

CLIMATE SPECIAL

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DownToEarth

FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

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CODE RED



Earth certain to cross 1.5°C warming
threshold by 2040

Major ecosystems on verge of collapse, climate
systems undergoing irreversible changes

Clear proof of fossil fuel impact on the staggering
rise in extreme weather events

Calculations of the planet's carbon sink
capacity hugely off the mark



Climate Change in North East India

Akshit Sangomla

Earth is heating up

- In 2020 the average concentration of carbon dioxide was the highest in 3 million years at 412.5 parts per million. In 2021 it has risen to 413.5 parts per million (September 28)
- 3 million years ago Earth was 2-3 degree celsius warmer. Sea levels were 15-25 m higher.
- Carbon dioxide is a long living green house gas and traps the heat in the atmosphere.
- The excess CO₂ has caused the Earth to heat up by 1.09 degree Celsius since pre industrial times (IPCC AR6).
- 2020 was the joint warmest year ever recorded along with 2016
- 2010-2020 was the warmest decade
- July 2021 was the warmest month ever recorded



Climate Crisis

- Latest IPCC report (August 2021) predicts that Earth might cross 1.5° C warming threshold by 2040
- Under a business as usual scenario a warming of up to 5.7°C could occur which will be far beyond the point of no return
- The 9 climate tipping points could be crossed faster than thought before and at lower levels of warming (1.5-2°C)
- These are systems which are crucial for maintaining life on Earth
- Amazon rain forests, boreal forests, permafrost, Arctic sea ice, coral reefs, Atlantic circulations, Greenland ice sheet, East Antarctic and West Antarctic ice sheets
- Many changes to earth's systems are already irreversible.
- 2009-2019 was the costliest decade in terms of climate disasters at US\$ 2.98 trillion as compared to 1.88 trillion from 2000-2009



Warming affects extreme weather

- Change in character of extreme weather
- Increase in intensity of cyclones.
- Extreme rainfall events which induce floods, flash floods and landslides
- Dust, hail and thunderstorms with lightning
- Disruption of the monsoon leading to cycles of floods and droughts
- Cold waves and cold days with ground frost
- Heat waves with wild fires
- Heavy snowfall leading to avalanches



Climate Change in North East: **real and visible**

- Temperatures are already rising. Future scenarios seem bleak
- October 2021 was one of the hottest ever recorded
- Rain is major source of water as glaciers are not common. Most of rain during monsoons.
- Rainfall patterns, especially during Monsoon, are changing. Mostly the region is drying up
- In 20 of the last 22 years monsoon rainfall has been below normal
- More than a century long datasets show a declining trend in many states in the region
- The probability of drought occurrence in the region was 54 per cent during 2000-2014



Floods in time of drought: vulnerability increasing because of extreme rain events

- Dry periods intermixed with floods
- Extended monsoons in recent years
- More intense rain comes in less time followed by elongated periods of none to very less rainfall
- Heavy to extremely heavy rainfall causes floods, flash floods and landslides.
- Region has lived with floods for a long time
- Flooding patterns are changing, becoming unpredictable for the people
- Short and long term impact of major floods can be witnessed all over the region
- Some places are witnessing floods more often than before



ALTERED PATTERN

Though rainfall in the Northeast has reduced overall in the past three decades, it has increased in some districts in all the states, except Tripura where all the districts now receive deficit rain

LEGEND
(Analysis period 1989-2018)
District-wise rainfall trend for monsoon season

- Increasing significantly
- Increasing but not significant
- Decreasing significantly
- Decreasing but not significant

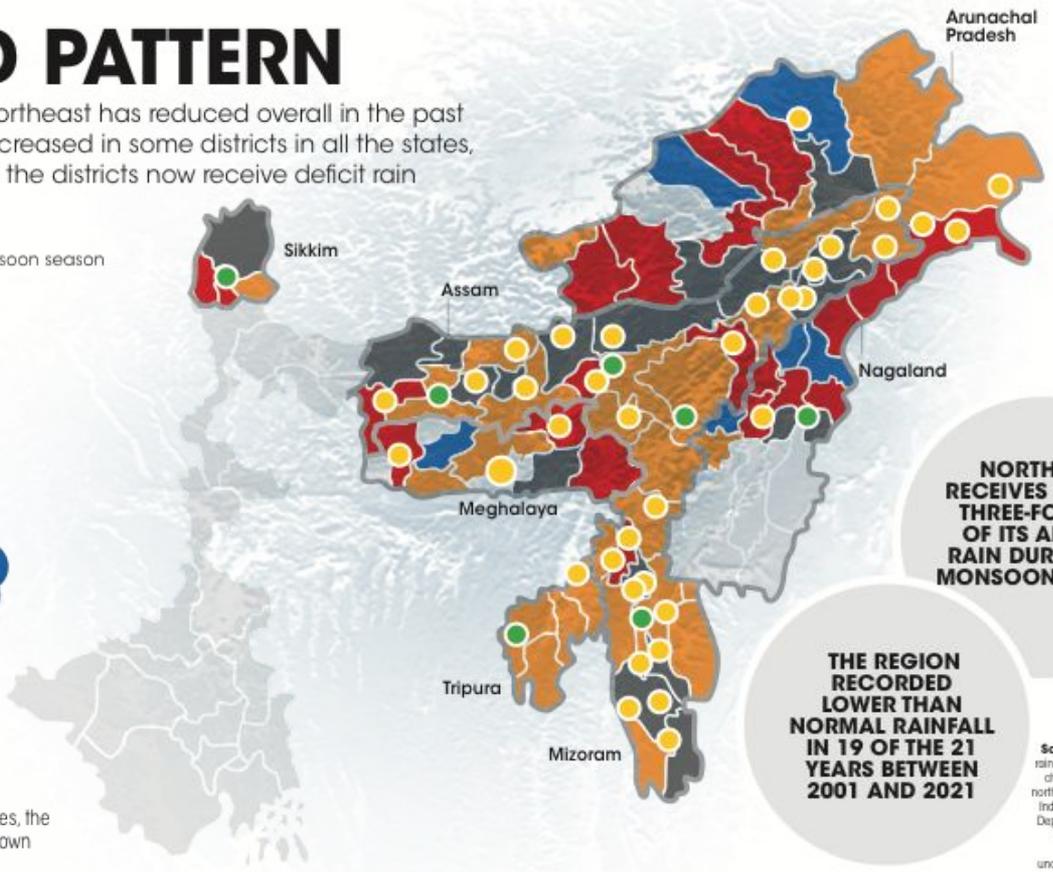
Trend in frequency of rainy days*

- Significant increase
- Significant decrease



MOSTLY DRY

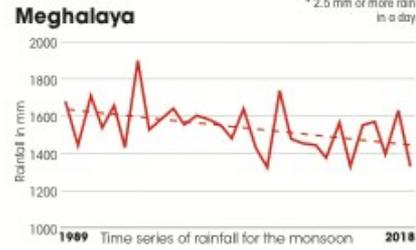
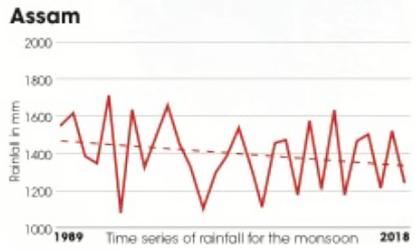
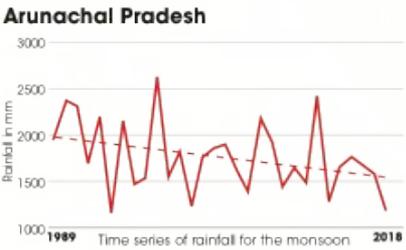
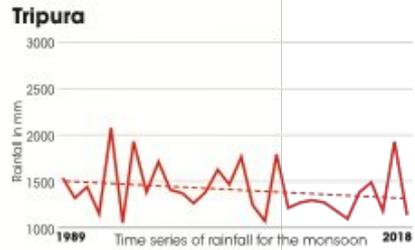
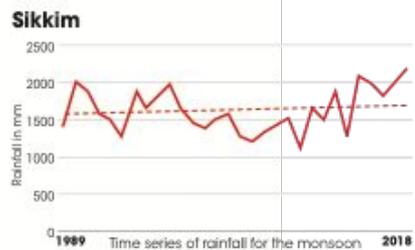
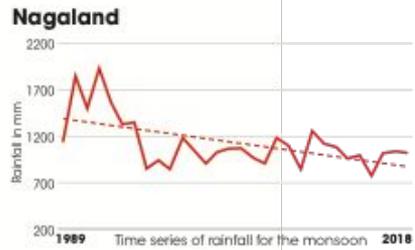
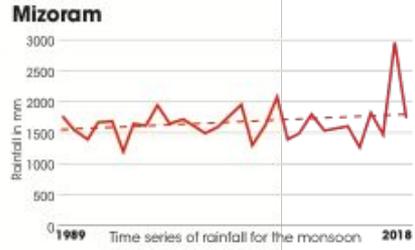
In six of the eight northeastern states, the overall monsoon rainfall is going down



NORTHEAST RECEIVES ALMOST THREE-FOURTHS OF ITS ANNUAL RAIN DURING THE MONSOON SEASON

THE REGION RECORDED LOWER THAN NORMAL RAINFALL IN 19 OF THE 21 YEARS BETWEEN 2001 AND 2021

Source: Observed rainfall variability and changes reports for northeastern states by India Meteorological Department. Analysis does not include Manipur due to unavailability of data
* 2.5 mm or more rain in a day



Local changes: **big impacts**

- In last 30 years or so all states in the region except Sikkim show a decreasing trend in monsoon rainfall
- Local district level trends depend on a lot of factors such as geography, forest cover
- For example in Assam, districts north of the Brahmaputra show an increasing trend in rainfall in the last 30 years or so which may be leading to occasional flooding in the other districts
- Mountain Springs which are the major sources of water in the region are drying up almost everywhere
- Water availability is a concern
- Changes in biodiversity and climate indicators of most places. Mango has started growing in cold Upper Siang.



Impacts on Livelihoods

- Rain feeds rivers, streams and springs.
- 27 per cent villages in northeast India are watered directly by springs
- Decrease in spring water has impacted livelihoods like agriculture, horticulture, fishing and animal rearing
- Changes in the varieties of rice cultivated in some regions because of changes in rainfall patterns
- Overall diversity of rice varieties has come down
- New pests and insects being witnessed in some places like Upper Siang in Arunachal Pradesh and Wokha in Nagaland
- More sand than fertile silt brought down by the rivers
- Unpredictable flooding means no long term planning
- Climate induced migration



Dhemaji, Assam



- Flood water from 2020 floods in Mas Dihiri village, Dhemaji district
- Village has shifted by 3 kilometres along with the Kumutiya river since 1960
- 28 houses in Kekuri village got washed away by the Jiadhal river floods in 2020
- Large swathes of rice fields covered with sand which will remain uncultivated for a long time

Pakke Kessang, Arunachal Pradesh



- Major micro climate changes close to the Pakke Tiger Reserve in Seijosa
- Illegal sand, boulder mining and logging
- The width of the Pakke river has also increased after devastating floods in 2004
- Many rare species such as the Blyth's Kingfisher are dwindling
- The movement of elephants within the reserve has also changed

West Kameng, Arunachal Pradesh



- Construction of a highway in the district has affected the health of springs. Human interventions exacerbate the impacts of climate change
- At least ten springs from Bhalukpong at the Assam-Arunachal Pradesh border to Morgung village in West Kameng have dried up
- Singchung village is witnessing some major changes to its biodiversity and climate indicators due to climate change



Wokha, Nagaland

- In 2018 many villages in the district witnessed floods for the first time in a generation
- Flood waters could still be seen in December 2020
- New pests and insects attacking vegetable and other crops
- Butterflies have decreased in number over the years so have many other small and large animal species that were common earlier
- Fish number and diversity have come down



What needs to be done

- More wide ranging and in depth research into the impacts of climate change in the region
- Study of combined impacts of climate change and other human interventions, especially in the case of the drying mountain springs
- More meteorological stations in the hills and mountains for better analyses and forecasts
- Adaptation strategies will mean community involvement; plans for building resilience and adapting to changes
- Traditional knowledge should be combined with modern science and technology

What needs to be done

- Science based spring rejuvenation should be taken up
- Flood and drought risk analysis and planning should be carried out
- Study of the new types of pests and insects in the agricultural fields should be done and the problem should be addressed scientifically
- Organic agriculture which many parts of the region have always practiced should be further encouraged
- New and innovative livelihood options should also be introduced



Few links to North East India Climate Change stories

<https://www.downtoearth.org.in/news/climate-change/climate-crisis-in-north-east-india-monsoon-variations-should-ring-alarm-bells-now-78707>

<https://www.downtoearth.org.in/news/climate-change/climate-crisis-in-north-east-india-how-geography-rainfall-variations-define-calamity-course-78845>

<https://www.downtoearth.org.in/news/climate-change/climate-crisis-in-north-east-india-why-are-rainfall-patterns-changing--78879>



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Thank you

