

Drought

A Severe Problem in Future Agriculture Farming

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Abstract

One of the most harmful environmental occurrences is drought. Drought, in general, is a sudden decrease in the average level of environmental moisture. Due to its complexity, drought is frequently solely researched in terms of its individual components (such as meteorological drought, soil drought, etc.). Drought is still being fully understood as a complicated environmental phenomenon. Droughts are frequently thought of in isolation from their acknowledged primary global causes. The latter is reliant on the overall

circulation of the oceans and atmosphere on a global scale, especially in the tropics. The impact of long-term anomalous ocean surface temperature on general circulation may help to explain some observed droughts. . The vast majority of the many drought metrics are unsuitable as catchment performance targets. This essay proposes an analysis for selecting appropriate rainwater catchment design requirements after briefly reviewing drought definitions.

Introduction

A time of drier-than-normal weather is called a drought. Days, months, or even years may pass between droughts. In addition to harming the local economy, drought frequently has significant negative effects on the ecosystems and agriculture of afflicted areas. The likelihood of a drought forming and subsequent wildfires is considerably increased during the annual dry seasons in the tropics. Heat waves

can make drought conditions much worse by accelerating the evaporation of water. Most regions of the world often experience drought, which is growing more extreme and unpredictable as a result of climate change, which dendro-chronological studies trace back to 1900. Environmental, economic, and social repercussions are the three different types of drought effects.

Wetlands drying out, wildfires being more numerous and intense, and biodiversity loss are some of the environmental repercussions. Economic repercussions include problems with water supply for the energy sector, poorer agricultural, forestry, game, and fishing outputs, greater food production costs, and disruption of water supplies for city economies. The detrimental impact on people's health who are directly impacted by this phenomenon (extreme heat waves), high food prices, stress brought on by poor harvests, water scarcity, etc., are only a few examples of the social and health consequences. Mass migrations and humanitarian crises have been brought on by protracted droughts.

Many plant species, including those in the Cactaceae family (often known as cacti), have adaptations for drought tolerance, such as smaller leaves and waxy cuticles, to improve their capacity to withstand drought. **Keddy, P.A. (2007)** Others persist throughout dry spells as buried seeds. Deserts and grasslands

are created by semi-permanent drought. The majority of arid habitats are naturally underproductive. In recorded history, the Atacama Desert in Chile has experienced a drought that has lasted 400 years. Since the beginning of time, humans have typically seen droughts as "disasters" because of the effects they have on society and the availability of food. Humans have frequently attempted to explain droughts by blaming them on either natural disasters caused by humans or supernatural entities.

A drought is commonly defined as "a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage" by the National Integrated Drought Information System, a multi-agency cooperation. Drought is defined as "a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area" by the National Weather Service office of the NOAA. **(NOAA, 2022)**

Types of Drought

Aridity, a characteristic of low rainfall that persists, is distinct from drought. A disruption from the long-term equilibrium between precipitation and evapotranspiration is a drought. Deviation can be caused by problems with quantity, time (such as a delay in the start of the rainy season), or effectiveness (such as the frequency of rainfall occurrences). High winds are one climatic condition that can exacerbate the effects of a drought.

1. **Meteorological Drought:** Meteorological drought occurs when there is a prolonged time with less than average precipitation **(Swain et al., 2017)**. Some definitions categorize time periods based on the number of days with precipitation that is below a certain level. Other definitions connect variances to time scales of a month, a season, or an entire year.
2. **Hydrological Drought:** Hydrological drought connected to how a lack of precipitation affects water supplies. On a river basin scale, frequency and severity are

frequently described. Although a lack of precipitation may cause a rapid loss of soil moisture, its effects on reservoir levels might not be felt for several months. Although climate is a major cause of hydrological drought, other elements including land use and the building of dams also have an impact on basin hydrology. Hydrological drought may transcend the boundaries of meteorological drought because hydrologic systems frequently connect regions.

3. **Agricultural Drought:** Agricultural drought is defined connects the effects of a drought on agriculture caused by weather or water conditions. The varying susceptibility of crops from emergence to maturity is explained by agricultural drought. At planting, insufficient topsoil moisture may prevent germination, which will reduce the eventual yield. Deficits in subsoil moisture at this early stage, however, may not effect eventual output if

subsoil moisture is replaced during the growing season if topsoil moisture is sufficient for early growth requirements.

4. **Socio-economic Drought:** Socio-economic drought is defined connects the supply and demand of economic goods with aspects of drought in the weather, water resources, and agriculture. Economic drought is influenced by supply and demand factors. Weather affects the

Causes of Drought

A drought is a time when the weather is drier than usual and there are issues with the water supply. Over the research area, precipitation or rain falls in erratic patterns. Precipitation amounts vary from year to year, month to month, even occasionally at a specific place.

Winter, the first part of spring, and July are when precipitation occurs. Rainfall shortages can happen even when annual rainfall is typically below normal at times when moisture is crucial for plant growth, such as in the early summer season but in northern areas of India. The amount of moisture and rainfall required for the growth of various crops throughout the year is insufficient. Soils can dry up and plants and agricultural crops might perish when there is little or no rainfall. When rainfall or moisture levels are below average for several weeks, months, or years, streams and rivers lose their flow, lakes and reservoirs lose water, and wells get deeper with each passing day, the dry spell can turn into a drought in northern regions if water supply issues arise.

1. **Lack of rainfall or precipitation:** Low or no precipitation or rainfall is the primary cause of drought. A region or area has water deficiency and becomes dry if there hasn't been much rain for an extended length of time, especially for more than a season. This circumstance results in dry conditions and water shortages for agricultural growth in the given area, which qualifies as drought. The amount of water vapour in the atmosphere has a significant impact on a region's precipitation. Rain, hail, and snow are very likely to fall in areas with damp

availability of economic commodities including water, pasture, and hydroelectric power. As a result, water supply is sometimes sufficient but not always enough to meet human and environmental needs. Socioeconomic drought happens when there is an economic good that is in high demand due to weather-related water supply shortages.

and low pressure systems. When the area is under pressure systems and there is less water vapour, the exact opposite would occur. Agricultural droughts occur because farmers plant their crops in anticipation of rain, and because there are no irrigation systems in place when the rains don't come.

2. **Human activities:** The management of the water cycle is largely influenced by human activity. The water cycle is significantly impacted by human activities as deforestation, overgrazing, over cultivation, construction, and agriculture. The presence of trees and other vegetation is crucial for the water cycle because it helps to prevent evaporation, stores water, encourages rainfall, and contributes significantly to atmospheric moisture through transpiration. Deforestation, in this sense, suggests that eliminating vegetation cover and chopping down trees causes more evaporation and less soil water retention, which raises the likelihood of desertification. Since deforestation reduces the potential watershed function of forests, it can also affect the occurrence of dry situations. Dry spells may also come from water supply reductions due to construction and agricultural activity. Another human activity that causes droughts is overfarming. Overfarming destroys the soil, causing erosion to occur. Erosion reduces the soil's ability to retain water.
3. **Surface water flow dries up** in diverse geographical areas close to the research area, small lakes, rivers, and streams are the

main sources of surface water that is used downstream. These surface water flows might dry out downstream due to intense heat or specific human activities, which can induce droughts where there are more demands for water than there is supply. Hydroelectric dams and excessive irrigation systems are just two examples of human activities that dramatically reduce the amount of water flowing downstream to other locations.

4. Global warming and climate change Earth's average temperature has been rising as a result of climate change or human activity, which has caused an increase in greenhouse gas emissions into the atmosphere. Due to increased levels of evaporation and evapotranspiration as well as greater temperatures, wildfires and prolonged dry

spells have resulted. Drought conditions are tended to by the global warming situation.

5. Lack of understanding of adaptive farming methods Some farmers have not varied their crops over the years, and it is not their fault. This might be the case because they are only familiar with growing basics, lack access to a variety of seeds, or lack knowledge of various farming methods. A farmer may be more susceptible to the effects of extreme weather if they depend solely on one crop. This results in the drying up of the land, the loss of water, and a change in the local climate. In general, both natural and human factors contribute to the drought. When compared to other sections of the country, the amount of precipitation and rainfall is typically quite low.

Conclusion

Depending on their economic situation and ability to grasp and use information, different mitigation measures and mechanisms are used to lessen these forms of drought in the research area. After that, people could efficiently utilize surface and underground water resources without wastage, every household should collect rainwater, and with the development of technologically sophisticated water storage structures as well as the restoration of

traditional water conservation structures, extra rainwater from the monsoon season can be utilized through tube wells during dry spells. The negative effects of drought can be reduced by connecting the rivers, diversifying the crops, and creating crop varieties that are resistant to drought. And also the farmers must be increase the share of irrigated land, especially by expanding drip irrigation facilities for proper utilization of available water resources.

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