



FLASH DROUGHTS - GS III MAINS

Q. Flash droughts are rising in intensity around the world, bring out the causes behind it and throw a light on the impact of flash floods on India. (15 marks, 250 words)

News: *Warming climate intensifies flash droughts worldwide*

What's in the news?

- Sudden, severe dry spells known as flash droughts are rising in intensity around the world, with a notable exception in mountainous Central Asia, where flash drought extent is shrinking, according to new research.

Key takeaways:

- Heat and changes to precipitation patterns caused by a warming climate are driving these trends, the study found.
- The new study is the first to apply a systematic, quantitative approach to the global incidence of flash drought, mapping hotspots and regions of rapid increases in recent decades.

Flash Drought:

- Flash droughts occur very quickly due to the **rapid depletion of soil moisture**. It is different from normal drought conditions that develop in months, but the **flash drought happens within a week or two**.

India and Flash Drought:

- Over **68% of India's land area is vulnerable to drought**.
- NITI Aayog, under the **Composite Water Management Index** report, highlighted that about two lakh people die in India every year due to inadequate water and sanitation. It also states that **6% of GDP will be lost by 2050 due to the water crisis**.
- A paper published in January 2021 predicted that by the end of the 21st century, the frequency of concurrent hot and dry extremes in India will rise by about five-fold. This can cause approximately a **seven-fold increase in flash droughts**.

Causes of Flash Drought:

1. Increased evapotranspiration:

- **Lack of rainfall coupled with increased evapotranspiration** makes flash drought unique from conventional drought development.
- Evapotranspiration is the combination of evaporation from the land surface and transpiration from vegetation.
- Both of these processes act to transfer water from the land surface to the atmosphere.



2. Global warming:

- The increased frequency and intensity of extreme weather events such as droughts, floods, heat/cold waves, cyclones, delayed or early onset of rains, long dry spells, early withdrawal, during the last two decades has been attributed to global warming.
- **Greenhouse emissions** will significantly increase the frequency of extreme hot and dry periods, which are the main drivers of flash droughts.

3. Precipitation deficit:

- When precipitation deficit occurs over an extended period of time, soil moisture is depleted by evapo-transpiration which desiccates land surface.

4. Failed Monsoon:

- For example in 2018 >> South-West monsoon that provides 80% of India's rainfall, fell short by 9.4% which brings drought like situations in India

5. High precipitation variability:

- Tropics and Sub-tropics have high potential for drought development due to high precipitation variability and evaporative demand.

6. Oscillation of the Inter-Tropical Convergence Zone (ITCZ):

- Flash drought development is more likely to occur in the May-June (period associated with increasing rainfall) if onset of ITCZ-induced rainfall is delayed/reduced, in combination with increased evaporative demand.

7. Anticyclones:

- They have a dual impact on flash drought development such as
 - a. They suppress rainfall which limits soil moisture replenishment.
 - b. Less cloud coverage and high surface temperatures increase evaporative demand of moisture.

8. Over-exploitation:

- Overexploitation of groundwater and sub-optimum conservation of surface water leading to inadequate water availability for irrigation.
- Traditional water harvesting systems have been largely abandoned.

9. Unsustainable agricultural practices:

- Growing crops that do not suit the agro-climatology of a particular region.
- For example, **cultivation of sugarcane in Vidarbha region of Maharashtra and Rice in Punjab region.**
 - Rice and sugarcane are water-intensive crops and growing them in an area where less water is available made the area prone to agricultural drought.



- Excessive use of **High Yielding Seeds (HYV)** as these seeds requires more water and proper irrigation.

Impacts of Flash Drought:

1. Decreases production:

- 2020 study - about 10-15% areas under **cultivation of rice and maize were affected** by flash droughts during monsoon season in India between 1951- 2018.
- **Flash droughts of 1979, 1976, and 1982 are the 3 most severe flash droughts that affected Kharif crops during the monsoon season in India.**

2. Depletion of soil moisture:

- Flash drought development with enhanced evapotranspiration and a lack of rainfall can quickly deplete soil moisture and lead to devastating impacts on agriculture and ecosystems.

3. Impact on economy:

- Flash drought has a '**multiplier effect**' on the economy.
- As per a report of the UN Office for Disaster Risk Reduction (UNDRR), the impact of severe droughts is estimated to be about **2-5% of India's GDP per annum.**

4. Increase farm distress:

- As per recent report, a temperature increase of a single degree Celsius in one day corresponded to about 67 suicides, on average.
- More than 12,000 farmers have committed **suicide** in Maharashtra between 2015-2018 mainly due to drought related distress.

5. Fiscal implications:

- The government is faced with **increased expenditure on relief, social welfare, health and water supplies, consumption-related subsidies on food distribution, and the logistical costs of drought related imports.**
- Increased budgetary pressures, resulting from lower revenues and higher expenditure, are usually met by either external and internal borrowings, higher taxes or the imposition of new taxes

6. Environmental impact:

- **Low water levels in water bodies** (lakes, ponds, reservoirs etc.) will reduce availability of drinking water and adversely affect flora and fauna.
- It causes deforestation, wildfires and increased desertification.
- Frequent flash droughts can increase stress on endangered species and cause loss of biodiversity.



PL RAJ IAS & IPS ACADEMY

MAKING YOU SERVE THE NATION

7. Distress migration:

- People tend to migrate from drought prone areas to water surplus areas. This may create crowding in certain places, **social tensions due to sudden demographic changes etc.**

8. Malnutrition:

- Due to reduction in crop yield, **food security is threatened as inadequate intake of food will cause malnutrition.**
- According to the paper published in Nature Communications (2019), India is a hotspot for flash droughts and this could have major implications on the country's crop production.

If not predicted and discovered early enough, changes in soil moisture that accompany flash drought can cause extensive damage to agriculture, economies, and ecosystem goods and services.

