

DRAUGHTS IN INDIA

- The India Meteorological Department (IMD) defines drought in any area when the rainfall deficiency in that area is $\geq 25\%$ of its long term normal. It is further classified into moderate and severe drought depending upon whether the deficiency is between 26 to 50% and more than 50% respectively
- Types of droughts:
 - ✓ Meteorological Drought – referring to lack of precipitation.
 - ✓ Agricultural drought – referring to lack of moisture in the soil where crops grow.
 - ✓ Hydrological drought – referring to low levels of water in reservoirs.
 - ✓ Socio-economic drought – referring to water shortages affecting people in society, which impacts availability of foodgrains, fodder, etc.

Meteorological Drought:

- The Indian Meteorological Department (IMD) defines a drought as a situation where the average annual rainfall is less than 75% of the normal.
- The uneven distribution of rainfall, caused by erratic and concentrated precipitation patterns, often leads to frequent droughts despite India's average annual rainfall of 110 cm.
- Causes of Meteorological Droughts:
 - ✓ If there is below-average monsoon and lean rainfall.
 - ✓ If the onset of monsoon is delayed or there is early withdrawal of monsoons.
 - ✓ Prolonged interruptions in monsoon activity.

Hydrological Drought:

- This type is characterized by a decrease in water levels,

with surface water droughts affecting resources such as rivers, lakes, and reservoirs, while groundwater droughts involve a decline in groundwater levels.

Factors of Hydrological Drought:

- First, Excessive extraction of groundwater.
- Widescale deforestation.
- Environmentally harmful mining practices.

Agricultural Drought:

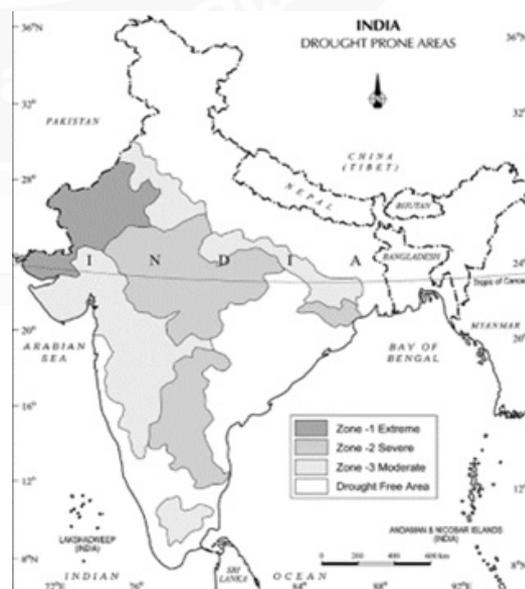
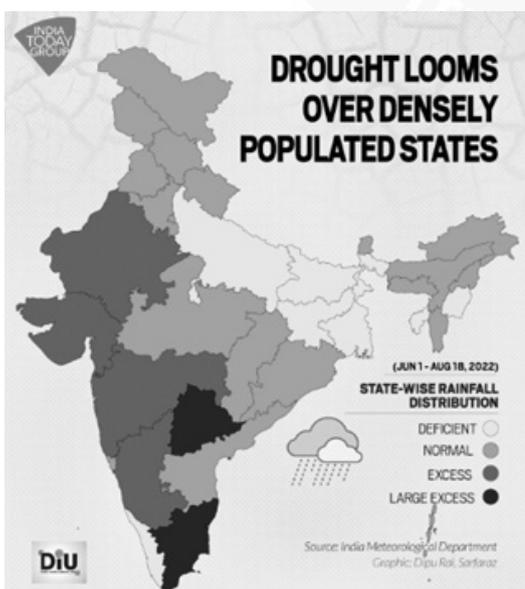
- It occurs when soil moisture falls below the level required to sustain plant growth, resulting in crop failures due to erratic rainfall and insufficient soil moisture.

Factors of Agricultural Droughts:

- Over-dependence on High Yielding Seeds (HYV) that demand more water and proper irrigation.
- Changing cropping patterns, such as the increased cultivation of water-intensive crops like rice in regions with limited water availability.
- 18 meteorological and 16 hydrological droughts occurred in India in the time span of 1870 to 2018. The most severe meteorological droughts were in the years 1876, 1899, 1918, 1965, and 2000, while the five worst hydrological droughts occurred in the years 1876, 1899, 1918, 1965, and 2000.
- As high as 68 percent of the cropped area in India is vulnerable to droughts of which 33 percent is classified as 'chronically drought-prone' comprising desert and semiarid regions that receive less than 750 mm mean annual rainfall

Drought Prone Areas

- According to the likelihood of a drought occurring, the Indian Meteorological Department (IMD) divides India's drought-prone regions into three categories, as shown below:



1. Areas impacted by a persistent drought:

- Chronically drought-prone regions are those where the likelihood of a drought exceeds 20%.
- In other words, these areas should prepare for at least one drought every five or four years.
- West Rajasthan and the entire State of Gujarat are the two primary regions in India that are frequently affected by drought.

2. Frequently prone to drought regions:

- This category has been given to regions with a 10% to 20% chance of experiencing a drought.
- East Uttar Pradesh, Uttaranchal, Haryana, Punjab, Himachal Pradesh, Himachal Pradesh, east Rajasthan, west Madhya Pradesh, Marathwada, Vidarbha, Telangana, coastal Andhra Pradesh, and Rayalaseema are among the regions that can anticipate drought every six to ten years.
- These regions often fall under the dry and moist sub-humid climate zones.

3. Areas least affected by the drought

- The remainder of the country is made up of regions with a drought probability of less than 10%.
- As they generally come under the per-humid and humid regions climate zones, it seems as though they don't provide any issues in terms of rainfall.
- Example-Areas of northeastern India, Assam, Meghalaya, etc.

Challenges of Draughts:

- Droughts are expected to affect over three-quarters of the world's population by 2050, with an estimated 4.8-5.7 billion people living in water-scarce areas for at least one month each year.
- By 2030, drought will displace 700 million people worldwide.
- Drought has killed over 10 million people over the last century, 90% of which have occurred in developing countries.
- Droughts have also impacted fauna, causing the death or displacement of three billion animals and threatening 84% of terrestrial ecosystems.

Impact of Droughts on agriculture in India

1. Crop Failure and Reduced Yields:

- Drought conditions, characterised by prolonged periods of insufficient rainfall, can lead to crop failures and reduced yields. This can result in a decrease in the production of key crops like rice, wheat, pulses, and oilseeds.

2. Livestock and Dairy:

- Drought affects the availability of fodder and water for livestock. Insufficient food and water can lead to a decline in the health and productivity of cattle and other livestock, impacting dairy and meat production.

3. Water Scarcity:

- Drought exacerbates water scarcity issues in agriculture. It reduces the availability of water for irrigation, forcing farmers to rely on groundwater sources, which can lead to over-extraction and depletion of aquifers.

4. Food Insecurity:

- Reduced agricultural production due to drought can result in food shortages, which can contribute to food price inflation and food insecurity, particularly for vulnerable populations.

5. Rural Livelihoods:

- Agriculture is a major source of livelihood for a significant portion of India's population. Drought can lead to income loss and economic distress among farming communities, potentially driving migration to urban areas in search of alternative livelihoods.

6. Increased Debt:

- Farmers often take loans for agricultural inputs and expenses. Crop failures due to drought can lead to an inability to repay loans, increasing indebtedness among farmers.

7. Impact on Cropping Patterns:

- Drought may lead to shifts in cropping patterns, with farmers opting for drought-resistant or short-duration crops. This can have implications for agricultural diversity and food security.

Initiatives taken the Government

- The Drought Prone Areas Programme (DPAP) and Desert Development Programme (DDP) were launched in the 1970s to develop drought-prone areas.
- DDP focuses on restoring desert ecology through sustainable practices. In response to the 1987 drought, the government shifted to long-term solutions, including watershed development, to conserve rainwater, improve soil fertility, and enhance ecosystem health.
- The National Watershed Development Programme for Rain-fed Areas and Watershed Development Programme for Shifting Cultivation also aim to address these challenges.

Drought mitigation measures

- Water and Soil Health Conservation: Drought adaptation and mitigation measures focus on conserving water and soil health in dryland farming.
- Improved Cropping Practices: Techniques like ridge farming tillage, no tillage, and stubble mulch farming are more effective than conventional tillage in enhancing crop yields, conserving moisture, and reversing land degradation.
- Water-Saving Technologies: Many farmers still lack water-saving technologies and rely on flood irrigation,

which reduces water productivity. Modern micro-irrigation methods like sprinkler and drip irrigation face barriers such as high initial investment costs, availability of irrigation water, and power supply constraints.

- Crop Diversification: Adaptation options include cultivating less water-intensive and drought-tolerant crops as well as intercropping.

- Administrative Mitigation Measures: Government measures like water supply, fodder distribution, employment opportunities, agricultural loans, crop insurance schemes, and waived electricity bills are crucial in addressing drought impacts and reducing farmer suicides.

