

Introduction to Disaster Management

Component-I (A) – Personal Details

Role	Name	Affiliation
Principal Investigator		
Paper Coordinator, if any	Prof. P.K Shajahan	Professor, School of Social work Tata Institute of Social Sciences
Content Writer/Author (CW)	Dr. Shibumani K Ms. Amritha Saikai*	Assistant Professor Jamsetji Tata School of Disaster Studies, Tata Institute of Social Sciences *PhD Scholar, Tata Institute of Social Sciences
Content Reviewer (CR)	Prof. John Menacherry	Principal Matru Sewa Sangh Institute of Social work, Nagpur
Language Editor (LE)		

Component-I (B) Description of Module

Items	Description of Module
Subject Name	Social Work
Paper Name	Fields of Practice in Social work
Module Name/Title	Introduction to Disaster Management
Module Id	
Pre-requisites<Expected to know before learning this module>	
Objectives	<ul style="list-style-type: none"> • To understand the concepts disaster and various types of disaster. • Understand the hazard, vulnerability, To learn disaster and risk and the inter linkages between them.
Key words	Disasters, Hazards, Types of disaster, Vulnerability and

	Risk	
--	------	--

DISASTER MANAGEMENT

2. INTRODUCTION

The world is witnessing an increase in the number of disasters (earthquakes, floods, hurricanes, tornadoes, tsunamis, drought, famines etc.). In the past decades, disasters have caused tremendous devastations in terms of loss of lives of people, damage to property, economic loss, environmental degradations etc. Disasters have the potential to wipe out years of development in a matter of seconds or minutes. Disasters are global phenomena that know no boundaries and do not distinguish between the rich and the poor. However, the impact of disasters is different on developed and developing nations as it depends on many factors such as population density, socio-economic factors, vulnerability of people, social security, pattern of development and so on. Hence, the impact of floods in a developed country such as the United States would be different from the impact of floods in a developing country like India or Bangladesh. The number of deaths due to disasters is more in underdeveloped and developing countries than in developed countries. Also, developed countries have better capacities to build back better within a short span of time owing to their economic condition and advanced technology than developing countries, which largely lack these capacities. Although disasters are largely natural events, anthropogenic activities are considered to be responsible for exacerbating the impacts of disasters. Deforestation, construction of dams, haphazard development, illegal mining of sand, oil spills in oceans, irregular land use patterns are some of the anthropogenic activities that are considered to have worsened the impact of disasters.

3. LEARNING OUTCOME

After reading the module you would be able to

1. Understand the concept of hazards
2. Understand the concept disasters

3. Understand the classification system of hazards and disasters
4. Understand the concepts of vulnerability and risk
5. Understand the interrelations between the above concepts

4. INTRODUCTION TO HAZARDS

4.1 DEFINITIONS

It is important to understand hazards before getting into the concept of disaster. There are several definitions of hazard, proposed by different scholars, agencies and governments. For the ease of understanding, let us consider a few.

1. "Hazard is an extreme geophysical event that is capable of causing a disaster" (Alexander 2007, as cited in Paul 2011).
2. "Hazards represent the potential occurrence of extreme natural events, or likelihood to cause the severe adverse effects, while disasters result from actual hazard events" (Tobin and Montz, 1997).
3. "Hazard is a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage" (UNISDR).

4.2 CONCEPT

From the above definitions, it is clear that hazards are threats and not the actual events. The originating point of hazards is the natural environment and they represent the likelihood to cause severe impacts. A single hazard may have a cascading effect causing a sequence of secondary and tertiary hazards. These can be determined using hazard sequencing. While the first and the second definitions do not take into account the role of human activity in exacerbating the impacts of hazards, the third definition by UNISDR addresses this aspect. The role of human beings in contributing to hazards cannot be ignored. The activities

of human beings adversely affect the natural processes. However, there is a constant denial on the part of governments of some countries, which interpret extreme events as acts of God.

4.3 TYPES OF HAZARDS

Over the years, many efforts have been made to arrive at a classification system of hazards. Hazards have been broadly classified into two categories: natural hazards and man-made hazards. Other classification systems may include more than these two categories. Hazard classification is important because it helps governments and other agencies that are tasked with hazard identification. While hazards are mostly classified based on their sources of origin, there may be other classification systems as well.

(A)

TYPE OF HAZARD	ORIGIN	EXAMPLE
NATURAL	Extreme physical processes	Earthquakes, volcanic eruptions, floods, hurricanes, tsunamis
BIOLOGICAL	Biological reasons such as viruses, bacteria, medical wastes	Epidemics
TECHNOLOGICAL	Interaction of society, technology and natural systems	Explosion, oil spills
SOCIAL	Social systems	Warfare, terrorism, civil disorders
CHRONIC	Long-term events (continuous discharges)	Industrial pollution

Source: Paul 2011 (pp. 16-20)

(B)

1. ATMOSPHERIC	ATMOSPHERIC
----------------	-------------

<p><i>Single element</i></p> <ul style="list-style-type: none"> • Excess rainfall • Freezing rain (glaze) • Hail • Heavy snowfalls • High wind speeds • Extreme temperatures 	<p><i>Combined elements/events</i></p> <p>Hurricanes 'Glaze' storms Thunderstorms Blizzards Tornadoes Heat/cold stress</p>
<p>2. HYDROLOGIC</p> <ul style="list-style-type: none"> • Floods – river and coastal • Wave action • Drought • Rapid glacier advance 	<p>3. GEOLOGIC</p> <ul style="list-style-type: none"> • Mass-movement <ul style="list-style-type: none"> ➢ Landslides ➢ Mudslides ➢ Avalanches • Earthquake • Volcanic eruption • Rapid sediment movement
<p>4. BIOLOGIC</p> <ul style="list-style-type: none"> • Epidemic in humans • Epidemic in plants • Epidemic in animals • Locusts 	<p>5. TECHNOLOGIC</p> <ul style="list-style-type: none"> • Transport accidents • Industrial explosions and fires • Accidental release of toxic chemicals • Nuclear accidents • Collapse of public buildings

Source: ADPC, nd¹

5. DISASTER

5.1 DEFINITIONS

Having established the concept of hazards, let us now look at the concept of disasters. There is no single definition of disaster. Scholars and agencies have defined disasters in different ways.

1. UNISDR defines disaster as “a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.”
2. FRC defines disaster as “a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the

¹ <http://www.adpc.net/casita/course-materials/Mod-2-Hazards.pdf>

- community's or society's ability to cope using its own resources. Though often caused by nature, disasters can have human origins.”²
3. Kreps (1998, p. 28) defines disasters as “nonroutine events in societies or their larger subsystems (e.g. regions, communities) that involve social disruption and physical harm. Among the key defining properties of such events are (1) length of forewarning, (2) magnitude of impact, (3) scope of impact, and (4) duration of impact.
 4. According to Carr (1932, as cited in Dombrowsky 1998, p. 18), “not every windstorm, earth-tremor, or rush of water is a catastrophe. A catastrophe is known by its works; that is, to say, by the occurrence of disaster. So long as the ship rides out the storm, so long as the city resists the earth-shocks, so long as the levees hold, there is no disaster. It is the collapse of the cultural protections that constitutes the disaster proper.

5.2 CONCEPT

From the above definitions, it is clear that disaster can be looked at from a wide range of perspectives. There is no single definition that we should depend upon. Based on our understanding of disasters, we can adopt any of the definitions that are available in literature or can even contribute our own.

While hazards are threats, disasters are the actual events that cause harm to the society and human welfare. Disasters are a complex combination of natural hazards and human action (Blaikie et al., 2003). Natural hazards such as floods, earthquakes, drought in a region coupled with political unrest and diseases such as HIV could prove to be extremely difficult for people to cope. For example, the situation in African countries like Sudan and Ethiopia.

Since disasters exceed the community's or society's ability to cope using its own resources, the disaster-affected communities depend on external assistance –

2 <http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/>

national and international governments, non-governmental organizations – to overcome the impact of disasters. Disaster-affected societies require immediate assistance in the form of food, water, shelter, medicines, and sanitation to fulfil the basic needs for survival, which are taken care of by donor agencies. Humanitarian agencies also provide long-term rehabilitation and assistance to disaster-affected communities and help them build back better.

Disasters also lead to the displacement of thousands people, making them internally displaced persons or refugees. In the absence of social and economic security, severed social relations, disruption of livelihood, inaccessibility to education and healthcare, the vulnerability of the displaced population increases manifold. Quest for better living conditions often compel people to migrate to cities, where they become vulnerable to exploitation and fall prey to trafficking. Under such circumstances, governments should focus on capacity building measures of vulnerable communities and adopt preparedness strategies to minimize the impact of disasters on communities.

Disasters and development are interlinked. The debate of disasters and development has attained a central position ever since the studies of development have gained prominence. The association is so obvious that it is difficult to ignore and therefore has attained global importance. The international community has recognized the importance of addressing the association by including it in agendas such as millennium development goals and sustainable development goals.

According to Collins (2009), disasters and development share a two-way relationship. Development leads to disaster and disasters impact development. The former deals with the idea that while disasters are induced by natural hazards, their impact is determined by the nature of development, as has been witnessed around the world. Development is taking place at a rapid pace. For the quest of economic gains, natural resources are being plundered beyond repair,

the effects of which have cascaded to climate change and disasters. Development activities such as constructing buildings, dams, entertainment parks, roads in mountainous terrains, industries have taken paramount tolls on the environment, triggering disasters that have damaged lives and properties. The latter points towards the fact that disasters can ruin development within seconds and send a society plummeting down the ladder of development. For example, disasters in underdeveloped countries like Nepal or Haiti. While developed countries are resilient enough to build back better and they achieve it within a short span of time (Japan built back within a few years of the Fukushima Daiichi disaster in 2011), in case of countries like Nepal and Haiti, which have been hit by devastating earthquakes, building back is a matter of decades.

5.3 CLASSIFICATION OF DISASTERS

Several classification systems of disasters exist in literature. Some of them are reproduced below.

(A) Natural and man-made disasters

NATURAL DISASTERS	MAN-MADE DISASTERS
Sudden-impact – earthquakes, tropical storms, tsunamis, volcanic eruptions, etc.	Industrial/Technological – pollution, fires, spillages, explosions, etc.
Slow-onset – drought, famine, pest infestation, deforestation, etc.	Complex emergencies – wars, civil strife, armed aggression, etc.
Epidemic diseases – water-borne, food-borne, vector-borne, etc.	Others – transportation accidents, material shortages

Source: Abdallah and Burnham, nd

(B) Natural and technological disasters

TYPES	SUB-TYPES	EXAMPLES
	Geophysical	Earthquakes, volcanic eruptions

Natural		
	Meteorological	Extreme temperature, fog, storm
	Hydrological	Flood, landslide, wave action
	Climatological	Drought, glacial lake outburst, wildfire
	Biological	Epidemic, insect infestation
Technological	Extraterrestrial	Space weather
	Industrial accident	Chemical spill, collapse, explosion, fire, gas leak, poisoning, radiation
	Transport accident	Air, water, road, rail
	Miscellaneous accident	Collapse, explosion, fire, other

Source: (<http://www.emdat.be/classification>)

6. VULNERABILITY

6.1 DEFINITIONS

- Blaikie et al. (2003) defines vulnerability as “the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process).”
- According to Paul (2011), “vulnerability is the state or condition of being capable of being wounded, attacked, or damaged. It is a measure of an entity’s inability to deal with natural disasters.

6.2 CONCEPT

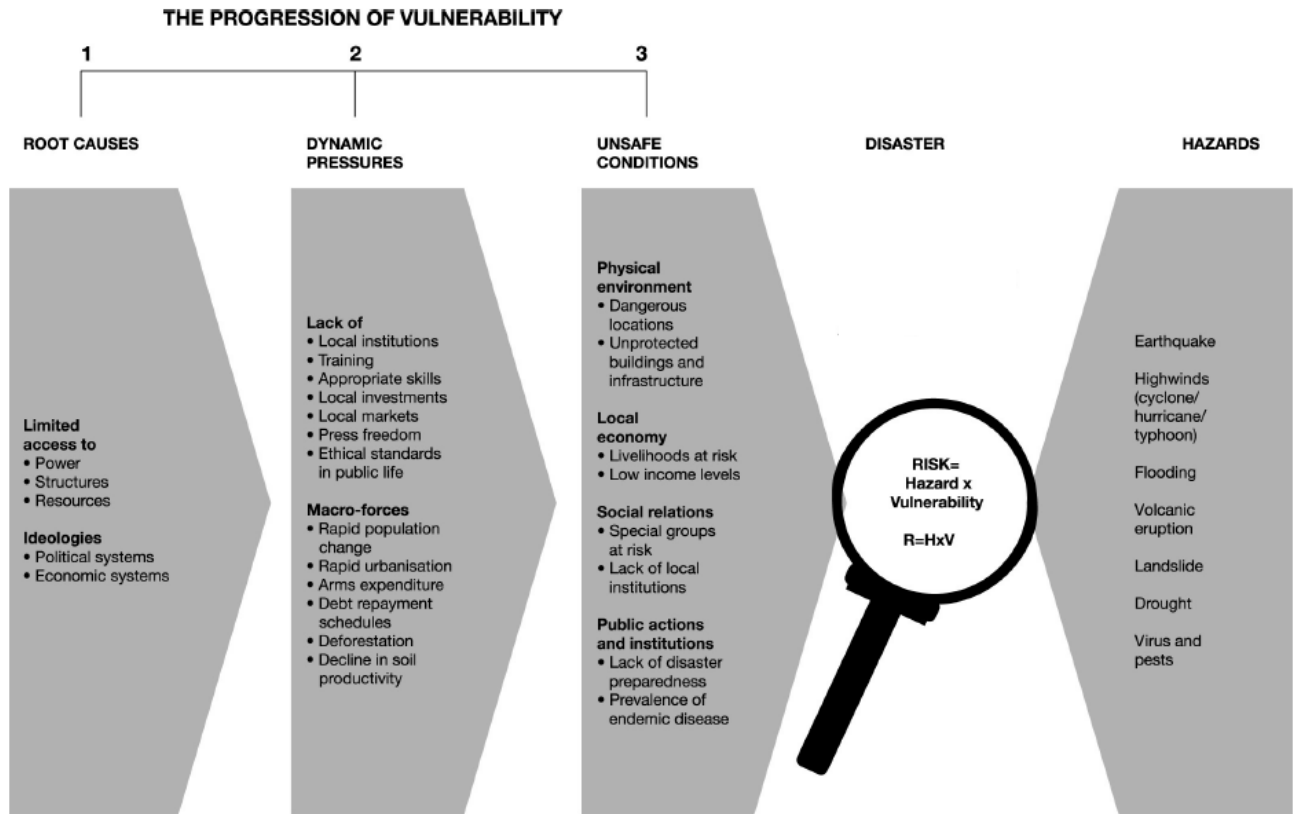
The concept of vulnerability is central to disaster studies. For the past many decades, researchers have shifted their attention from hazard studies to vulnerability studies, the conditions that contribute to people’s vulnerability. It is important to understand why certain individuals, families or groups of people are affected more by disasters than others. Blaikie et al. (2003) identified some key

vulnerability variables that explain the impact of disasters – poverty, class, caste, ethnicity, race, religion, occupation, gender, health, disability. Vulnerable groups, owing to these condition, lack the ability to build back their lives after disasters and hence become more vulnerable after disaster events.

Vulnerability of individuals, a community, or a society evolves over a long period of time and is a combination of physical, socio-economic and demographic factors. Vulnerability is defined by social systems rather than natural forces. People's lives are embedded in the social, political and economic circumstances and these influence the choices that people make while coping with the hazards that they encounter. Those who have the fewest choices because of the discrimination that they face in the society – lack of political power, disability, inaccessibility to education and livelihood options, and lack of legal rights – are the most vulnerable.

Blaikie et al. (2003), in the pressure and release (PAR) model (Figure 1) that they had propounded, had explained the relationship between vulnerability, hazards and disaster. They had established that disasters are the result of the interaction of hazards and vulnerability. The vulnerability is a product of unsafe conditions, which according to the authors are *“the specific forms in which the vulnerability of a population is expressed in time and space in conjunction with a hazard.”* For example, unsafe living conditions or low income levels. The unsafe conditions are entrenched in the dynamic pressures, which are *“processes and activities that ‘translate’ the effects of root causes both temporally and spatially into unsafe conditions.”* For example, lack of education and skills, rapid urbanization. These in turn are within what are called as root causes, which are *“an interrelated set of widespread and general processes within a society and the world economy.”* For example, limited access to power and resources.

Figure 1: Pressure and Release Model



Source:Blaikie et al. (2003)

It is believed that people in the developing countries are more vulnerable than the people in the developed countries because the root causes, dynamic pressures and unsafe conditions are more pronounced in such countries. The developing countries also lack preparedness measures and are less resilient. Hence, the impact of tropical cyclones on the coastline of India or Bangladesh would be more than the impact of hurricanes in the USA, which has better preparedness levels than India or Bangladesh. In the developing countries, the state fails to provide social protection to its citizens. On the contrary, in the developed world, people's livelihoods are secure and social protection makes them resilient. However, according to Cannon (2000), this assumption is based on ill-informed understanding since a considerable population in the developed countries is economically vulnerable to hazards. Vulnerability to disasters is not absent in developed countries altogether. In USA, those people who earn less or are unemployed because of their ethnicity will obviously be impacted more during

natural disasters.

7. RISK

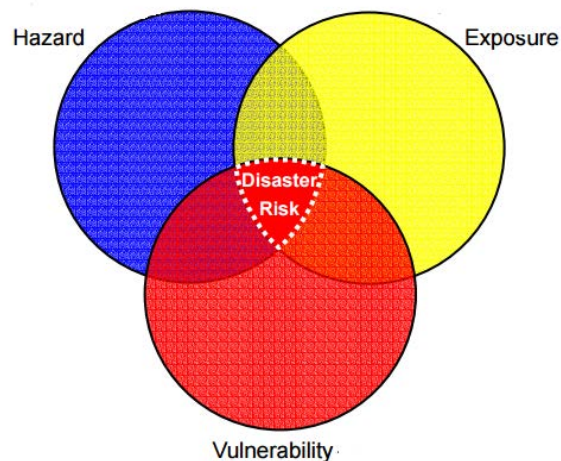
7.1 DEFINITIONS

- UNISDR defines risk as “the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.”

Exposure is “the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.”

- Blaikie et al. (2003) defines risk as a compound function of the natural hazard and the number of people, characterized by their varying degrees of vulnerability to that specific hazard, who occupy the space and time of exposure to the hazard event.

Figure 2: Risk = Hazard x Vulnerability x Exposure



Source: Asian Disaster Reduction Centre, 2005

7.2 CONCEPT

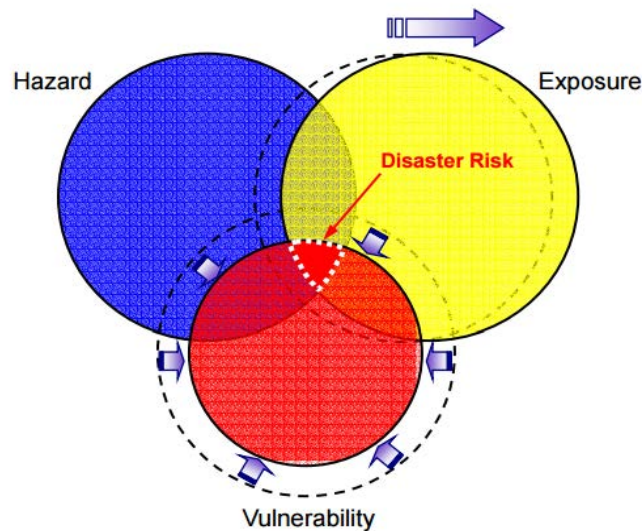
Risk is a very important facet in the context of natural hazards. It shapes people's perceptions and actions. It is more of a mental construct, distinct from the other things in the environment that can be seen, identified or counted (IRGC, 2005). People perceive risk, that is, have subjective judgments about the characteristics of risk, and take decisions based on their perception of risk. Risk perception plays an important role in developing emergency preparedness measures at the household, community, national and regional level. When the risk perception level is low among individuals and communities, they would adapt poorly to hazard events. Developing risk reduction measures is a better alternative than recovery and reconstruction measures after disaster events. The significance of risk reduction has been understood by governments and international communities and hence risk studies have gained centrality in disaster research in the recent times.

A unique feature of risks that are facing the modern society is "high-frequency" and "low-severity." The risks manifest as small-scale, recurrent and less-damaging events such as flash floods, mudslides, fires etc. and are not reported globally. However, when the factors driving such risks – ill-planned and badly managed urban development, environmental degradation, poverty, inequality, vulnerable livelihoods, poor governance etc. (United Nations 2015; pp. 90) – are left unaddressed and not dealt with severity, the small-scale events may take unanticipated turns. The consequences could be far more damaging and unmanageable.

Thus, the understanding of disaster risk is not confined to the study of hazards alone. It is to be looked at through different lenses such as sociology, anthropology, political science, economics, health, gender, conflicts, and business etc. because disaster risk can only be reduced if an interdisciplinary approach is adopted. Addressing physical hazards is just one aspect. There are multiple underlying aspects that need to be looked at, analyzed and understood in order to arrive at sustainable solutions. Reducing exposure and vulnerability

and taking into account society's and communities' capacity to protect themselves from disasters is essential.

Figure 3: Reducing Disaster Risk



Source: Asian Disaster Reduction Centre 2005

8. SUMMARY

The module explained the concepts of hazard, vulnerability, disaster and risk and the interlinkages between them. While hazards (earthquake, floods, drought, and cloudburst) exist in the natural environment, vulnerability (poverty, illness, caste and class discrimination) is socially constructed. Where the two intersect, disasters occur. If a hazard, for example an earthquake, strikes in an unpopulated place and does not result in loss of property and lives, it will not qualify to be called a disaster. Although the accepted notion is that the poor are vulnerable, this is not always the case. According to Cannon (2000), middle-class

population living in unsafe buildings in an earthquake-prone area will be more vulnerable than the poor who live in fragile houses because if the latter collapses, not many would death or be injured. Risk is a mental construct. What is perceived as risk by one community, may not be regarded as risk by another community. Risk perceptions are important in shaping preparedness strategies. For governments, formulating the right risk reduction measures is better than spending millions in reconstruction post-disasters.