. The World Bank and United Nations Geological survey calculated that economic losses worldwide from natural disasters in the 1990s could be reduced by $280billion if $40 billion were invested in preparedness, mitigation and prevention strategies. In China, $3.15 billion has been invested over the past 40 years in measures to control floods: this is believed to have averted potential losses of $ 12 billion. UN estimates, the total cost of disasters worldwide during the 1980s at $120 billion. As per Charlotte Benson (2005), Direct Costs relate to the capital costs of assets (such as buildings and the physical infrastructure, raw materials, and the like) destroyed or damaged in a disaster, crop losses included. Indirect losses result from adverse impacts on businesses that result as a consequence.

For structural mitigation measures, measures like making disaster mitigating, a condition for financial assistance can be expected. This underlines the regulating role of the state, which would assume increasing significance in the face of rising newer threats. Mandatory risk mitigation stipulations for construction companies, for example, are an instance of the monitoring/policing role of the state that would set to rest most conjectures regarding 'defunct state'!

2.5   RESPONSE MECHANISM IN INDIA

In India, there is integrated administrative machinery for management of disasters at the National, State, District and sub-District levels. The primary responsibility of undertaking rescue, relief and rehabilitation measures is that of the State governments. The Central government supplements the efforts of the state governments by way of physical and financial resources, if need arises. The extent/necessity of Central response/assistance depends on the severity and scale of the calamity and the requirements of Central assistance for augmenting the financial resources at the disposal of the State Government. The effort is more in the nature of support to the state governments. Drawing from the Ministry of Home Affairs', official document," National Policy", Union government's response could be in two ways:

1) Policy Response, provided by the Prime Minister, Cabinet Committees, and the Home Affairs and/or Agriculture Minister; and

2) Administrative Response

The Central response can be:

i) Policy response, keeping in view the short and long term policy objectives of the government

ii)   Administrative response, broadly relating to:

a) Operational requirements

b) Provision of Central assistance as per existing policy.

Central initiatives are in the form of:

i)   Visits of the calamity affected areas by President, Prime Minister and other dignitaries;

ii)   Activating the administrative machinery for assisting in relief measures; and

iii)   Setting up machinery for implementing, reviewing and monitoring of relief measures.

The operational aspects of the administrative response could, further, be classified into:

i)   Primary relief functions, and

ii)   Secondary relief functions.

The *primary* relief functions of the Central Government relate to:

i)   Forecasting and operation of warning system

ii)   Maintenance of uninterrupted communication

iii)   Wide publicity to warnings of impending calamity, disaster preparedness and relief measures through TV, AIR and Newspapers

iv)   Transport with particular reference to evacuation and movement of essential commodities and petroleum products

v)   Ensuring availability of essential commodities at reasonable prices particularly the commodities through the Public Distribution System

vi)   Ensuring availability of medicines, vaccine and drugs

vii)   Preservation and restoration of physical communication links

viii)   Investments in infrastructure; and

ix)   Mobilisation of financial resources.

The *secondary* functions of the Central Government which supplement the States' relief efforts, would relate to:

i)   Flood/inflow forecasts from the Central Water Commission

ii)   Relief, rehabilitation and restoration through military aid to civil authorities

iii)   Contingency plans for crops, cattle preservation nutrition and health measures

iv)   Technical and technological inputs for provision of drinking water

v)   Technical assistance in the water budgeting and water management for various uses; and Coordination of the activities of the State agencies and voluntary agencies.

Energising Local Government

Since, efforts at controlling disasters are concentrated at the local level, and much depends on the initiative at that level, particularly by local people, institutionalising inherent

social capital in panchayat raj institutions and local volunteer groups (civil society) *inter se* could strengthen administrative preparedness for disaster response. Following the 73rd and 74th constitutional amendments, development planning at the local level is expected to incorporate disaster mitigation, which would make planning and implementation for/of the same more targeted and cost-effective. Efforts would be made to organise civil society activity to make it operate in tandem with the state apparatus under the aegis of the local institutions of self government (Tenth Plan).

Civil society actors at the local level are now proposed to be trained through mainstream administrative organisations like the Police, for better, more educated effort in various aspects of disaster management. As articulated in the Tenth Plan, their participation would be better institutionalised in close cooperation with government agencies. Presently, as evidenced during the recent Muzaffarabad quake, and also cited earlier, effort is a little scattered in that it is ill-organised and inconsistent. Efforts are in order through state initiative for better organisation of effort on the part of these agencies.

Stakeholder Involvement

Apart from national, state, district and local levels, there are various institutional stakeholders, who are involved in disaster management at various levels in the country. These include the police and paramilitary forces, civil defence and home guards, fire services, ex-servicemen, non-government organisations, public and private sector enterprises and the media, all of who have important roles to play.

The Government of India GoI-UNDP Disaster Risk Management Programme envisages active association and involvement of all stakeholders in various disaster prevention, mitigation and preparedness measures. Recognising the potential of the private corporate sector in contributing to disaster management, it envisages, sensitisation, training, and co-option of the private corporate sector and their nodal bodies and organisations in disaster planning process and response mechanisms. The Ministry of Home Affairs has outlined areas for substantial involvement of the corporate sector; some of the more pertinent of which are:

- Organisation of sensitisation programmes for building the knowledge, attitude and skills of the industries in adopting and implementing disaster risk reduction measures to make the industrial structures and infrastructures, disasters resistant.

- Development of onsite and offsite disaster management (DM) plans by the industries. The process of developing DM plans is being explained to the industries during sensitisation programmes.

- Training of industrial personnel in various facets of disaster management and response; viz. first aid, search and rescue, evacuation, etc.

The objectives of the work plan area to mainstream private sector participation in disaster management; create linkages between the community and the private corporate sector to strengthen/facilitate cooperation between some of the major stakeholders in disaster management (that is, the corporate sector, local authorities and the community).

2.6   CONCLUSION

Disaster management encompasses a range of activities, which are envisaged as a cycle involving, disaster event, response, preparedness and mitigation in that sequence. In the

immediate aftermath of a disaster, search and rescue and immediate relief activities are imminent. Long-term risk reduction or mitigation measures include rehabilitation, securing/ restoring livelihoods and infrastructure restoration. Later, development strategy incorporates lessons learnt from the past, as safe development practices. This is known as mitigation. In addition, preparedness activities need to be carried out in the sense of instituting infrastructure and crafting required policy for effective disaster response and vulnerability reduction for reduced disaster losses in the future. Disaster mitigation includes preparation of disaster management plans, pre-positioning of equipment and materials, and practice and drills of response procedures. The cycle is a visual depiction of activities in disaster management and the logical sequence of their instance. The Total Disaster Risk Reduction Management discussed above, involves; human resource development, hazard mapping, vulnerability and risk assessments, information management systems, communication, coordination and funds, among others, as articulated in the regional workshop on TDRM held in Kathmandu on Aug. 9, 2002, organised by the ADRC and OCHA, UN.

Disaster occurrences are *cyclic phenomena*. Hazards exist in nature, which when the vulnerability conditions allow, turn into disastrous events with devastating impacts on populations. Following disasters, communities slowly recover and get back to life. Normal developmental processes set in after some time, till disaster strikes again, setting the cycle into motion all over again. During or immediately after a disaster, search and rescue, immediate relief and shelter activities are taken up. In the longer-term rehabilitation, housing, livelihoods and infrastructure restoration are carried out. Later, during non-disaster times, it is important to ensure *safe development practices* so that there is lesser impact of disasters in the future. In addition to this, preparedness activities need to be carried out for responding to a disaster. This is put to use when the next disaster happens, and the cycle goes on.

2.7 KEY CONCEPTS

Disaster Management	:	As per Coburn, Sspence, Pomonis DMTP, 1994, "Disaster Management is a collective term, encompassing all aspects of planning for and responding to disasters, including both pre and post disaster activities. It refers to both the risks and the consequences of disasters."
Mitigation	:	Mitigation is a long-term measure to reduce vulnerabilities, both physical, which is of infrastructure, and socio-economic, that is, pertaining to social positioning that predisposes vulnerable sections to disaster losses. Mitigation is an integral aspect of planning. Post-Yokohama, countries have been exhorted to follow the path of mitigation which mandates dovetailing vulnerability reduction measures in development planning, through resource allocation with the added perspective of disasters in sectoral schemes. It implies treating disaster mitigation as a plan commitment and not a non-plan contingency issue, as had been the approach up till now. The rationale for mitigation comes from repeated occurrence of disasters in recent times and the unsustainable impacts.

Preparedness	:	Preparedness is explained as a state of readiness of the administrative apparatus to respond to a disaster quickly and in a way that minimises the loss of life and property that could accrue, implying, minimum time lag and maximum effectiveness.
Prevention	:	Disaster Prevention entails measures to preempt a disaster by controlling a potentially threatening hazard. For example, water harvesting can prevent droughts. To that end, it entails advance planning to forestall a disaster.
Risk Reduction	:	As per DMTP, 1994, "risk reduction is a long-term measure to reduce the *scale,* and/or the *duration* of eventual adverse effects of unavoidable or unpreventable disaster hazards on a society which is at risk by reducing the vulnerability of its people, structures, services and economic activities to the impact of known disaster hazards. Typical risk reduction measures include improved building standards, flood plain zoning and land use planning, crop diversification and planting windbreaks. Disaster mitigation, prevention, risk reduction are often used interchangeably. Hence, it is the activity and not the semantics that are/should be stressed.
Risk Perception	:	Risk perception is the degree to which people are aware of disaster risks and willing to budget for the same. It applies to general people as well as policy makers in government. Awareness generation through proactive measures, like television programmes and door-to-door campaigns improve the level of Risk Perception in society. Risk perception is generally low in developing countries and high in the developed world.
Safe Development	:	Development should be physically sustainable in that it should be able to withstand the vicissitudes of changing environment and disasters. Hence, the 'safety parameter' has to be incorporated in development schemes. Theoretically, it implies viewing development as a means to a long and healthy living and not as an end in itself.