

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

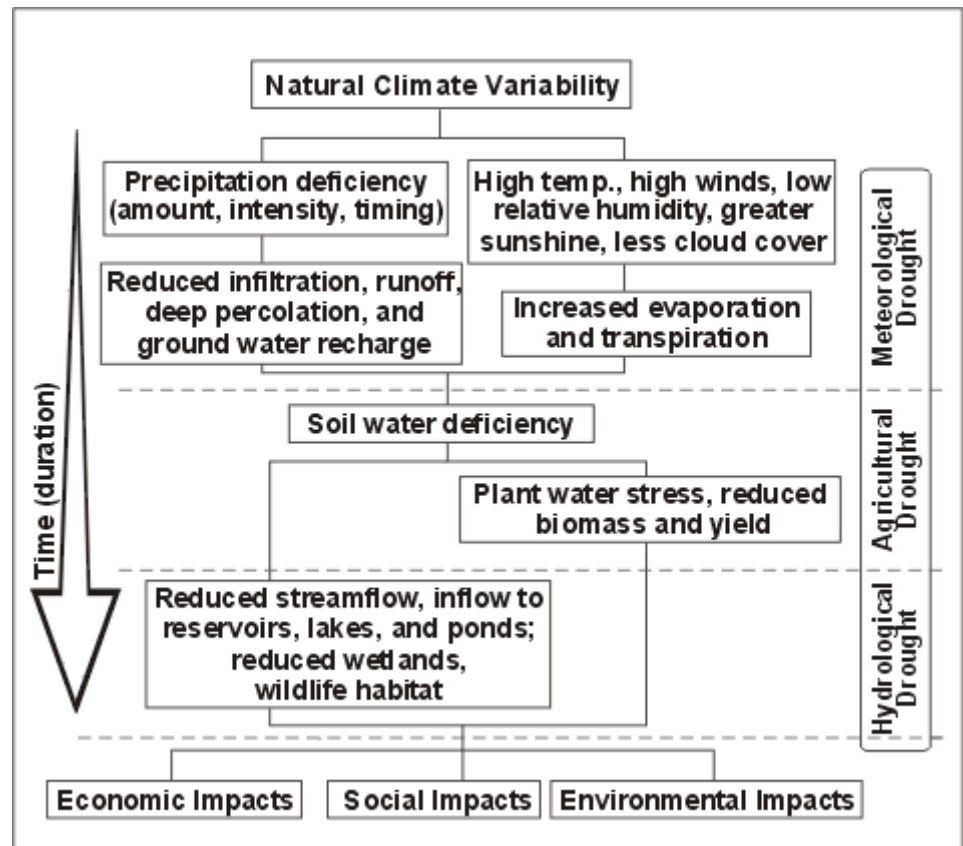
What are Flash Droughts?

- 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 long-term 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