UNIT 17  EMERGING TRENDS IN DISASTER MITIGATION-II

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17.0 LEARNING OUTCOME

After going through this Unit, you should be able to:

- Establish the relationship between sustainable development and mitigation
- Appreciate the importance of epidemiological surveillance
- Bring out the issues involved in sustainable land-use planning; and
- Highlight the significance of coastal zone management.

17.1 INTRODUCTION

Disasters, considered for a long time as isolated events, are now being looked upon as the consequence of human activities. Mitigation of disasters needs to extend from straitjacket simple strategies to a holistic approach. It has to aim at sustainable development. Mitigation strategies need to focus on environmental protection and conservation. This Unit focuses on a few emerging trends in disaster mitigation.

17.2 SUSTAINABLE DEVELOPMENT AND DISASTER MITIGATION

Environment and development are closely interlinked. Development cannot subsist on a deteriorating environmental base. Implicit in this is that development cannot take place without exploiting the environment, but harmony between the two is a prerequisite for the safeguard and preservation of all life on earth. Development in the absence of emphasis on effective environment ironically has resulted in pollution of air, water and soil, which in turn has invited the resurgence of a number of life threatening diseases. This situation
is causing a grave concern perhaps due to our orientation in deep-seated ideologies of production and consumption.

The UN regards "sustainability" as meeting the needs of the present generation without compromising the abilities and opportunities of future generation. It, thus, implies both inter-generational and intra-generational equity. Sustainability is an important dimension of human development. Human development is a process of enlarging peoples' choices. But such enhancement must be for both present and future generations without sacrificing one for the other. Thus, sustainable development is a technique of enabling future generations enjoy the benefits of the present. Development should not as far as possible, disturb the surrounding environs. A balance has to be struck between development and environment. Sustainable development is being advocated to be built into disaster management policy.

Our earth is an infinitely insignificant part of the cosmos. Life is only a recent and significant development on earth. Human being is only one amongst millions of species - plants as well as animals, past and present, confined only to the outer surface of the earth of a few inches out of 8,000 miles of earth's interior and a few feet above in the atmosphere. We are exposed to space hazards. Some 65 millions years ago, a heavenly body crashed on our planet leading to extinction of many life species including Dinosaurs. In 1908, a comet or a meteor with a mass between 1,00,000 to 10,00,000 tonnes exploded over Central Siberia. The impact was 1500 times more powerful than the bomb dropped on Hiroshima which destroyed an area of woodland 40 kms by 50 kms large.

Human beings participate in many social circles - concentric circles - family, village, block, district, state, country, continent and the global society at large. A few degrees of higher temperature resulting from changes in solar radiation or any other reason will burn up life and few degrees lower will freeze all life to death. A few degrees rise in maximum temperature will melt all polar ice resulting in submergence of all landmass and the terrestrial life forms. Any minor change in the composition of the atmosphere - because of cosmic developments - crashing of a space object on the earth, burning of hydro-carbons - resulting in greenhouse effect, rising temperature, melting of polar ice and flooding and submergence of land masses, exhaustion of mineral resources, ozone hole, environmental degradation, disappearance of flora and fauna with unspecified effects on human life, appearance of diseases which can extinguish human life, in the light of cosmic level scales and possible variations in cosmic parameters - within the very narrow limits of which alone human life is possible - there is every reason to believe that human life hangs by a slender thread. Should we not seek to preserve, protect and promote evolution of humanity by accepting others in totality and live with cooperation and harmony emphasizing unity rather than identities.

Ever since the dawn of civilisation, human being has been constantly engaged in the pursuit of unraveling the mystery of nature with a view to arriving at the fundamental values of life. Today, the world is in a state of turmoil, the causes of which seem to be beyond individual's comprehension and capabilities. Paradoxically enough, human being seems to be lost in the world of plenitude. His/her soul is starved in the midst of unbounded materialistic pleasures and comforts that science and technology of today have placed at his/her disposal. Now human being everywhere is bedeviled by complex and complicated moral, cultural and social issues. The harder one strives to extricate oneself out of the web of these problems, the more one is caught and involved in it. Underneath the mists of conflicting values lies one's quest for the real meaning of life and the destiny to which it leads. With all the scientific and technological revolutions that humanity has
achieved so far, we have not risen above the level of satisfying the bare physical needs. Science does not help us to discuss the fundamental moral and spiritual values of life or how to live and here we see that the advancement of science has partially contributed to mankind's lopsided growth and development.

The United Nations Conference on Environment and Development, informally known as the Earth Summit 1992, is widely regarded as one of the most important events of the century to address issues of global environmental degradation, inequities between nations and possible strategies to protect the future of life on earth. Agenda 21, which emanated from the Earth Summit, reflects a global consensus and political commitment at the highest level on development and environment cooperation. It provides a framework for governments in their endeavour to seek a balance between population and pathways of development. It strives to formulate plans of action that meet the needs of people while providing for the ecological security of natural systems.

The main policies and programmes contained in Agenda 21 of the Conference provide a major reaffirmation of a number of traditional values inherent in the Indian culture. It is also in conformity with all those values that are enshrined in the Indian Constitution. The notion of sustainable development is not a new one. History is replete with innumerable initiatives undertaken by people that demonstrate not just concern for environment, but also the awareness of the need to balance it with livelihood resources. This tradition of care, conservation and preservation of environmental resources is also reflected in the spirit of the Constitution of India, which has acted as the guiding inspiration of the nation for over half a century. The strength of the Indian Constitution lies in the fact that it does not advocate any new or imported principles, instead it builds on the deep-rooted and therefore, resilient practices of sustainable development that have evolved over time in the country. Thus, the congruity of Agenda 21's objectives of sustainable development with India's own traditional values provided renewed thrust to several initiatives in the country. It also provided a new direction to sectors that have emerged as areas of global concern.

India has over a billion people spread across 3.28 million sq km, of land and associated water resources, surviving on an astonishing range of biodiversity and other natural resources. The policymakers’ struggle with the choice of pathways to development in a country presents a spectrum of lifestyles that range from the very rich, comparable with those of the most developed countries, to those that are among the poorest. The complex poverty issues in the country force a large number of persons to remain at low level of resource consumption.

Despite the seemingly desperate grapple, by people of all classes to use all means available to exploit resources, there are still efforts put in by individuals and organizations that advocate caution. Over hundreds of years, the people of India have evolved refined mechanisms of conservation and prudent utilization of their livelihood resources. Many of these have survived the test of time; others that have not, have given way to newer and more opposite institutional arrangements. The question is how can the available land/water mass (2.5per cent of the world) sustainably provide for a rapidly increasing population (16per cent of the world)? The positive answer to the question requires the most unprecedented mobilisation of people's minds, ideas, institutions and resources to come up with a socially just and environmentally sustainable blueprint for survival. More than 165 countries that subscribe to Agenda 21 have over the last decade adopted varied and innovative means of interpreting and implementing its provisions suitable to their respective contexts. The Indian context presents a unique mosaic of biological, anthropic, cultural, physiographic and climatic diversity, with a population as diverse as its geography.
The Constitution and Environment

Part IV, Section 38 of the Directive Principles of State Policy, lays down that the State shall strive to promote the welfare of the people by securing and protecting as effectively as it may a social order in which justice, social, economic and political, shall inform all the institutions of the national life. Section 48A postulates the protection and improvement of environment and safeguarding of forests and wildlife. As per this – “The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country”. Section 51A provides for the State to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures.

The fact that India is the second most populous country that survives on just 2.4 per cent of world’s landmass, creates its own population-resource tension and combined with the colonial legacy of systems that sub-served the exploitative objectives of the then colonial administration, has made the task of change much more difficult. Thus, despite the creation of an enabling framework for sustainable development, India continues to face enormous challenges in search of options for development that are environmentally sound and suitable to its specific social conditions. Sustainable development must be defined as a process that enables individual communities and government to regain their rights and capacities to their own future. An environmentally sound development based on technology with human face is the need of the hour (Singh, 1988). We have already discussed extensively about the issues of sustainable development in Unit 16 of this Course.

17.3 EPIDEMIOLOGICAL SURVEILLANCE

Epidemiological Surveillance is one of the important disaster mitigation strategies. Disasters both natural and human-made result in outbreak of several diseases. Now let us understand the meaning of epidemiological surveillance, and its set-up in India:

The National Surveillance Programme for Communicable Diseases was launched as a pilot programme in 1997-98 in five districts (one each in Kerala, Karnataka, Rajasthan, Haryana and Gujarat) with a view to strengthening the disease surveillance system so that early warning signals of outbreaks are recognised and appropriate follow-up action is initiated. The programme is being implemented through the existing health infrastructure and surveillance system involving training of medical and para-medical personnel, upgradation of laboratories, and improvement in communication system. Under the programme, the surveillance system is strengthened through training of medical and para-medical personnel, dissemination of technical information and guidelines, upgradation of laboratories, modernisation of communication and data processing systems.

The programme includes Information Education and Communication activities to promote community participation in the prevention and control of outbreaks. It is now proposed to expand the programme, under the 10th Five Year Plan, to more districts and broaden the scope of the programme and cover non-communicable diseases also and integrate the disease surveillance system for which a Project Implementation Plan has been prepared and is under the active consideration of the Government of India for World Bank assistance. Its aim is to strengthen the existing surveillance system at the district, state and national levels and to build up additional capacities for effective communication and technology, upgradation of laboratories etc., ensure involvement of medical private practitioners and NGOs in the process of effective implementation of disease surveillance programme, develop proper urban surveillance systems, optimise the utilisation of available resources.
and to bring about effective inter-sectoral cooperation among various agencies in the health and lion-health sector.

Vector borne diseases are a major health hazard in the country. In order to bring about the convergence of ongoing schemes for malaria, kala-azar and filariasis and also to expand programme coverage to include Dengue/DHF and Japanese encephalitis, a National Vector Borne Disease Control Programme has been proposed to be implemented in the country in Tenth Five Year Plan with an outlay of Rs. 1370 crores. India has the highest accident rate in the world. It has been felt necessary to upgrade and strengthen emergency care in state hospitals located near national highways in order to provide treatment to accident victims as near the accident sites as possible. To augment and upgrade the accident and emergency services in selected state government hospitals which fall in the most accident-prone areas of national highways, financial assistance is being provided to the government hospitals through the state governments to develop necessary emergency facilities. For this purpose, financial assistance has been provided to the states of Arunachal Pradesh, Bihar, Gujurat, Goa, Haryana, Himachal Pradesh, J&K, Kerala, Madhya Pradesh, Mizoram, Pondicherry, Sikkim, Tripura, Tamil Nadu and Uttar Pradesh.

Improvement in the health status of the population has been one of the major thrust areas in social development programmes of the country. This was to be achieved through increasing the access to and utilisation of health, family welfare and nutrition services with a special focus on under-served and underprivileged segments of the population. Technological improvements and increased access to health care have resulted in a steep fall in mortality but the disease burden due to communicable diseases, non-communicable diseases and nutritional problems continue to be high. Despite the fact that norms for creation of health care infrastructure and manpower are similar throughout the country, there remain substantial inter-state/inter-district variations in availability and utilisation of health care services and health indices of the population.

The Tenth Five Year Plan focuses on the reorganisation and re-structuring of existing health care set up, including the infrastructure for delivering indigenous systems of medicine and healthcare services at primary, secondary and tertiary levels so that they have the responsibility of serving population residing in a well defined geographical area and have appropriate referral linkages with each other. All the above-mentioned programmes are implemented in collaboration with state governments, local self-governments and civil society. Unit 3 of MPA-007 also deals with epidemiological surveillance.

17.4 SUSTAINABLE LAND-USE PLANNING

The conservation of natural resources in India, be it land, forests, mountains, or marine ecosystems, is linked to the conservation of livelihoods resources of at least 62 per cent of the current working population and resources for the welfare of the future generations. Indian agriculture contributes to 26 per cent of Gross Domestic Product (GDP) and provides food to one billion people. Of the total workforce of India, 58.4 per cent are either cultivators or agricultural labourers. An additional 4.07 per cent of the workforce is engaged in household industries, which are largely based on utilisation of natural resources and their produce. Similarly, approximately 20 million households derive a significant part of their livelihood from forests and another 5.96 million from fishing in fresh waters and marine areas. Animal husbandry is a secondary occupation for most cultivators, agricultural labourers and main occupation for trans-human pastoralists and landless, including women. Conservation of natural resources is therefore essential for the sustainability of livelihoods of two thirds of the nation besides contributing to environmental sustainability,
Land Resources

Agriculture and forests constitute major land use component accounting for 46.6 per cent and 22.6 per cent of the land area respectively. This pattern of land use has shown no perceptible change in the last ten years. Habitation and non-agricultural use have increased while there has been a general decline in common land resources. The per capita land availability in India has declined from 0.89 ha in 1951 to 0.3 ha in 2001. The per capita availability of agriculture land has declined from 0.48 ha in 1951 to 0.14 ha in 2001. The declining availability of per capita land resources is further exacerbated by degradation and desertification of land. At the same time, decline in area of common land resources affect the livelihood system of marginal farmers, landless and livestock dependent people of whom women constitute a substantial portion.

Land Degradation and Desertification

It is estimated that more than 5,000 million tonnes of topsoil is eroded every year. About 20 per cent of the reported area is categorised as wasteland in one form or the other. Apart from the inherent problems of salinity affected areas, barren and rocky areas and some of the water logged areas, most other problems leading to degradation of land resources are due to declining investments on marginal holdings.

Common Property Land Resources

Approximately, 77 million ha are designated as common property land resources. These common property resources provide fuel, fodder, minor forest produce, small timber, raw material for household, cottage industries and grazing areas. Integrated planning and management of land resources is an integral part of planning process in India. In the nineties, land resource management and area development programmes were restructured to allow for greater flexibility in choice of technology, decentralisation of procedures and active participation of people in planning and implementation. Several steps have been taken towards institutional restructuring and better management of land resources. A national policy on the management of land resources is being formulated. The proposed policy makes a paradigm shift from use of land to management of land. The initiatives taken by other ministries also have a bearing on the prevention of the degradation of the land. Some of these are:

- Improved policy framework for natural resource management
- Collection of data on land resource degradation and its management
- Draft grazing and livestock management policy
- Formulate national policy for common property resource lands.

Ownership Rights to Landless Labourers

About 12.42 million cultivators have been conferred ownership rights of around 6.33 million hectares of land. Under various ceiling laws, until September 2000, 2.97 million hectares of land had been declared as surplus of which 2.14 million hectares have been distributed to 5.51 million beneficiaries mostly belonging to the weaker sections. Legislative provisions have been made for consolidation of holdings and 66.10 million hectares of land have been consolidated so far.

Several measures have also been initiated for sustainability of land resources. These include:

Land Reforms

Legislative provisions have been made for conferment of ownership rights on tenants.
There are provisions also for allowing cultivating-tenants to acquire ownership rights on payment of a reasonable compensation to landlords. A major initiative has been taken to ensure transparency in land records management. In the Ninth Five-Year Plan period (1997-2002), the Ministry of Rural Development focused on land reforms including new strategies such as the promotion of women's land rights to benefit socially excluded groups and issuing passbooks to land owners.

**Combating Desertification**

Two major programmes to combat desertification are the Desert Development Programme (DDP) and Drought Prone Area Programme (DPAP). The DDP is being implemented in 234 blocks of 40 districts in 7 States while the DPAP presently covers 971 blocks of 183 districts in 16 States. In addition, an Integrated Wasteland Development Project (IWDP) has been under implementation on a watershed basis since 1989-90. The IWDP projects have treated an area of 3.72 million hectares. It is also estimated that approximately 10 million hectares of wastelands in the common property regimes have been regenerated through the efforts of NGOs and people.

A cost-effective and proven technology for the development of various categories of wastelands is demonstrated in the Technology Development Extension and Training Scheme, launched and implemented through the Indian Council of Agriculture Research (ICAR), state universities and other government organisations. This includes technologies for the conservation of soil, water and vegetation control management and reclamation of degraded lands, combating desertification and mitigating the effects of drought. For preparation, maintenance and updating of land records the accent has been on induction of modern technology. The centrally sponsored scheme for computerisation of land records is being implemented in 582 districts of the country. The major strategy for sustainability of land resources focuses on tenurial reforms, decentralised and resource management through local bodies adopting a watershed approach, promoting people's participation and bringing technological innovations.

## 17.5 COASTAL ZONE MANAGEMENT

The marine environment in India includes a roughly, 500 km coastline of the mainland as well as the Andaman and Nicobar Islands in the Bay of Bengal and the Lakshadweep Islands in the Arabian Sea. While marine areas support enormous biodiversity, which in turn sustains a large number of people, there are also serious threats that need to be urgently addressed. These include pollution by untreated municipal and industrial wastes, sand mining, aquaculture, backwaters, port development, offshore drilling, etc.

### Livelihood from Fisheries

An Exclusive Economic Zone (EEZ) covers an area of 2.02 million sq km while the continental shelf covers 0.5 million sq km. 26.3 per cent of the population lives within 100 km of the coastline with nearly 90.58 per cent of the population engaged in fisheries and related activities. The annual export of fisheries is over 0.4 million tonnes. The potential harvestable yield of marine fish stock in the EEZ of India is estimated at 3.9 million tonnes.

### Marine Habitats

A variety of specialised marine ecosystems like mangroves, coral reefs, salt lakes and mud flats form the habitat for a number of endangered marine species and commercially important marine flora and fauna. 3,960 sites of coastal wetlands have been mapped
covering an area of 40,230 sq km of which 97 major estuaries, 34 major lagoons and 241 creeks are reported to be important for conservations.

**Mangroves**

India has about 6,740 sq km of tidal forests of which approximately 4,871 sq km (0.15 per cent of geographical area) are under mangroves. 50 species of mangroves are found in India, which contribute to 7 per cent of the world’s mangrove cover. In 1986, the Ministry of Environment and Forests initiated an exclusive scheme on Conservation and Management of mangroves. Subsequently, a National Committee on Mangroves and Coral Reefs was also set up which identified 32 mangrove areas as critical for conservation. Management Action Plans has been prepared for many of these areas and a National Management Action Plan has been prepared for many of these areas. In addition, a National Mangrove Genetic Resource Centre has been established. A draft National Action Plan on Mangroves and Strategy for Implementation is currently under circulation. Mangroves are reported to be threatened by indiscriminate cutting, reclamation for agriculture and urbanisation, fuel wood, overgrazing and aquaculture.

**Law and Policy**

The central and state pollution laws provide legal cover for the protection of marine areas. In addition, the Environment protection Act 1985, sets standards for effluent and waste discharge into marine waters, besides the merchant Shipping Act, 1958, which controls offloading of wastes from ships at sea. In 1991, the Coastal Regulation Zone (CRZ) notification was issued which classifies coastal areas into four zones and sets limits on the types of construction and development activities that can take place along the coastline. The prohibited activities include setting up of new industries, expansion of existing industrial units.

In 1991, the Department of Ocean Development launched the Coastal Ocean Monitoring and Prediction System (COMAPS) to monitor the state of marine waters of India including the impact of anthropogenic factors on marine flora and fauna. The government has also established an Island Development Authority specifically for overseeing the sustainable development of the islands. The tsunami which struck the coastal areas on December 26, 2004 has resulted in massive destruction. This later, raised several questions of ecological prevention. M.S. Swaminathan (2005) proposes a systemic ‘beyond-the-tsunami’ agenda for action encompassing ecological programmes. In brief, this requires the following:

a) initiating a coastal bio-shield movement along the coastal areas which includes raising of mangrove forests, plantations of bamboo, palms, etc., agro-forestry programmes and soon.

b) Promoting people’s participation in the conservation and enhancement of mangrove and other coastal wet-lands as well as coral reefs and coastal marine biodiversity. The super cyclone havoc in Orissa (October, 1999) and the tsunami calamity (December, 2004) have created widespread awareness among the people on the role of mangrove forests play in reducing the fury of cyclonic storms and tidal waves.

c) Promoting the organisation of community nurseries of mangrove and other appropriate tree species chosen under the coastal bio-shield and agro-forestry programmes.

d) Regenerating fisheries and fostering a sustainable fisheries programme.

e) Raising artificial coral reefs that can stimulate fish breeding and revival.
f) Constructing permanent sea walls and dykes.

g) Developing a code of conduct for coastal ecological security. This includes steps to ensure that no permanent construction is permitted within 500 meters of high tide. The code can consist of a package of rewards for initiatives in the areas of energy efficient construction, use of wind tidal and solar energy, rainwater harvesting, use of local construction material. The coastal ecological security literacy programmes should bring to the attention of builders the opportunities now available for mainstreaming ecology in building design and construction.

h) Promoting sustainable management of coastal land and water resources to prevent salinisation of ground water.

The Ministry of Environment and Forests will shortly put in place a Coastal Zone Management Plan. It will be based on the concept of vulnerability line. This vulnerability line will be the set back line demarcated along the coast. It will be based on the hazard assessment of each coastal area (The Hindu, 2006).

17.6 CONCLUSION

It would be unrealistic, however, to suppose that the damage that has been done, and still continues to be done, can be arrested and undone in the short-term. Rather, long-term global policies must be envisaged and, if they are to be successful, they need to bring about change. If our global physical environment is not to be further degraded, we must change our conceptual environment, our ways of thinking and behaving. Perhaps the worst environment pollution is the product of human mind and the greatest need is for well thought out principles of environmental ethics.

All spheres of human conduct, private and public, are subject to ethical principles or rules. When governments or other corporate bodies despoil the environment in the name of development or political dominance or national security and government adopts laissez faire policies that permit the exploitation of nature far narrow, short term gains, they contravene the basic ethical principle of the greatest good for the greatest number of people. In reviewing all these environmental effects of water, earth and air and their possible dangers, we should not however reach too gloomy a conclusion. A comforting finding, which may be extended to many other aspects, is the recent discovery that fish caught in the last century and preserved in museums have been found to have similar mercury levels as those found in fish today. And after all, the human race with its great adaptability has survived the innumerable disasters and environmental hazards it has encountered for several millions years. There is no reason to doubt that human ingenuity and intelligence will prevail as far as environment problems are concerned.

17.7 KEY CONCEPTS

Exclusive Economic Zone (EEZ): In international maritime law, an EEZ is a sea zone over which a state has special rights over the exploration and use of marine resources. This concept of allotting nations EEZs to give better control of maritime affairs outside territorial limits gained acceptance in the late 20th century and was given binding international recognition in the Third United Nations Convention on the Law of the Sea in 1982 (wikipedia.org/wiki)
Earth Summit: The Earth Summit (an informal name for UN Conference on Environment and Development) was held at Rio de Janeiro in June 1992. The first UN Conference on the Human Environment was held at Stockholm in 1972. UN, through this Summit, sought to help governments rethink economic development and find ways to halt the destruction of irreplaceable natural resources and pollution of the planet. The Summit made the governments recognize the need to redirect international and national plans and policies to ensure that all economic discussions take into account any environment impact.

Green House Effect: The warming of the atmosphere by the trapping of longwave radiation being radiated to space. The gases most responsible for their effect are water vapour and carbon dioxide.

Vector-borne Diseases: These are diseases transmitted through vectors—a term used to any animal that transmits human disease or plays an important role in the parasite's life cycle such as mosquito.

17.8 REFERENCES AND FURTHER READING

Bhargava, Gopal, 1992, Environmental Challenge and Ecological Disaster—Global Perspective, Mittal, New Delhi.
Godschalk, David R et al., 1999, Natural Hazard Mitigation Recasting Disaster Policy and Planning, Island Press, Washington DC.
The Hindu, 17 January, 2005
The Hindu, 12 March, 2006

17.9 ACTIVITIES

1) Prepare a brief note on any one disaster in India that has been caused due to land degradation and desertification.