
UNIT 15 REHABILITATION AND RECONSTRUCTION

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15.0 LEARNING OUTCOME

After reading this Unit, you should be able to:

- Understand the concepts of rehabilitation and reconstruction;
- Explain the types of rehabilitation;
- Throw light on the progress of rehabilitation work in the Tsunami aftermath;
- Examine the problems underlying the process of long-term recovery;
- Discuss the guiding principles of rehabilitation and reconstruction; and
- Analyse the interlinkages between disaster recovery and development.

15.1 INTRODUCTION

Rehabilitation and reconstruction are at the heart of disaster recovery phase. The rehabilitation and reconstruction activities, which follow the disaster response stage, aim at achieving long-term recovery. Disaster recovery is a very significant stage in the disaster management cycle, as this is when the support of governmental and non-governmental agencies in the disaster aftermath usually starts receding and the affected community has to fend for itself. At this stage, the role of the community and self-help groups becomes paramount since they can make or mar the crucial link between disaster response and disaster recovery.

It also needs to be kept in view that the entire rehabilitation and reconstruction process has to be attuned towards developmental goals. Unless we understand the relationship between recovery and development, issues and challenges facing the rehabilitation and reconstruction process cannot be met. This Unit examines the pertinent issue of disasters and development. It throws light on the concept and principles of rehabilitation and reconstruction that must make way for larger disaster recovery process by examining the post-tsunami aftermath. It also analyses the problems faced by planners and implementers in the rehabilitation and reconstruction process.

15.2 CONCEPTS OF REHABILITATION AND RECONSTRUCTION

As we all know, the disaster recovery stage in the disaster management cycle falls between the disaster response phase and the overall development phase. Thus, it is necessary that vital interlinkages between all the three phases be established. This could be achieved through systematic planning and implementation of a long-term recovery programme in the disaster aftermath.

Rehabilitation and reconstruction operations are integral to disaster recovery. They provide a direct 'connect' between disaster response and long-term development. The two activities, however, do not have similar connotation. Rehabilitation involves restoring local services related to the provision of immediate needs. It implies a systematic return to pre-disaster status. It refers to actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims' self-help efforts to repair physical damage, restore community facilities, revive economic activities and provide support for the psychological and social well-being of the survivors. It focuses on enabling the affected population to resume more or less normal patterns of life. It may be considered as a transitional phase between immediate relief and major long-term development.

Reconstruction, on the other hand, represents long-term development assistance, which could help people in the affected areas to rebuild their lives and meet their present and future needs. It takes into account reduction of future disaster risks. Rehabilitation may not necessarily restore the damaged structures and resources in their previous form or location. It may include the replacement of temporary arrangements established as part of emergency response or the upgradation of infrastructure and systems from pre-disaster status.

For instance, following a damaging hurricane, the rehabilitation of the power lines would aim to restore the system as rapidly as possible so that the essential services would continue to function, whereas, reconstruction of the power lines would aim to rebuild the rehabilitated system to a higher or safer standard than before, so that the future risks to the power lines from a similar damaging event could be reduced. Reconstruction must be fully integrated into long-term developmental plans, taking into account future disaster risks and possibilities to reduce them by incorporating appropriate measures. As we have mentioned before, the term recovery is used to embrace both the rehabilitation and reconstruction activities. Both the activities may be required in the aftermath of disaster. One does not essentially exclude the other.

It should also be remembered that rehabilitation and reconstruction do not always safeguard full recovery. In the disaster aftermath, it may take longer to return to 'normalcy' or in some situations, total recovery may never be possible. It is, therefore,

not possible to suggest a 'model' time frame for rehabilitation, reconstruction or recovery stages.

The distinction between rehabilitation and reconstruction is not watertight, but they have to be well-incorporated into a long-term disaster recovery plan. A comprehensive rehabilitation and reconstruction or a broad recovery plan should take into consideration both physical and non-physical requirements of the communities. Failing to address long-term recovery could have adverse consequences. For instance:

- i) It may simply result in large investment in infrastructure without the necessary inputs to help the victims to become psychologically fit, socially ready and economically self-sufficient; and
- ii) The necessary links between physical, social and psychological recovery may be ignored

Thus, we can say that processes of rehabilitation and reconstruction are essential for long-term disaster recovery, even though they need not always lead to recovery. Problems underlying rehabilitation and reconstruction can even go on to stall the recovery process. We will read about this aspect in Section 15.6 of this Unit. Suffice it to say over here that rehabilitation and reconstruction are complex processes that are determined by varied parameters. The nature of rehabilitation and reconstruction largely depends on the intensity of damage caused by a disaster in terms of losses to lives and infrastructure.

There are several factors that need to be taken into view while designing a long-term disaster recovery plan entailing rehabilitation and reconstruction. These are economic, social, political and cultural. While economic, social and cultural factors will become clear by reading the following Section, it is important to understand the political factor over here. Disasters, as we all know, are great electoral opportunities for political parties, especially when elections are round the corner. Politicians derive political mileage out of announcing huge sops and incentives through their recovery package. The recovery plan finds smooth execution if there is political will behind it. The political environment of the disaster aftermath, therefore, needs to be considered by planners of long-term recovery.

15.3 TYPES OF REHABILITATION

Since social, cultural, economic and political factors provide the contours of a thorough recovery plan, we could deduce that there are three major types of rehabilitation, namely, physical, social and psychological. Let us discuss them briefly:

Physical Rehabilitation

Physical rehabilitation is a very important facet of rehabilitation. It includes reconstruction of physical infrastructure, such as, houses, buildings, railways, roads, communication network, water supply, electricity etc. It also comprises short-term and long-term strategies towards watershed management, canal irrigation, social forestry, crop stabilisation, and alternative cropping techniques, job creation, employment generation and environmental protection. It involves policies for agricultural rehabilitation, rehabilitation of artisans and small businessmen as well as rehabilitation of animal husbandry.

The short-term and long-term physical rehabilitation measures should take into view: provision for subsidies, farm implements, fertilizers etc., establishment of seed banks, grain

banks and fodder banks, scope of employment generation, availability of livelihood generation and alternative technologies, along with development of houses and infrastructure. This type of rehabilitation is economic in nature and is broadly geared towards an alternative livelihood approach that can enable the communities to withstand the disaster aftermath.

Developmental measures involve expenditure. These relate to collection of information, hiring of specialist staff, implementation and evaluation of development programmes. However, these developmental costs should try to reduce the economic, social and political costs that are likely to be incurred in the event of a disaster. For a systematic physical rehabilitation plan, the economic environment of a disaster-affected area needs to be kept in view.

Attention needs to be given to disaster-resistant house construction. Earthquake resistant buildings must be planned on sites of hard bedrock. The sites chosen should not be steep, narrow and clayey. They should not be anywhere near loose sands and heavy faulting areas. Cyclone shelters should not be planned at low elevation land, which lacks natural outlet to discharge water. Land at the foot of slopes should also be avoided for cyclone resistant housing. To guard against landslides, recovery plan should include planning for houses that are stable and away from areas near quarrying activity. Flood resistant reconstruction planning must focus on areas that are not low lying. Wetlands, lagoon mouths, edges of island, lake, flood plains, downstream banks, and narrow gorges should be avoided.

Rehabilitation and reconstruction package must also incorporate acquisition of land for relocation sites, adherence of land use planning, flood plain zoning, retrofitting or strengthening of undamaged houses, and construction of model houses. Thus, disaster-resistant housing will have to be systematically included in physical rehabilitation plan. It should comprise identification of hazard prone areas, vulnerability and risk assessment of buildings, outlining of disaster scenarios, technical guidelines for hazard resistant construction and adoption of technical-legal regime.

Social Rehabilitation

Social rehabilitation is an important part of disaster recovery, but this dimension is often assumed to be a community function and neglected in most post-disaster programmes. As we are all aware, disasters can render some groups such as the elderly, orphans, single parents with young children, etc., much more vulnerable to disaster aftermath due to lack of adequate support. In the post-disaster phase, family support systems can break down due to physical and mental trauma resulting from losses of life and property, physical dislocation, and migration of some members of disaster affected communities.

These vulnerable groups would need special social support to survive the impact of disaster. Thus, construction of infrastructure such as community centres, day care centres, anganwadis, balwadis, old age homes, etc., is a vital part of social rehabilitation. There has to be an adequate provision for building this infrastructure wherever it is non-existent or has been destroyed by the disaster. A realistic recovery plan has to take note of this social dimension of the disaster-affected area.

Psychological Rehabilitation

The psychological trauma of losing relatives and friends, and the scars of overall shock of the disaster event can take much longer to heal than the stakeholders (planners,

governmental agencies, NGOs, international agencies, self-help groups, community) in disaster management often assume. It is, therefore, essential, that social welfare and psychological support programmes be considered immediately after a disaster event so that they could be made a vital part of recovery programmes.

No recovery plan can be successful if it does not take cognisance of the psycho-cultural milieu of the affected site. This means that it must give due respect to the tradition, values, norms, beliefs and practices of the disaster-affected people. The cultural dimension of recovery plan is most wanting in the area of housing and shelter. As we will read later in this Unit, the recovery plan is often drafted and executed with utter disregard to basic issues such as availability of water, access to toilets, health and hygiene, privacy of women folk, etc. Housing designs are imposed on the victims without taking into consideration their lifestyles, cultural mores and preferences. A good recovery plan must make a note of these factors.

For a proper rehabilitation of persons suffering from ill-health, there is a need for a systematic Epidemiological Surveillance and Nutrition Centred Health Assessment to monitor the spread of disease. A comprehensive health recovery plan should be in place to deal with the problems of psychological rehabilitation. Physical discomfort and illness could have multiple psychological repercussions. Besides, the chances of post-traumatic stress disorder are high in disaster aftermath. Efforts should be made to arrange for crisis intervention, psychological debriefing (semi-structured crisis intervention), trauma counselling and panic management.

The victims' response to a disaster passes through various stages, for example, 'impact'(disaster event phase); 'inventory' that follows immediately after the disaster event, 'response' and 'recovery'. Each stage evokes a different response. The disaster managers and rehabilitation workers must understand the psychology of victims at the recovery stage and respond accordingly. Priority needs to be accorded to utilising human resources from the affected area itself and only the expert help should be sought from external sources.

15.4 GUIDING PRINCIPLES OF REHABILITATION AND RECONSTRUCTION

In order to meet its objectives, rehabilitation and reconstruction programme needs to draw upon certain guiding principles. We can infer from our previous Sections some of the guiding principles that are part and parcel of an effective approach towards long-term disaster recovery. The broad priorities in a situation of disaster rehabilitation are:

- Provision of emergency relief to be operationalised by the way of mobilising human and material resources on a war footing, comprising food security, construction of temporary shelters and other basic needs
- Rehabilitation of all the displaced people, restoration of basic and alternative means of livelihood along with community-based infrastructure and institutions; and
- Initiation of long-term development interventions, which would lead to sustainable community-based actions (Medury and Dhameja, 2005).

Let us have a look at some of the guiding principles that reflect these priorities:

Treating Communities as Heterogeneous

A systematic rehabilitation plan must not regard the affected communities as a homogenous group. The needs and requirements of disaster affected community would vary from one group to the other within the community, and also from one individual to the other within the group. The requirements of affected farmers will be different from small traders or say professionals like teachers and government workers. Again, the requirements of children, women and elderly will be different from each other. A recovery plan has to prioritise the different requirements and set its objectives accordingly.

Striking a Balance between Economic, Social and Psychological Needs

Just as the needs and requirements of the affected community are largely dependent on what its various groups desire, the economic, social and psychological needs also vary from one group to the other within the affected community. These needs have to be carefully scrutinised. Satisfaction of one need or requirement does not automatically lead to the satisfaction of other needs. For instance, the loss of agricultural land due to a disaster, even though compensated in monetary terms and in terms of new occupational opportunities under rehabilitation, cannot fulfill the psychological loss of being a landowner in the victims. The nostalgia of the ancestral place also cannot be overcome easily.

This reality, is a part of the social status characteristic of traditional culture and people derive gratification from it. Established livelihood, social relations, social status, kinship etc., are sources of satisfaction. Any change or blockage, even though temporary, towards fulfillment of these needs results in varying degrees of tensions and stress in different people. A good recovery plan must not lose sight of this aspect. Recovery actions can be therapeutic in assisting the victims to rebuild their lives and livelihoods if they are contextual and rooted in local values. Likewise, they also need to strike a neat balance between the different types of requirements of victims.

Focusing on Key Issues

Minimising the adverse effects of disasters forms the key focus for achieving the efficacy of various objectives of rehabilitation projects. The success of these projects depends upon the way a disaster is managed and the way the affected population perceives the various rehabilitation programmes as appropriate means of meeting their requirements. This makes it imperative to plan, design and implement rehabilitation programmes to cope with specific aspects of a disaster at appropriate stages to meet the key issues.

These key issues pertain to assessment of damage, fixation of responsibility, prioritisation of requirements, execution of major mitigation strategies, monitoring of development process as well as evaluation and review of projects. It has to be seen that no affected group is left out of the rehabilitation operations in order to avoid social tensions. Disaster management should be addressed in a political, economic and social context, otherwise, the groups who cannot voice themselves may be left out of provisions of disaster recovery.

The focus on key issues makes for an effective rehabilitation and reconstruction plan. In order to realise these issues, attempt has to be made to institutionalise all recovery efforts. Rehabilitation measures cannot be sustainable if they are not institutionalised. Efforts have to be made to establish and sustain the local institutions that are involved in disaster recovery such as grain banks, fodder banks, day-care centres, 'anganwadis', 'bal mandals', 'mahila mandals', 'pani panchayats', etc.

Encouraging Flexibility and Adaptiveness

A recovery plan has to be adaptive in nature so that it can change as per the demands of a new situation. Flexibility norms in terms of structure, processes and finances need to be ingrained in the plan. Disaster management needs a strong political commitment for erecting an effective planning and coordination process at the governmental and societal levels. A process with a clearly defined authority as well as an appropriate budget to maintain an effective disaster plan is needed.

Disaster recovery plans should be comprehensive in scale and operational in style, as disaster management planning is a sequential and continuous process. Effective planning requires systematic diagnosis, resource evaluation, and continuous feedback towards fulfillment of the goals of disaster reduction. Since the scope of disaster management is quite wide and the actors involved in the process fairly numerous, it is essential that a legal and formal framework for coordination is accepted and provided for.

Management is needed at all stages of a disaster viz., the disaster preparedness and mitigation phase, the disaster event phase, the response phase, and the recovery phase comprising rehabilitation and reconstruction processes. Only a flexible and adaptive disaster management plan can achieve it. The recovery plan has to imbibe similar features.

Promoting Systematic Damage Assessment

Damage assessment is a precondition for effective disaster management. Unless we are clear about the nature, extent and intensity of damage in the aftermath of a disaster, we can never plan out, implement or evaluate the disaster management plans and strategies. Thus, the recovery plan can also be ill-conceived in the absence of systematic damage assessment. There is a need for a methodical damage assessment so that the strategies of livelihood creation and infrastructure development are incorporated in the recovery plan.

Damage assessment could take recourse to sample surveys (simple random, systematic, cluster, stratified), and make use of traditional means as well as modern technology damages. The concept of knowledge management is an emerging field, which is soon catching up as an important tool of assessment and recovery. India has its own space based Earth Observation Programme, and expertise is built up in a wide variety of Remote Sensing applications. Emerging information technologies in the area of Remote Sensing and Geographical Information Systems offer immense potential for efficient damage assessment that needs to be urgently harnessed.

Aerial Photography, as a form of Remote Sensing, is an important tool of damage assessment. It refers to the use of satellite with imaging systems that produce computer generated images. Possible uses of Aerial Photography include hazard mapping, vulnerability analysis, disaster assessment and reconstruction planning. Remote Sensing and Aerial Photography can provide an impression of a large area over a short period of time.

Another important step towards damage assessment and reconstruction of infrastructure is the 'feasibility study'. The basic objective of a 'feasibility study' is to generate the data necessary to have a complete plan for reconstruction vis-à-vis its economic viability. It also helps to complete the application of formalities for construction grant for 'infrastructure rehabilitation programme' after any disaster or even in normal times.

Risk management is another dimension of damage assessment. There are three different stages of managing risks: perception, assessment and mitigation of risks. Risk perception

is very important at all levels, that is, the local residents, the NGOs, the donors, should all have adequate perception of the risk. Risk assessment is more of a technical word and is rather the responsibility of the academicians or professionals to quantify the risk in that area or community, which aids in mapping its vulnerability. The last step is that of risk mitigation. It focuses on policy level decision-making, which is a collective effort. The community, government and NGOs have a collective responsibility based on co-operation and capacity building towards resource mapping and social mapping that are essential components of damage assessment. These aspects of assessment must go into the recovery planning stage for effective results.

Supporting Transparency, Efficiency and Effectiveness

The recovery plan must be clear, structured, objective, accessible, accountable and responsive. This is possible if transparency is maintained at each level of recovery plan. Continuous monitoring and evaluation (M&E) could ensure transparent, efficient and effective plans. The basic objective of an M&E exercise is to ensure whether the project is proceeding as originally intended. This is done using indicators.

In case of a post-disaster exercise, M & E could strive to check if all the rehabilitation needs of the affected victims are being met. It could follow the SMART (Specific, Measurable, Attainable, Relevant and Time-bound) tool of indicators, which have to be set at the planning for recovery stage itself. However, the constraints in the process that range from reluctance of project teams to expose themselves to evaluation, inability in understanding the process and impact indicators underlying the M & E, difficulties in collecting data, managing the complexity and extent of the M & E process, and most importantly, keeping objectivity in the process need to be addressed. Viability of a disaster recovery policy depends on responsible monitoring and review. A good recovery plan should strive towards this guiding principle.

Ensuring Financial Recovery

One of the most important components of rehabilitation and reconstruction is that of infrastructure development, which largely depends on financial support. Governments at the Central as well as state levels have specific schemes and strategies for providing funds for disaster management activities, be it relief, rehabilitation or reconstruction. The Calamity Relief Fund (CRF) is one such arrangement at the central level. Even though, the disbursement by the CRF is meant to supplement relief funds, a sizeable portion is earmarked for all phases of disaster management pertaining to six natural calamities namely cyclone, drought, earthquake, flood, fire and hailstorm.

Other financial arrangements include National Calamity Contingency Fund, Prime Minister's National Relief Fund and Member of Parliament Local Area District Scheme (MPLADS). Even the Insurance Schemes could be regarded as an important source for resource generation. Schemes such as Swarnajayanti Gram Swarozgar Yojna, National Agricultural Insurance, Seed Crop Insurance, Kisan Credit Card, etc., should be encouraged as practicable options of disaster mitigation. The Eleventh Finance Commission has recommended the extension of agricultural insurance to all crops, and the Twelfth Finance Commission has also emphasised on the need to link the developmental projects with disaster mitigation. This positive fillip should be sustained to strengthen financial recovery.

Some funds from government's developmental programmes such as Drought Prone Area Programme, Desert Development Programme, Integrated Afforestation Scheme, Eco-

development Scheme, Watershed Development Programme, Indira Awaas Yojna, Sampoorna Grameen Rozgar Yojna, etc., could be diverted towards disaster mitigation and recovery. There is a need to incorporate recovery planning into preparedness planning. In order to ensure smooth inflow of funds, the stakeholders should act swiftly and maintain the interest of the influence groups in disaster recovery.

The UN agencies: World Health Organisation (WHO), United Nations Children's Fund (UNICEF), United Nations Educational, Scientific and Cultural Organisation (UNESCO), World Food Programme (WFP), International Labour Organisation (ILO), United Nations Population Fund (UNFPA), and also the International Monetary Fund (IMF) as well as the World Bank working through International Development Association, International Finance Corporation, Multilateral Investment Guarantee Agency can also provide legitimacy to recovery process, and encourage donors to provide finances and seed capital for disaster recovery projects.

Developing Disaster-resistant Buildings

As we read in Section 15.3, physical rehabilitation calls for construction of disaster resistant structures and retrofitting of existing ones to make them disaster resilient. Different types of resistance components will have to go into earthquake-resistant, cyclone-resistant or flood-resistant structures. A recovery plan should have adequate provision for building disaster-resistant structures as a guiding principle.

Earthquakes are no strangers to India, as 55 per cent of the country is prone to seismic shocks. Several earthquake-prone regions in the country have traditionally built houses that minimise the damage to life and property, and stand up well in the wake of the quake. The traditional wisdom and attention to details can be applied to modern materials as well. These techniques are based on the use of traditional materials, for example, timber and bamboo for building houses. The structural system needs to be tensile and the material should be flexible, as is the case with timber, steel and bamboo. It also helps if the structure is constructed in a way that it vibrates as one unit and sways together.

The recovery plan has to lay emphasis on disaster resistant construction techniques as most new constructions with heavy roofs (slate tiles or Reinforced Concrete Cement or RCC) supported by weak walls (random rubble in mud mortar) have performed badly in the recent past. Older houses in mountain regions have roofs held together by timber and tie-bands, horizontal timber beams spanning across the entire building, connecting the entire structure and giving it the character of a cage. Such houses have suffered little damage despite their mud and stone masonry. These types of constructions need to be promoted.

Quake resistant houses should have tie-bands just above the level of the floor, the level of the doors and windows, and another at the roof level. Corners are the most vulnerable and thus ought to be strengthened. Elasticity of the structure can be enhanced with flexible steel rods or wood batons at corners. Doors and windows should be few, small and symmetrically placed away from the corners. In short, properties of symmetry, ductility, deformability, rectangularity and simplicity have to be followed to build disaster resistant houses.

The performance of earth or stone or brick buildings is generally very poor in earthquakes if tie bands and timber are not used. Wooden buildings perform better but most dangerous aspect of wooden buildings has been their poor fire resistance and therefore

a high danger of catching fire during earthquakes, due to short-circuiting of electric wiring. Even stone and brick buildings have not had a good track record. As far as flood-resistant housing is concerned, structures need to be erected on a higher elevation on best bearing soil and raised mounds using concrete cement and waterproofing. Building failure occurring due to cyclones is mainly confined to the roof. Cyclone resistant structures thus need to be sturdy, wind resistant and concrete in texture. Mangalore tiled and RCC roofs help in this regard. The guidelines for housing in a good recovery plan should make a note of all these aspects.

A good recovery plan should identify and promote them. The role of Building Authorities and Research Institutes such as National Building Construction Corporation (NBCC), Building Materials and Technology Promotion Council (BMTPC), Housing and Urban Development Corporation (HUDCO), Structural Engineering Research Centre, etc., is very important in this regard. Their activities have to be rightly networked in order to derive advantages from their work and experience in disaster-resistant construction.

Building Resilient Communities

No rehabilitation package, as we read earlier in this Unit, can succeed without taking into view the psychology of those affected by disasters. Human psyche comes into play at every stage of disaster management cycle, be it mitigation, rescue and relief or reconstruction and rehabilitation. A participatory disaster recovery programme that involves the local people, civil society organisations and grass roots agencies at decision-making and implementation stages would go a long way in shaping a more humane and feasible disaster rehabilitation programme. A good recovery plan must aim at building resilient communities. This can be ensured through four major strategies (i) Community Participation, (ii) Education and Training, (iii) Stress Management, and (iv) Positive Role of the Media. Let us discuss these now:

Long-term counter disaster planning should be based on building the resilience of victims. A number of Community Based Disaster Management (CBDM) projects are coming up in different parts of the world. Some of these have worked well, while others represent good examples towards making of success stories. Though, almost in all cases, the successes have been driven by external, international and national agencies.

The World Conference on Disaster Reduction held from 18 to 22 January 2005 in Kobe, Hyogo, Japan has adopted a Framework for Action (2005-2015) on “Building the Resilience of Nations and Communities to Disasters”. It is a positive step, as the Conference has provided a unique opportunity to promote a strategic and systematic approach to reducing risks and vulnerabilities to hazards.

There is certainly a need to give due importance to self-help and people’s participation in building resilient communities. A recovery plan should incorporate provisions of creating Village Task Force, Disaster Task Force and Pani Panchayats, etc. It would facilitate the process of capacity building as well as people’s resilience and self-sufficiency.

Education and training are means of learning, and play a significant role in building resilient communities. Education and training have an important role to play in planning and implementing disaster recovery strategies at both the pre-disaster and post-disaster stages. Sustenance of disaster education is dependent on well-formulated training and research strategies.

In fact, education and training are interdependent concepts. The foremost goal of all training and educational programmes should be to target the community. No disaster management programme can achieve its objectives unless the affected community participates in the formulation, implementation and evaluation of disaster related tasks. Adequate community participation is the key to effective disaster recovery. The entire approach to disaster education and training is dependent upon volunteers, social workers, functional specialists and the people at large. They should be assigned clear cut functions and responsibilities. Demarcation of stakeholders in disaster recovery must form a part of recovery plan.

Counseling for stress management is a continuous exercise. The process does not end with the first session of talking to the victims. Healing requires time, and the counsellor may be called upon time and again, sometimes to listen to what has been said before, sometimes to discuss specific problems, and at others to just offer reassurance and support. Stress management is a long drawn process. At every stage, the counsellors have to exhibit empathy and concern, care as well as caution. Dealing with victim's psychology is a very sensitive issue and must be dealt with in the same manner. The provisions for psychological rehabilitation have to be incorporated in a recovery plan.

Rehabilitation programmes should make use of available skills and talents and also focus upon providing new skills and competencies to the affected population to equip them to face the outer world. Efforts should be made to develop commitment to self-support and sustenance, to eliminate dependency syndrome at the onset itself through psychotherapeutic health programmes implemented in the form of family counselling and stress reducing exercises. Community programmes, and other socio-occupational programmes should form an essential component of rehabilitation package.

The media also play an important role in building disaster resistant communities. As an important channel of communication, they transmit facts from a disaster site to the general public and specific target groups. The relationship between the disaster recovery managers and media people could be proactive as well as reactive. Well-planned interactions with the media could be of critical importance in strengthening rehabilitation work and increasing the awareness of levels of affected community. In disasters, where warning is possible, accurate, timely and consistent information dissemination by the media could be a useful contributor to disaster recovery. Media can and should suppress rumours actively because rumours demoralise and reduce resilience.

Suitable policies are needed to incorporate the paradigm shift from crisis management to community-based preparedness at the recovery stage. This should include adequate provisions for education, awareness and training, people's participation at the decision-making and implementation levels, networking of NGOs and other relief organisations, and participative endeavours based on indigenous approaches of coping with disasters.

Upholding the Norms of Equity and Social Justice

Since disasters often hit the least developed areas and the most disadvantaged groups the hardest, rehabilitation and reconstruction programmes should aim to change the vulnerable conditions of the high-risk population through development programmes. There is a need for a more humane paradigm of disaster management. The goals of equity, justice and balanced development have to be ingrained in the disaster management policy right at the outset.

The United Nations Development Programme (UNDP) has a vision on human development, which treats development not merely in terms of mere rise or fall of national incomes. It envisages a space in which people can develop to their full potential and lead productive and creative lives in accordance with their needs and interests. This idea of human development has to be translated into action to uphold the values of equity and justice in the disaster recovery exercise. The guiding principles of rehabilitation, as we read earlier, speak of focus on key issues, vulnerable sections, and objective handling of needs of affected community. These factors define and seek to meet the objectives of equity and justice.

It is also important to introduce gender analysis into recovery planning in order to avoid further marginalisation of women and the other disadvantaged groups. A gender sensitive approach helps to identify differing vulnerabilities of men and women to crisis situations as well as their different capacities and coping strategies. Besides, social and economic costs of all development programmes need to be analysed and incorporated in the recovery plan so that the vulnerable are not affected negatively.

Respecting Traditional Wisdom

Even though, we have a tradition of living in harmony with nature, this balance is being disturbed in the present context. People have always followed traditional practices of coping with disasters, but are becoming too dependent on external agencies to withstand the disaster aftermath. Traditional practices of water conservation such as 'Kuhls' of Himachal Pradesh, 'Kundis' and 'Rapats' of Rajasthan and 'Palliyals' of Kerala have held people in good stead against low intensity droughts. 'Sumers' and 'Chaukhats' of Rajasthan are inimitable earthquake resistant structures from our rich heritage.

These traditional practices are being abandoned to make way for new technologies. At the time when we need a thoughtful amalgam of the 'old' and the 'new', we are slowly losing our traditional wisdom to a haphazard approach to modern technology. A systematic recovery plan should make way for a right mix of traditional practices, modern ways of living and technological development.

Disseminating Good Practices and Lessons Learned

Advancements in the field of Information and Communication Technology (ICT) have made the concept of global village a reality. A proper communication system can be of enormous use in effective disaster management. It can be instrumental in generation of awareness and dissemination of information during disaster preparedness and disaster recovery. The use of modern communication is of relevance not only to disaster managers but also at grass roots levels, though low-cost options such as HAM (amateur) radios, wireless, loudspeakers, folklore, nukkad nataks, market fares, posters are also effective. These must find a place in recovery plan for proper information dissemination on disasters.

Existing developmental policies are also being reexamined to incorporate disaster prevention and preparedness. However, there has been a limited debate on the content and thrust of these policy initiatives. The crucial question that needs to be addressed is: How can the public policy enable the transfer of good practices and research to the most threatened communities? The success stories of Ralegan Sidhi, greening of Arvari River in Alwar, rejuvenation of Sukhna Lake in Chandigarh, Mission Ground Water in Madhya Pradesh, and Build Your Own Check Dam in Suarashtra are waiting to be replicated. The

lessons from these case studies have to be woven coherently in order to build some kind of knowledge base on disaster recovery. Incorporating grass roots experiences, with its indigenous initiatives and constraints, into the developmental policies would provide real substance to the disaster recovery policy. Education and training could play an important role in this regard.

Protecting Environment

Disaster management and environmental protection should go hand in hand. As we all know, the frequency, intensity and impacts of disasters can be attributed to flawed environmental policies. Greenland's Glaciers are melting twice as fast as previously, pointing towards a scary reality. The Earth's oceans are rising fast and by 2050, cyclones, tsunamis, submerging islands would become headline news everywhere (Saxena, 2006).

The beaches of a third of the 200 islands of the Maldives are being swept away. A quarter of all species of plants and land animals could be driven to extinction. Sea ice in the Arctic Ocean has decreased by 10 per cent. Coastal areas of the US, China, Bangladesh and India are threatened. Globally, the Earth's climate is warmer today than it has been at any time in the past 140 years (*ibid.*). These are alarming statistics and their mitigation must form a part of disaster recovery.

There are many International Environmental Treaties such as Kyoto Protocol, United Nations Framework Convention on Climate Change, Basel Convention on Trans-boundary Movement of Hazardous Wastes, Convention on Biological Diversity, Convention to Combat Desertification, Convention on International Trade in Endangered Species (CITES), Convention on the Law of the Sea (LOS), and Montreal Protocol on Substances that Deplete the Ozone Layer. These Treaties and Conventions have set good and practicable guidelines for environmental protection. The relationship between environmental degradation and disasters thus needs to be clearly surveyed. The recovery plan must keep this aspect in view and assimilate environmental protection measures wherever required.

Endorsing Sustainable Development and Alternative Livelihood Strategies

In order to create long-term vulnerability reduction conditions, a 'sustainable livelihood framework' is urgently required. The livelihood approach advocates an increase in economic opportunities of work without degrading the natural environment. It seeks to understand the many factors influencing people's choices of livelihood strategies and reinforcing their constraints. Creation of livelihood options is a crucial component of community vulnerability reduction. It is an important step towards capacity building.

Sustainable development involves more than growth. It requires a change in the content of growth to make it more equitable in its impact. The main objective of sustainable development is to prevent acts of nature from becoming disasters. The main focus of sustainable development is to mitigate the conflict between development and environment. While at first glance, this may seem unrelated to disaster prevention, the truth is that they are intricately entwined (Dhameja, 2001).

A sustainable livelihood programme needs to analyse the existing socio-economic conditions prevailing in the area before the occurrence of a disaster, examine the occupational pattern in the affected area, survey the prevailing infrastructure facilities, adjudge the awareness levels of the people; and gauge the mindset of the people, their culture, attitudes, traditional beliefs and practices.

A sustainable livelihood framework needs to recognise the premise that the community's relationship with the environment is a basic unit for all planning and implementation activities. Self-reliance should be promoted and administrative interventions should follow a 'rights-based' approach, so that people are not treated as mere beneficiaries, but are integrated in the total development process. This kind of approach could be really beneficial in creating sustainable livelihood conditions and the recovery plan should make a note of this.

The United Nations (UN) commitment to promoting sustainable development and mitigating disaster losses, as we all know, is strong. The World Bank and the regional development banks have also begun to engage with issues surrounding the relationship between disaster risk reduction and economic development. The World Bank's Board of Executive Directors has endorsed viable Environment Strategy on July 17, 2001.

The Strategy has three interrelated objectives: improving people's quality of life, enhancing the prospects for quality of social and economic growth, protecting the quality of the regional and global environmental commons, rational and planned growth of agricultural, industrial and tertiary or services sectors of the economy, creating employment opportunities, programmes for the youth, women and physically handicapped, promoting alternative cropping patterns, irrigation and water harvesting techniques, social and farm forestry, and skilled labour. An effective recovery plan has to be sustainable and must therefore give credence to creation of sustainable livelihood opportunities and alternative technologies.

Integrating Recovery with the Larger Development Process

It is clear from our discussion in this Unit that disaster recovery has to be integrated into larger development process. The basic justification for Linking of Relief and Rehabilitation with Development (LRRD), the new approach to disasters and development, is quite simple. Disasters are costly in terms of both human life and resources; they disrupt economic and social development; they require long periods of rehabilitation; they lead to separate bureaucratic structures and procedures, which duplicate development efforts by the institutions involved.

At the same time, however, development policy also often ignores the risks of disasters and the need to protect vulnerable households by helping them to develop 'coping strategies'. If relief and development were to be linked, these deficiencies could be reduced. Better 'development' can reduce the need for emergency relief; better 'relief' can contribute to development; and better 'rehabilitation' can ease the transitional process between the two.

The "backward" and "forward" linkages between political, developmental, relief and rehabilitation operations constitute a complex network of relationships, which have to be examined within the global policy framework or strategic planning policy, which is a dynamic function of the specific situation of each country or region. In other words, the components of the LRRD and their design are highly situation specific, and should be considered in the light of the 'contextual' realities of the country or region concerned. A good recovery plan should keep into view the interlinkages between all the stages of disaster management, as well as the 'connect' between disaster rehabilitation, reconstruction and the larger developmental planning. The recovery plan has to, therefore, be holistic and comprehensive.

15.5 POST-DISASTER STORY: THE TSUNAMI AFTERMATH

There are many case studies on the rehabilitation work that have been undertaken by the governments, NGOs, self-help groups, international agencies in various parts of the country in the aftermath of different types of disasters such as the Latur Earthquake, Malpa Landslide, Orissa Cyclone, Bhuj Earthquake, Muzzafarabad Earthquake, etc. These Cases speak of the problems, issues and challenges of the rehabilitation phase. In this Unit, we will talk about the Tsunami aftermath in order to have an in-depth understanding of the complex problems involved in the process.

Tamil Nadu bore most of the wrath of the Tsunami that struck the Indian Peninsula on December 26, 2004. At least, 13 coastal districts of the State were devastated. Nagapattinam and Cuddalore were the worst hit. Around 7995 people and innumerable livestock were consumed by the killer waves. The relief and rehabilitation work was collectively carried out by the central and state governments, NGOs, international agencies and community groups.

The Joint Assessment Mission comprising the World Bank, the Asian Development Bank and the UN Organisations have put the damages and losses at \$838.32 million. This includes the losses in fisheries, agriculture and livestock, micro-enterprises, housing, rural and municipal infrastructure and so on. From day one, the State Government took speedy action to provide relief, which was completed by the end of January 2005. In the rehabilitation phase, which commenced soon after, the affected families were given a sustenance package consisting of cash, and other provisions to see them through the initial months.

By May-June 2005, most of the fishermen had gone back to the sea. The Government gave assistance for replacement and repair of boats and board motors, as well as for the purchase of nets. The central government gave 100 per cent subsidy for catamarans (that is., boats with twin hull in parallel), 50 per cent subsidy for Fibre Reinforced Plastic (FRP) boats and 35 per cent subsidy for mechanised boats. The NGOs also contributed substantially to the replacement of boats and other fishing implements.

Apart from fishermen, agriculturalists, agricultural labourers, small businessmen, small traders and several others having other occupations were affected. The government took note of the requirements of each of the sectors and provided different packages to suit their needs. Those owning small-scale industrial units also received assistance. Students who were affected received new textbooks, notebooks and uniforms. Assistance was given to agriculturalists to treat their lands that had become saline.

Tsunami Farmers' Self-help Groups (SHGs) were formed and they are still undertaking activities relating to recovery and reclamation of soil. Many women who were widowed have received the ex-gratia payment of Rs.1 lakh from the government, and 250 of these women who were eligible for the destitute widow pension have been granted pension. Children, adolescent girls and unmarried girls above 18 years of age who were orphaned, have been given a special package of assistance in the form of financial assistance, vocational training, capacity building and psychological support (Sridhar, 2006).

The State government had undertaken a Disaster Risk Management Programme in 2005 with the support of the United Nations Development Programme (UNDP). The Programme

has been implemented in six districts (Thiruvallur, Kancheepuram, Cuddalore, Nagapattinam, Kanyakumari and Nilgiris), and two cities (Chennai and Coimbatore). These areas have been identified because they are multi-hazard prone. After the Tsunami, the State Government has asked the Union Government to extend the programme to other coastal districts (*ibid.*).

Unlike Tamil Nadu, the fury of the Tsunami in Andhra Pradesh was diffused and coastal villages were soon able to return to normalcy. The Tsunami left 107 dead in Nellore, Prakasam, Guntur, Krishna, West Godavari and East Godavari districts, and damaged property worth lakhs of rupees. Reconstruction work by the State Government has since then mainly focused on Prakasam and Nellore districts, which bore the maximum brunt of Tsunami. The Central Government sanctioned Rs. 100 crores towards reconstruction. Official figures show that less than 7,500 out of 40,000 houses planned have been completed. Out of 34,000 fishing nets sanctioned, 27,000 have been procured by the fishermen. While 8,657 damaged boats have been repaired, getting new boats is a promise yet to be fulfilled. In short, rehabilitation has miles to go and Tsunami phobia still haunts the fishermen (Krishna Kumar, 2006).

Rehabilitation efforts were taken up in full swing in the Andaman and Nicobar Islands which were badly affected. Over there, in spite of the intensity of the disaster, the locals showed great resilience in bouncing back to life. Liberal contributions to the Lieutenant Governor's Relief Fund helped speed up relief and recovery efforts. NGOs took up a Livelihood Restoration Project in this region. The media played a very positive role in complementing the efforts of the administration in this region.

In Pondicherry, the State Government came out with a policy for permanent rehabilitation through Government-NGO participation. Agreements were reached with 12 NGOs and the Government of Maharashtra for construction of 4,947 houses. Though 78 NGOs had initially proposed to participate in the process, many withdrew after Government insisted they deposit 25 per cent of the Project costs. Except in the coastal villages in northern Pondicherry, land acquisition for rehabilitation was completed. A Committee was formed to facilitate the process. The construction of 500 houses in Pannithittu, Pudukkuppam and Mandapathur was completed. Another 2000 houses are in various stages of completion. The Government has formed a Project Implementation Agency to rebuild infrastructure using Rs. 4.2 crores, which is being given by the World Bank (Sridhar, *op.cit.*).

The Pondicherry Multipurpose Social Service Society (PMSSS) is the NGO that is building the houses in the Tsunami affected regions. It has distributed several Catamarans, FRP boats (some fitted with outboard engines) and nets, apart from repairing fishing equipment. PMSSS has conducted various activities not traditionally known to these communities, in order to enhance their earning capacity. For instance, school and college-going children have been taught to handle computers. About 160 women have been trained in tailoring and another 120 are undergoing training. Many of them are now supplying stitched fabric for a garment export unit based in Pondicherry (*ibid.*).

The NGO has also organised several self-help groups (SHGs) to make and trade products such as prawn pickles or to set up shops in the village. Women have also been increasingly active in the panchayats after the Tsunami. Thus, we can see that many sincere efforts have been made in the aftermath of Tsunami, which are gradually yielding results. A lot is being done in the area of physical and social aspects of rehabilitation, but much more can still be done. Psychological rehabilitation is an area that needs more attention. Plus, there are many other problem areas that need to be looked into. Let us

now discuss some of the major problems usually facing the rehabilitation and reconstruction process in the aftermath of a disaster.

15.6 PROBLEM AREAS IN DISASTER RECOVERY

Haphazard Planning

Adequate recovery plans are never laid down. Components such as planning for shelters, health recovery, financial provisions, and coordination amongst agencies involved, monitoring and evaluation are never systematised. Enumeration of affected families is not done properly. While rehabilitation help is extended, victims just keep trickling in. It has also been noticed that temporary structures are often not planned properly. As a result, core facilities of water, electricity, and food are never met adequately. The shelters in the disaster aftermath are sometimes not worth living. Food packets distributed are often stale and inconsumable. Even basic health and hygiene are not maintained. It has been seen that many a time the relief shelters become permanent dwellings of victims for want of reconstructed and retrofitted houses. Many a time, authorities do not even insist on strict enforcement of Coastal Regulation Zone and land use norms during reconstruction work.

Lack of Adherence to Legislative Controls

Non-adherence to building byelaws and similar legislation can be counter-productive. Even blindfolded adherence to archaic regulations could have an adverse impact on development planning. For several reasons (including ignorance, indifference and the 'nothing would happen' attitude), the municipalities and/or the local governments have been negligent in the enforcement of building design regulations and inspection of construction work in accordance with the stipulations. An effective control mechanism for adherence to the disaster resistant design rules has not been established.

Inadequate Transparency and Accountability

Generally, the recovery plan is not transparent enough for the victims to know what it has on offer for them. Lack of awareness makes it difficult for the stakeholders to point fingers at the loopholes. It becomes very tough to establish accountability of the agencies involved in disaster management. As a result, many organisations that have no credibility, take on the rehabilitation work. These agencies only work for their self-interest and are not responsive to the people.

The government and other stakeholders generally do not guard against unregistered NGOs and relief agencies, which have no standing. On top of it, we find that the government itself makes way for public-private partnerships, but the district administration is not given proper powers to monitor them. As a result, these organisations just jump into the rehabilitation scene to make a quick buck. All this makes accountability to people rather elusive.

Low Levels of People's Participation

Even though there have been Case Studies of people's participation in disaster management, for example., Gujarat State Disaster Management Authority's initiatives, Livelihood and Employment Restoration Programme in Orissa, Educational Rehabilitation in Kutch etc., their spread is quite patchy. Lack of people's involvement in disaster recovery is a major problem. There have been many cases where people have just been passive beneficiaries of disaster management programmes.

In case of Tsunami-affected Tamil Nadu, the Government came up with Rajiv Gandhi Rehabilitation Package with a separate component for the restoration of livelihood. But the catch was that it involved the beneficiary going to the bank, securing a grant-cum-loan and also insuring the vessel. A majority of the fishermen rejected the scheme and turned instead to the non-governmental organisations, which were working in the affected districts. Such instances bring out the growing passivity of the affected community, and their dependence on external agencies for aid and relief.

Lack of Sensitivity

Displacement in the post-disaster phase forces the victims to change the pattern of social relationships. The victims have to undergo an entire process of resocialisation and adjustments in a new social milieu. This leads to loss of existing social relationships. A recovery plan does not take into view the psychology of victims. In post-tsunami rehabilitation phase, women have complained about lack of privacy. The heat radiated by the asbestos roof was unbearable for the victims. Women feared for their safety and that of their grown up daughters. In most cases, the common toilets were situated quite a distance away from the shelters and some were in a dilapidated state and even without proper lighting. Many women in Kanyakumari District protested that they were not consulted on the nature of relief that they needed or on issues of sanitation, privacy, land or personal security (Krishna Kumar, *op.cit.*).

There have often been complaints that certain categories of people such as Dalits, elderly and disabled have been left out of rehabilitation concessions. Development and rehabilitation efforts depend on the target groups, their perception and awareness of the situation, fear and apprehensions on the possible problems to be faced, acceptability of the proposals etc. These types of issues are never looked into. The fear of changing of sources of livelihood leads to 'occupational disruption, which subsequently leads to low to high degree of 'occupational redundancy'.

Psycho-social consequences of displacement, unfortunately, do not form a part of recovery plan. Specialised techniques such as debriefing and stress management are carried out by local people or NGO workers who may not be equipped to handle the intricacies of clinical psychology. Rehabilitation programmes often lack specific components of the aspects of mental health of people. There is no evidence of discussion of mental health problems and their implications for assessing costs and benefits of disaster projects.

Local Area Problems

Rehabilitation can run into rough weather if it encounters local area problems. In the aftermath of Muzzafarabad Earthquake, relief and rehabilitation agencies had difficulties in accessing the quake-affected interior regions such as Uri. Besides the hilly terrain and freezing weather conditions, other local problems like terrorist infiltration hampered the relief work. In the post-tsunami phase, sharp divisions among fishing communities on the question of relocation were encountered. Some were afraid of another monster wave and wanted to move out; others were fiercely adamant that moving further inshore would threaten their livelihood. There were also worries about the government displacing them from the coast to favour land sharks and tourism developers. It shows that if the victims feel that their source of livelihood is threatened, many problems surface.

In Andamans, many victims took to alcohol consumption in a big way. In some villages in Tamil Nadu, people started building shrines as small memorials in the memory of the

victims of the Tsunami. The people even started leaving sweets and food items at these shrines. These developments appear to be innocuous in the first instance, but could become problematic if not handled sensitively. During the reconstruction phase, majority of the problems that need to be addressed sometimes pertain to mere availability of resources in the affected area and people's opinion of rehabilitation work. The local context (economic, social and political) leads to problems of enforcement of recovery plan. These may have nothing to do with the nature of aftermath as such.

Duplicity of Tasks and Inadequate Coordination

There are many organisations: national (central, state, local), international, NGOs, interest groups, community groups working in the area of disaster recovery. The multiplicity of organisations leads to duplicity of tasks and coordination problems. Red tapism and bureaucratic delays come in the way of many recovery projects. Efforts are not made to use the existent organisational structure for reconstruction, rather for every activity, new specific organisations are envisaged.

What has generally been noticed is that government itself leaves the doors open for various kinds of actors to work in the field of disaster recovery. There are, as it is, many government ministries and departments that are already involved in disaster management. Plus, there are innumerable national and international relief agencies, community and self-help groups that are doing their bit in disaster management. All this creates an Octopus like set up with just one head and several tentacles performing almost similar tasks.

Lack of Education, Training and Awareness

The community is generally not aware of its basic capabilities to withstand disasters. Relevant information on disaster resistant housing, retrofitting, land use zoning, drought proofing, water conservation, alternative technologies, insurance schemes etc., is unavailable. Recovery plan often lacks the essential component on creation of awareness through formal and non-formal education and training. Vocational training programmes are conducted randomly and building of social infrastructure like schools, colleges and technical institutes is generally neglected. The recovery programme always encounters the problem of shortage of skilled labour.

Absence of Monitoring and Evaluation

Monitoring of the recovery project is always the last of the priorities of the planners. In the post-tsunami phase, there have been instances of leaking boats being dumped at the fishermen's doors in the name of new boats. Absence of monitoring hampers the quality of tasks involved in the recovery process. Inadequate feedback also comes in the way of building theories and testing their relevance. The process for monitoring and evaluation (M & E) faces a number of problems, such as reluctance of project teams to expose themselves to evaluation, difficulties in collecting data and managing the complexity of the process. M & E exercise is generally subjective and ill-designed. Lack of knowledge or epistemological base in disaster management is thus a problem, which emanates from faulty M & E process. With a narrow knowledge base emanating from poor feedback and research anomalies, the scope for weaving the good practices and success stories into a databank becomes narrow.

15.7 INTERLINKAGES BETWEEN RECOVERY AND DEVELOPMENT

The 'oughts' and 'shoulds' in disaster recovery planning make for a good reading, but in reality we do not even have anything that can be remotely referred to as a disaster recovery plan. There is no systematic disaster management plan at the central, state and local levels. We all know by now that the real solutions to the problems of rehabilitation and reconstruction lie in the establishment of interlinkages between disasters and development. The relationship between disasters and development is, however, not that of straight cause and effect. There are many intricacies in its backward and forward linkages and the underlying network of relationships.

Disasters can seriously degrade a country's long-term potential for sustained development and cause governments to substantially modify their economic and social priorities, as well as developmental programmes. Disasters often force the otherwise stable, sedentary population to move away from their established places of work, and creates psychological stress leading to many dysfunctional consequences. Yet, they do highlight high-risk areas where action must be taken before another disaster strikes.

In the present context, disasters can no longer be viewed as random occurrences caused by nature's wrath. The distinction between natural and man-made disasters is getting blurred with time. The frequency and intensity of disasters have recorded an all time high, as the harmonious balance between human beings and nature has been disturbed to almost irreparable proportions. Faulty urbanisation, population explosion, civil strife, unbalanced industrial growth are the reasons attributed to environmental degradation characterised by global warming, deforestation, desertification, soil erosion and so on. Environmental degradation and mismanagement may aggravate the frequency, severity and predictability of hazards. It could be behind the increased instances of disasters. Disaster management has to thus be placed in the context of the development challenges that the country faces as a whole. There is a significant relationship in the way that disasters and development affect one another.

While disasters are catastrophic events, lessons learnt and incorporated into long-term development planning may serve to reduce future vulnerability. The destruction of unsafe infrastructure and buildings can provide an opportunity for rebuilding with better standards, or relocation to a better place if the present site is found specifically vulnerable. Particularly damaging disasters will also focus on relief aid and rehabilitation investment, thus, providing developmental opportunities that were previously unavailable. Damaged buildings may highlight structural weaknesses, which could be rectified and may serve to improve building and planning regulations.

The 'connect' between population growth, poverty and development is strong and complex. When assessed in terms of the Gross Domestic Product (GDP) in the context of our large population we are far behind many of the countries of the world. Conditions of poverty, as we have mentioned, often contribute to greater vulnerability of some sections of a population to an environmental disaster. Food insecurity, lack of means of livelihood and capacity to access resources characterise their lives even in normal times. While the challenge is equally present in rural and urban areas, it is worse in the case of the latter.

Adequate linkages between disasters and development can, for example, reduce the vulnerability of coastal communities to natural hazards by establishing a regional early warning system; applying construction setbacks, greenbelts and other no-build areas; promote early resettlement with provision for safe housing; debris clearance; potable water, sanitation and drainage services and access to sustainable livelihood options; enhance the ability of the natural system to act as a bioshield to protect people and restoring wetlands, mangroves, spawning areas, sea grass beds and coral reefs, and by seeking alternative building design that is cost-effective, appropriate and consistent.

It has to be seen as to how the interlinkages between disasters and development could be incorporated in the disaster recovery plan. Rehabilitation and reconstruction phase, as we have mentioned earlier in the Unit, is the most opportune time to rebuild infrastructure, resources and communities. Recovery plan should encompass the issues related to negative impact of disasters on socio-economic system and the ways and means through which these challenges could be converted into developmental opportunities. We have moved on from post-disaster assistance to pre-disaster preparedness; from readiness to mitigation; from individual aid to restoration of services; and from relief to rehabilitation. A broad disaster recovery plan should include comprehensive sub-plans on:

- i) Health and Medical Care;
- ii) Creation of Livelihood Options;
- iii) Environmental Protection; and
- iv) Rehabilitation and Reconstruction.

Many endeavours to strengthen the process of recovery need to be taken note of over here. These aim at using modern technology, community participation and assistance from national and international agencies in disaster recovery. The National Institute of Oceanography (NIO) in Goa has developed a real-time reporting and Internet-accessible coastal sea-level monitoring system. It has been operational at Verem Jetty on the Mandovi River in Goa since September 24, 2005. The gauge uses a cellular modem to put on the Internet real-time sea-level data, which can be accessed by authorised personnel. By using a cellular phone network, coastal sea-level changes are continuously updated on to a web-server. The sea-level gauge website can be made available to television channels to broadcast real-time visualisation of the coastal sea level (Prabhudesai and Joseph, 2006).

An improved Seismographic Network, a network of real-time sea-level gauges in the Indian Ocean and deep-sea pressure sensors has been proposed, along with National Tsunami Warning Centres (NTWCs), for a reliable warning and mitigation network for the region. While satellite communication is expensive, wireless communication infrastructure and the presence of cellular phones have made cellular communication affordable. The sea-level network in the Indian Ocean has been upgraded with the establishment of 23 real-time stations, which form a part of the Global Sea Level Observation System (GLOSS) set up in 1985 and transmit data every hour through the Global Telecommunication System (GTS) of the World Meteorological Organisation (WMO).

Deep-ocean Assessment and Reporting of Tsunamis (DART) is another effort. It is a second-generation DART system (DART-II) that is under development. It will allow bi-directional communication, which would enable transmission of tsunami data on demand. This would ensure the measurement and reporting of tsunamis with wave amplitude below

the automatic reporting threshold (Prabhudesai and Joseph, *op.cit.*). After the Tsunami, the India Meteorological Department (IMD) has upgraded the existing seismological observatory at Port Blair with a state-of-the-art broadband seismograph system. A network of five temporary field observatories has been established. Permanent observatories have also been planned for some areas. Setting up bio-shields, knowledge centres and agronomic rehabilitation have been called for (Parsai, 2006).

The advancement in science and technology could be used with advantage for speedy long-term recovery. These efforts have been supplemented by international developments in terms of various environmental treaties, international consortiums, sustainable data forums and declarations such as ProVention Consortium, Fribourg Forum, Hemispheric Conference, South Asian Livelihood Options Project etc. The International Decade for Natural Disaster Reduction (IDNDR) helped raise the profile of discussions surrounding the social and economic causes of disasters and acknowledged the mitigation of losses through technological and engineering solutions. Yokohama Strategy in May 1994 endorsed these objectives and further underlined the link between disaster reduction and sustainable development.

The International Strategy for Disaster Risk Reduction aims at carrying the good work ahead. The Strategy aims at: increasing public awareness of the risks that natural, technological, and environmental hazards; obtaining commitment by public authorities to reduce risks to people, their livelihoods, social and economic infrastructure and environmental resources; engaging public participation at all levels of implementation to create disaster-resistant communities through increased partnership and expanded risk reduction networks at all levels; and reducing the economic and social losses of disasters as measured. The World Health Organisation (WHO) Meet in Bangkok in December 2005 aimed at identifying gaps in addressing response, preparedness and recovery for health needs of the affected. One of the major objectives of the Meet was to develop benchmarks and corresponding course of action (The *Hindu*, Dec.28, 2005).

Disaster management is acquiring a global connotation. Besides the United Nations and the World Bank, many international organisations such as Caritas India, Lutheran World Service, Asian Development Bank, Intermediate Technology Development Group (ITDG), Danish International Development Agency, Swedish International Development Agency, Cooperative for Assistance and Relief Everywhere (CARE), International Federation of Red Cross and Red Crescent Societies, Oxfam, etc., are doing substantial work in the area of disaster management.

Of late, the Narmada Bachao Andolan has been drawing attention to the travails of Project Affected People (PAPs), as a result of unthoughtful and insensitive development and rehabilitation policies of the governments. The Andolan has been focusing on issues such as non-compliance with rules, violation of human rights, hardship of the poor etc. One viewpoint is that those who equate development with huge shopping malls, big dams, vehicular proliferation, and global merchandise are never faulted for the negative consequences of development that ignores norms of equity, environmental protection and social justice (Iyer, 2006). We would though not like to go into the debate on utility of the mega projects over here. Yet, the issue to ponder over is that if in normal times, a development project can cause so much displacement and inadequate rehabilitation of PAPs, can we expect a comprehensive rehabilitation policy for natural disasters?

The Disaster Management Act 2005 has been passed in India. The Act aims at speedy handling of natural and man-made disasters. It makes way for the setting up of a National

Disaster Management Authority at the Central level and a State Disaster Management Authority at the State level. How far and how much it would achieve are questions only time will answer. Meanwhile, the National Disaster Management Authority is already functional and so also are the State Disaster Management Authorities in Orissa and Gujarat.

The Bureau of Indian Standards (BIS) has also initiated several pre-disaster mitigation projects to reduce the impact of natural disasters on life and property as well as bring down social vulnerabilities. It has undertaken standardisation efforts in the area of earthquake engineering. Some new earthquake-resistance techniques have been developed that can be kept in view. One of them is the Base Isolation Technology. It aims at reducing the forces transmitted to the building from the ground by placing the building atop a mechanical system of isolators, sliders and dampers called Base Isolation Technology. Such technologies along with Diagonal Bracing, disaster resistant pier systems, Welded Wire Fabric Reinforcement could help in disaster-resistant construction.

Disaster management has been incorporated in the training curricula of All India Services with effect from 2004-05. There is a separate Faculty for disaster management in 29 State Level Administrative Training Institutes. National Council for Educational Research and Training (NCERT) books now include a chapter on disaster management for school children. The All India Council for Technical Education has been advised to include engineering aspects of disaster management in engineering courses. This education and training impetus has to be sustained through informed people's participation. A simple philosophy for coping with disasters is one of government and people working together in a coordinated way, by means of a coherent disaster management system.

A Rehabilitation-Reconstruction-Tracking Matrix is being produced that provides salient information on the overall recovery effort. The Matrix brings together information from tsunami-affected countries on what work is being done and what is being planned, who is doing the work, what measurable results are expected, where the work is being done, when the work is expected to begin and end, and its current status, and the source, amount and status of financing etc. The Matrix is at three levels of resolution-regional overview, sector-level status by region and country, and project level status by country. It is expected to provide a comprehensive view of recovery. This Matrix could serve as the platform for coordination of work in the recovery process and its relationship with developmental goals.

There is also a need to strengthen the legal, organisational and procedural objects of disaster management. The Sustainable Disaster Network (SDN) could be a solution. It is a global network of organisations whose mission is to encourage policies, which allow individuals to pursue their goals without intervention. The SDN focuses on the institutional framework within which people act, to ensure that policies encourage individuals to make the best use of resources and protect the environment, while improving both theirs as well as others' well being.

There have been many instances where disasters have hindered development and many more where lopsided development process has led to disasters. Many seismologists now relate earthquakes with high-rise buildings. Dam-induced afflictions such as deforestation, soil erosion, water logging cannot be overlooked. Loss of mangrove plantation in coastal areas has been the cause behind the colossal loss of human lives and property in the intense Tsunami of 2004. The Chennai floods and the inundation of Mumbai in the year 2005 have been the result of faulty and shortsighted urban planning.

Disaster recovery is not a one-time isolated exercise. The objectives of recovery plan can only be achieved if the conception, execution and evaluation of disaster management programmes are clearly laid down. The interlinkages between all the stages of disaster management cycle as well as between disasters and development have to be recognised and assimilated in the disaster recovery plan. We will read more about it in our next Unit on disasters and development.

15.8 CONCLUSION

Disasters can delay development by leading to loss of resources, shifting of resources to meet the emergency, depressing the investment climate and affecting the formal and non-formal sectors. Thus, the development policies must make adequate provision for well-planned disaster management approach. The Rehabilitation plan necessarily needs to be designed according to the expectations of the affected population.

There are several erroneous assumptions made regarding post-disaster situations that affect rehabilitation. These are: political support will be available when needed, funding will last as long as required, all stakeholders in the process will think alike, all agencies conceived will be competent to carry out required tasks, physical recovery must precede economic and social recovery, there is no trade off between speed and quality of reconstruction, codes and controls will have to be rigidly followed, reconstruction is an isolated process from pre-disaster planning and so on.

There are dilemmas and alternatives which also face post-disaster planners: survey quickly or survey accurately, repair or rebuild, rebuild or relocate, respond quickly or invite wide participation, create new organisation or rely on existing ones, rely on public or private investment, pursue physical reconstruction or economic reconstruction, and use local resources or imported ones. All these extend over to the disaster recovery phase and these need to be systematically looked into. To sum up, we may reiterate an important observation, which is a kind of slogan for disaster management. “*Vikas aisa ho jo aafat se bachaaye, vikas aisa naa ho jo aafat ban jaaye*”. It means that development should be such that guards against calamities. Development process should not be such that leads to calamities.

This Unit examined several problem areas in disaster recovery. It highlighted the Tsunami aftermath and the physical and social rehabilitation that has taken place in the affected areas. There are certain guiding principles that need to be adhered to in order to make rehabilitation and reconstruction effective and sustainable. The Unit discussed the important principles in the light of the necessary interlinkages that need to be established between disasters and development.

15.9 KEY CONCEPTS

Base Isolation Technology : Reducing the forces transmitted to the building from the ground by placing the building atop a mechanical system of isolators, sliders and dampers is called ‘base isolation technology’. This dampens the violent movements of the earth during a seismic event. By using isolators and dampers, the building is ‘decoupled’ from the ground motion of any earthquake and the transmission of seismic energy to the building is dampened. This is done by lowering the vibrational

frequency, allowing the building to move or displace and also by lowering the shock acceleration of the seismic event; thus reducing the tendency for the upper floors to move faster than the lower floors.

‘Chaukhats’

- : The technology applied on the ‘Chaukhats’ is reminiscent of a machine stitch on a fabric that keeps a piece of cloth in shape. In like manner, the technology makes use of wood, like a thread and keeps the entire structure intact against the ravages of weather and geo-activity. Through-stones and flat-stones are used, and wood predominates the structures of whatever dimensions they are. Pairs of thick wooden logs, beginning from the base of any two opposite walls are used at every 30 inches alternately with heavy stones to raise the walls and run through the entire length of all the walls. At the right angle where any two walls meet, the edges of the pair of logs on one wall are placed on the edge of the logs of the other and they are joined together by hammering thick wooden nails through them. This has an effect of turning the structure into a single piece construction. Such technologies for building quake resistant houses are available in the Himalayan region in India.

Damageability

- : Damageability of a structure is the property, which refers to the ability of a structure to undergo substantial damage without partial or total collapse.

Deforestation

- : Deforestation is the permanent destruction of indigenous forests and woodlands. It could be brought about by various factors such as conversion of forests and woodlands to agricultural land, plantation of cash crops and cattle ranching, commercial logging, felling of trees for the purposes of firewood or building material. It can further lead to soil erosion, silting and desertification.

Deformability

- : The deformability is the ability of a structure to displace or deform substantially without collapsing. A deformability action is a must to achieve earthquake resistance.

Desertification

- : Desertification is becoming a major problem as more and more of the world’s land surface is turning into a desert. The new deserts, which are being created, are not necessarily hot, dry, sandy places, but are those areas where humans have mistreated the soil and rendered the land useless for agricultural purposes. Soils, in any case, are ruined easily in areas where seasonal rainfall is unreliable. Cutting down of forest and trees, over-cultivation of soil and overgrazing leads to desertification.

- Disaster Resistant Pier Systems and Diagonal Bracing** : A good foundation of the house is of immense help in making it disaster resistant. For manufactured homes, one option is a disaster resistant pier system, with stout members rigidly connecting the home's chassis to a slab, grade beam, or array of pads. Some systems incorporate lateral or diagonal bracing for greater resistance. Though often referred to as Earthquake Resistant Bracing (ERB) systems, these also resist high winds, frost heaves and floods. Not only are these systems cost-effective in reducing structural movement (compared to conventionally manufactured housing foundations), they can even save lives and property.
- DISKNET** : National Natural Disaster Knowledge Network (DISKNET) is a network that could aid and stimulate functions such as: assisting in implementation of national projects by establishing crosslinkages and appropriate alignments with other related projects, ensuring free flow of high quality information and on-line interaction; helping state governments and disaster related institutions in securing appropriate partnerships by matching the felt needs with available capacities; leveraging funding from Internet and external resources; matching specific needs with apt solutions in public or private domains; providing technical guidance to the stakeholders and beneficiaries at large; serving as a national clearing house of information on natural disasters; and promoting partnerships between the government, public and the private sectors.
- Ductility** : The ductility of a building is the ability to bend, sway and deform by large amounts without complete collapse.
- Epidemiological Surveillance** : Epidemiological surveillance is the collection and interpretation of data on the risk or actual occurrence of communicable diseases and other health problems. As an assessment tool, epidemiological surveillance is most important in slow-onset and continuing disasters, especially where changes in living patterns occur such as the relief camps of disaster victims. These changes rarely occur after rapid onset disasters. However, because fear of disease is always prevalent after any major disaster, health status assessment and disease surveillance should be carried out as a guide for planning and management of health interventions, especially as a tool for quality control, and as a means of controlling rumours and reassuring the victims.
- Faulting** : A fracture or crack in the earth's surface.
- Fribourg Forum** : The Fribourg Forum held in June 2000 in Switzerland

was convened by the UN Office for Coordination of Humanitarian Affairs to bring together ministers and representatives from 52 countries of Europe and Commonwealth Nations, international and national organisations and NGOs, etc. The purpose was to obtain the policy guidance, political support and commitment necessary to improve coordination and cooperation to reduce the negative impact of disasters.

- Geographic Information System (GIS)** : Software uses geography and computer-generated maps as an interface for integrating and accessing massive amounts of location-based information. This unique characteristic of GIS makes it an effective tool in the field of disaster response and preparedness. It can be used for scientific investigations, resource management, disaster and development planning.
- Global Warming** : The earth is getting warmer by the day. Human activities as well as natural processes have precipitated the rate of global warming by producing certain green house gases such as carbon dioxide, methane and chloro- fluoro carbons into the atmosphere. It is the people also who are causing the change in the climate by burning nature's vast stores of coal, oil and natural gas.
- Hemispheric Conference (2001)** : The Conference laid emphasis on: developing the capacity to forecast, prepare for and mitigate the potential impact of disasters; reducing the vulnerability of people through risk and damage assessment; promoting the exchange of information; strengthening partnerships with all relevant stakeholders; promoting exchange of knowledge and experiences; and building database of disaster mitigation agencies.
- Kyoto Protocol** : At the Earth Summit in 1992, the World representatives agreed to prevent 'dangerous' climate change. The first step was the 1997 Kyoto Protocol, which has come into force in 2005. Kyoto Protocol is an amendment to the United Nations Framework Convention on Climate Change (UNFCCC), an International Treaty on Global Warming. Countries, which ratify this Protocol, commit to reduce their emissions of carbon dioxide and other green house gases such as chloro-fluoro carbons. Around 153 countries are the signatories of Kyoto Protocol, which imposes cuts on emissions between 2008 and 2012.
- Lagoon** : A shallow lake formed at the mouth of a river or near the sea but separated from it by a sand mound.
- Land Use** : Land use refers to the range of uses of earth surface made by humans. Uses are classified as urban, rural,

agricultural, forested etc., with more specific sub-classification. It means the way the land is developed and used in terms of the kinds of activities allowed and the size of buildings and structures permitted in agricultural, residential and industrial areas.

- Nutrition Centred Health Assessment** : Nutrition Centred Health Assessment (NCHA) evaluates the health and nutritional status of children under age of five (that is, 12 months to 5 years) as the 'point of contact' to detect and assess a full range of health problems. The method is used for: initial assessment of health and nutritional status, long-term surveillance of disease, malnutrition and death as well as long-term monitoring of food supplies, logistics, water and food quality.
- Ozone Layer Depletion** : Ozone is a form of oxygen, but unlike oxygen, it is a harmful gas. The action of sunlight on oxygen constantly produces small amounts of ozone in the stratosphere. At the same time, natural processes are breaking down ozone. Till now, the total amount of ozone has usually stayed constant because its formation and destruction has occurred at about the same rate. Human activity has recently changed that natural balance. We are producing certain substances such as chloro-fluoro-carbons and hydro-chloro-fluro-carbons at a rate, which is destroying the stratospheric ozone much faster than it is formed.
- ProVention Consortium** : This Consortium, comprising 43 governments, international organisations, academic institutions, private sector and civil society organisations was launched in the year 2000. It aims at: promoting a culture of safety through education and training; supporting public policy that can reduce the risk of natural and technological disasters; encouraging pilot projects to disseminate information about the proven best practices to mitigate disasters; developing the abilities of governments to minimise disasters; and forging links between public and private sectors, between scientific community and policy makers, between victims and donors so that stakeholders in disaster risk reduction work together.
- Remote Sensing** : Remote sensing is the acquisition of information on disaster related subjects. Weather radar, weather satellite, seismographs and videotape are examples of remote sensing systems. Remote sensing information can be valuable in determining the extent of cataclysmic disasters and monitoring slow-onset disasters such as environmental degradation and droughts. These tools also offer the possibility of acquiring data over remote

regions or areas made inaccessible by disruption of normal transportation and communication systems. However, these tools require that ground studies (known as ground-truth studies) be carried out to verify and adjust and/or calibrate the data obtained from air or space and be made available in time for emergency responses.

Social Forestry

- : Growing of plantations for the use of villagers' basic needs preferably with their participation in the process.

'Sumers'

: The 'Sumers' are ascribed to the Rajput families of Rajasthan in India. Typical 'Sumers' stand 15-17 mts high from the ground level and have 5-6 floors with 4 rooms on each floor. The ground area covered by the Sumer is 86 sq.mt. A foundation trench 3 mts deep and 70 cms wide is first dug and then refilled with flat dressed stones. This foundation is then raised above the ground in the fashion of a rectangular platform, to the height of 2-3 mts with the help of flat stones, clay and stone fillings. To raise the walls, double wooden logs are placed horizontally on the edge of the two parallel sides of the platform, which are opposite to each other. The width of the logs determines the thickness of the walls, which is 70 cms. On the other two parallel sides, the wall is raised with well-dressed flat stones to the surface level of the logs placed on the other two sides. The walls are further raised by placing heavy, flat, dressed stones upon the wooden logs on the two sides and by placing another pair of wooden logs upon the stones on the other two opposite sides. The structure is further reinforced with the help of wooden beams fixed alternately that run from the middle of the walls of one side to the other, intersecting at the centre. This arrangement divides the 'Sumer' into 4 equal parts from within and provides for joists supporting the floorboards in each floor of the building.

Sustainable Development

- : The United Nations Conference on Environment and Development (UNCED) also called Earth Summit, 1992, defines "sustainable development as the right to development which must be fulfilled so as to equitably meet development and environment needs of the present and future generations". UNCED's objectives emphasise that in order to achieve sustainable development, environment protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Vulnerability Analysis

- : Vulnerability Analysis is the process of estimating the vulnerability of specified elements at risk to potential disaster hazards. Disaster mitigation and emergency

plans are based on the systematic knowledge of the system's vulnerability in terms of deficiencies in its capacity to provide services, physical weaknesses of the components to external forces and organisational shortcomings in responding to emergencies. Vulnerability analysis identifies and quantifies these weaknesses, thereby defining the expected performance of the system and its organisation.

Watershed

- : We all live in a vast watershed and we all contribute to the health of the lakes, rivers and groundwater in our watershed and beyond. A watershed is the area across or under which water flows on its way to lakes, rivers, streams and groundwater. Any area of land is made up of overlapping basins. Water flows to the lowest point in each of these basins; usually a lake, stream, pond or river. This basin is a watershed, and can come in many different shapes and sizes. The Mississippi River Watershed, for example, is composed of hundreds of smaller watersheds.

Welded Wire Fabric

- : Currently, the most widely accepted form of reinforcement is Welded Wire Fabric (WWF). It is a mesh of thick steel wires that is placed in concrete. However, synthetic-fibre reinforcement avoids the increased labour costs and difficulty in placement that are associated with WWF. Small diameter synthetic fibres (nylon and polypropylene) are now being added to concrete in order to reduce shrinkage and cracking by more than 80 per cent according to certain independent laboratory tests.

15.10 REFERENCES AND FURTHER READING

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15.11 ACTIVITIES

- 1) Browse the Internet and make a list of Websites that deal with rehabilitation and reconstruction.
- 2) Go through the newspapers and magazines, and scan their write-ups and articles for any recent disaster. Prepare a list of rehabilitation activities that these write-ups deal with.
- 3) Make a list of the guiding principles of rehabilitation and reconstruction
- 4) Make a note on the nature of problem areas in long-term disaster recovery.