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Drought: Causes, Impacts and Management Strategies

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Drought

It is very difficult to define drought because it is often used in more than one context. But in simple words, drought is defined as the scarcity of water resources for a longer time duration at a place where it appears unusual than the normal condition. On an average 25 to 30 % of the Indian population is affected by one or the other form of drought.

Drought is the conditional term, as the same amount of rainfall in a particular area may be considered as a drought but in another place, it may be considered as no drought (normal). This is because of the distribution of water resources on the earth's surface. As we know that some places receive very little precipitation whereas some places receive plenty of precipitation which continuously replenishes the available water source structures such as ponds, lagoons, lakes, rivers, and groundwater aquifers. Therefore, a place receiving less rainfall goes without rainfall for a couple of weeks but available plants, animals, and people experience a few problems whereas, high rainfall region with the same amount of dryness can be experienced as a more severe drought.

In a short duration, people don't consider drought as a natural disaster like other natural catastrophes (Hurricane, flood etc.) because these natural calamities become devastating in a very short period, whereas, drought doesn't affect much if occurred for a couple of weeks. However, if the drought occurs for the longer duration, it would be more devastating than the Hurricane and floods.

Different types of drought

Drought is categorized based on certain conditions and indicators which help the planner (government agencies) release or provide the necessary relief resources to the drought-affected places. Based on this, drought is classified into three main types:

i. **Meteorological drought**:

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It is defined as a situation when there is more than a 25 % decrease in the precipitation than the normal values over an area. As per the Indian Meteorological Department, meteorological drought is again divided into sub-groups based on the deficiency in the precipitation.

a. Moderate drought-

It is defined as the seasonal deficiency which varies between 26 to 50 %.

b. Severe drought-

This type of drought occurres when the deficiency level is more than 50 % of the normal value.

Based on the above condition, drought year would be considered if an area records any kind of drought alone or collectively more than 20 % of the total country area.

ii. Hydrological drought:

Hydrological drought occurs if the meteorological drought persists for a longer duration and results in depletion of surface water resources which leads to drying of the rivers, stream, ponds and tanks etc.

iii. Agricultural drought:

The principal criteria of this drought is the deficiency in rainfall amount. It is defined as the decline in the soil moisture effectively and leads to water deficiency in the plants and land aridization. Agricultural drought can be specified through the aridity index (A) which is defined as-

$$A = \frac{PET - AET}{PET} \times 100$$

Where, PET- potential evapotranspiration

AET- actual evapotranspiration

If the values of aridity index is zero, it is considered as no drought and as it approaches to the higher values it represents severe drought.

Causes of drought

There are several factors responsible for drought:

a. Uncertainty and lack of rainfall

b. Faulty agricultural practices

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c. Delay in onset or early termination of monsoon

d. Change in cropping pattern

e. Use of flood irrigation methods

f. Deforestation

g. Lack of water conservation structures

h. Climate change

Impact of drought

Drought impacts every aspect of life such as economic, environmental and social component. Following are the ill effects of drought:

a. No crop production and or decline in the yield based on drought condition

b. Lack of availability of the seed material for the next season

c. Leads to desertification

d. Excessive dependency on groundwater for irrigation and expentidure for withdrawal Drought lowers the soil quality by affecting the breakdown process of organic matter.

e. Health and quality of water bodies such as rivers, streams, lakes, ponds, wetlands are affected

Management of drought

Like any other natural disaster such as hurricane, storm, and flood it is difficult to predict the occurance and termination of drought. But with pre-planned strategies and adopting water-saving technologies, the impact of drought can be minimized. . Following are some of the strategies:

a. Educating the people regarding the importance of water in their life.

b. Adopting high water use efficient irrigation technologies

c. Selection of Less water demanding crops

d. Creating water conservation and storage structures

e. Adopting conservation agriculture practices

f. Creating awareness to stop pollution

g. Promoting organic farming by use of farmyard manure, compost, concentrated organic manure in agriculture

h. Adopting mulching in the agricultural field to enhance crop production and moisture conservation.

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Essence

In the developing country like India where the economy is mainly dependent on the agriculture, occurance of drought can severly affects the agricultural production and food security. Therefore, there is an urgent need to tackle with this natural calamity. In order to overcome the adverse impact of drought, adoption of proper soil management practices like mulching, conservational tillage, use of organic manures, green manure, compost, and sheep penning can lead to an enhanced agricultural production in the affected areas. These management practices are not only economically viable but are also environmentally sustainable as they result in improved soil health and agricultural production.