CENTRE FOR SCIENCE AND ENVIRONMENT

ANIL AGARWAL DIALOGUE 2019

ANNUAL MEDIA CONCLAVE
ON THE STATE OF INDIA'S ENVIRONMENT

FEBRUARY 11-13, 2019

Anil Agarwal Environment Training Institute (AAETI)
Nimli, Alwar, Rajasthan

BEING A FARMER

Being a farmer…

Role

- The smallest farmer in the word, sustaining one of the largest consumers
- Shoulder the country's food self-sufficiency as well as own

Being a farmer…

Economy

- Rs. 26.70 lakh crore turnover; 60 crore people engaged making it the largest private enterprise
- Dependence is increasing but contribution to GDP declining
- 7 crore HHs in 1951 to 12 crore in 2011; 51% in GDP to 17% now
- Landless agriculture labourers: 2.7 crore/1951 to 14.4 crore/2011

Being a farmer…

Income

- India fastest economy and highest growth in food consumption expenditure; but every 2nd farmer is indebted
- India, a biomass economy: 1 Ha supports 7 people
- A losing preposition: Income Rs. 6,426/month; Expenditure Rs. 6,223/month
- 85% farmers earn just 9% of total agri-income

Being a farmer…

Prospect

- The promise: To double income by 2022
- The hope: Third consecutive historic foodgrain production

But

- December: Food commodities hit deflation; govt. admits no income in last two years
- Farm income fell by 6% a year during 2014-16; farmers earn less than daily wage labourer
- Doubling income will take 25 years
- AND: Farmers lose Rs. 63,000 crore a year for just not selling produces they have invested for

Being a farmer…

Threat

- Monsoon: Fourth consecutive contrasting weather events
- 265 districts heavy flooding; 235 drought-like
- Altogether, 500 million people affected by weather-related events
- Flooded districts also rain-deficit
- 850 cases of crop losses/ last 2 years; 300 districts under drought now

Being a farmer…

Climate change

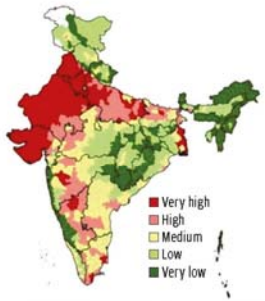
- Economic Survey, 2018: CC will reduce farm income by 20-25% in medium term
- Extreme heat reduces income by 4.3%; extreme rainfall by 13.7%
- 60 crore Indians in extreme heat and rainfall hotspots

Being a farmer…

- India ranks 13th most vulnerable country
- 150 poorest districts are most vulnerable
- Most of these districts are also agrarian
- CC will lead to Rs. 700 crore/year loss by 2030
- Income of 10% population will be impacted

ON THE EDGE

By 2050, India is likely to experience a temperature rise of 1-4oC; rainfall will increase by 9-16 per cent. This will have a detrimental effect on farmers in more than half of the country. However, severity of the impact will differ from district to district, depending on the region's sensitivity. People's resilience in these areas will depend on their exposure to extreme events and on their adaptive capacity.

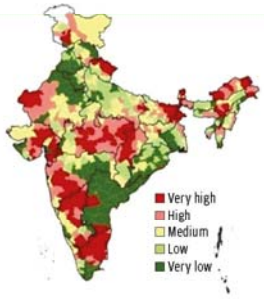


Sensitivity

12 states*

have districts that are highly sensitive to climate change

Sensitivity is the degree to which a region gets affected by climate-related stimuli, such as climate variability and the frequency and magnitude of extremes events like cyclone and drought. It is determined by demographic and environmental conditions of the region. Most districts in north-western India are highly sensitive to climate change impacts. Eastern, north-eastern, northern and west coast of the country have relatively low sensitivity.

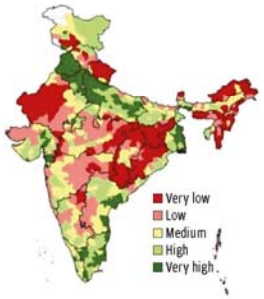


Exposure

21 states*

have districts that are highly exposed to climate change risks

Exposure is defined as the nature and degree to which a system is exposed to significant climatic variations. It includes parameters, such as maximum and minimum temperatures and the number of rainy days. High to very high exposure has been observed in districts in Madhya Pradesh, Karnataka, Rajasthan, Gujarat, Maharashtra, Bihar, Tamil Nadu, north-eastern states and Jammu & Kashmir. Districts with low exposure are in Andhra Pradesh, Odisha, West Bengal, Punjab, Haryana, Rajasthan and Uttar Pradesh.



Adaptive capacity

17 states*

have districts with low adaptive capacity to climate change

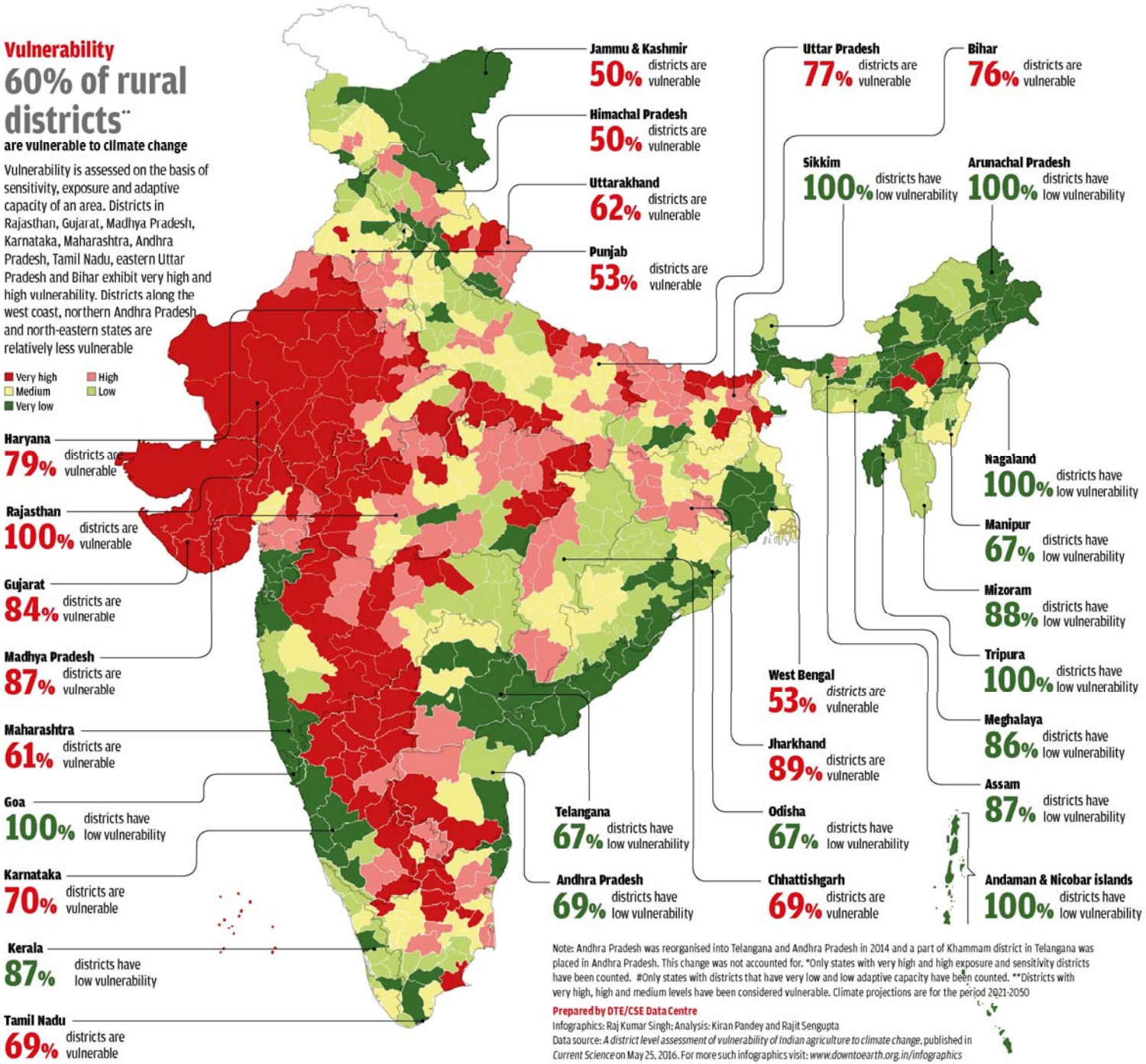
Adaptive capacity is the ability of a region to adjust to climate change. It is a function of wealth, technology, education, skills, infrastructure, access to resources, and management capabilities. Adaptive capacity is found to be very low in the eastern and north-eastern states, Rajasthan, Madhya Pradesh, peninsular and hill regions. Adaptive capacity is high in Punjab, Haryana, western Uttar Pradesh and Tamil Nadu.

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

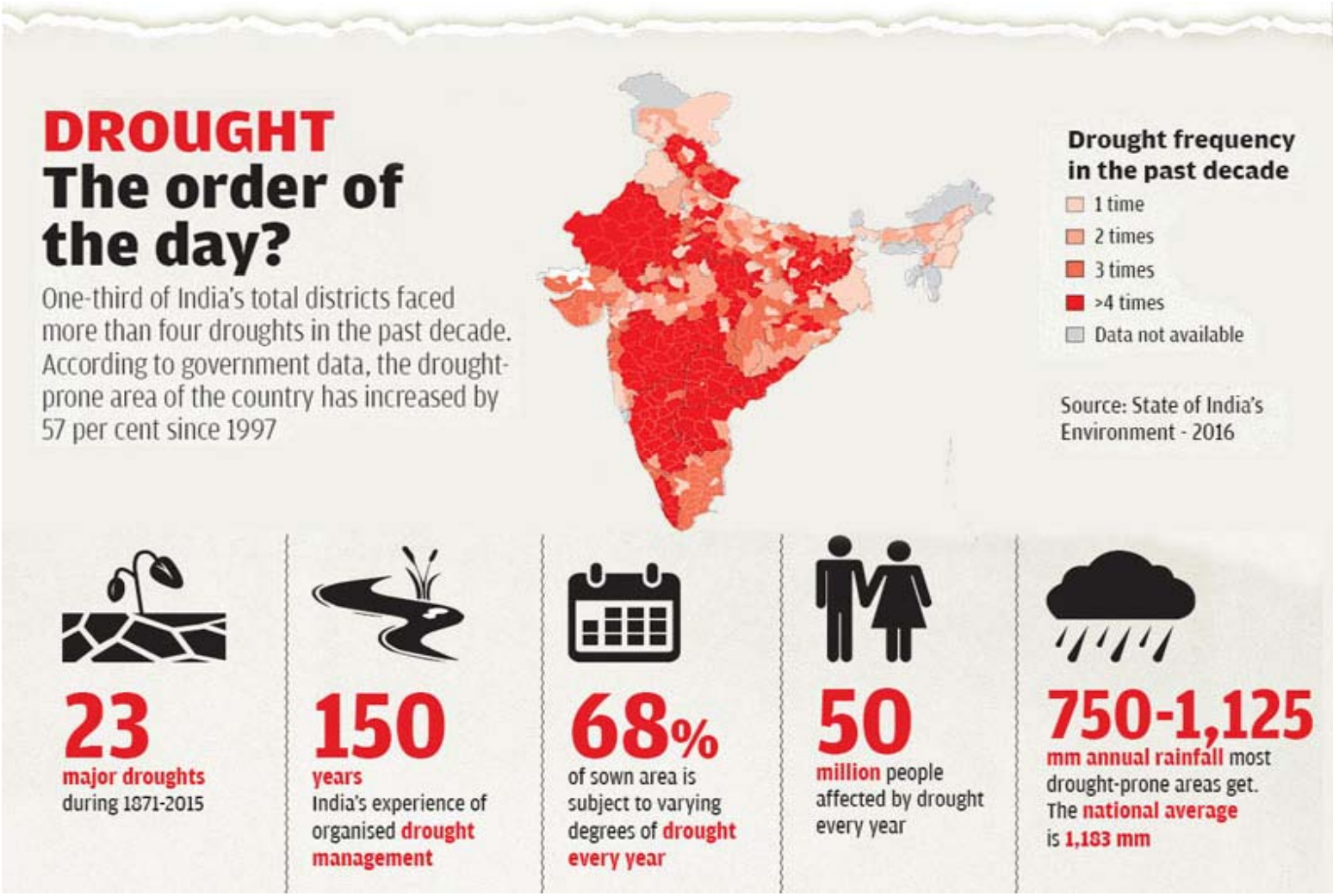
Data source: *A district level assessment of vulnerability of Indian agriculture to climate change*, published in *Current Science* on May 25, 2016. For more such infographics visit: *www.downtoearth.org.in/infographics*

Being a farmer…

Drought

- 300 districts under drought this year; 1/3rd districts are chronic drought-prone
- Increasingly, drought is setting in before monsoon ends
- States are having more and more drought-prone districts

Being a farmer…



Being a farmer…

The loss after loss

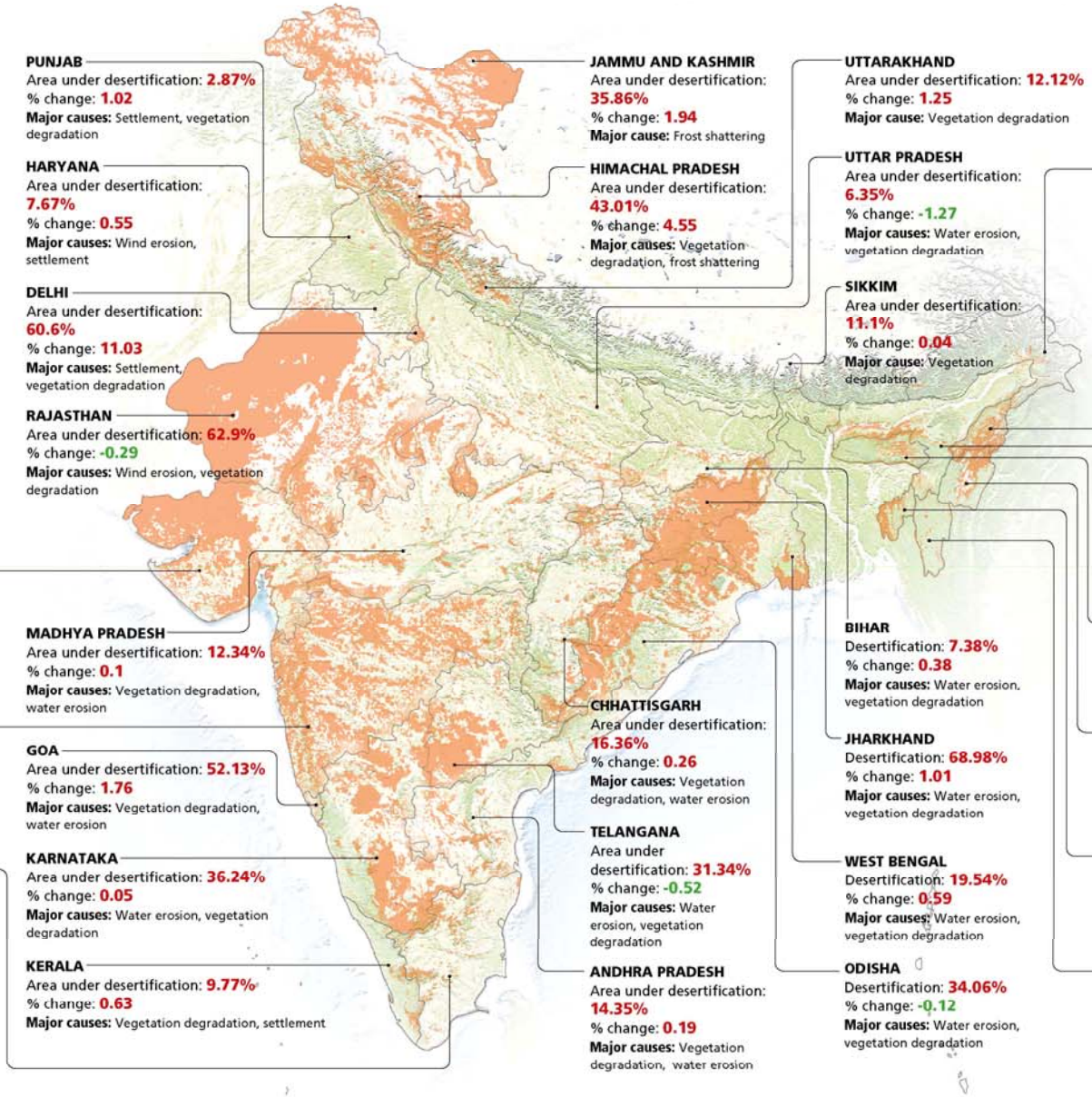
- Chhattisgarh, Odisha and Jharkhand: $400 million/year loss in a drought year
- 13 million people fall below poverty line
- “Inadequate rain” and drought two biggest disasters
- Bundelkhand: 16th consecutive crop loss; Marathwada: 6th consecutive deficit rain

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

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

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

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

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

* *% 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

Being a farmer…

Future shock

- 42% of cultivable lands in drought prone districts
- 68% lands are rainfed; so dependent on monsoon entirely
- Impacts food security; Green Revolution areas will not meet the demand
- The drought-prone districts are the saviour

Being a farmer…

Human-made

- It is not a drought
- Drought has nothing to do with deficit monsoon
- Rain/water doesn't have anything to do with suicide
- Then, who is responsible

Being a farmer…

The capital

- In the last 12 years, MGNREGA has created, on an average, 22 water bodies in every village
- Some 14 million water harvesting structures have been built.
- 64% of the total expenditure under MGNREGA was on agriculture and agriculture-related works.
- From its inception in 2006 to March 2016 , the government has spent over Rs 3 lakh crore on these
- Of this, Rs 2,30,000 crore has been spent as wage or money that has gone to people directly

Being a farmer…

The solution

- There are villages in the same areas who don't see a drought
- They have raised their income by even 700%
- They have not spent extra; don't depend on takers
- And, they are not using rocket science

Being a farmer…

The Anil Agarwal formula

- In 10 years India can be drought-proof
- Barmer: 100 mm rain but never water crisis
- In 1 Ha, harvests 10 lakhs litres of water
- Enough to meet drinking and cooking water needs of 182 people at a liberal 15 litres per day

Being a farmer…

- Average Indian village needs 1.12 hectares to capture 6.57 million litres of water
- It will use in a year for cooking and drinking
- If there is a drought and rainfall levels dip to half the normal, the land required would rise to a mere 2.24 hectares.
- The amount of land needed to meet the drinking water needs of an average village will vary from 0.10 hectares in Arunachal Pradesh (average population 236) where villages are small and rainfall high to 8.46 hectares in Delhi where villages are big (average population 4769) and rainfall is low.