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## Management Of Drought And Its Preparedness

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### Abstract

Drought can be defined as a natural disaster which takes place due to scarcity of water whether it is groundwater, surface water, or less precipitation. Drought can last for years or even for a short period of time depending upon the temperature of the particular area where drought has occurred. As the temperature rises, evaporation of water increases due to which drought occurs. However, droughts have become more extreme and more unpredictable due to climate change. Drought threatens people's livelihood, increases the risk of diseases, deaths and fuels mass migration. Water scarcity impacts 40% of the world's population and as many as 700 million people are at risk of being displaced as a result of drought by 2030. Droughts are complex and multifaceted phenomena but still least understood of all natural hazards, affecting more people than any other hazard. Drought impacts are long lasting at times of lingering for many years. It occurs with varying frequency in all regions of the globe i.e., high as well as in low rainfall areas: in all types of economic systems, socialist and capitalist: and in developed and less developed countries alike. Droughts differ from one another in three essential characteristics: intensity, duration and spatial coverage. Like, other environmental phenomena, it cannot be understood solely through scientific investigation. Instead, it is constituted through the interactions between science, nature and society.

**Keywords:** Drought, Water scarcity, Natural hazards, Environmental phenomena, multifaceted phenomenon.

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### Introduction

The one climatic occurrence that may be most associated with desertification is drought, one of the several that affect the ecosystem of the planet. Drought is a natural disaster that is caused by lack of precipitation that causes a water scarcity for specific activities or people. It is sometimes accompanied by additional meteorological variables (including high temperatures, strong winds, and low relative humidity) that can make the event more severe. Aridity, as opposed to be drought, is a permanent characteristic of the climate while the former is only present in areas with minimal rainfall. Drought occurrences are widespread in practically all climatic regimes. In 2000, significant droughts devastated parts of south-eastern Europe, the Middle East, and the area through central Asia to northern China. Extremely heavily damaged were Afghanistan, Bulgaria, Iraq and the Islamic Republic of Iran and sections of China. Throughout North America, months of above-

average warmth coupled with below-normal precipitation through northern Mexico and much of the southern and western areas of the USA, leading to one of the deadliest wildfires in the preceding 50 years.

More people than any other natural hazard are affected by drought, which is regarded by many as the most complex but least understood of all natural hazards. Despite this, there is still a great deal of misunderstanding about drought's characteristics among scientific and policy communities. It is precisely this misconception that explains, to some extent, the lack of progress in drought preparedness in most parts of the world.

Compared to damages from other natural disasters, the effects of drought are primarily nonstructural and spread over a wider geographic area. The non-structural nature of drought impacts has undoubtedly made it more difficult to develop timely, accurate, and reliable estimates of the severity and,

ultimately, for most governments to develop drought preparedness plans.

A region's exposure to the natural hazard and susceptibility to protracted water shortages produce the danger of drought. Nations and regions must increase their understanding of the hazard and the variables that affect vulnerability if they are to advance in decreasing the devastating effects of drought.

#### **Mitigation Of Drought**

Initiatives intended to lessen the effects of drought are known as mitigation strategies. Together with drought resistance, these actions aid in climate change adaptation, ecological balance restoration, and human development. But, drought mitigation programmes must be incorporated into long-term planning for forestry, watershed development, and soil conservation, not as stand-alone interventions to be carried out immediately after a drought. Thus, drought mitigation strategies must be integrated into the regular development plans of the federal and state governments.

The government's strategy for managing droughts has evolved through time and currently emphasizes early warning and readiness, crisis management response, medium- and long-term drought mitigation measures, as well as a greater use of cutting-edge technology and scientific techniques. To fulfill the demand for medium- and long-term drought mitigation requirements, a variety of Central Government Schemes/Programs have developed over time. Among these are the Integrated Watershed Management Program and the Mahatma Gandhi National Rural Employment Guarantee Plan (MGNREGS) (IWMP), including the National Rural Drinking Water Program (NRDWP), Swarnajayanti Grameen Swarozgar Yojana (SGSY), Rashtriya Krishi Vikas Yojna (RKVY), Fodder & Feed Development Plan, etc., as well as the former Drought Prone Area Program (DPAP). Moreover, numerous area development initiatives by State Governments, whether funded by their own funds or with assistance from the Government of India, such as the Rural Infrastructure Development Fund (RIDF) and the Backward Region Grant Fund (BRGF), have a significant impact on improving drought resilience. The Central and State Governments are still looking for additional ways to refocus or synergize

ongoing development activities in order to establish a strong drought-resistant regime.

#### **The operational framework for drought mitigation comprises of:-**

- Drought risk and vulnerability assessment.
- Forecasting and early warning.
- Structural & nonstructural measures including drought proofing programmes/schemes.
- Awareness generation.
- Research & development.
- Community participation.

#### **Drought Risk Assessment**

Drought mitigation is mostly the responsibility of state governments. The State Governments should establish a mission or task force on drought mitigation to provide them with advice on policies and programmes, according to the Manual for Drought Management (2009). In order to identify drought-prone areas, the nature and severity of the drought, susceptible economic sectors, communities, and individuals, among other things, the aforementioned mission/task force should also undertake a drought risk and vulnerability assessment. Such an evaluation will help identify mitigation measures and give an economic justification for initiatives. A composite risk and vulnerability assessment would aid in formulating effective strategies for filling crucial gaps during drought relief as well as long-term policies and programmes for reducing drought risk at the State level. In order to bring rain-fed areas under assured irrigation to the greatest degree possible, States would need to create vulnerability maps as part of this operation.

The Department of Agriculture and Cooperation (DAC) and other relevant Ministries/Departments of the Government of India shall be informed on the State Governments' efforts to mitigate the effects of the drought. Involving concerned line departments of the State government, State agricultural universities, and ICAR institutes located in the States is required when formulating mitigation strategies by the State Disaster Management Department, which is frequently a division of the Revenue Department. This is done to ensure that mitigation measures are given adequate attention in a variety of ongoing and new government schemes and If practicable, relevant provisions are incorporated.

#### **Early Warning Of Disaster**

The Crop Weather Watch Group (CWWG), an Inter-Ministerial forum at the Central level, convenes on a regular basis to assess rainfall, weather forecasts, the state of the sowing process, crop health, the amount of storage in the largest water reservoirs, pest control, input availability, etc. The Central Ministries/Departments and State Governments share CWWG observations to develop an effective strategy to address drought-related contingencies, if any. When the circumstances call for it, central resources are added to state governments' efforts to help ease the burden on agriculture and related industries.

❖ **The following actions (illustrative) can help to further develop early warning systems:**

- Improvement of IMD's long-, medium-, and short-range forecasts of the monsoon at the district, Taluka, and meteorological subdivision levels.
- Improving the Mahalanobis National Crop Forecasting Center's (MNCFC) National Agricultural Drought Assessment and Monitoring System (NADAMS) (MNCFC) employing a Geographic Information System (GIS) and Remote Sensing (RS) to forecast precise and early indications of drought in partnership with NRSC. Moreover, NADAMS shall provide a weekly evaluation and drought forecast, as well as an early forecast of soil moisture stress before the start of the monsoon in various districts.
- Improvements to the IMD's Aridity Anomaly Report, which now compares current conditions to those from related time periods in previous years of drought.
- MNCFC maintains a database in consultation with the National Informatics Center (NIC), the Institute for Medical Decision Making (IMD), and other institutions in the nation to provide early warning signals of drought through their long- and medium-term forecasts as specified in the Manual for Drought Management (2009).
- The Handbook for Drought Management (2009) lists key drought indicators that take into account factors including insufficient rainfall, reservoir water storage levels, surface and ground water levels, sowing and crop conditions, etc. These indicators, along with the Palmer Drought Severity Index, the Aridity

Anomaly Index, the Standardized Precipitation Index, the Crop Moisture Index, the Surface Water Supply Index, the Normalized Difference Wetness Index, the Effective Drought Index, and the Moisture Adequacy Index, can be taken into account when creating a composite index to help with early drought detection and drought declaration.

❖ **The following metrics are tracked by the federal government and state governments in case drought-like conditions start to develop:**

- i. Rainfall & Dry spell
- ii. Progression of sowing
- iii. Remote sensing based Vegetative Indices
- iv. Soil Moisture Based Indices
- v. Hydrological Indices

#### **Drought Mitigation**

The necessary strategies and measures for lowering drought vulnerability and minimizing the effects of droughts are collectively referred to as drought mitigation, preparedness, and response. Any structural or physical measures (such as suitable crops, dams, engineering projects) or non-structural measures (such as policies, awareness, knowledge development, public commitment, and operating procedures) done to reduce the negative effects of drought. The pillar on drought mitigation, preparedness, and response aims to identify appropriate mitigation and response actions aimed at risk reduction, appropriate triggers to phase in and phase out mitigation actions, particularly short-term actions, during the onset and termination of drought, and, finally, to identify agencies or ministries or organizations to develop and implement mitigation actions.

Short-term, medium-term, and long-term choices are available for the measures. The development strategies of the relevant sectors typically involve long-term measures; therefore, reviewing these strategies to make sure they are in line with drought risk management is a crucial step when drafting a national drought management policy. Based on triggers supplied by monitoring and Early Warning Systems, medium-term interventions are performed promptly before, during, and after drought. If a severe drought develops, emergency response measures are put in place with the goal of meeting the

immediate needs of the affected people while also promoting long-term growth.

#### Early Indicators Of Drought

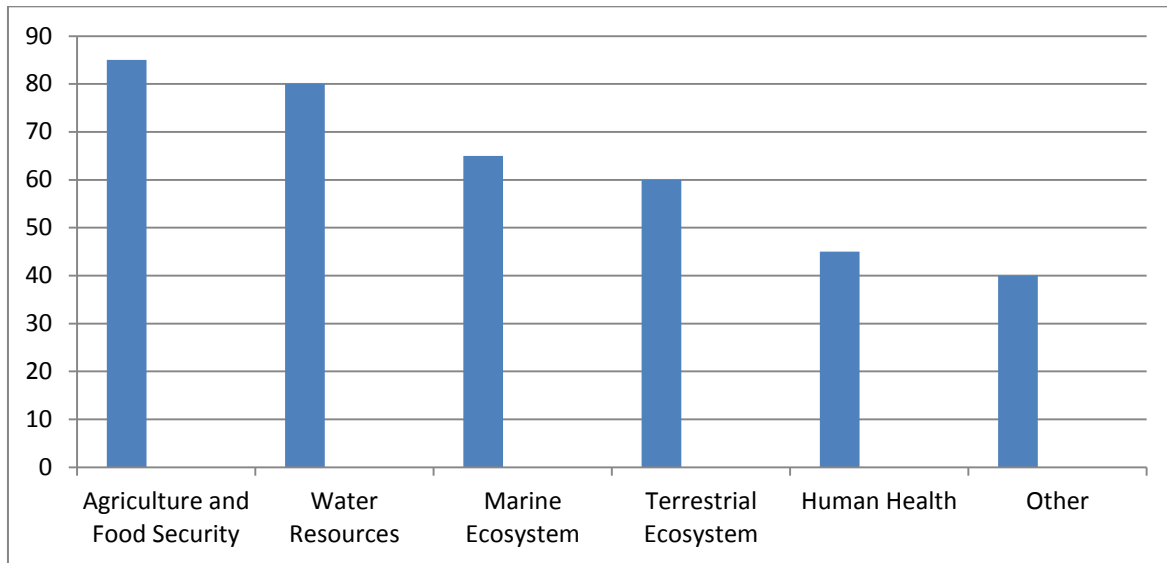
1. Delay in onset of Monsoon.
2. Long break or dry spell during the Monsoon season.
3. Insufficient Rains.
4. Rise in price of Food and staples.
5. Reduction in stream flows and depletion rate of groundwater.
6. Drying up of rural drinking water supply.
7. Declining trend in the progress of sowing as compared to total normal sown areas.

#### After Affect Of Drought

Drought has a direct effect on the environment. Fish, wildlife, plant populations, and water sources are all impacted. Reduced stream flow in rivers and

lower water levels in reservoirs, lakes, and ponds can also be caused by drought. A loss in some wetlands, groundwater depletion, and even water quality might result from this drop in water supply.

Lack of water can make the soil less capable of supporting crops, increase dust production owing to dryness, cause erosion, and raise the risk of wildfires because of the dry environment. Because of low soil quality, wildlife habitat might deteriorate due to lack of water, which can also damage fish, animals, and plants. Plant growth may be hampered by insufficient water, and animals may not have access to enough water for drinking. Moreover, the area may see a loss of biodiversity and stress on endangered species.



**GRAPH SHOWING VARIOUS SECTORS THAT ARE AFFECTED BY DROUGHT**

#### Suggestions

Droughts are natural calamities that nobody can stop, but we may prepare for their consequences to make them easier to handle. This force of nature has many costs to the human and natural systems that we should be aware of. It's likely that a drought is already underway or that one is soon to arrive, which is why raising awareness of this crisis is so crucial.

❖ **The key actions/steps that citizens can do to prevent future drought are listed below.**

The practice of collecting rainwater has grown significantly in recent years, and everyone should use it. Homes that use rainwater harvesting can retain the water

that they receive from the rain and use it later, in dry situations.

- Just 15% of rainwater reaches the earth in urban areas, while 50% of rainwater soaks into the ground in rural areas. Urban and rural areas can effectively retain rainfall through rainwater harvesting and reuse it during dry spells.
- If a home has primary water source, rainwater collection gives them an additional option to employ in the event of a water shortage. Farmers and herders are now urged to use rainwater gathering as a fantastic drought-relieving strategy to supply their land with water.
- The best strategy to lessen the effects of drought, enhance the ecosystem, and increase the likelihood that precipitation

will occur is to plant trees. Many nations have begun their initiatives by converting desert plains into forested areas by sowing tree saplings.

- More greenhouse gases are released into the atmosphere as a result of the exploitation and use of additional non-renewable resources, which in turn causes global warming and, of course, droughts. Using renewable resources, like as wind and solar, as an alternative to this will not cause droughts and have minimal to no negative effects on the ecosystem.
- Teaching the next generation the importance of recycling, reuse, and tree planting as well as protecting, preserving, and improving the environment. In order for drought prevention to become a personal responsibility, the need of environmental preservation must be emphasized in the educational curriculum, the media, and businesses.
- Prior to the rainy season, restore and revitalize local water sources.
- Check tanks, taps, and bore wells frequently to detect water leaks.
- Make a deep pit excavation to assist raise the groundwater table.
- Reuse water as much as you can.

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