

MORE FLASH DROUGHTS IN INDIA BY END OF CENTURY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Impact: Frequent flash droughts can have deleterious effects on crop production in India. |

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In 1979, India faced a severe flash drought, affecting about 40% of the country and taking a toll on agriculture. An article published that year in the journal *India International Centre Quarterly* noted that the big granaries of Uttar Pradesh and Andhra were affected, and the country suffered a loss of about 5,000 crores. A new study has now pointed out that India could experience more such flash droughts by the end of this century.

Flash droughts are those that occur very quickly, with soil moisture depleting rapidly. Normally, developing drought conditions take months, but these happen within a week or in two weeks' time. Several factors including atmospheric anomalies, anthropogenic greenhouse gas emissions play an important role.

"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. If we can meet the 'Paris Agreement' goals and limit global warming to well below 2 degrees C, the numbers and frequency of the projected flash droughts may go down," says Vimal Mishra from the Civil Engineering and Earth Sciences at IIT Gandhinagar. He is the corresponding author of the paper published in *npj Climate and Atmospheric Science*. The team analysed the major flash droughts that occurred from 1951 to 2016 in India. They simulated the soil moisture using the meteorological data obtained from the India meteorological department. Duration, intensity, and area of the flash droughts were studied and an overall severity score was given. The top five flash droughts based on the overall severity score occurred in 1979 followed by 2009, 1951, 1986 and 2005.

To predict the future flash droughts the team used a Community Earth System Model which simulates the summer monsoon precipitation, sea surface temperature, role of El Nino Southern Oscillation, and air temperature over India. The analysis showed a considerable rise in the frequency of extremely dry and hot years in the coming three decades. They also examined the role of greenhouse gas emissions, industrial aerosols, and land-use/land-cover change. "The frequency of concurrent hot and dry extremes is projected to rise by about five-fold, causing an approximately seven-fold increase in flash droughts like 1979 by the end of the 21st century," adds the paper.

They conclude that this increased frequency of flash droughts can have deleterious implications for crop production, irrigation demands and groundwater abstraction in India.

The team has planned future studies that will consider the flash-drought prediction ahead of time using operational meteorological forecasts from India Meteorological Department. They explain that this will help manage irrigation water demands and avoid considerable losses in agriculture.

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