



Manual for Drought Management: Drought Declaration



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Drought Declaration: Need for Scientific Approach



- Traditional practice such as the annewari/ paisewari/ girdawari systems of eye estimation is subjective
- Crop cutting experiments for crop yield loss is time –consuming
- Need for a uniform approach for all states
- Tremendous progress in technology available to assess the crop situation
- Availability of data from various sources
- Drought being a complex (multi-faceted) phenomenon, there is a need to integrate various parameters fro drought declaration
- Intensity of drought needs to be assessed.



Five Categories of Indices



- Rainfall
- Crop sowing
- Vegetation Condition
- Water availability
- Other collateral parameters

Three Levels of Drought Assessment

- Trigger 1: Rainfall
- Trigger 2: Impact Indicators (Crop, Remote Sensing, Soil Moisture, Hydrology)
- Verification: Ground Truth

State Governments are expected to develop monitoring systems at the smallest administrative unit levels (e.g. Hobli/ sub-division/ Tehsil/ Taluk/ Block/Mandal/ Gram Panchayat etc.), to enable generation of credible observation data that are reflective of ground realities



Parameters for Drought Declaration



Levels	Category	Parameters
Trigger 1 (Cause)	Rainfall Based	1. RF Deviation or SPI 2. Dry Spell
Trigger 2 (Impact)	1. Remote Sensing 2. Crop Situation 3. Soil Moisture 4. Hydrological	1. NDVI & NDWI Deviation or VCI 2. Area under sowing (<50% by Jul/Aug) 3. PASM or MAI 4. RSI/GWDI/SFDI
Verification	Field Data	GT in 5 sites, each, of 10% of Villages

RF – Rainfall

SPI – Standardized Precipitation Index

NDVI – Normalized Difference Vegetation Index

NDWI – Normalized Difference Wetness Index

PASM – Plant Available Soil Moisture

MAI – Moisture Adequacy Index

RSI – Reservoir Storage Index

GWDI – Ground Water Drought Index

SFDI – Stream Flow Drought Index

GT – Ground Truth



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Other Factors



The State Governments may further monitor socio-economic indicators (the following factors) in making a holistic evaluation of drought.

- Extent of fodder availability and its prevailing prices compared to normal prices and information on cattle camps;
- Scarcity of drinking water supply (human and livestock);
- Demand for employment on public works, and unusual outmigration of labour in search of employment
- Current agricultural and non-agricultural wages compared with normal times;
- Supply of food grains, and price situation of essential commodities.



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Steps in the Determination of Drought



Step 1: First Drought Trigger based on Rainfall parameters will be set off as follows.

Rainfall Deviation/SPI	Dry Spell	Drought Trigger
Deficit or scanty rf/SPI<-1	Yes	Yes
Deficit or scanty rf/SPI<-1	No	Yes if rainfall is scanty or SP<-1.5, else No
Normal rf/SPI>-1	Yes	Yes
Normal rf/SPI>-1	No	No

Step 2: Once Trigger 1 is set off, State Government can select any three of the four.

- *Severe drought: if all the selected 3 impact indicators are in Severe category*
- *Moderate drought: if two of the selected 3 impact indicators are in ‘Moderate’ or ‘Severe’ class.*
- *Normal: for all other cases.*

Trigger 2 will be set off in the event of a finding of ‘severe’ or ‘moderate’ drought.

The State has an option to reduce the drought category by one rank (i.e. Severe to Moderate) if the irrigation percentage of the administrative region (District/Taluk/Block/Mandal), for which drought is being declared is more than 75%. However, in such a situation of reduction of drought intensity from ‘Moderate’ to ‘Normal’, the State Government will still be required to conduct field verification



Ground-truth for Verification



- In the event that trigger 2 is set off, States will conduct sample survey for ground truthing in order to make a final determination of drought.
- The finding of field verification exercise will be the final basis for judging the intensity of drought as 'severe' or 'moderate'.
- Ground Truthing (GT) needs to be conducted in each of the 10% of the drought affected villages, selected on a random basis
- In each of the selected villages, representative locations (about 5 sites for each of the major crops), may be inspected for data collection.
- GT, preferably using Smartphone based App
- It should capture photo, location and crop attributes (an App proposed to be developed by NRSC)
- To be uploaded on real-time to a centralized server (e.g. Bhuvan)
- Isolated small fields to be avoided for GT collection



Memorandum for Financial assistance under NDRF



- Memorandum for assistance under the National Disaster Response Fund (NDRF) will be submitted within a week of the declaration of drought
- **Only if the calamity is of a severe nature**
- Memorandum will mandatorily contain a copy of the State Government notification on drought, details of assessment of drought and details of village-wise field verification data
- The State Governments will consider the overall socio-economic scenario for providing relief



Timelines



- Kharif Drought Notification: by 30th October
- Rabi Drought Notification: by 31st March
- IMCT Constitution & Dispatch: within a week of receiving Memorandum
- IMCT Report: within 7 days after receiving all relevant information
- Central Govt Decision on assistance from NDRF: within 1 month of IMCT report
- Disbursement of input subsidy by state government: within 1 month of receipt of central assistance
- *.The timelines in the case of declaration of an early season drought will be suitably modified*
- *State Governments should invariably use DBT to provide various kinds of beneficiary oriented assistance under SDRF/NDRF*



Early Season Drought Declaration



- Deficit rainfall in June and July with prolonged dry spells leading to significant reduction in crop sown area can trigger the declaration of early drought in August
- Indicators for early season drought
 - Rainfall deficiency based on rainfall deviation or SPI and the dry spell – Mandatory
 - Reduction in crop sown area or failed sowing, MAI, Ground water or Reservoir water index are important.
 - NDVI is less effective when the canopy coverage is low. In such situation NDWI, a surface wetness indicator is preferred to NDVI.



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Institutional Mechanism for Drought Monitoring



Category	Institutions/ Systems
Government of India	<ul style="list-style-type: none"> • Central Drought Relief Commissioner • Crop Weather Watch Group
State Level	<ul style="list-style-type: none"> • State Drought Monitoring Centres
Scientific & Support Organisations	<ul style="list-style-type: none"> • India Meteorological Department (IMD) • Mahalanobis National Crop Forecast Centre(MNCFC) • Central Research Institute for Dryland Agriculture (CRIDA) • Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD & GR) • Indian Space Research Organisation (ISRO) • State Remote Sensing Application Centres (SRSACs)

Thank you.