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A global local beat

Researching and Reporting Himachal
in time of climate change

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It’s real

Some 90 lakh years ago…

- A ape-like ancestor roamed around; earlier known as a native of only Eurasia
- Himalaya might not be as tall as now
- Himachal Pradesh wouldn’t have looked like now without us
- But, this fossil is the most sought after property in understanding the planet and climate change

A hundred years ago…

- Rishidogra, and many more villages vacated as water dried up
- Somewhere at the top, glaciers and snow were normal, not allowing apples to be grown
- Britishers were already thinking of the summer while increasing footprints
- Somewhere, far away in the Europe, a small group of scientists had just started thinking of melting snows and glaciers

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Now....

- 15 years, Kangra has nor received its normal rainfall
- For the first time in higher hills, people are seeing nomads
- Nomads are clueless, changing route and time evolved over hundred years ago
- Apples, of course, are now being produced at higher level
- Farmers in lower altitude are opting other crops
- Snowfall has drastically decreased in Himachal Pradesh and rain and hailstorms have increased over the last 25 years
- In 2018, in many days, HP received up to 500% more rainfall a day than normal; Shimla had water scarcity
- 43.01% area under desertification;

GROWING DRY

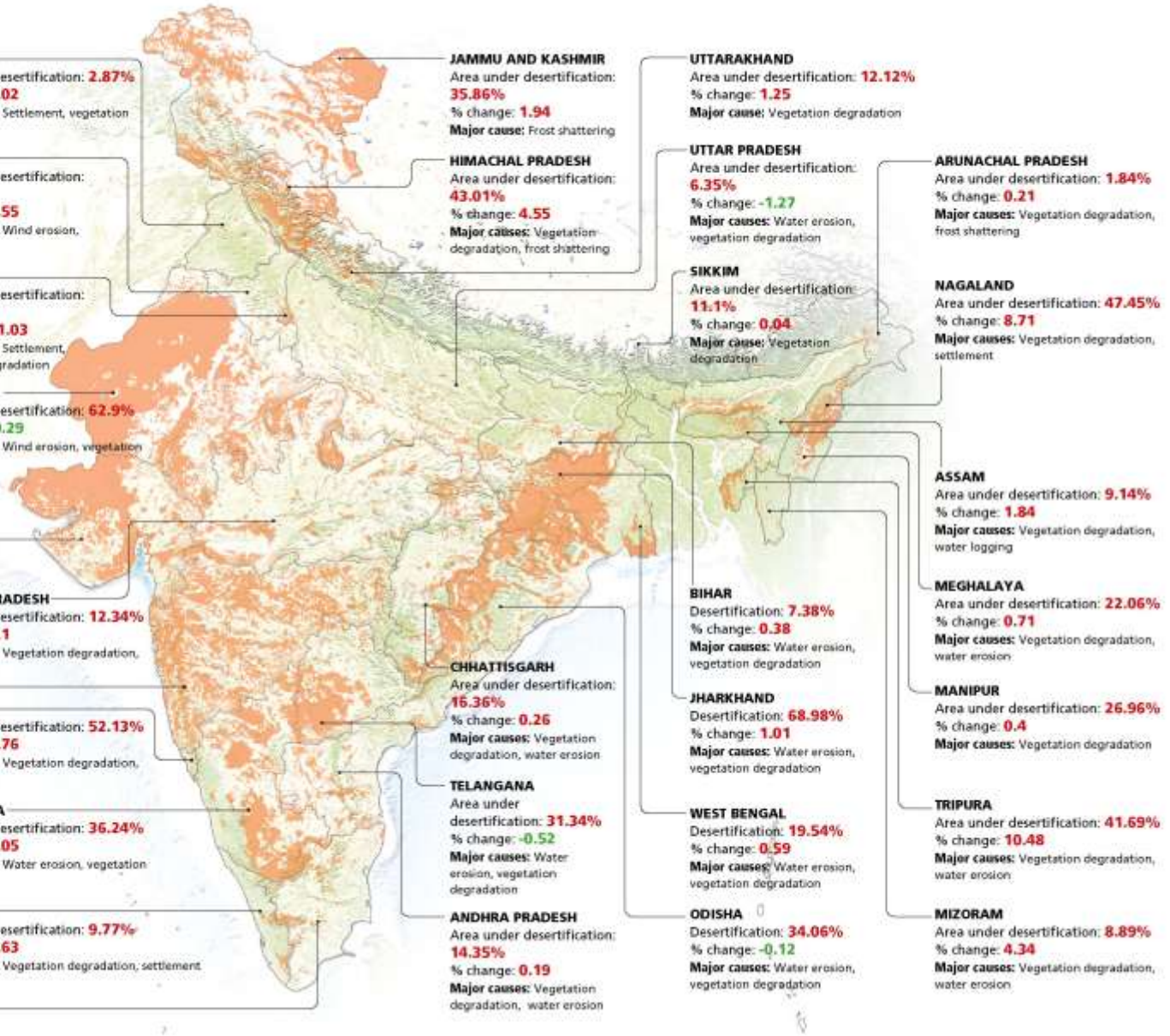
26 out of 29 Indian states have reported an increase in the area undergoing desertification in the past 10 years

Area under desertification

India average

Area under desertification: **29.32%**

% change*: **0.56**



PUNJAB
Area under desertification: **2.87%**
% change: **1.02**
Major causes: Settlement, vegetation degradation

HARYANA
Area under desertification: **7.67%**
% change: **0.55**
Major causes: Wind erosion, settlement

DELHI
Area under desertification: **60.6%**
% change: **11.03**
Major causes: Settlement, vegetation degradation

RAJASTHAN
Area under desertification: **62.9%**
% change: **-0.29**
Major causes: Wind erosion, vegetation degradation

GUJARAT
Area under desertification: **52.29%**
% change: **0.94**
Major causes: Water erosion, salinity

MADHYA PRADESH
Area under desertification: **12.34%**
% change: **0.1**
Major causes: Vegetation degradation, water erosion

MAHARASHTRA
Area under desertification: **44.93%**
% change: **1.55**
Major causes: Water erosion, vegetation degradation

GOA
Area under desertification: **52.13%**
% change: **1.76**
Major causes: Vegetation degradation, water erosion

TAMIL NADU
Area under desertification: **11.87%**
% change: **0.21**
Major causes: Vegetation degradation, settlement

KARNATAKA
Area under desertification: **36.24%**
% change: **0.05**
Major causes: Water erosion, vegetation degradation

KERALA
Area under desertification: **9.77%**
% change: **0.63**
Major causes: Vegetation degradation, settlement

JAMMU AND KASHMIR
Area under desertification: **35.86%**
% change: **1.94**
Major cause: Frost shattering

HIMACHAL PRADESH
Area under desertification: **43.01%**
% change: **4.55**
Major causes: Vegetation degradation, frost shattering

UTTARAKHAND
Area under desertification: **12.12%**
% change: **1.25**
Major cause: Vegetation degradation

UTTAR PRADESH
Area under desertification: **6.35%**
% change: **-1.27**
Major causes: Water erosion, vegetation degradation

SIKKIM
Area under desertification: **11.1%**
% change: **0.04**
Major cause: Vegetation degradation

ARUNACHAL PRADESH
Area under desertification: **1.84%**
% change: **0.21**
Major causes: Vegetation degradation, frost shattering

NAGALAND
Area under desertification: **47.45%**
% change: **8.71**
Major causes: Vegetation degradation, settlement

ASSAM
Area under desertification: **9.14%**
% change: **1.84**
Major causes: Vegetation degradation, water logging

MEGHALAYA
Area under desertification: **22.06%**
% change: **0.71**
Major causes: Vegetation degradation, water erosion

MANIPUR
Area under desertification: **26.96%**
% change: **0.4**
Major causes: Vegetation degradation

TRIPURA
Area under desertification: **41.69%**
% change: **10.48**
Major causes: Vegetation degradation, water erosion

MIZORAM
Area under desertification: **8.89%**
% change: **4.34**
Major causes: Vegetation degradation, water erosion

BIHAR
Desertification: **7.38%**
% change: **0.38**
Major causes: Water erosion, vegetation degradation

JHARKHAND
Desertification: **68.98%**
% change: **1.01**
Major causes: Water erosion, vegetation degradation

WEST BENGAL
Desertification: **19.54%**
% change: **0.59**
Major causes: Water erosion, vegetation degradation

ODISHA
Desertification: **34.06%**
% change: **-0.12**
Major causes: Water erosion, vegetation degradation

CHHATTISGARH
Area under desertification: **16.36%**
% change: **0.26**
Major causes: Vegetation degradation, water erosion

TELANGANA
Area under desertification: **31.34%**
% change: **-0.52**
Major causes: Water erosion, vegetation degradation

ANDHRA PRADESH
Area under desertification: **14.35%**
% change: **0.19**
Major causes: Vegetation degradation, water erosion

* % change is calculated for the periods 2003-05 and 2011-2013

Source: Desertification and Land Degradation Atlas of India 2016 by Space Applications Centre, ISRO

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More…

- An overall reduction in glacier area from 2,077 sq. km. to 1,628 sq. km. from 1962-2001 in Chenab, Parbati & Baspa Basins, H.P.
- An overall deglaciation of 21% of total area in these basins.
- About 10% deglaciation is observed in Spiti Basin during 2001-2007.
- Shimla: Warming rate was higher during the period 1991-2002 as compared to earlier decades and reduction in rainfall by about 17% from 1996 onwards

The Indian Himalayan region

The Himalayas, which represent about 16.2 per cent of the total area of the country, are not only a key watershed of India but also play a crucial role in the monsoon system. Climate change impacts on the mountain range can affect the entire sub-continent

POPULATION

Total
47 million

Rural **80%**
Urban **20%**

LAND USE

Net sown area
14.5%

Forest
47%

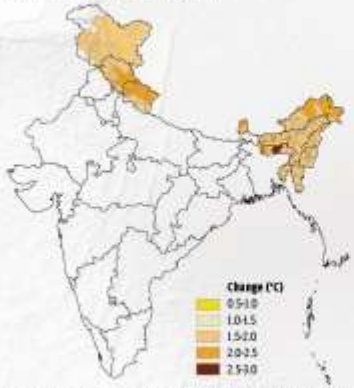
LIVELIHOODS

61.5%
on hill agriculture and cultivation

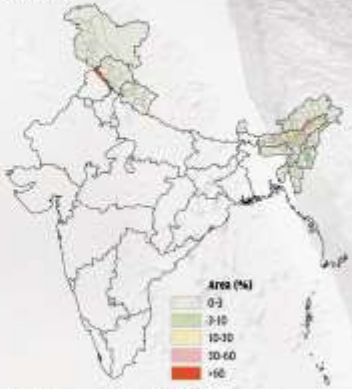
20.5%
on service sector

CLIMATE CHANGE TRENDS

Change in maximum temperature (2021-50 over 1961-90)
Change in the maximum temperature of most districts of the region is projected to increase by at least 1.5°C-2°C



Flood
The northeastern states of India, particularly parts of Assam and Manipur, are vulnerable



Source: Rama Rao C.A., et al., Atlas on Vulnerability of Indian Agriculture to Climate Change, Central Research Institute for Dryland Agriculture, Hyderabad, 2021

The mean temperature of the Himalayas has gone up by **0.6°C** in the past 30 years; the frequency of warmer days is also increasing

Climate change projections and impacts

Increase in annual temperature
0.9°C ± 0.6°C to 2.6°C ± 0.7°C

Annual rainfall is likely to increase (by 2021-50)
5-13%

Flood: An increase in flooding to the extent of
10% to >30% (by 2021-50)

Drought: Moderate to extreme drought is projected in certain parts

Impact and vulnerabilities:

- Flash flood due to glacial lake outbursts may lead to landslides and affect large-scale food security
- Himalayan glaciers melting faster than others elsewhere in the world
- Productivity of apple has decreased by 2-3% over the past few years; this will go down further
- Projected increase in intensity of rainy days is 2-12% in the Himalayan region

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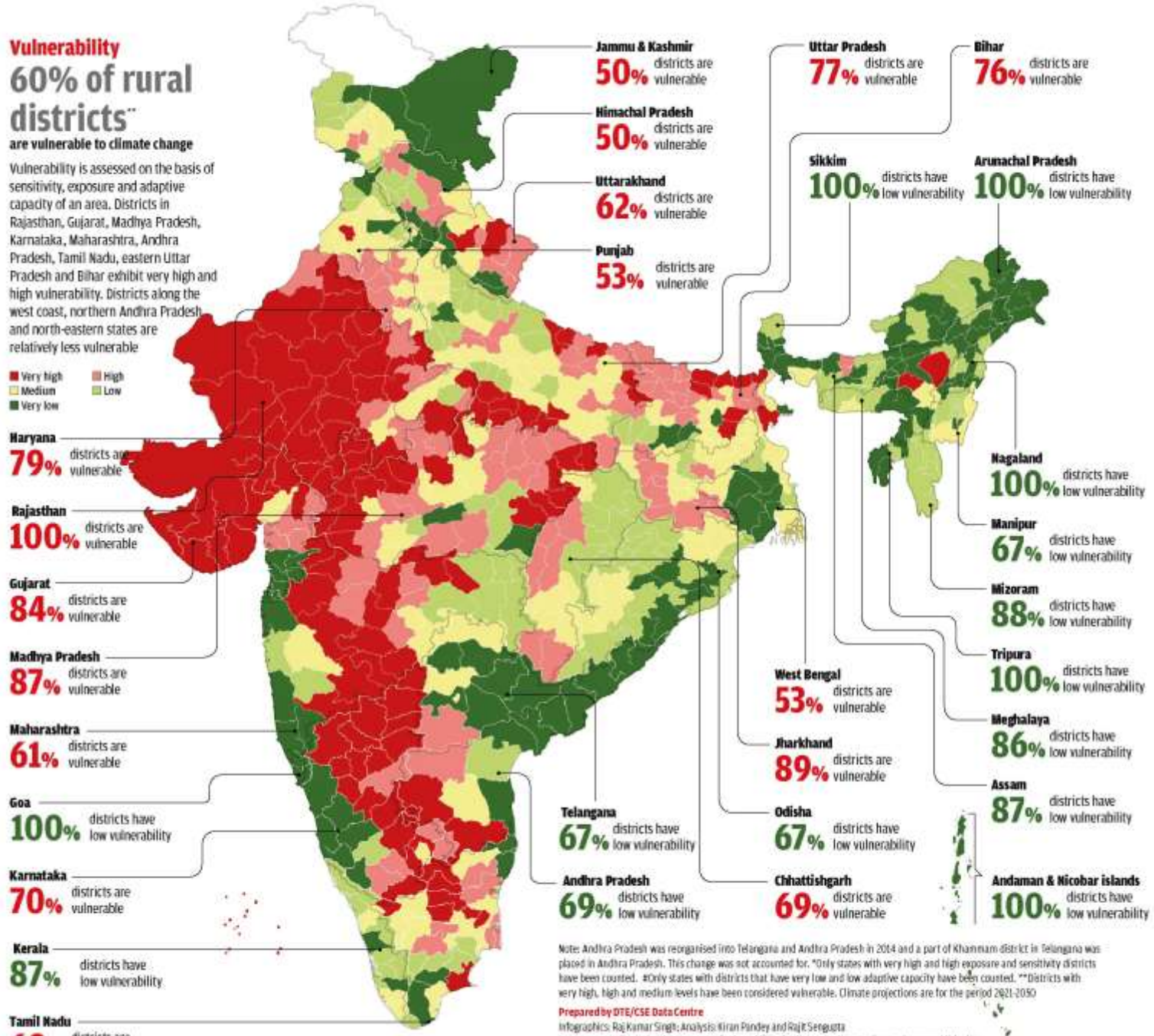
Vulnerability

60% of rural districts**

are vulnerable to climate change

Vulnerability is assessed on the basis of sensitivity, exposure and adaptive capacity of an area. Districts in Rajasthan, Gujarat, Madhya Pradesh, Karnataka, Maharashtra, Andhra Pradesh, Tamil Nadu, eastern Uttar Pradesh and Bihar exhibit very high and high vulnerability. Districts along the west coast, northern Andhra Pradesh and north-eastern states are relatively less vulnerable



Note: Andhra Pradesh was reorganised into Telangana and Andhra Pradesh in 2014 and a part of Khammam district in Telangana was placed in Andhra Pradesh. This change was not accounted for. *Only states with very high and high exposure and sensitivity districts have been counted. #Only states with districts that have very low and low adaptive capacity have been counted. **Districts with very high, high and medium levels have been considered vulnerable. Climate projections are for the period 2021-2050

Prepared by DTE/CSE Data Centre

Infographics: Raj Kumar Singh; Analysis: Kiran Pandey and Rajit Sengupta

Data source: *A district level assessment of vulnerability of Indian agriculture to climate change*, published in *Current Science* on May 25, 2016. For more such infographics visit: www.downtoearth.org.in/infographics

But the local has a global link..

- It is in the Himalayan region, the planet's Third Pole
- This region is also called the Hindu-Kush region, the most populated and sensitive region
- This region controls a significant climate of the planet; its rivers sustain 1.5 billion people
- So, if you feel cold in summer or hot in winter, the world has to be told

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But the local has a global link…

- The HKH region warming faster than the global average
- It would continue to warm for this century even if the world meets 1.5 degree target
- Last 60 years, extreme cold events have become lesser while extreme warm weather events have become more pronounced
- Every decade HKH loses one cold night and half a cold day
- Warm nights have increased by 1.7 per decade, the region gets 1.2 warm days every decade.
- HKH might contain 27 per cent less ice than previously suggested

But why…

- Total emission in HP is 10.08 MtCO2e which is 0.67% of the total GHG emissions in the country in 2009 which has come down to 9.197 MtCO2e in 2012
- The per capita fossil fuel CO2 emission is 1/6th of the global average

Now the play…