Why is India facing bouts of extreme weather?

Did Kerala and Uttarakhand receive incessant rain in October due to climate change?

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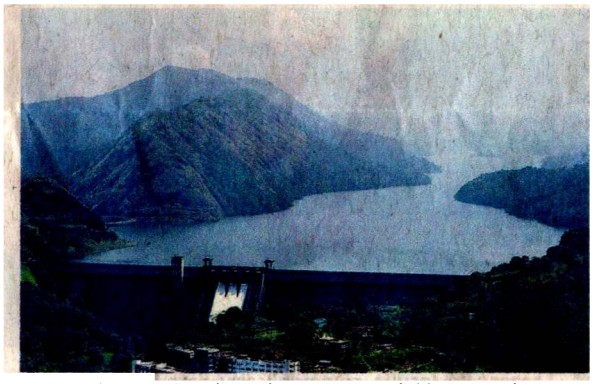
The story so far: Even as the southwest monsoon began to retreat from the subcontinent, Kerala and Uttarakhand received record rainfall in October. In both these States and others, over the last few years, there have been variations in the pattern and intensity of rainfall. Kerala had seen a severe spell in 2018, which caused havoc. This year's rain, too, claimed lives in Kerala and Uttarakhand.

What is the quantity of rainfall?

■ According to the India Meteorological Department (IMD), the Kerala and Mahe region received 124% excess rainfall from October 14 to October 20. Against the normal 72.1 mm rainfall for the period, the region had received 161.2 mm. Lakshadweep received 15% excess rainfall. From October 1 to October 22, Kerala recorded 121% excess rainfall, with all districts, except Alappuzha, recording above 70% excess rainfall. Alappuzha recorded 52% excess for the period. The latest fortnightly forecast from the agency says "above normal" rainfall is expected over the next fortnight. Uttarakhand recorded 192.6 mm against the usual 35.3 mm from October 1 to October 20, with several districts reporting 24-hour highs that exceeded the figures from over a century.

What explains the torrential rain?

■ There are different factors at play in Kerala and Uttarakhand. There have been two rain-bearing 'low pressure systems' that are active in the Arabian Sea as well as the Bay of Bengal since the past week. The low pressure system in the Arabian Sea contributed to the heavy rain in Kerala, whereas western disturbances, which are periodic influxes of moisture-laden clouds from the Mediterranean, and common during winter, are what caused the rain in northern India. The Bay of Bengal is still warm and strong winds from there are reaching as far as Uttarakhand and will contribute to rainfall in several parts of north-eastern India.



Filling up fast: The Cheruthoni Dam in Idukki started discharging water on October 19 after torrential rain. ▪ AFP

October is the month when the southwest monsoon entirely retreats from India and the northeast monsoon sets in, bringing rain over Tamil Nadu, Puducherry, coastal Andhra Pradesh and Kerala. Both low pressures as well as western disturbances are tangentially connected to the larger pattern of global warming. The Bay of Bengal is historically the warmer ocean that seeds low pressures and cyclones that bring rain to India. In recent years however, the Arabian Sea, too, has been warmer than normal, and leading to significant cyclonic activity. Overall elevated temperatures are also contributing to warmer waters in the Arctic Ocean and drawing colder air from the poles with greater intensity. This added to the increased moisture, thereby seeding more intense western disturbance activity over north India.

Is the delayed monsoon withdrawal responsible?

■ This year, the monsoon began its retreat on October 6 and though it was expected to fully retreat by October 16, it is yet to completely withdraw, with the associated clouds still lingering on. The IMD's latest assessment is that the monsoon will completely withdraw by October 26 and that will also herald the beginning of the northeast monsoon. When the atmosphere and the ocean is considered as a whole, rain everywhere is the result of moisture rushing up to fill differences in temperature between oceans and the land and while there is a broad agreement that warming oceans are contributing to intense spells of rainfall in pockets followed by long rainless spells, specific instances – such as what is being seen in Kerala and Uttarakhand – aren't unprecedented. The monsoon cycle is prone to large variations, and every year regional factors get accentuated – it's hard to predict which in advance – that then lead to extreme climate events.

What are the factors responsible for the disasters?

■ This year, India was poised to receive below normal rainfall until August when global meteorological factors changed and caused a torrential September that largely repaired the monsoon deficit. However, the vagaries in climate reveal their impact in the damage that they cause and the latter is due to society's environmental choices. Kerala and Uttarakhand have large tracts of hilly terrain that are prone to landslips. But construction has continued unabated even on land unsuited for human habitation. Several ecologists and environmentalists have for years warned of the consequences of unplanned development and, in the context of an increasingly erratic climate, it is only logical that more inhabitants of these regions will be exposed to greater climate risk.

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