
1. Manage flood disaster

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Manage flood refers to all methods used to reduce or prevent the detrimental effects of flood waters. Some of the common techniques used for flood control are installation of rock berms, rock rip-raps, sandbags, maintaining normal slopes with vegetation or application of soil cements on steeper slopes and construction or expansion of drainage channels. Other methods include levees, dikes, dams, retention or detention basins.

1.1 Causes of Floods

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Periodic floods occur on many rivers, forming a surrounding region known as the flood plain.

During times of rain or snow, some of the water is retained in ponds or soil, some is absorbed by grass and vegetation, some evaporates, and the rest travels over the land as surface runoff. Floods occur when ponds, lakes, riverbeds, soil, and vegetation cannot absorb all the water. Water then runs off the land in quantities that cannot be carried within stream channels or retained in natural ponds, lakes, and man-made reservoirs. About 30 percent of all precipitation is in the form of runoff small and that amount might be increased by water from melting snow. River flooding is often caused by heavy rain, sometimes increased by melting snow. A flood that rises rapidly, with little or no advance warning, is called a flash flood. Flash floods usually result from intense rainfall over a relatively small area, or if the area was already saturated from previous precipitation.

1.2 Effects of Floods

Flooding has many impacts. It damages property and endangers the lives of humans and other species. Rapid water runoff causes soil erosion and concomitant sediment deposition elsewhere (such as further downstream or down a coast). The spawning grounds for fish and other wildlife habitats can become polluted or completely destroyed. Some prolonged high floods can delay traffic in areas which lack elevated roadways. Floods can interfere with drainage and economic use of lands, such as interfering with farming. Structural damage can occur in bridge abutments, bank lines, sewer lines, and other structures within floodways. Waterway navigation and hydroelectric power are often impaired. Financial losses due to floods are typically millions of dollars each year.

1.3 Methods of Control

In many countries, rivers prone to floods are often carefully managed. Defences such as levees, bunds, reservoirs, and weirs are used to prevent rivers from bursting their banks. When these defences fail, emergency measures such as sandbags or portable inflatable tubes are used. Coastal flooding has been addressed in Europe and the Americas with coastal defences, such as sea walls, beach nourishment, and barrier islands.

A dike is another method of flood protection. A dike lowers the risk of having floods compared to other methods. It can help prevent damage; however it is better to combine dikes with other flood control methods to reduce the risk of a collapsed dike.

2. Manage drought disaster

Drought is a subtle natural hazard that is a normal part of the climate of virtually all regions of the world. Its occurrence results in a myriad of economic, social, and environmental impacts in developed as well as developing nations, although the characteristics of its impacts differ considerably between the two settings.

Drought is considered by many to be the most complex but least understood of all natural hazards, affecting more people than any other. It is a normal feature of

climate and its recurrence is inevitable. However, there remains much confusion about its characteristics. It is precisely this confusion that explains, to some extent, the lack of emphasis on proactive drought management efforts in most parts of the world. Through an improved understanding of the inevitability and characteristics of drought, as well as its differences from other natural hazards, scientists, policymakers, and the public will be better equipped to establish much-needed policies and plans whereby future vulnerability to drought can be reduced.

2.1 Drought as a Natural Hazard

Drought differs from other natural hazards in several ways. First, drought is a slow-onset, creeping natural hazard. Its effects often accumulate slowly over a considerable period of time and may linger for years after the termination of the drought event. Second, the absence of a precise and universally accepted definition of drought adds to the confusion about whether a drought exists and, if it does, its degree of severity. Third, the impacts of drought are nonstructural and typically are spread over a larger geographical area than are damages resulting from other natural hazards. These characteristics of drought have hindered the development of accurate, reliable, and timely estimates of severity and impacts and, ultimately, the formulation of effective drought preparedness plans.

2.2 Causes of Drought

1. Rainfall or Precipitation Deficiency

Droughts take place whenever there is prolonged periods of rainfall deficiency for a season or more and usually when there is a lack of anticipated rainfall or precipitation. When a region goes for long periods without any rain, especially for more than a season, then the situation leads to dry conditions and water deficiency which qualify as drought.

2. Human Causes

Human activities play a relatively significant role in the management of the water cycle. Human acts such as deforestation, construction, and agriculture negatively

impact the water cycle. Trees and vegetation cover are essential for the water cycle as it helps to limit evaporation, stores water, and attracts rainfall.

3. Drying out of Surface Water Flow

Lakes, rivers, and streams are the primary suppliers of downstream surface waters in various geographical regions around the globe. In extremely hot seasons or because of certain human activities, these surface water flows may dry out downstream contributing to drought – meaning the demands for water supply become higher than the available water.

Irrigation systems and hydro-electric dams are some of the human activities that can significantly diminish the amount of water flowing downstream to other areas.

4. Global Warming

Human actions have contributed to more and more emissions of greenhouse gasses into the atmosphere thus resulting in the continued rise of the earth's average temperatures. Consequently, evaporation and evapotranspiration levels have risen, and the higher temperatures have led to wildfires and extended dry spell periods. The global warming situation tends to exacerbate the drought conditions. Some of the worst droughts witnessed in sub-Saharan Africa have been associated with global warming and climate change.

2.3 Types of Drought

Drought is normally grouped by type: meteorological, hydrological and agricultural. The impacts associated with drought usually take 3 months or more to develop, but this time period can vary considerably, depending on the timing of the initiation of the precipitation deficiency.

- Meteorological drought is expressed solely on the basis of the degree of dryness in comparison to some normal or average amount and the duration of the dry period. Thus, intensity and duration are the key characteristics of this type of drought.
- Hydrological Drought involves a reduction in water resources (stream flow, lake level, ground water, underground aquifers) below a specified level for a given period of time

- Agriculture Drought is usually the first economic sector to be affected by drought because soil moisture content is often quickly depleted, especially if the period of moisture deficiency is associated with high temperatures and windy conditions.

2.4 The Impacts of Drought

The impacts of drought that must be addressed can be classified into one of three principal types: economic, environmental, and social.

1. Economic Losses.

Economic impacts range from direct losses in the broad agricultural and agriculturally related sectors (including forestry and fishing), to losses in recreation, transportation, banking, and energy sectors. Other economic impacts would include added unemployment and loss of revenue to local, state, and federal government.

2. Environmental Impacts.

Environmental losses include damages to plant and animal species, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; and soil erosion. These losses are difficult to quantify, but growing public awareness and concern for environmental quality has forced public officials to focus greater attention on them.

3. Impacts on Society.

Social impacts mainly involve public safety, health, conflicts between water users, and inequities in the distribution of impacts and disaster relief programs. As with all natural hazards, the economic impacts of drought are highly variable within and between economic sectors and geographic regions, producing a complex assortment of winners and losers with the occurrence of each disaster.

2.5 Methods of Control

Drought mitigation, preparedness and response comprise the appropriate measures and actions aimed at reducing the vulnerability to drought and reducing the impacts of droughts. The goal of the pillar on drought mitigation, preparedness and response is to determine appropriate mitigation and response actions aimed at risk reduction, the identification of appropriate triggers to phase in and phase out mitigation actions, particularly short-term actions, during drought onset and termination and, finally, to identify agencies or ministries or organizations to develop and implement mitigation actions.

The measures can be subdivided into long-term, medium-term or short-term options. Long-term measures are normally included in the development strategies of the concerned sectors; hence, revisiting these strategies to ensure their alignment with drought risk management is an important step when developing a National Drought Management Policy. Medium-term measures are implemented in a timely manner, prior, during and after drought, based on triggers provided by monitoring and Early Warning Systems. Emergency response measures are implemented if a severe drought occurs with a view to responding to basic needs of the population affected, while contributing to long-term development.

2.5.1 Preparedness: Long Term Measures

1. Water resources

- Enhancing supply
- Storage capacity increase
- Water transfers
- Locating new potential resources
- Aqueducts and canals
- Groundwater recharge
- Small scale water collection/harvesting
- Adjusting legal and institutional framework
- Artificial precipitation

- Desalination of brackish & saline
- Water treatment & reuse of wastewater/recycling

2. Improving demand management (in all sectors/uses)

- Reducing use
- Reducing losses
- Reviewing water allocation
- Monitoring, metering, forecasting
- Conjunctive use (surface-groundwater)
- Reviewing education curricula
- Adopting/reviewing water tariffs
- Adjusting legal & institutional framework
- Voluntary insurance, pricing and economic incentives