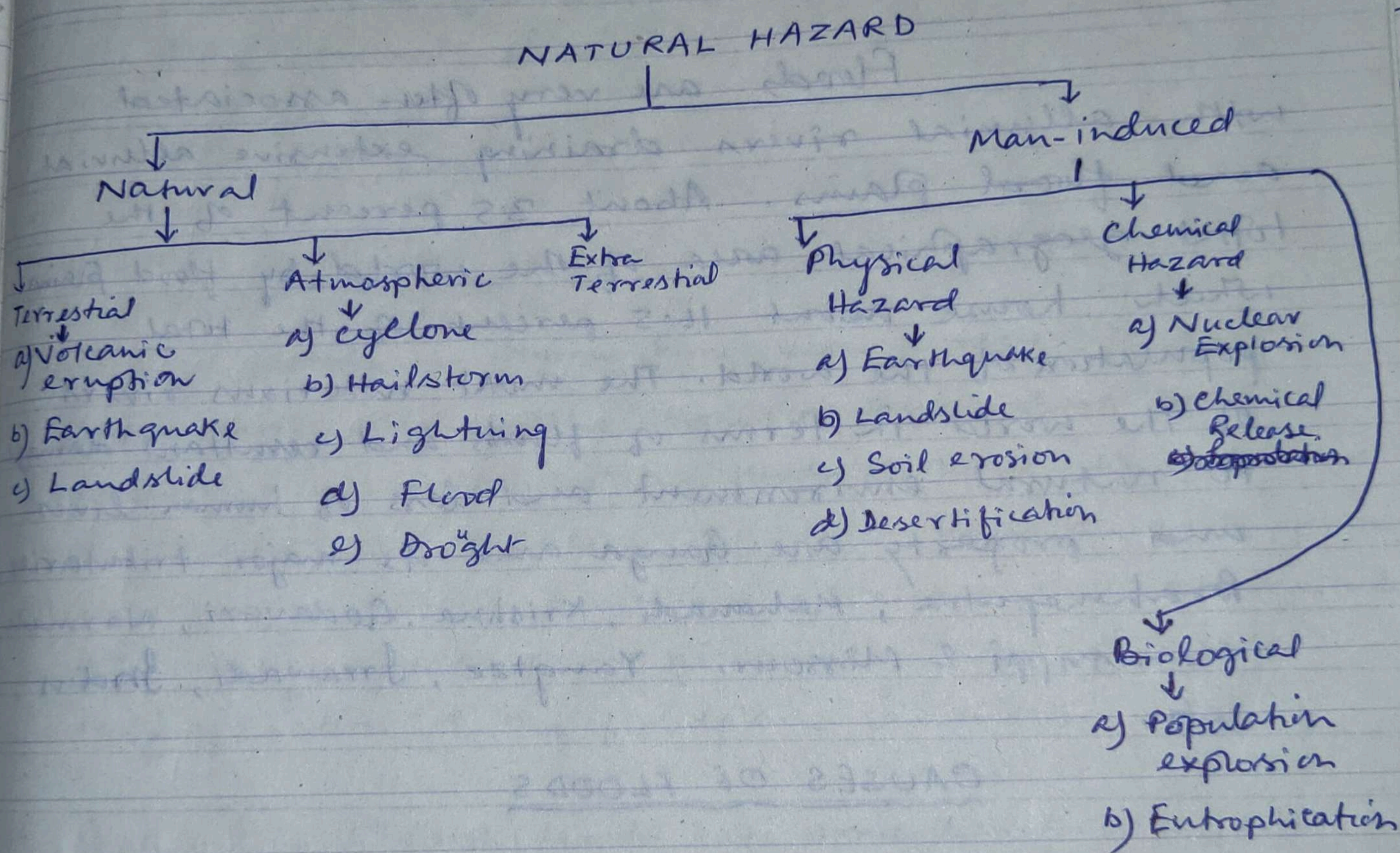


Chapter: Natural Hazards

Flood, Drought, landslide and Earthquake.

Define Natural Hazard: Those events or accidents, whether caused by natural processes or human factors, are called extreme events or natural Hazards. As for example, flood, drought, landslide, cyclone, earthquake etc. Natural Hazards may be defined as those extreme events either natural or man-induced, which exceeds the tolerable magnitude.

Natural Hazard or disaster can be classified as follows



FLOOD:

Flood simply means inundation of extensive land area with water for several days in continuation. Generally, floods are considered to be associated with rivers and people conceive floods as the outcome of accumulation of huge volume of water coming out of the rivers through overtopping of river banks.

during peak discharge period. In fact, flood is an attribute of physical environment and thus is a component of hydrological cycle of a drainage basin. It may be pointed out that flood is a natural phenomenon and is a response to rainfall but it becomes hazard when it causes colossal loss to human lives and property. It is also important to note that floods are also aggravated by human activity and thus flood hazard is both natural as well as man-induced.

Floods are very often associated with alluvial rivers draining extensive alluvial and flood plains. About 3.5 percent of the total geographical area of the world by flood plains which house about 16.5 percent of the total population of the world. The most notorious rivers of the world in terms of floods and resultant damage to natural environment and loss of human lives and property are Ganga and its major tributaries, Brahmaputra, Mahanadi, Krishna, Godavari, Narmada, Mississippi & Missouri, Yangtze, Irrawadi, Indus etc.

CAUSES OF FLOODS

Since the floods of rivers are the response of both natural and anthropogenic factors, the causes of floods of the alluvial rivers become highly complex.

Among natural factors —

- i) prolonged high intensity rainfall;
- ii) Meandering courses of rivers,
- iii) extensive flood plain
- iv) break in slope in the long profile of the river;

- v) Sudden change in channel gradient at the intervening zones of foothill slope
- vi) blocking of free flow of the rivers because of enormous debris provided by landslide, volcanic eruption
- vii) nature of river valleys and channels etc.

Among anthropogenic causes —

- i) building activities and eventual urbanization,
- ii) channel manipulation through diversion of its course,
- iii) construction of bridges, barrage and reservoirs,
- iv) agricultural practices
- v) deforestation
- vi) land use changes etc.

FLOOD IN ASSAM

Floods in Assam have been a recurring feature since early times. The plains of Assam have been variably inundated by the floods of the Brahmaputra and the Barak river system. Floods in both the Brahmaputra and Barak valleys sometimes attained such a magnitude that they appeared to be greatly hazardous to a major section of the floodplain dwellers.

Though floods have some beneficial effects, such as fertile silt deposition on the agricultural fields, recharge of soil moisture, increase in fish population and washing effect on dirty environment, they cause substantial damages to standing crops, dwelling houses and development infrastructures. Generally, the damages during floods are caused by inundation and associated bank erosion. Presently, Assam accounts for nearly 8 percent of the total flood-damaged area in India

The flood damage data available for the Brahmaputra valley indicate that the cropped area damaged and number of affected people are gradually increasing in the recent years (1951-1998). It is due to growing human encroachment into the floodplain and increasing severity of floods. As regards annual floods, the flood of 1988, occurring in four severe waves has been recognised as the most devastating one.

Floods in Assam can be attributed to a variety of natural, hydrometeorological and anthropogenic origin. Of the two river systems the Brahmaputra and Barak, the Brahmaputra system is highly responsible for causing more devastations. It is so vast and dynamic that the physical and hydrological processes themselves are capable of creating floods in the narrow valley. However, heavy monsoonal rains with easy erodibility of rocks, steep slopes and high mountains are the major causes of Assam floods. The runoff pattern of the Brahmaputra catchment in the Himalayas and the Barak catchments in the hills of Nagaland and Manipur are primarily governed by the quantity and nature of precipitation.

As soon as the monsoon starts, most of the river's water level comes up in the Brahmaputra and Barak valley. Particularly, the Brahmaputra river, carrying high volume of water and sediment load, when additionally charged with heavy concentration of rain during monsoon, obviously becomes capable of creating unbelievable flash flood.

Seismic and geological factors combined with the hydrometeorological factors also aggravate

the flood situation of Assam. The earthquake of 1897 and 1950 caused tremendous changes in the fluvial process of the state, particularly raising of the Brahmaputra river bed. The aggradation of river beds due to silting has forced the rivers to spill their water overbank, inundating large tracts of land in the valley. The severe floods of 1954, 1955, 1956 and 1958 are the examples.

Besides the natural factors, the human induced factors are also highly responsible for devastating floods in the state. Deforestation and unwise tree felling in the hilly catchments of the Brahmaputra and Barak are the important causes of flood in Assam. The shifting cultivation practised in the hill districts of Karbi Anglong and N.E. Hills has substantially reduced forest cover. As a result, enormous sediments are generated and continually getting deposited on the river beds.

The flood problem has become more serious due to some other human-induced factors like large scale human occupation in the floodplains, destruction of wetlands (beels) and the poorly managed embankment network.

However, flood control measures in Assam were started by the govt. during the early fifties. Till today, embankments are widely adopted as a measure of flood control. In the Brahmaputra valley, the embankments measuring 984 km. and 2,567 km. have been built along the Brahmaputra and its tributaries. But this only measure is not capable to combat the chronic flood problem of the State. So, some of the long term measures like development of the vast water resources of

the Brahmaputra and the Barak rivers, protection of existing vegetal cover and generation of new growth in the catchment, adoption of an appropriate crop calendar adjusted to the rhythm of flood, and pursuance of the approach of living with the floods may be the key factors in the better management of Assam flood.
