UNIT 7 OBSERVATION AND PERCEPTION OF VULNERABILITY

Structure

7.0 LEARNING OUTCOME

After reading this Unit, you should be able to:

- Understand the observational and analytical framework of vulnerability;
- Analyse vulnerability as a socially constructed phenomenon; and
- Discuss perceptions of vulnerability.

7.1 INTRODUCTION

Vulnerability understood as a measure of the degree to which a system may be harmed in response to a stimulus, is not new; rather it has been widely used in the physical and social sciences in literature dealing with hazards, climate change, health, epidemiology, crime, military planning, ecology and engineering. Vulnerability is a relative condition. The term "vulnerable" originates in the verb "to wound" and it has been used in a variety of ways to characterise the response of social and ecological systems to *perturbations* (Timmerman, 1981). As analysed in the earlier units as well, risk is closely related to and associated with vulnerability and can be viewed as a joint product of environmental stresses and human and ecological vulnerability. The concept of vulnerability, thus, like risk and hazard, indicates a possible future state. It implies a measure of risk together with a relative inability to cope with the resulting stress (es). Timmerman (1981), looking towards explanation of societal collapse, has reviewed the concepts associated with vulnerability. In his words, "Vulnerability is the degree to which the subject (individual or group) reacts adversely to the occurrence of a hazardous event. The degree and quality of that adverse reaction are partly conditioned by the system's *resilience;* the measure of a system's, or part of a system's, *capacity* to absorb and recover from the occurrence of a hazardous event."

Looking at the composition of society, there are some groups that are more prone to damage, losses, and suffering from differing hazards. Certain factors causing variations of impact include class, caste, ethnicity, gender, disability, and age. It should also be noted that understanding of vulnerability has a temporal dimension as long-term consequences are involved by way of reduced capacities and/or enhanced vulnerabilities. Since damage to livelihood and not just life and property is the major issue, those that find it hardest to reconstruct their livelihoods following a disaster, are left more vulnerable.

The concept of vulnerability as 'the differential susceptibility to loss,' is a central but still incompletely and incoherently developed concept. The variety of efforts across disciplines to address vulnerability has generated differing approaches and concepts. The related concepts of '*resistance'* (the ability to absorb impact and maintain functioning) '*resilience'* (the ability to maintain a system and to recover after impact), and '*exposure'* (the presence of a threat to a group or region), provide some guidance. These three dimensions account for most of the discussions included under the general framework of vulnerability. Although the specific terms, concepts and criteria used to address vulnerability differ, basic concepts are consistent. *Resilience* refers to the ability to continue to function within a normal range despite perturbations and ability to recover from disturbances that substantially disrupt the normal functioning of the system. These two concepts address the internal characteristics of the affected system. Economic, political or biophysical changes may, however, interact to alter the resistance or resilience significantly, the characteristics of exposure experienced by a system. In climate change literature, vulnerability is defined as the degree to which a system is susceptible to, or unable to cope with, the adverse impacts of climate change (climate variability and extremes). Vulnerability to climate change is a function of the *character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.*

7.2 STRUCTURAL ASPECTS OF VULNERABILITY

Disasters have two factors:

- The danger or threat of a situation; and
- The vulnerability, that is, the possibility of persons or goods being affected.

The idea of danger or *threat* points out the possibility of a physical event capable of causing damage, like earthquake, cyclone, floods, industrial accidents, etc. The concept of vulnerability brings to light the structural susceptibility of a society or a social group to suffer harm, based on a physical event constituting a 'threat'. It needs to be understood that the structural aspect of vulnerability concerns the relationship between the social, economic and physical elements, on which the well being of the society or the group in question depends. Thus the analysis of vulnerability is specific and based on the type of danger or threat, which is apprehended.

Disasters take place when a situation having a force of threat or danger coincides with vulnerability condition and exceeds the social capacity to assimilate the consequences. The distinction between *threat*, *vulnerability* and *risk* is fundamental. Even in such cases as when the threat goes completely beyond human control (as in an earthquake), risk can be efficiently reduced or mitigated through appropriate management of the conditions of vulnerability.

Utility of the concept of vulnerability depends on a precise definition of an *event* and its

contexts to provide insights into specific factors/ forces, natural and man made, creating/ causing vulnerability. Key considerations in the above context include the following:

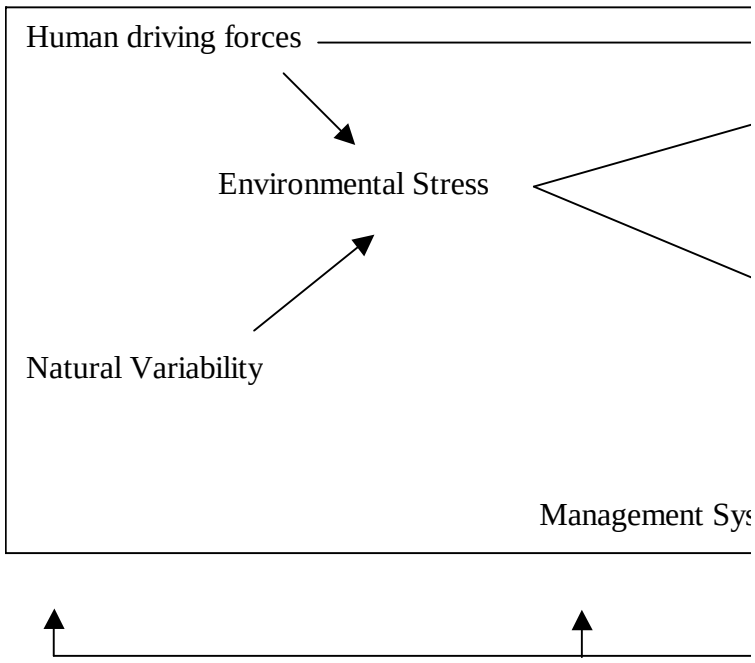
1) Vulnerability is viewed as *comprising internal characteristics of the subject and external processes* contributing to differential exposure;

2) Vulnerability is understood as *relative* to a given hazard, thus, the degree of vulnerability will differ with regard to hazards of varying kinds and magnitude; and

3) The unit of analysis varies in scale as suggested by 'system' in Timmerman's definitions.

The structure of global environmental risk reflects human driving forces, patterns of environmental changes, the fragility of ecosystems, the vulnerability of social groups and the adverse effects that result (Fig. 1, Kasperson, Kasperson and Turner, 1995).

Fig. 1 Simple model of the structure of environmental risk



The stages in the evolution of risk consequences are highly interrelated and interactive. The magnitude of the impact depends upon various *ongoing processes* and *existing factors* contributing to the resilience or capacity of a group or a region to resist impact(s) (that is, its vulnerability). Five broad categories of factors and processes are identified in determining the vulnerability of affected populations. These are *ecosystem fragility*, *economic sensitivity*, and *social system sensitivity*, *individual decision-making* and *demographic characteristics*.

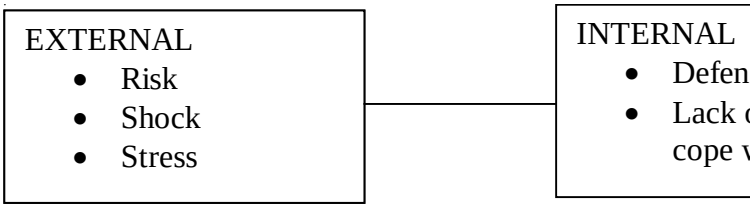
7.3 OBSERVATIONAL AND ANALYTICAL FRAMEWORK OF VULNERABILITY

Internal and External

Vulnerability has two sides: an external side of risks, shocks and stress to which an individual is subject; and an internal side which is defenseless, meaning a lack of means

to cope without damaging loss (Chambers, 1989). The diagram below depicts it illustratively:

CHAMBER'S EXTERNAL AND INTERNAL SIDES TO VULNERABILITY

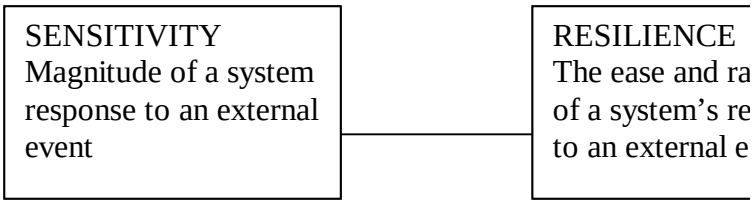


Both behavioural and structuralist schools of thought on disasters acknowledge that disasters happen on the bases of interactions between a 'natural' hazard and population. However, the need to place greater emphasis on the vulnerability of a population as a determinant of disaster has been contended by the structuralist school of thought. It has been conceded however, that evidence of the primacy of vulnerability as a determinant of a disaster becomes prominent through the fact that nearly all deaths from disasters, triggered by natural hazards, are located in the 'developing' world, whereas hazards themselves are much more evenly spread (Abbott, 1991: Smith, 1996).

Sensitivity and Resilience

Moser (1998) has also come out with two dimensions to vulnerability in his model. He has used the concepts of *sensitivity* and *resilience*.

MOSER'S TWO DIMENSIONS TO VULNERABILITY



The focus in this model is two-fold. It has not only emphasised the extent and severity of the interaction between the external 'hazard' and the internal 'capability', that is, s*ensitivity*, but has also stressed on the *tensile* strength of the 'system' to cope with the external hazard, that is, its *resilience*. Moser's model has laid emphasis on the importance of the 'capability' of individual to respond to stress. It is revealed through the significance attached by Moser on *assets* as the primary factor in vulnerability. Moser's model has indicated that the capabilities people in meeting with the stress are often being influenced by 'the social and psychological effects of deprivation and exclusion'.

Exposure, Capacity and Potentiality

The internal/external distinction of Chambers (1989) paved the way for Watts and Bohle's (1993) definition of the 'space of vulnerability'. Their exposition has looked at the risk of exposure to hazards as the external side of vulnerability and the risk of inadequate capacity to mobilise resources to deal with hazards along with the risk of severe consequences as the internal side of vulnerability.

WATTS AND BOHLE'S 'SPACE OF VULNERABILITY'

EXPOSURE Risk of exposure to crisis, stress and shocks	CAPACITY Risk of adequate capacity to crisis, stress

Watts and Bohle's model has added another dimension to vulnerability, which is equated with the downstream consequences of becoming exposed to a shock or stress on one hand and lack of resource mobilisation for coping with the situation on the other.

Exposure Vulnerability and Aversion

Sinha and Lipton (1999), in their in-depth and complex discussion of 'damaging fluctuations' (DFs) and risk, have come out with an exposition which is similar to the 'space of vulnerability' concept coined by Watts and Bohle (1993). Sinha and Lipton (1999) have described exposure to 'damaging fluctuations', which increase with size, frequency, earliness and bunching. It is similar to what Watts and Bohle have stated as 'exposure'.

7.4 VULNERABILITY AS A SOCIALLY CONSTRUCTED PHENOMENON

The contention that the state of vulnerability is *socially differentiated* owes its origin to the work of Gilbert White. White and Haas, 1975 have referred to the significance of *population shifts, mobility* and *housing type* in contributing to a nation's vulnerability to hazards. Majority of the works carried out earlier in this field emphasised on *individual social determinants* of vulnerability. The role of *age* and *occupation* has been assessed by Bolin (1982). He along with Bolton have focused on *housing,* the *built environment* and *family structure* (Bolin and Bolton, 1986). It was Parr (1987), who stressed on *disability.* It becomes evident through the literature on 'social construction' in vulnerability literature where emphasis has been on the system and its ability to cope with and respond to the stimulus. It has also been recognised that the degree to which populations are vulnerable to hazards does not exclusively depend on the proximity to the source or the nature of the hazard but also on social conditions. It proves that different societies living under varying social, economic, physical, cultural and institutional settings have different levels of vulnerability.

Social vulnerability literature, with regard to policy, has proposed the requirement to emphasise on such characteristics of the system that influence the ability of people and communities to be responsive to such stimuli. Two approaches to social vulnerability, that is, *political economy* and *social constructivism,* are to be studied for better understanding.

Political economy is concerned with the social, economic and political structures that influence vulnerability (Peet and Thrift, 1989) and emphasises the central role played by differential economic and political power in determining individuals' and groups' vulnerability. This perspective emerged as part of the structuralist thinking within geography and the social sciences in the 1970s with the work of Santos and Harvey on economic dependency and underdevelopment in the third world.

Blaikie et al's (1994) framework has separated biophysical and social dimensions of

vulnerability. *Causality* is examined using the Pressure and Release Model (PAR), which evaluates vulnerability as part of risk. The model requires one to trace the progression of vulnerability through a series of levels of social factors that generate it. These factors re termed, root causes and dynamic pressures, with focus on the social, cultural and political processes that give rise to the unsafe conditions (vulnerable groups). This model has a distinct scale element, whereby root causes refer to remote influences including economic, demographic and political processes within the society and the world economy and reflect the distribution of power. Unsafe conditions reflect the specific forms of vulnerability expressed in space and time, expressed as people living in dangerous locations and engaging in dangerous livelihoods, lack of building codes and regulations, and a lack of disaster preparedness, suffering poor health and overall quality of life (refer vulnerability models in Unit 6).

7.5 OBSERVATION OF FLOOD VULNERABILITY

A number of methodological tools are available to study the possible effects of flooding. The techniques applied depend upon the scale of the problem being analysed. For small areas, where detailed maps are available at reasonable costs, quantitative methods are applied. At a small scale, floodplain hydraulic analysis can be carried out through one or two-dimensional modeling of the movement of water. Many such numerical schemes are available for objective assessment of flood impact over an area (Horlick et al., 1995).

Flood hazard affects people as per vulnerability patterns generated by their socio-economic conditions. Class relations and structures of domination are crucial in determining the degree of vulnerability to floods. Ethnic divisions are often superimposed on class patterns to create differential vulnerabilities of groups/segments of population. In some situations where some distinction are adhered more staunchly, become the dominant factor in possession of resources, or other forms of "capability deprivation" (Sen, 1990) such as inequalities in access to livelihood opportunities, according to imposed racial or ethnic distinctions. For example, the impact of exceptional flooding around Alice Springs in Central Australia in 1985 was felt more by the 'aborigines' people, who did not receive any flood warning and who inhabited vulnerable areas in low-lying lands. The radio broadcast that alerted the white people was not on channels, which were customarily used by the 'aborigines'.

Factors such as the location of houses (and their proneness to inundation) and the structure and type of housing and situation and condition of/at the workplace determine losses due to flood hazards (and their resistance to floods). Both of these are a function of household income, legal or social limitations on land use, availability or cost of building materials and the location of livelihood activities. The daily and yearly pattern of work and other activities interact with the periodicity/ timing of flood occurrence to create losses. These, in turn, interact with the temporal pattern of flood hazard occurrence. This variability not only affects the risk of death and injury but also the risk of destruction of assets and livelihood "capability". The most vulnerable landscape setting (physical vulnerability) for floods is:

a) *Low Lying Parts of Active Floodplains and River Estuaries:* The area of Ganga, Brahmaputra and Meghna Basin in India extends over more than 1,750,000 km sq. In an average year it receives about four times the annual rainfall of the Mississippi Basin in USA. In estuarine areas there may be a combined threat from river floods and high tides as in the case of the Thames, in London, England.

b) *Small Basins Subject to Flash Floods:* Flash floods are found mainly in arid and semi arid zones where there is a combination of steep topography, little vegetation and high intensity short duration convective rain forms. They can also occur in narrow valleys and heavily developed urban settings. For example the city of Kuala Lumpur is situated at the foot of a relatively steep fan shaped basin, which has almost perfect hydrological conditions for flash floods (Sehmi, 1989).

c) *Area below Unsafe or Inadequate Dams:* Structurally unsafe dams are hazardous to people living in its vicinity. If the foundation is weak people may die of flash floods or even due to the structure giving in even structurally sound dams may be over topped by surges of water induced by earth movements

d) *Low Lying Inland Shorelines:* Inland shoreline facilities are vulnerable to floods due to rising lake levels. This happens mostly after rains. Erosion of barrier islands, and dunes or bluffs removes any natural protection from wind driven wave attack, which is responsible for damage to buildings and other immovable property.

e) *Alluvial Fan Areas:* Such areas as in Western America, though generally dry, can be affected by high velocity winds highly charged with sediments capable of destroying built structures. There is absence of well-defined surface watercourses and the likely damage in case of floods is quite high.

Losses Due to Floods

Physical damage to property, especially in urban areas, is the major component of tangible losses. There are also secondary losses associated with a decline in house values, immediately after the event although such declines appear to be temporary (Montz and Tobin, 1998; Montz, 1992). Damage to crops and livestock and agricultural infrastructure can also be high in intensively cultivated rural areas. In India, for example, almost 74% of the direct flood damage has been attributed to crop damage. In addition to mortality due to drowning, tangible losses to human resource occur as a result of illnesses that follow floods. Endemic diseases like cholera, typhoid, and brain fever part from undetected strains of bacterial and viral infections reaching epidemic proportions create most post flood illness. Gastrointestinal diseases regularly break out in the less developed countries (LDCs) where sanitation standards are low, when sewerage systems are damaged. In tropical countries there is more widespread incidence of water- related diseases like typhoid, malaria etc. In the developed countries, flood survivors have been found to suffer from mental illnesses. For example, for as long as 18 months after the Buffalo Creek West Virginia Disaster, in 1972, over 90% of the survivors reportedly suffered from mental illnesses (Newman, 1976). Other less tangible losses include environmental changes brought about by floods, for example, as has been estimated, riverbank erosion of farmland and villages in Bangladesh renders up to one million people landless and homeless every year (Zaman, 1991).

Positive impacts of floods include, increased fertility of the soil by deposition of new alluvium, silt deposition, flushing salts from surface layers of soils etc. Floods provide water for natural irrigation and fisheries which are an important source of protein in many LDCs, flood retreat agriculture where the moist soil is left after flood recession and is planted with food crops is widely undertaken in the tropics. The seasonal inundation of large flood plains in semi -arid West Africa is of crucial ecological and economic significance and is responsible for larger agricultural output than that associated with formal highly capitalised irrigation systems (Adams, 1993).

Flood Management

In India, since floods are almost an annual occurrence, the impact on the economy is considerable. As is evident in the map given below (UNDP, 2005), river basins in the East and West Coast, Punjab, Bihar, Uttar Pradesh, parts of North East, Gujarat and West Bengal are the major flood prone zones in India. Vulnerability of flood areas is due to their apparent attractiveness for human settlement and ill- planned growth owing to administrative and political exigencies.

Therefore, flood management is an important/indispensable economic activity and a development imperative. The following measures are advocated for protection of life and property in the event of floods:

a) *Event Modification Adjustments*: These imply physical control of floods, which depends on two measures, adopted singly or in combination; viz. *flood abatement* and *flood diversion.* Flood abatement or flood reduction involves decreasing the amount of run-off potentially able to create a flood peak in a drainage basin. Watershed treatment is a widely used means of controlling the flow of water by reducing its velocity. Typical strategies include, reforestation or reseeding of sparsely vegetated areas to increase evaporative losses, mechanical land treatment of slopes, such as contour ploughing or terracing, comprehensive protection of vegetation from wild fires, overgrazing, clear cutting of forest land or any other practices likely to increase flood discharges and sediment loads. In addition, downstream decreases in peak flow can be achieved by the clearance of sediment and other debris from headwater streams, construction of small water and sediment holding areas (farm ponds) and preservation of natural water detention zones

such as sloughs swamps and other wetland environments. Within urban areas the grading of buildings plots, detention ponds and the creation of parkland can achieve some water storage. The emphasis is on an integrated approach, involving soil vegetation and drainage processes. However soil conservation and reforestation cannot prevent floods or reduce losses dramatically. These flood reduction measures need to be supplemented with other approaches to control floods in large river basins. *Flood diversion* measures include a wide range of engineering structures known in geography literature as *'levees'* (embankments, dykes or stop banks), which are used to divert floodwaters from plain areas. Such structures have been seen to successfully minimise damage to life and property in case of large catastrophic floods.

Channel improvements can be achieved in a variety of ways. Channel enlargement increases the cross -sectional area of the channel to control flood flow within the banks. It also increases the carrying capacity of the river. Flood relief channels are used to provide extra overspill storage to manage the volume of water. It can be used to divert the water around an area of urban development. Such channelisation however affects the ecology of the region by diverting a stream from the river basin and is not considered good for long -term viability of riparian ecology. Reservoirs are built to store excess water in the upper drainage basin so that it can subsequently be released in a controlled measure for long-term benefit of the region. *Flood Proofing* is term applied to adjustments to buildings and contents with view to reducing losses in the event of a flood. Examples are blocking up of certain entrances, sealing doors and windows, use of sand bags, building cupboards high up on the walls etc.

Flood Plain Zoning involves demarcating areas along the river's course that are susceptible to flood damage to varying degrees. For damage minimisation acceptable levels of development in specified areas are prescribed.

b) *Structural Improvements*: Sahni, Dhameja and Medury (2001) give the following specific guidelines for structural improvements in designing of public facilities:

- Use disaster resistant high-tension towers and poles in the new construction of transmission lines and in any replacement of existing towers and poles.
- Set poles to an adequate depth to prevent uprooting, or bending due to wind pressure when the ground is waterlogged.
- Upgrade design specifications and quality of construction for concrete poles
- Upgrade specifications for wooden poles to ensure that mature timber is used, that poles are cured adequately, and that the wood has been treated by a proper impregnation method against moisture and insect damage.
- Replace pole mounted transformers with plinth mounted transformers
- Place underground the low-tension main supply cables between transformer stations in urban areas, wherever feasible economically.
- Upgrade outside telecommunication equipment in storm proof buildings above flood level.
- Replace overhead cables with underground cables in areas of high vulnerability and wherever feasible economically.

- Pumping stations must be upgraded to the ones that are damage proof.
- Water tower and storage tanks should be designed to withstand cyclonic winds, earthquakes and floods.
- Regional cooperation between India, Nepal and Bangladesh is needed to improve the existing drainage system so that the extent and time of flooding is lessened. Freeing up natural drains (old channels or *dhars*) and natural depressions should be part of the disaster mitigation strategy in flood prone areas.

7.6 VULNERABILITY DIMENSIONS

Concerned by the increasing number and the impact of disasters, the International Decade for Natural Disaster Reduction (IDNDR) was initiated in 1990 to enforce the agenda for disaster reduction. One of its major goals was to reduce vulnerability to natural disasters, "requiring concerted and coordinated efforts of government, UN-system organisations, the world's scientific and technical community, volunteer organisations and educational institutions, the private sector, the media and individuals at risk. Vulnerability assessment……[is] essential" (United Nations, IDNDR, 1992). The international community was alerted to the fact that if disasters have to be controlled and prevented, vulnerabilities should be assessed and identified in order to design, timely, affordable and effective strategies for reducing the negative effects of disasters (Anderson, 1995). Most of the agencies further recognise that vulnerability is a bigger concern for the poor and that the most vulnerable sectors in society need special attention. Three different views have been identified to address vulnerability:

1) **Natural Causation**

This view blames nature and natural hazards as the cause of the peoples' vulnerability, which changes as per the intensity, magnitude, and duration of external shocks. Vulnerability emerges from hazards and risks consequent thereupon. In order to reduce vulnerability, it is imperative to pit in place, systems for predicting hazards and technologies to make human structures withstand adverse impacts. Hence, the reliance in this approach is on scientific a technological solutions.

2) **Costly Technology**

Despite enormous increase in technological and scientific capacity, people continue to suffer. The main reason for this could be costly prediction and mitigation technologies and also because these systems are inappropriately used. Public administrators, disaster management professionals and economists are continuously working to find methods whereby losses could be reduced and risks minimised. The emphasis in this approach is on economic and financial solutions to minimise costs. This calls for proper vulnerability reduction measures with the active participation of the concerned communities as an essential prerequisite for user- friendly application of technology and development of indigenous low cost options.

3) **Societal Structures as Cause**

This view observes that disasters have differential impacts on people who live in hazard-prone areas. It is not only exposure to hazards that puts the people at risk, but also socio-economic and political processes in society that generate vulnerability as per advantageous/disadvantageous social positioning. These create the conditions that adversely

affect the ability of communities or countries to respond, to cope with or, recover from the damaging effects of the disaster events. These conditions precede the disaster event, contribute to its severity and might continue to exist long afterwards (Anderson, 1989). "Reducing the vulnerability of the poor is a development question and such a question must be answered politically" (Cuny, 1983). The long-term solution lies in transforming the social and political structures that breed poverty and the social dynamics and attitudes that serve to perpetuate it. However, it does not appear to be an easy solution.

The three views, mentioned above, are not independent rather, mutually reinforcing. Invariably, there is more than one view to be considered by policy formulators and executors. Vulnerability is a result of both external dynamics and lack of capacity to resist. It is often felt that the poor are affected by the critical trends, shocks and seasonal problems, which lie far beyond their control. For lasting solutions, there is need for well thought out, detailed disaster mitigation strategy, preparedness planning, risk identification, sharing and transfer, etc.

7.6.1 Local Adaptation Strategies

Populations inhabiting hazard prone areas adapt with extreme events, using their own capabilities, skills, talents, knowledge and technologies inherited from their ancestors and learnt through experience. These strategies have the legitimacy of tradition and culture. In Orissa, which is one of the cyclone prone areas in India, in a study entitled "Community Based Disaster Preparedness in Orissa" (2000), it has been highlighted that the local community has developed its own coping strategies to deal with cyclones. These can be better understood by the people and can prove to be beneficial in minimising the loss of life and property from cyclones. Some of these points are as follows:

1) People wrap all available seeds, rice paddy and bury it under ground when they move for safer places.

2) Some families wrap all their important papers, documents and other valuables and bury it under ground before leaving their houses.

3) Houses are constructed on higher plinth so that water does not enter the house.

4) If the clouds move northward it is an indication of possible flood over the next three or four days.

5) Some people can look at the colour of the clouds and their formation and predict floods.

6) People grow banana trees around houses as banana stems are used for floating. Something similar to a boat is made out of banana stems and is used as a barge.

7) Banana leaves are used as fodder during cyclones and floods.

8) People identify nearby villages and inform them before hand for their temporary migration and shelter in those villages in case of floods.

9) People store foodstuff, dry food, coconut, pumpkins, etc., to be used immediately after the disaster.

10) Beating of drums for dissemination of warning is a regular practice among indigenous communities.

11) The continuously blowing wind from east indicates that the cyclone is approaching. If within two hours, the wind starts becoming hot, the indication is that the intensity of cyclone will increase.

12) If the wind changes its direction from east to south and gets cooler, it indicates that the cyclone has changed its direction.

13) Barking of village dogs without any provocation during daytime is indicative of an unusual event like a cyclone in the immediate future.

14) If dogs start scratching the ground it is an indication of impending hazard.

15) Fishermen get substantive catch of a particular fish prior to the cyclone, which they normally are unable to catch.

16) The fishermen nets catch a particular small plantation, which they never get otherwise. This also indicates that a cyclone is approaching.

17) A strange and rather thundering sound from the sea for two or three days indicates that a cyclone is about to strike.

18) If the clouds move fast from North to South, there is a likelihood of a cyclone.

19) Birds in large quantity flock together and fly from the North to South, give the indication of an approaching cyclone.

20) People don't plant big trees near their houses to escape injuries from felling during cyclones.

21) People untie the animals to save their lives.

22) Animals are used to swim across rivers during floods/ cyclones.

23) Sharing of food after the disaster is a survival strategy.

24) Community kitchen is a survival strategy that is now being officially taken up by governments.

25) Maintenance of as much hygiene and sanitation as possible is an imminent response requirement.

26) Distribution of food during relief first to children, then to elderly people and women and the remaining to the rest is the usual sequence followed.

27) People from other nearby villages not affected by the cyclone, get together to help the victims.

It may not be altogether wrong to say that when disasters strike, people have always been ready to cope and have not relied much on support and assistance from outsiders, even the government. Local people may not even have any familiarity with the concept of 'vulnerability'. In local dialects, there is seldom an appropriate translation of the term. The situation is now changing. Political, demographic and global economic processes have put local adaptation strategies under pressure and created vulnerabilities (and reproduction of vulnerability over time), which arise due to allocation and distribution of resources between development objectives /different groups of people respectively.

Another concern for local communities are the government's 'development' projects like dams for electricity generation and irrigation, mining operations, plantations, and recreation areas that require conversion of prime agricultural land to industrial and commercial uses. These projects might favour national and global interests but displace local communities, which lose their livelihoods and the right to cultivate lands. These kinds of projects with immediate negative effects on local poor communities are referred to as 'development aggression' and are considered by the local people as human made disasters. Government or private investors offer compensation that is far below the amount needed to rebuild a livelihood elsewhere, or land is not made available at all.

7.7 CONCLUSION

In a fast changing environment, local people might realise that traditional coping strategies are no longer valid or appropriate. They therefore continuously look for new ways to adjust their livelihood strategies with the aim of reducing risk and sustaining livelihoods. The irreversible strategies undermine the basis of their means of survival.

Vulnerability to disasters is a matter of perception, and in most aid agency perception, the view of the local people is lacking. Most agencies tend to think on behalf of the victims, not realising that disaster-prone communities might interpret their circumstances differently. If we want our disaster responses to be meaningful, we need to give affected communities a voice and **recognise** their risk perception and as well as their active role in exploring strategies that ensure livelihood security on a long term basis.

7.8 KEY CONCEPTS

Exposure : Four factors appear to determine risk perception in a society. As per United Nations, they are, Exposure (actual quantitative risk level), Familiarity (previous experience), Preventability (assurance that it could be prevented) and Dread (apprehended consequences). Exposure gives the extent of likely damage to physical and human capital in the event of a disaster. Populous settlements or location of critical facilities in a hazard prone zone implies more 'exposure' to hazard.

Perception : Perception is explained as viewpoint. With our limited perceptions we miss comprehension of an issue in all its aspects. Recognition of this basic human weakness is the first step towards developing a more comprehensive understanding of any phenomenon, in this case disaster. Positive social capital in communities and between institutions helps counter the weakness effectively sine different perceptions give totality to a policy. In disaster management terminology, awareness of a disaster and preparedness to combat the same on the part of the government depends on risk perception. Media has an important role in creating this awareness; in other words improving perception on the part of people by facilitating information dissemination regarding disasters.

Resilience : Resilience is explained as fortitude in the face of adversity. Resilience is more than a character trait. It is built up over time by government intervention by way of long term socio-economic ameliorative measures that enable people to be resilient to extreme events like disasters.

Vulnerability : Vulnerability gives the degree of loss to each 'element' (physical social or human) should a hazard of a particular magnitude strikes. Precise estimation of likely losses is attempted in vulnerability assessment.

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7.10 ACTIVITIES

1) Discuss the structural aspect of Vulnerability.

2) "Vulnerability has two sides: an external side of risks, shocks and stress to which an individual is subject; and an internal side which is defenseless, meaning a lack of means to cope without damaging loss". Discuss with relevant examples.

3) Write a note on community's perception of 'Vulnerability'.