# Flash Droughts

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Monsoon is normally associated with flash floods. But a team of Indian researchers found that a kind of rapidly developing drought also manifests during the prominent rainy season.

In news: A recent study predicts more Flash Droughts in India

by the end of the century

Placing it in syllabus: Geography

**Dimensions** 

- What are Flash Droughts?
- Causes of Flash Droughts
- Effects of Flash Droughts on Agriculture
- Reasons for their increase in India
- Prevention and Mitigation Measures

# Content

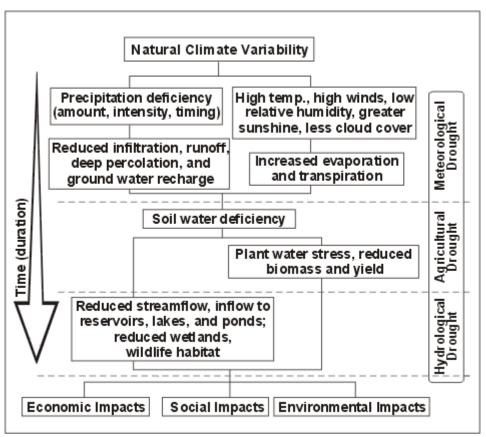
# What are Flash Droughts?

- •Flash droughts refers to a severe drought kind of situation that develops very quickly and are characterized by rapid soil moisture depletion.
- Normally, drought conditions take months to develop and are caused by prolonged lack of precipitation or rains.
- But Flash droughts are an extreme climate phenomena that happen within a week or in two weeks' time and intensify very quickly.
- In India, most of the flash droughts occur during the Monsoon Season.
- Researchers from the Indian Institute of Technology, Gandhinagar identified 39 flash droughts during 1951-2018 and found that 82 per cent of those occurred during the monsoon season.

#### **Droughts**

- Drought is a deficiency in precipitation over an extended period.
- It is a **normal**, **recurrent feature of climate** that occurs in virtually all climate zones.

The prolonged period of abnormally low rainfall, leads to a



shortage of water.

#### Classification:

- Meteorological Drought: classified based on rainfall deficiency with respect to long term average, where 25% or less is normal, 26-50% is moderate and more than 50% is severe.
- Hydrological Drought: defined as deficiencies in surface and subsurface 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 reserves.
- Agricultural Drought: it's identified with soil moisture deficiency in relation to meteorological droughts and

climatic factors and their impacts on agricultural production and economic profitability.

#### **Drought Prone Areas:**

- In India, around 68% of the land area is prone to drought to varying degrees.
- The 35% area which receives rainfall between 750 mm and
  1125 mm is considered drought prone
- 33% receiving less than 750 mm is chronically drought prone. Meteorological Drought: classified based on rainfall deficiency with respect to long term average, where 25% or less is normal, 26-50% is moderate and more than 50% is severe.

## Causes of Flash Droughts

- We know very little about flash droughts or 'hidden hazards' — when compared to research available on longterm droughts.
- But, scientists agree that flash droughts are mostly driven by heat waves and very high temperatures.
- They are usually affected by conditions that lead to abnormally high evapotranspiration (ET) rates such as abnormally high temperatures, winds, and/or incoming radiation.
- Several factors including atmospheric anomalies, anthropogenic greenhouse gas emissions play an important role.
- A considerably long dry spell with significantly low precipitation anomalies during the monsoon results in an increase in air temperature.
- Increased air temperature and precipitation deficit together cause a rapid depletion of soil moisture leading to flash drought.
- Therefore, flash droughts in the monsoon season are primarily caused by the monsoon breaks. However, flash

droughts can also occur due to delayed onset of the summer.

In India, prolonged dry spells during the monsoon season
 are leading to a flash drought. This happens because
 rains stay away for 15-20 days at a stretch.

### Effects of Flash Droughts on Agriculture:

- Flash droughts are mainly concentrated in the monsoon season in the majority of India.
- They affect crop production and pose challenges in meeting increased irrigation demands
- This can adversely affect maize and rice grown in the Kharif (June-September) season.
- About 10-15 per cent areas under cultivation of rice and maize were affected by flash droughts during the monsoon seasons in India between 1951 and 2018, a recent study has found.
- In 1979, India faced a severe flash drought, affecting about 40% of the country and taking a toll on agriculture. The big granaries of Uttar Pradesh and Andhra were affected, and the country suffered a loss of about ₹5,000 crores.

## Reasons for increase in Flash Droughts in India

- The **ongoing climate change** has caused a significant increase in global temperature and this can lead to more and more flash droughts in the coming years.
- Around the world, stronger El Niño weather patterns and the ongoing climate breakdown are bringing harsher and more frequent droughts. India is also hard hit by this.
- The changes in greenhouse gas emissions, industrial aerosols, and land-use/land-cover can disrupt the pattern of summer monsoon precipitation, sea surface temperature, and air temperature over India.
- Scientists predict that as temperatures continue to rise with global heating and populations grow, Indian region

will experience harsher water shortages.

- A recent study by researchers from IIT Gandhinagar concluded that the frequency of concurrent hot and dry extremes is projected to rise by about five-fold. This may cause an approximately seven-fold increase in flash droughts like 1979 by the end of the 21st century
- This increased frequency of flash droughts can have deleterious implications for crop production, irrigation demands and groundwater abstraction in India.

#### **Groundwater depletion**

- Groundwater is the source of 40% of India's water needs and it is depleting at an unsustainable rate
- As per NITI Aayog's 2018 report 21 Indian cities including Delhi, Bengaluru, Chennai and Hyderabad – are expected to run out of groundwater by 2020
- 40% of India's population will have no access to drinking water by 2030

## **Prevention and Mitigation Measures**

- Flash droughts have severe impacts and occur when regular drought conditions rapidly intensify.
- This makes it more urgent to accurately identify the physical processes behind their origins.
- Early-warning systems (EWS) that could identify trends in climate and sources of water were needed to detect the emergence or probability of the occurrence of flash droughts.
- EWS and drought monitoring helps in formulating an effective, proactive drought policy.
- If the 'Paris Agreement' goals are met and global warming is restricted to well below 2 degrees C, the numbers and frequency of the projected flash droughts may go down.

Mould your thought: How are Flash droughts different from

normal droughts? What can be done to reduce the effects of flash droughts in India?

### Approach to the answer:

- Define Flash droughts
- Identify the differences between flash droughts and normal droughts
- Briefly discuss the effects of flash droughts in India
- Mention the prevention and mitigation measures
- Conclusion