

Drought preparedness in India

February 5, 2019

Manifest pedagogy

This year most parts of the country are reeling under drought conditions. Parameters for declaration of droughts and preparedness are important aspect of study. Droughts and disaster management is other dimension where the question could be asked.

In news

States demand for drought relief

Placing it in the syllabus

Important Geophysical phenomena, geographical features and their location- changes in critical geographical features (including waterbodies and ice-caps) and in flora and fauna and the effects of such changes.

Static dimensions

1. History of Drought
2. Drought preparedness in India

Current dimensions

1. The new classification of drought
2. Manual for Drought Management, December 2016

Content

Defining drought

Drought is generally considered as a deficiency in rainfall

/precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

It a prolonged period of abnormally low rainfall, leading to a shortage of water.

Earlier classification of drought and the new classification of drought as per IMD

Earlier classification of drought

The 2009 Manual of Drought Management issued by Ministry of Agriculture, Union of India (prepared for Ministry by National Institute of Disaster Management) classifies droughts into three categories based on the existing literature on the subject:-meteorological, agricultural and hydrological. The manual also specifies the India specific features for each type of these droughts.

- **Meteorological drought** is defined as the deficiency of precipitation from expected or normal levels over an extended period of time (i.e. normal levels accommodate upto 10% deviation from long term average). Meteorological drought usually precedes other kinds of drought and is said to occur when the seasonal rainfall received over an area is less than 25% of its long-term average value. It is classified as moderate drought if the rainfall deficit is 26-50% and severe drought when the deficit exceeds 50% of the normal.
- **Hydrological drought** is best defined as deficiencies in surface and sub-surface water supplies leading to a lack of water for normal and specific needs. Such conditions arise, even in times of average (or above average) precipitation when increased usage of water diminishes the existing reserves.
- **Agricultural drought** is usually triggered by meteorological and hydrological droughts and occurs when

soil moisture and rainfall are inadequate during the crop growing season causing extreme crop stress and wilting. The relationship of agricultural drought to meteorological and hydrological drought is shown in the graph. Plant water demand depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth and the physical and biological properties of the soil.

Agricultural drought arises from variable susceptibility of crops during different stages of crop development, from emergence to maturity. In India, it is defined as a period of four consecutive weeks (of severe meteorological drought) with a rainfall deficiency of more than 50 % of the long-term average or with a weekly rainfall of 5 cm or less from mid-May to mid-October (the kharif season) when 80% of India's total crop is planted or six such consecutive weeks during the rest of the year.

The new classification of drought

Manual for Drought Management, December 2016

A Manual for Drought Management was published by the DAC & FW in November 2009, which has been revised and updated in December 2016. The revised manual has come into effect from Kharif season of 2017. It's revised norms include;

- The various indices and parameters appropriate for the declaration of drought revisited and **new indices** like Standardised Precipitation Index, Vegetation Condition Index, Percentage Available Soil Moisture, and Hydrology Indices like Reservoir Storage Index, Stream-flow Drought Index, and Ground Water Drought Index have been added.
- **Limitations of each of these indices/parameters have been specified**, wherever required. The magnitude of the drought event has been graded on a **scale of values as**

“Moderate” and “Severe”.

- Other factors such as the extent of fodder supply, scarcity of drinking water supplies, demand for employment and migration of labour, wage trends, food grains supply position etc. have been touched upon with the suggestion that State Governments may frame guidelines for objective evaluation based on monitoring mechanisms and baseline data.
- **Rainfall related indices have been recommended as the first trigger in the assessment of drought.** In the event of rainfall inadequacy of a certain magnitude, the first trigger is set off which would then obligate State Governments to consider other impact indicators related to agriculture (crop sowing coverage), remote sensing, soil moisture, and hydrology.
- **The level of severity of drought will be based on the recorded values against the impact indicators** and accordingly, the second drought trigger is set off.
- In case the second drought trigger is set off, the Manual prescribes field level verification of ground truthing of crop damage through sample field survey in 10% of the villages selected randomly.
- **The drought and the intensity of the calamity will be declared on the basis of findings from the field survey.**
- **Time-lines have been indicated for the declaration of drought,** namely, 30 October for Kharif and 31 March for Rabi. **States will declare a drought and carry out relief operations. They can submit Memorandum for Financial Assistance to Govt of India** if the drought was found to be of a severe nature.
- **The Manual for Drought Management is a guide for governments and agencies engaged in the prevention, mitigation, and management of drought.**

India Meteorological Department (IMD) has replaced the word “drought” to describe poor rainfall with “deficient year” and “large deficient year”.

Updated Nomenclature(IMD)

New Terminology	Old Terminology	
Normal	Normal	Percentage departure of realized rainfall is within +/- 10% of the Long Period Average
Below Normal	Below Normal	Percentage departure of realized rainfall is <10% of the Long Period Average
Above Normal	Above Normal	Percentage departure of realized rainfall is >10% of the Long Period Average
Deficient Year	All India Drought year	When the rainfall deficiency is more than 10% and 20-40% area of the country is under drought conditions
Large Deficient Year	All India Drought year	When the rainfall deficiency is more than 10% and when the spatial coverage of drought is more than 40%

According to a circular issued by the department, the move was part of a decision to do away with or re-define terms that are not scientifically precise.

History of Drought and Drought preparedness in India

- Droughts during the colonial period tended to degenerate into severe famines causing massive human losses. According to one estimate, in the latter half of the 19th century, there were approximately 25 major famines across India, which killed 30-40 million people. The first Bengal famine of 1770 is estimated to have wiped out nearly one-third of the population. The famines continued until Independence in 1947, with the Bengal

famine of 1943–44 which affected 3-4 million people, is among the most devastating.

- **The situation improved remarkably in post-independent India. Investment in irrigation works, promotion and availability of quality inputs, focus on research & extension led to increased agricultural productivity and greater resilience among the farming communities. This development did not only render the country self-sufficient in food production but to a considerable extent, famine proof.** Though population quadrupled since Independence, the country did not witness a famine in the past 69 years and in fact, India has become a major exporter of agricultural produce in the world.
- **After independence droughts have received much more attention of policymakers than before.** One observes an evolution in the drought policy over the past few decades. Famines have been eradicated and starvation deaths are rare if not nil. **The government has adopted a three pronged strategy to face droughts:**
 1. Providing relief to drought-hit population under scarcity relief programmes
 2. Designing special area development programme for drought-prone areas and desert areas (DPAP – drought-prone area programme and DDP – desert development programme) and
 3. Promoting dry farming agriculture as a part of agricultural policy.
- **With the liberalization of the Indian economy in the 1990s, accelerated growth in industry and services saw the share of agriculture in Gross Domestic Product (GDP) shrink to less than 15% (half its share from a few decades ago), yet the country continued to be largely self-sufficient in food and agri-commodities, gained greater resiliences in absorbing the impact of drought.**

Preparedness through Programs

Some Programs and Schemes

1. **Seeing watershed as key biophysical unit for drought proofing & resilience:** integrating lessons from SLEM
2. **The Green India Mission**– aims to restore 10 Mha in 10 Years with a project cost of about US\$ 8 billion; focus on restoration of ecosystem services, using landscapes and watershed units.
3. **Integrated Watershed Management Programme** – targeted development of 75 million hectares of rainfed/degraded area in a phased manner during 2007-2027.
4. **The Mahatma Gandhi National Rural Employment Guarantee Scheme** – strong focus on land, water and afforestation activities
5. **The mission for Sustainable Agriculture** – including climate-smart agriculture, National Food Security Mission, National Mission on Micro Irrigation among others.
6. Making use of Traditional Knowledge Systems in programs /Missions