

# EARTH

September - 2022



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## **Why climate change should be integrated into crop calendars at the hyper local level?**

In 1996, the India Meteorological Department (IMD) created a first-of-its-kind calendar with district-wise weather information for crop cultivation. It provided sowing and harvesting time, as well as weekly average rainfall and temperature during critical growth stages of the area's major crops. Agriculture departments across the country used it to prescribe sowing dates to farmers. Over the years, the sowing schedule became India's farming cycle, to the extent that at least two generations of farmers have now been following it.

However, rainfall patterns in the past two decades have seen substantial changes in the date of arrival, frequency as well as distribution. The crop calendar was set according to the onset of rain, its volume and distribution. For example, the monsoon reaches the Kerala coast by June 1. Crop sowing in the state has been set accordingly. It reaches Odisha by June 12-13, where, again, sowing has been set as per this date. Agriculture universities in the states developed the calendar according to the major crops and the monsoon. But the calendar assumes that the weather is 'normal' and can no longer precisely suggest operations for rain-fed agriculture.

Growing a crop like paddy, which needs continuous flooding of fields up to 10 cm depth for two weeks at the transplantation stage, requires precise weather information. This signifies the pressing need for a relook at the crop weather calendar. Rain-fed crops are likely to be worst hit due to limited options of coping with variability of rainfall and temperature resulting in a shift in sowing time and shorter growing season, which may necessitate effective adjustment in sowing and harvesting dates.

**False Start:** It refers to a situation where the first spell of rain is followed by dry spell lasting a week or more. 'False start', happening more frequently in the first monsoon month of June. False start condition is very vital, because it leads to germination failure and re-sowing by farmers resulting in increased cost of cultivation.

**'Normal' revised:** IMD has taken note of the erratic nature of the monsoon. In April this year, it lowered the average normal value for June-September by 12 mm. The new normal of 868.6 mm is based on 1971-2020 data and replaces the earlier figure of 880.6 mm based on 1961-2010 data.

IMD also has recognised the need to revise the crop weather calendar. Studies suggest that variability is increasing in certain areas. It is leading to more floods and more droughts. There is a change in the distribution of rainfall. This is reason enough for a re-look into the conventional sowing dates and practices followed across India.

*Source: <https://www.downtoearth.org.in>*



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## Climate change: Why is the world seeing more record-breaking floods?

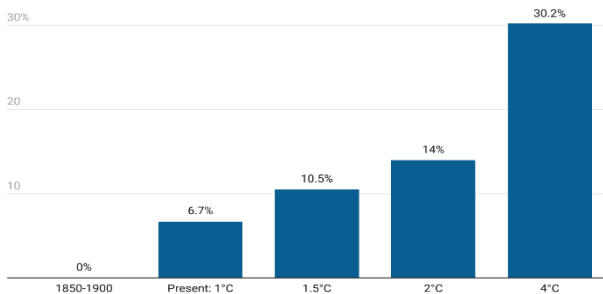
Although floods are a natural occurrence, human-caused climate change is making severe flooding events more common. In mountainous regions, three effects of climate change are creating higher flood risks:

- **More intense precipitation** - Warmer air can hold more moisture. The amount of water vapor that the atmosphere can contain increases by about 7% for every 1.8 degrees Fahrenheit (1 degree Celsius) of increase in atmospheric temperature.
- **Shifting snow and rain patterns** - In colder areas, especially mountainous or high-latitude regions, floods have been caused by snowmelt. But, as impact of climate change, winters are warmer, thus, more precipitation is in form of rain instead of snow. Eventually, these rain-caused floods can be much larger than snowmelt-only floods.
- **The effects of wildfires on the landscape** - Burned areas are more susceptible to mudslides & debris flows during extreme rain, both because of the lack of vegetation and changes to the soil caused by the fire. Fire can change the soil in ways that allow less rain to infiltrate into the soil, so more rain ends up in streams & rivers, leading to worse flood conditions.

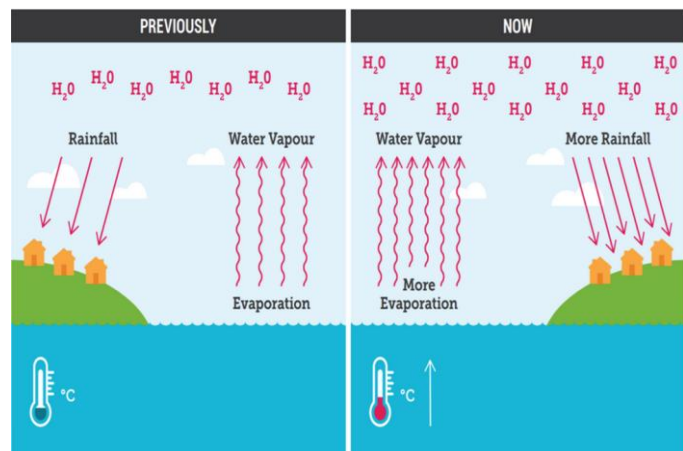
Climate change is affecting the water cycle. Generally speaking, wet areas are getting wetter and dry areas are getting drier. Moreover, we are experiencing more of our rain in the form of intense downpours, leading to a greater risk of floods. The IPCC sixth assessment report confirms.

### Extreme storms get wetter as temperatures rise

As temperatures rise, the intensity of storms increases, the IPCC's latest assessment report shows. The chart shows how much wetter heavy one-day storms that historically occurred about once every 10 years are likely to become as temperatures rise.



Compared to the 1850-1900 average. 1° Celsius increase = 1.8° Fahrenheit increase.  
Chart: The Conversation/CC-BY-ND • Source: IPCC Sixth Assessment Report



Source: <https://www.climatecouncil.org.au/weforum.org>



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Impacts of extreme rainfall and floods include:

- Economic Impact
- Decrease in physical and mental health
- Loss of habitat
- Damage to flora and fauna

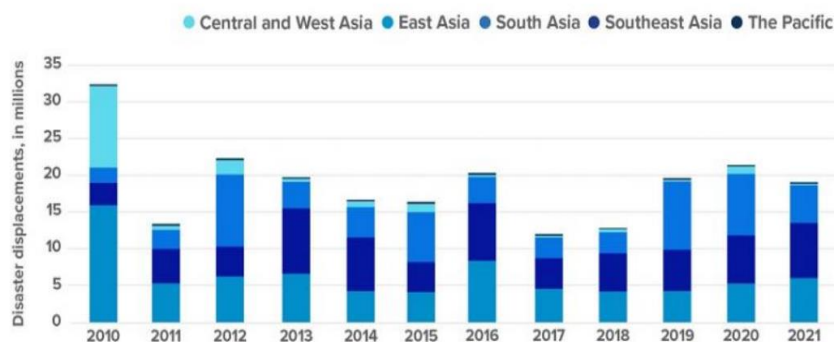
## Climate Change and the Southwest Monsoon

Climate change contributes to more prolonged and erratic monsoon seasons. This leading to more severe spells of rainfall events, floods and storms in south Asia, particularly India and forcing displacement of people.

According to a report by the Internal Displacement Monitoring Centre (IDMC) and the Asian Development Bank (ADB), in South-Asia, between 2010-21, disasters displaced some 61.4 million people in 2010-2021. Of this, 58.6 million were displaced due to weather-related disasters.

Floods and storms were responsible for over 90 % of the total displacements. Floods and storms displaced 37.4 million and 21 million people respectively.

## Internal Displacements by Disasters per Subregion (2010–2021)



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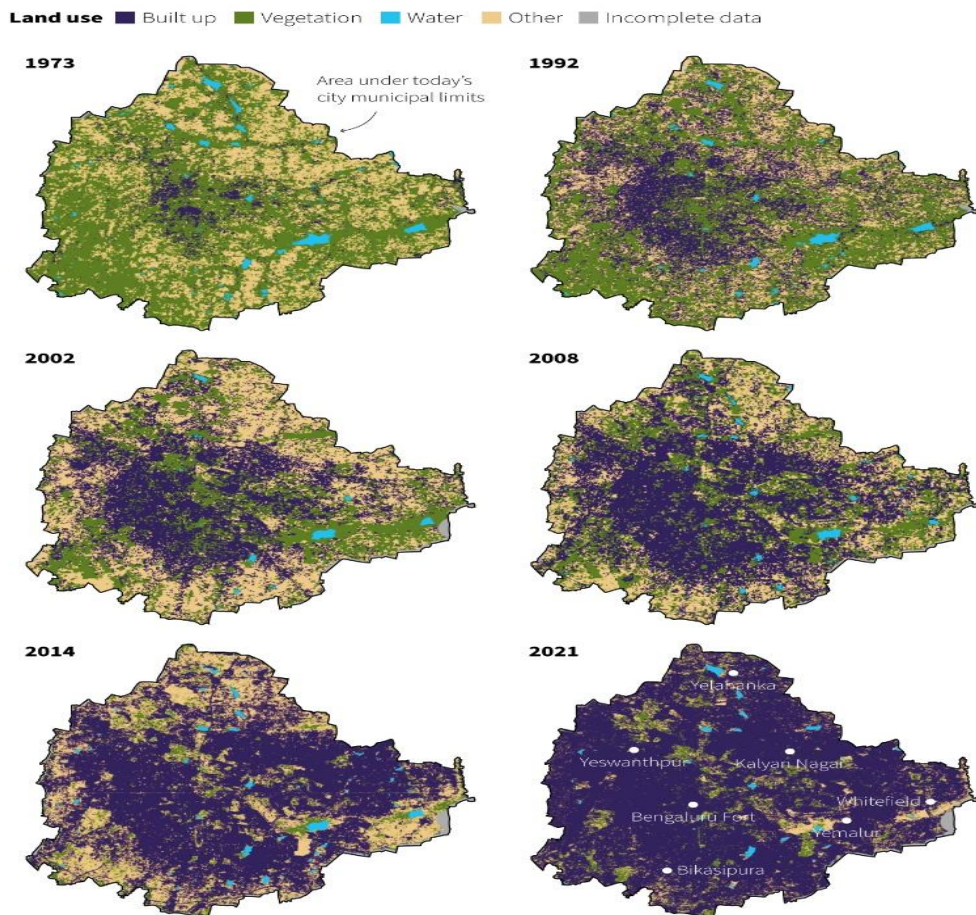
## Urbanization and Climate Change

Rapid Urbanization along with climate change is like adding fuel to fire. The cities are experiencing construction activities in areas which were considered unsafe earlier. Change of land use patterns, loss of vegetation cover are making impact of floods and storms worse.

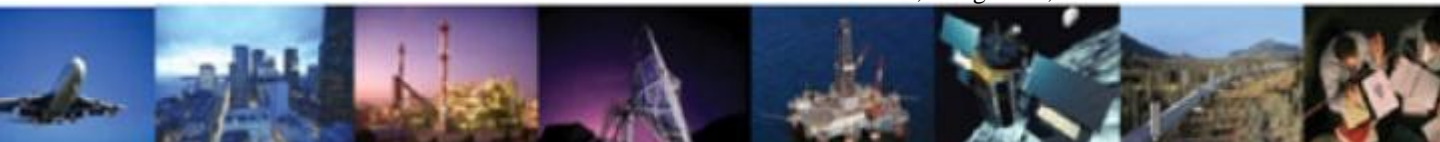
Take example of Bangalore. Experts believe the floods in early September 2022 happened due to:

- Hasty urban urbanization
- Encroachment of natural drains
- Depletion of wetlands
- Topography change caused by constructions

The built-up area was about 86% of city area in 2021 compared to just 21 % 3 decades back.



Source: Source: T.V. Ramachandra, Centre for Sustainable Technologies, Indian Institute of Science, Bangalore , Reuters



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## **Climate Change and Insurance**

Re/insurers are already experiencing the impact of climate change in form of increased claims. A study by Swiss Re estimates that floods along with wild fires will increase weather-related insured claims and premiums by 2040. It further estimates that losses from floods (which include pluvial, fluvial and sea-level rise perils) will likely increase most. Floods losses will increase in Europe (France, Germany and UK), China and Canada.

The Federal Emergency Management Agency (FEMA), USA has observed that 90% percent of all-natural disasters involve flooding. FEMA, which has been managing the National Floods Insurance Program (NFIP) since 1968, revamped it in 2021 to make it more sustainable and factor in more variables to determine a home's flood risk and climate change.

Earlier, rates were based largely on a property's elevation and whether it was built in a designated flood zone. The new system considers the type and frequency of floods, how far a home is from a water source and the estimated cost to rebuild after damage. FEMA expects the change will lead to fairer pricing since smaller homes cost less to replace.

The re/insurers are focusing on to have better attention to climate change within organizations, better modeling of climate change risks, and working with governments around the world to develop more climate-resilient public policies and infrastructure.

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