UNIT 33 REVIEW

Structure

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33.0 OBJECTIVES

This is the last unit of this course on disaster management. After studying this unit you should be able to:

- explain in an overall manner about disaster management;
- highlight the importance of preparedness and mitigation in disaster management;
- discuss the urgency for timely relief and rehabilitation;
- describe report writing on the post-disaster scene bringing out relevant important aspects of information for area-based approach; and
- draw lessons from a disaster to handle any likely future event with greater confidence.

33.1 INTRODUCTION

As you commence the study of this unit, you have already gone through the various aspects relating to disaster management that are considered necessary for a basic understanding of the subject, at the certificate level. This should have, hopefully, awakened a desire in you to seek a more advanced level of understanding for the benefit of not only yourself but also the community in which you live.

Every post-disaster review in the wake of a calamity should serve the important purpose of identifying the immediate and long-term needs of the affected community. Even more importantly, it should enable the policy makers and planners to draw appropriate lessons that will enable a likely future disaster to be handled with greater efficiency, lesser loss of lives and property. We shall briefly discuss these issues in this unit.

33.2 UNDERSTANDING DISASTERS

The history of the world has recorded that all along, natural disasters have resulted in a very heavy toll of death, destruction and human suffering. Recently compiled statistics reveal that during the period 1971 to 1995, on an average, disasters killed over 1.2 lakh people and affected more than 135.5 million people every year. Asia and Africa account for more than 90 per cent of the above. In India, on an average, 4728 deaths were reported per annum in this period (1971-95) due to disasters, which affected over 63 million people each year. Table 1 gives broad details.
TABLE 1: Average Annual Toll due to Disasters (1971-95)

<table>
<thead>
<tr>
<th>Region of the World</th>
<th>No. of deaths</th>
<th>Affected people (In millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>46,258</td>
<td>119.81</td>
</tr>
<tr>
<td>Africa</td>
<td>62,632</td>
<td>10.62</td>
</tr>
<tr>
<td>America</td>
<td>9,583</td>
<td>3.85</td>
</tr>
<tr>
<td>Europe</td>
<td>3,329</td>
<td>0.59</td>
</tr>
<tr>
<td>Oceania</td>
<td>113</td>
<td>0.67</td>
</tr>
<tr>
<td>TOTAL</td>
<td>121,915</td>
<td>135.54</td>
</tr>
<tr>
<td>India</td>
<td>4,728</td>
<td>63.72</td>
</tr>
</tbody>
</table>

Source: Disaster-watch. "DOWN TO EARTH", 31 October, 1997

Natural disasters such as those due to earthquakes, landslides, cyclones (and other high winds), floods, tidal waves, volcanic eruptions, wild fires, etc. are the matters of concern in this study of ours. Classified in terms of the number of incidents of disasters and by the type of natural disaster, during the same period 1971-95 (Table 2) almost sixty per cent of disasters around the world are due to high winds and floods. Two single incidents were responsible for the loss of over a quarter million people each. In the last two decades, the property loss due to natural disasters was estimated to be between U.S. $25-100 billion. The total losses would be even higher and these are reflective of the shattered economies and disrupted social structure that occur in the wake of disasters.

TABLE 2: Worldwide Natural Disasters (1971-95)

<table>
<thead>
<tr>
<th>Type of disaster</th>
<th>No of incidents</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High wind</td>
<td>1,650</td>
<td>31.5</td>
</tr>
<tr>
<td>Flood</td>
<td>1,508</td>
<td>28.8</td>
</tr>
<tr>
<td>Drought and famine</td>
<td>469</td>
<td>9.0</td>
</tr>
<tr>
<td>Earthquake</td>
<td>678</td>
<td>12.9</td>
</tr>
<tr>
<td>Landslide</td>
<td>232</td>
<td>4.4</td>
</tr>
<tr>
<td>Volcano</td>
<td>110</td>
<td>2.1</td>
</tr>
<tr>
<td>Others</td>
<td>593</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,240</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Source: Disaster-watch. "DOWN TO EARTH", 31 October, 1997

Loss of valuable lives, human and cattle, and the heavy losses at the hands of nature are certainly not inevitable. It may be true that it may not be possible to prevent the occurrences of extreme natural phenomena, in the form of hazards like cyclone or earthquake, but the disasters they result in can most often be mitigated and the severity of effect blunted.
The world possesses adequate knowledge, which if properly applied, can lead to saving of lives and mitigation of the destructive impact of natural disasters. In fact, such concerted global efforts to reduce the destructive impact of natural disasters were launched in 1989 when the United Nations General Assembly proclaimed the 1990s as the “International Decade for Natural Disaster Reduction” (IDNDR). The overall primary objective was to reduce loss of life, property, damage and economic and social disruption caused by natural disasters. After the year 2000 when IDNDR was completed, the UN decided to continue disaster reduction programmes under a new programme titled “International Strategy for Disaster Reduction” (ISDR).

The important thing to keep in mind is that the occurrence of an extreme natural phenomena (flood, cyclone, etc.) is not a disaster in itself. What leads to a disaster is the impact of that upon a community that is vulnerable to it. Understanding the natural force is necessary but even more important is the focus on the people and the infrastructure subjected to its force.

Every time a disaster takes place and in the wake of the large economic disruption caused by it, an analysis of the post-disaster scene takes place invariably. Workshops and seminars are held to discuss the various aspects of the tragedy. Invariably one significant conclusion comes out that the effectiveness of pre-disaster preventive measures in the mitigation of adverse effects is high and is achieved at much less cost as compared to the post-disaster relief and rehabilitation. Most often one of the conclusions drawn after such discussions is to the effect that the main thrust of disaster management should be shifted from disaster relief to disaster preparedness and disaster mitigation.

Check Your Progress 1

Note: i) Use the space given below for your answers.
     ii) Check your answers with those given at the end of this Unit.

1) What is the new U.N. Programme after the completion of IDNDR?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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2) What is the main basis for the present day conclusion that the main thrust of disaster management should be shifted from disaster relief to disaster preparedness?

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________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Generally mitigation process is described in four basic steps viz. risk analysis, plan formulation, preparation for implementation, and implementation and maintenance.

Risk analysis provides a basis for different options of planned interventions to reduce the risks from natural hazards on settlements and for the preparation of the risk profile of a settlement, area or region. This process consists of successive steps of hazard assessment, vulnerability analysis, risk assessment and risk appraisal.

Plan formulation is to improve the risk profile of a settlement. It does not limit itself to physical planning measures only but extends to engineering, functional and adaptation of institutional measures as well. Disaster mitigation planning needs to be comprehensive and will have to review a range of alternative strategies against clearly laid down criteria so that the objectives can be met and performance evaluated. The selection of the plan for implementation is a policy decision and requires the involvement of decision makers.

The preparation of the implementation phase is the next step. The instruments for implementation are identified and attuned to the plan proposals and the local conditions. These may relate to legal, financial, land tenure and community participation aspects of the plan implementation.

The final step is implementation and maintenance. This applies itself to details of project management, phasing, resources, maintenance aspects etc. The disaster mitigation process is an iterative one, running through successive steps, somewhat on the lines of the flow diagram in figure 1 below.

Figure 1 – DISASTER MITIGATION PROCESS (After UNDRO Manual)
You have already studied the specific manner of dealing with the different types of natural disasters such as floods, earthquakes etc. and all these mitigation options and processes are applicable to them. An important point to keep in view is that it will not be always possible to make a clear distinction between pre-disaster planning and post-disaster planning. Post disaster planning looks back in the light of what has happened, the damage that has occurred etc., to mitigate the effects, not only this time, but also in future similar situations. Pre-disaster planning, on the other hand, looks into the future, anticipating an event with the intention of mitigating its consequences. Certain actions are not possible in certain types of situations. Prevention comprises steps that are taken to fully protect lives and property. For example, a storage dam upstream that is designed to completely store the flood water or a carefully implemented bypass channel that reduces the originally anticipated high flood in a downstream location. Mitigation makes the disaster less severe, but may not totally nullify its effects. In the post-disaster oriented approach, preparedness comprises several types of warning systems such as correct and timely cyclone warnings. Later the relief phase takes care of evacuation, supply of relief articles, shelter, social care etc.

Every disaster becomes an educative tool to reflect on the inadequacies in the existing method of managing disasters, and if we are able to draw the right lessons from it, it will enable improved disaster management in the future. It will be worthwhile to study some case studies of this type, international and national, in this context.

The Tangshan earthquake in China in 1976 was one which caused huge loss of life and property. All kinds of structures were severely damaged. 60% of highway bridges and 40% of railway bridges suffered damage. After the earthquake, extensive field observations and investigations were carried out by many professional teams. Many lessons were learnt.

While hundreds of multistoried brick buildings collapsed, those few that did not collapse had reinforced concrete columns, connected with closed ring beams at each floor at the junction of longitudinal and transverse walls. This led to the important lesson that the above measures could delay the shear cracks and increase the capability of preventing collapse. It was also found that roof structures fell down due to breaking of columns at the bottom or at points of cross-sectional change. Also weakness of bracing systems between roof frames and between columns caused longitudinal collapses.

No collapse occurred in industrial buildings with strong columns, light weight roofs and perfect bracing systems, as well as in buildings with folded plate roofs.

Nearly all of the ten thousand chimneys in Tangshan were destroyed but brick chimneys with vertical reinforcements anchored to ring beams were intact. Chimneys with vertical and circumferential steel angles, or straps, by way of strengthening proved to be effective.

A number of buildings, which had been strengthened after an earthquake in Tianjin in 1975, suffered little damage in the 1976 quake. For instance over 60,000 sq. meters of buildings of Tianjin power plant had been strengthened before the Tangshan quake and none of these collapsed in the 1976 shock.

As a result of these the building design code for Industrial and civil buildings earlier published in 1974 was revised after the 1976 shock. Similar design codes for hydraulic structures, roads and bridges etc. were also undertaken.

Each destructive disaster is to be taken as the nature's way of testing on a large scale of our structures, equipments and disaster mitigation capability and of the ability to draw timely lessons from nature.
The recent Indian experience in terms of the Uttarkashi earthquake of October 1991 has been discussed in the earlier units. Similarly the manner of the disaster mitigation resorted to the Latur quake of September 1993 and the lessons learnt there from was also discussed earlier. Lessons are still being drawn from the Bhuj (Gujarat) earthquake of January 26, 2001 described in an earlier Unit.

Most damaged houses in Uttarkashi were of poor quality, built in fieldstone using clay mud in place of mortar. The buildings in Uttarkashi were classifiable in four broad types and each performed differently in this quake. Over 20,000 houses were fully destroyed and three to four times that number partially damaged. The lessons learnt in this quake were:

1) The rural stone houses were one to two-storeyed with average plinth size 2.4m x 4m floor area, with intermediate floor being wooden deck type and pitched roofs consisting of slates resting on wooden purlins and round wood rafters. Random stone walls were dry packed or set in mud mortar. All such houses were destroyed.

2) In Uttarkashi town also maximum damage occurred to old stone masonry houses. Buildings constructed in cement, mortar and those with seismic bands suffered only minor damages.

3) Buildings in the Irrigation colony at Manery were mostly two-storeyed using cement concrete solid blocks in cement mortar with reinforced cement concrete slab floor and pitched roof on wooden rafters and CGI roof covering. They did not have seismic bands but were having vertical steel bars at corners. None of these collapsed, though located within 10 km from the epicenter, but some of them had serious damage to walls in the first storey.

4) The houses in the Indo-Tibetan Border Force colony at Mahitanda built by CPWD to codal specifications including a seismic band as per Indian Standards were generally of single or double storey with cement concrete blocks in cement mortar. Roofs were either sloping RCG slabs or CGI sheet on wooden purlins. There was no damage to them except for some minor cracking.

These revealed structural weaknesses, planning defects and construction and maintenance defects. Based on this experience, appropriate recommendations had been made for the type of safe construction that should be encouraged in such areas as also the manner of retrofitting needed.

We have studied here in some detail, what lessons were learnt from past disasters triggered by earthquakes. Similar literature exists about the lessons learnt from past cyclone and flood havocs which had enabled a better planning for managing the likely future disasters of similar types. It is worth reiterating that a review of the details of how a disaster situation was managed and with what results is an important necessity to enable appropriate lessons being drawn there from. These alone will enable improved planning and implementation of disaster mitigation in the future.

### 33.4 RELIEF AND REHABILITATION

Relief and rehabilitation come immediately after the disaster. The basic difference between them is that relief relates to the immediate days and weeks after the disaster when attempts are made to provide basic needs like food, clothing, shelter, medicine, etc. to the victims. Rehabilitation relates to the work undertaken in the following weeks and months, for the restoration of basic services to enable the population to return to normalcy.
We have already studied the various aspects of these activities in the earlier units. The policy on disaster management, as at present in vogue, seeks to provide relief and arouse the energies of social groups, NGOs etc. in the total organised effort to ensure the least damage to the affected population due to the natural calamity. Lives must be saved and deterioration and destitution of people prevented. It also aims at community effort and shaping the infrastructure of society such that recurrence of scarcities and other calamities are minimised.

The approach of moving away from crisis management to risk management, initiated some two decades back and thereafter to integrated disaster preparedness involving reliable early warnings, carefully planned emergency response and better community preparedness has also been found to be highly rewarding in as much as notable success was achieved in reaching timely relief in recent years.

A comparison of the major cyclones which resulted in disasters in 1977 and again in 1990 in Andhra Pradesh underlined the beneficial role of disaster-preparedness strategy. While both had similar destructive potentials, the loss of lives was drastically reduced from 10,000 in 1977 to 910 in 1990. Similarly the loss of cattle came down from 230,000 in 1977 to 27,000 in 1990.

Similarly in the wake of unprecedented floods in August 1986 in the Godavari river in Andhra Pradesh (A.P.) based on Central Water Commission’s timely and accurate flood-forecasts and warnings, the A.P. Govt. was able to move over one million people who were living within 10 km of flood banks to places of safety. There are many more instances to show the preparedness approach as superior in dealing with relief and rehabilitation. This also points to the importance of preparing a detailed, factual and documented account of every disaster and the manner in which relief and rehabilitation were handled and the results thereof in a comprehensive manner. Each disaster situation must thereafter be reviewed to draw appropriate lessons for the future. Unfortunately, such detailed records are not available for most disasters of the past in the requisite details. Another matter of importance is the need to avoid exaggerated or inadequate documentation of the effects of a disaster. Most often, in recent decades, there had been a tendency to exaggerate highly the adverse effects and damages allegedly suffered in order to arouse sympathies or to obtain greater relief grants. This tendency needs to be eschewed.

The National Flood Commission in its report (1980) had drawn pointed attention to this aspect as under:

"It may be stated at the outset that the available data, which we have used, suffer from many deficiencies. These generally stem from factors like inability of the primary reporting agencies to assess the magnitude of the flood damages objectively, human bias in reporting, arbitrary methods adopted in estimating yields and crop values, absence of a suitable mechanism for supervision, checking and lack of coordination at the lower levels between concerned departments of the Govt. Possibility of deliberate distortion of these statistics with a view to gaining some governmental assistance and concessions in some areas also cannot be ruled out....."

In-depth disaster case studies should be prepared as soon as possible after the event. Further, these should be archived and disseminated widely and may be put on INTERNET as well. These case studies need to be multi-disciplinary and multi-functional. There can be no rigid format for all places or all types of events. However, a certain basic format has evolved over the years and the past cases reported will serve as some guide.
As a result of National Workshops on ‘Building up of National Capability to cope with Disasters’ held only a few years back, another important dimension of the two distinct components of Disaster mitigation viz. preparedness and relief was pointedly focused upon. Even though communities and their administration plan and execute policies and strategies appropriate to the requirements of both these domains, there is a subtle difference. Disaster relief involves adequate infrastructural set up and quick response on the part of the entire system, primarily dealt with by governments and institutions. On the other hand, disaster preparedness is a continuous process which has to involve all sections of society. This points out the important role of local communities and local institutions, which need to create and sustain disaster preparedness.

33.5 REPORT WRITING: AREA-BASED APPROACH

No place in India seems to be free from the likelihood of occurrence of disaster of one type or the other. Some states or regions suffer repeatedly and others now and then. It becomes obvious that an area should be prepared to face the different types of disaster situation that it is likely to face. Hence, an area-based approach to disaster proneness and disaster mitigation is essential.

For any area, detailed knowledge should be generated and the following aspects require focused attention:

- A chronological and spatial study of affected areas in their physical environment
- Inventoried details of individual disasters that had struck the area
- Evaluative study of the rehabilitation measures
- Detailed study of various relief measures at the local, regional and national levels
- Availability and adaptability of new technology to help local situations and possible dissemination patterns
- Study of infrastructure development in the affected areas
- Study of socio-economic profile of the area and changes therein
- Such other specific aspects to suit one type of disaster or other

Check Your Progress 2

Note: i) Use the space given below for your answers.
    ii) Check your answers with those given at the end of this Unit.

1) List the four basic steps in the Disaster Mitigation process.

____________________________________________________
____________________________________________________
____________________________________________________
____________________________________________________
2) List the items on which detailed knowledge should be generated in writing to enable adoption of an area-based approach in report writing.

33.6 LET US SUM UP

We have now reached the end of the course. The overall objective in Disaster Management is to reduce loss of lives, property damage and economic and social disruption caused by natural disasters. Our attempt presently is to reorient the approach to pre-disaster planning and preparedness even sustaining and further improving post-disaster relief and management capabilities. The public attitude which was so far accustomed to passive acceptance of the consequences of disasters should be turned towards disaster mitigation, utilising the opportunities of pre-planning, prevention, warning, preparedness and increased application of science, technology and research. Cooperation of NGOs and involvement of communities are essential and should be ensured.

Every past disaster is a text book case study to enable the community to face a future likely disaster situation with greater ability and better management. The preparation of actual case studies should be realistic, factual, accurate and cover all relevant aspects eschewing bias to achieve some hidden agenda. These need to be reviewed competently to draw lessons for the future.

33.7 KEY WORDS

<table>
<thead>
<tr>
<th>Natural Hazard</th>
<th>An extreme natural phenomenon capable of causing a disaster.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Assessment</td>
<td>The process of identifying the probability of occurrence of a hazard of a given intensity in a specified area based on an analysis of natural processes and site conditions.</td>
</tr>
<tr>
<td>Risk</td>
<td>The probability of an expected loss in a given area triggered by a natural hazard to an infrastructure system and the people.</td>
</tr>
<tr>
<td>Risk Appraisal</td>
<td>The process of identifying risks in specific areas or specific infrastructure system and quantifying the risk in social and economic terms.</td>
</tr>
<tr>
<td>Disaster Preparedness</td>
<td>The reduction of disaster impact by requisite anticipatory planning and action.</td>
</tr>
<tr>
<td>Disaster Management</td>
<td>The efficient use of resources to coordinate the process of relief, recovery and reconstruction.</td>
</tr>
<tr>
<td>Mitigation</td>
<td>Actions taken to reduce the risk to lives and property and disruption from a natural hazard.</td>
</tr>
</tbody>
</table>
33.8 REFERENCES AND FURTHER READINGS


Proceedings of CAPART workshops on strengthening of community participation in disaster reduction, 1995.

33.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. Your answer should include the following points.
   - International Strategy for Disaster Reduction (ISDR)

2. Your answer should include the following points.
   - Effectiveness of the pre-disaster preparedness and preventive measures is high and visible as compared to post-disaster relief measures.
   - The pre-disaster preparedness measures are achieved at much lesser cost.

Check Your Progress 2

1. Your answer should include the following points.
   - Risk Analysis
   - Plan formulation
   - Preparation for implementation
   - Implementation and maintenance

2. Your answer should include the following points.
   - A chronological and spatial study of the affected area.
   - Inventoried details of individual disasters that struck the area in the past.
   - Evaluative study of the rehabilitation measures that were taken.
   - Detailed account of various relief measures at the local, regional and national levels.
   - Availability and adaptability of new technology.
   - Study of the infrastructure development in the affected area.
   - Study of socio-economic profile of the area and changes therein.