

INRM Beginner Level Training

Session 01: What Is NRM? Importance of Natural Resource Management

Participant's Expectation

Natural Resources?



Natural Resource Management?

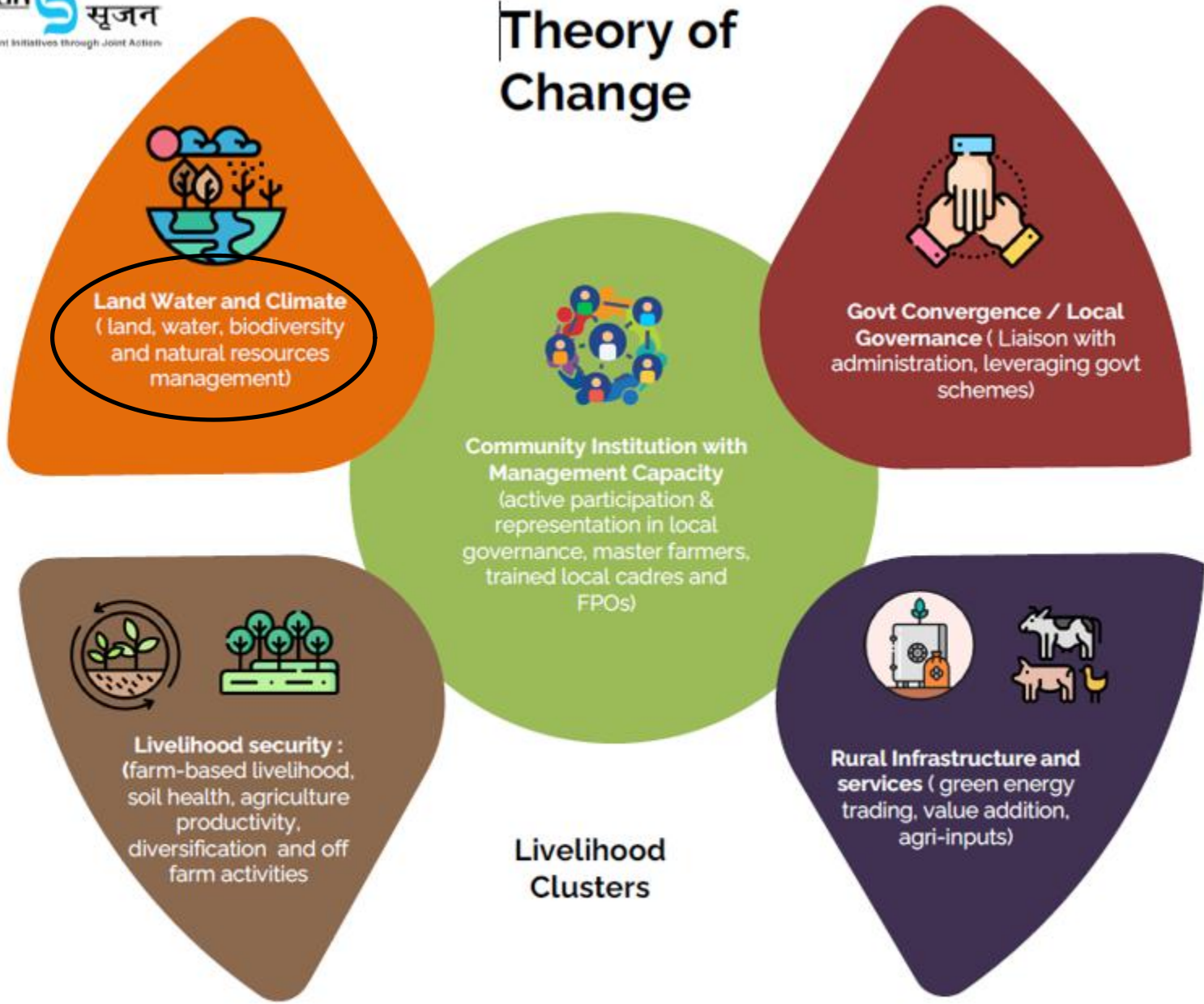
Definitions

- Soil, water and vegetations are three basic natural resources. The survival of creation depends upon them and nature has provided them as assets to human beings.
- In wider view, land, water, bio-diversity and genetic resources, biomass resources, forests, livestock, fisheries, wild flora and fauna are considered as natural resources.
- Natural Resource Management (NRM) refers to the sustainable utilization of major natural resources, such as land, water, air, minerals, forest, fisheries, and wild flora and fauna. Together, these resources provide the ecosystem services that underpin human life.

Source: ICAR Website

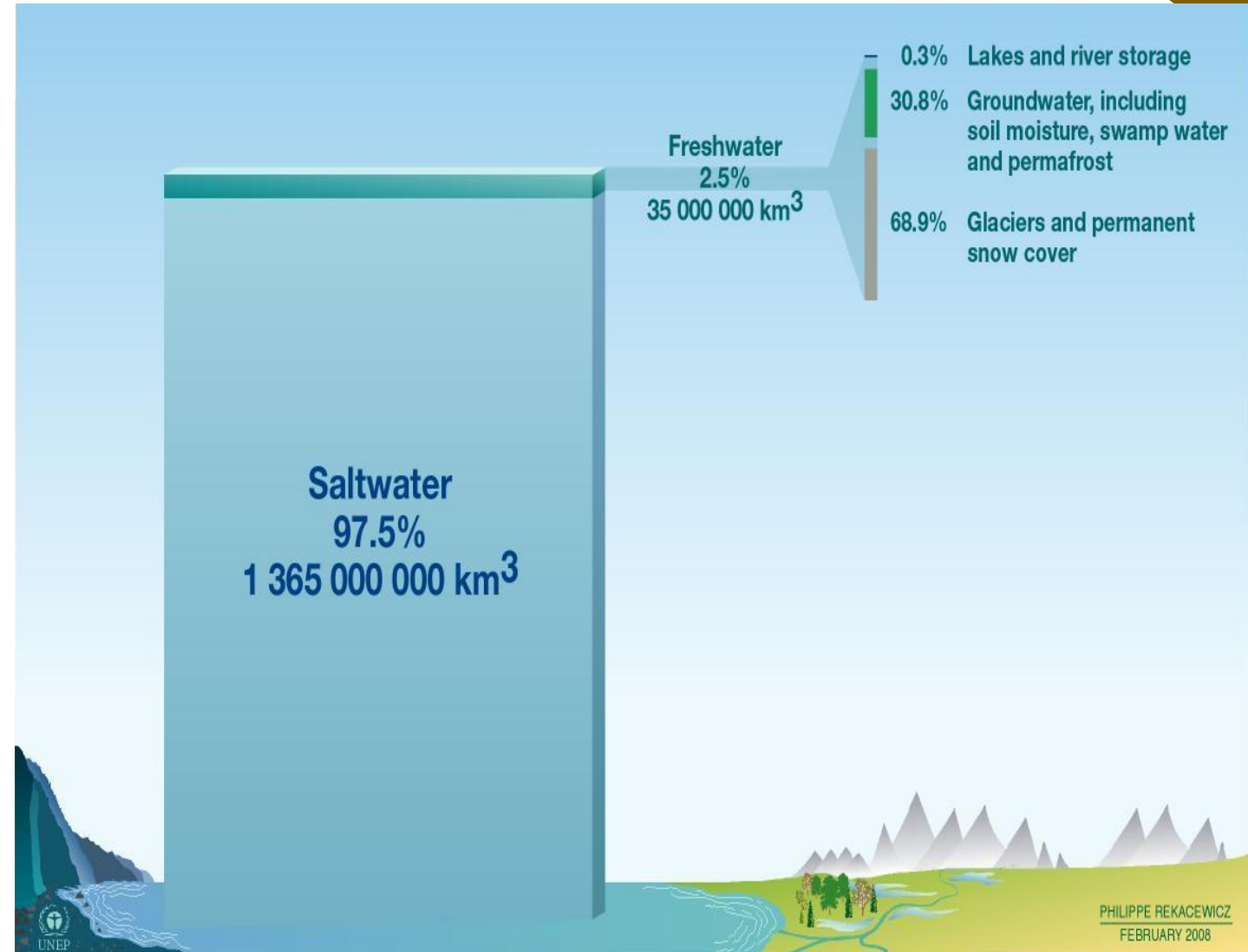
<https://krishi.icar.gov.in/jspui/bitstream/123456789/32696/1/43%20Natural%20Resource%20Management%20Through%20Land%20Development%20Process%20with%20Healthy%20Farm%20Machinery.pdf>

Theory of Change



Water – Sources?

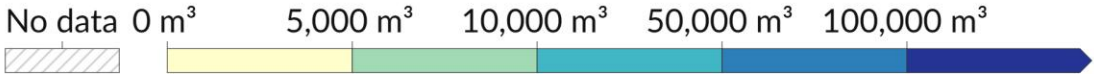
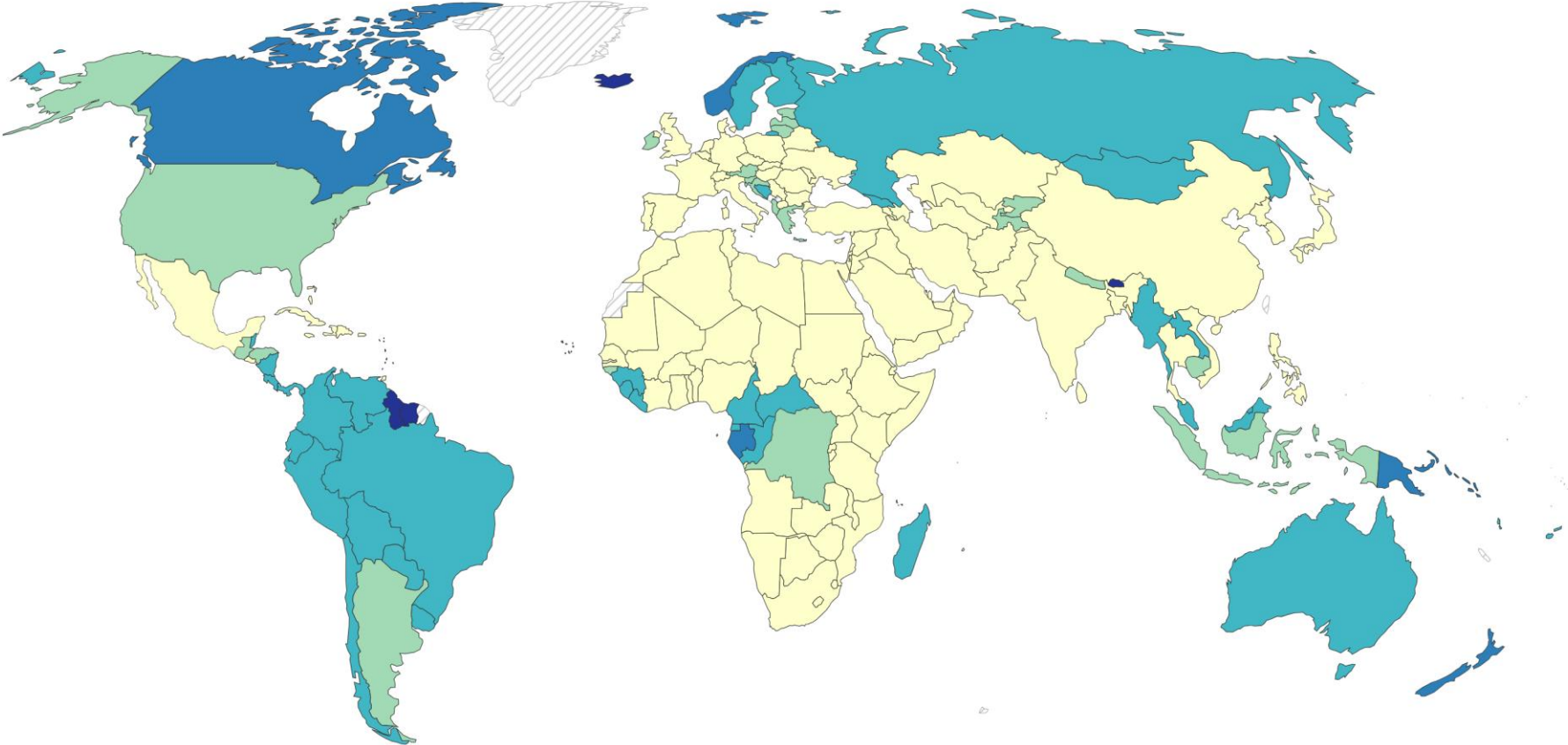
- Ocean
- Rivers
- Lakes
- Drainage Lines
- Ground Water
- Artificial Structures
- Glaciers and Permanent Snow Cover
- Others If Missed..



Source: Igor A. Shiklomanov, State Hydrological Institute (SHI, St. Petersburg) and United Nations Educational, Scientific and Cultural Organisation (UNESCO, Paris), 1999.

Renewable freshwater resources per person, 2020

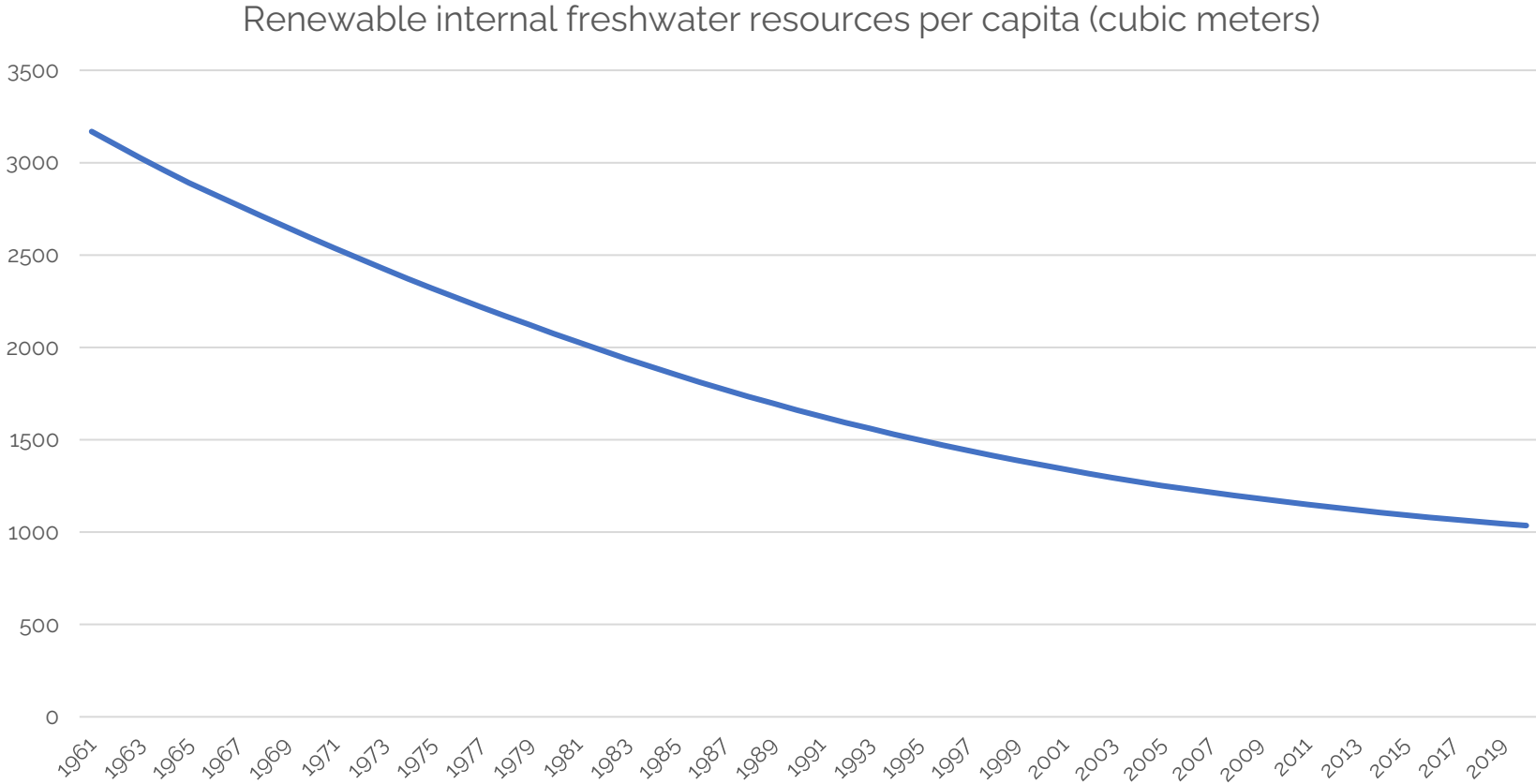
Renewable internal freshwater resources refers to the quantity of internal freshwater from inflowing river basins and recharging groundwater aquifers. This is measured in cubic meters per person per year.



Source:

<https://ourworldindata.org/grapher/renewable-water-resources-per-capita>

India



Source: <https://ourworldindata.org/grapher/renewable-water-resources-per-capita>

Water Uses in India

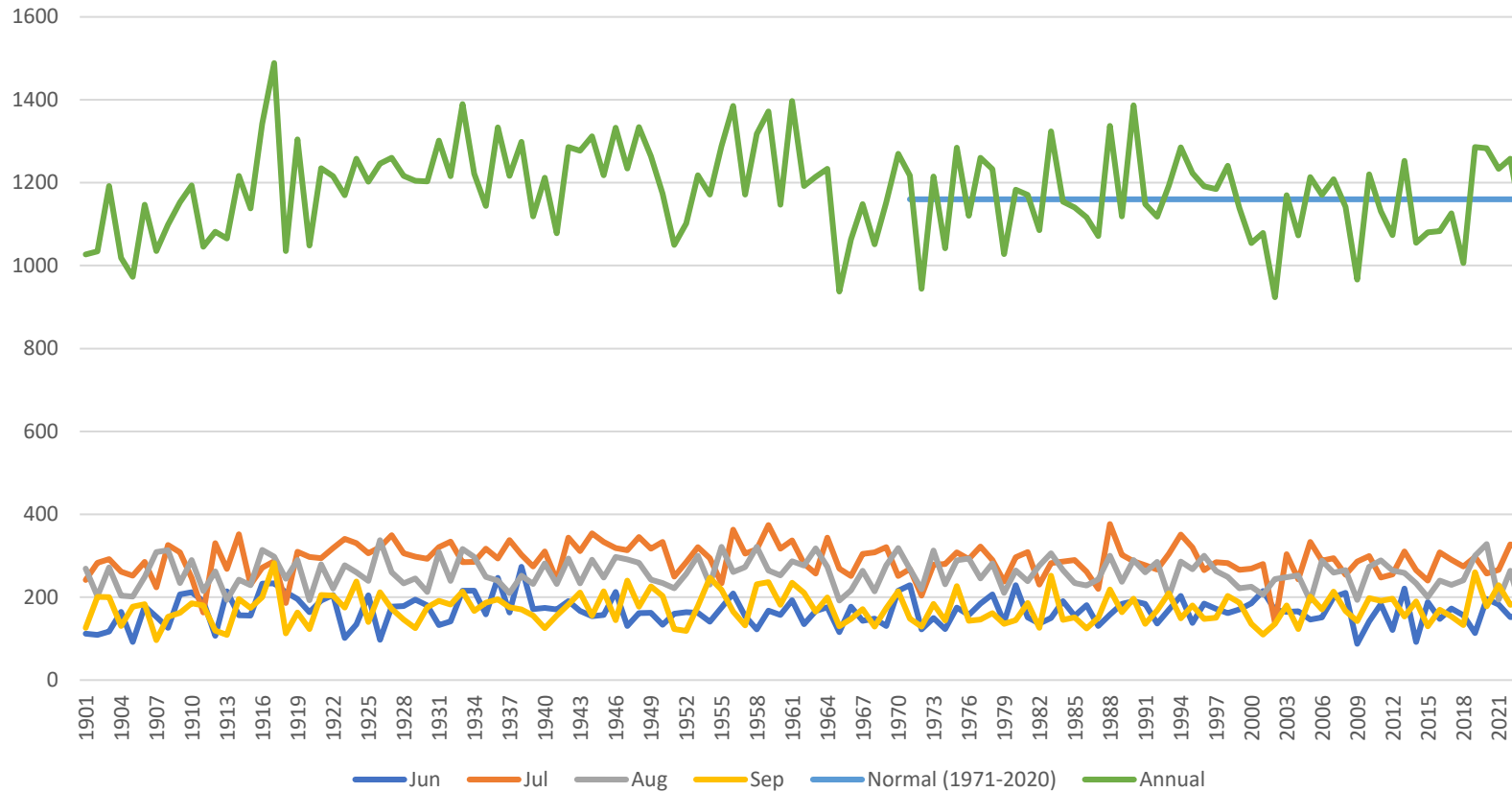
*“The average annual water resource of the 22 basins of the country has been assessed as 1999.20 Billion Cubic Meters (BCM), as per the study report ‘Reassessment of Water Availability in India using Space Inputs’ released by Ministry of Jal Shakti. Due to geological and other factors, the utilizable water available is limited to 1122 BCM per annum, comprising of 690 BCM of surface water and 432 BCM of ground water. Out of this, the water potential utilized is around 699 BCM, comprising of 450 BCM of surface water and 249 BCM of groundwater. **85-90% of the total usage of water in the country is estimated to be in agriculture sector.**”*

Source:

<https://pib.gov.in/PressReleaseDetail.aspx?PRID=1742813®=3&lang=1>

Rainfall - India

All India Rainfall Data (1901 - 2023) - Rainfall Data in Millimeters



Source:

<https://imd pune.gov.in/lrfindex.php>

Particulars	Jun	Jul	Aug	Sep	Normal (1971-2020)	Annual
Standard Deviation	34.86	39.62	36.20	36.54	0.00	107.87
Mean Rainfall	166.81	290.32	257.03	173.06	1160.00	1179.20
Coefficient of Variation	21%	14%	14%	21%	0%	9%

Ground Water - India

- Over-Exploited Zone (Stage of Extraction > 100%)
- Critical (SoE vary between 90-100%)
- Semi-Critical (SoE vary between 70-90%)
- Safe (SoE lesser than 70%)

Source: Dynamic Ground Water Resource of India 2023, Central Ground Water Board

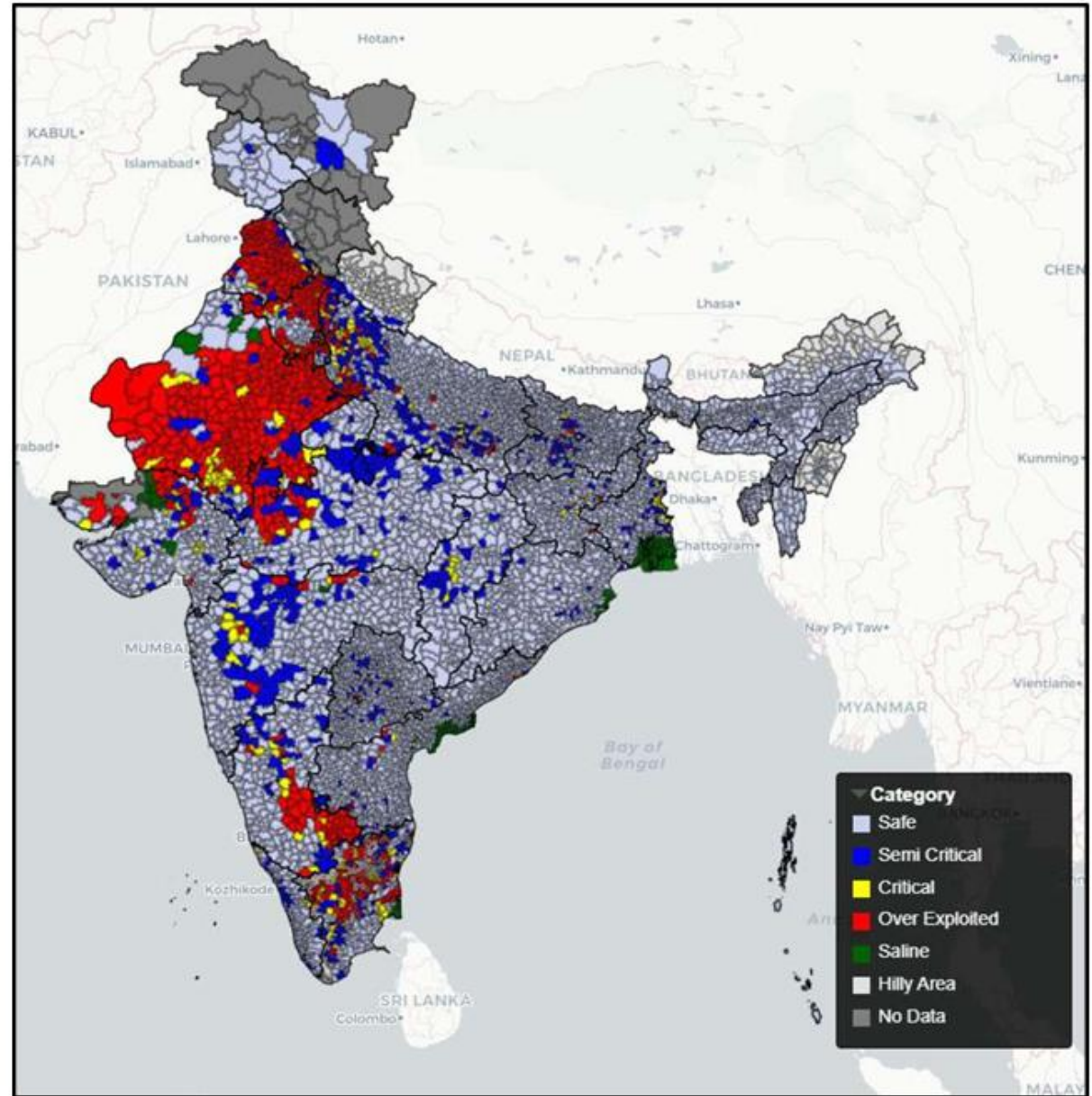


Fig-6.5: Categorization of Assessment Units

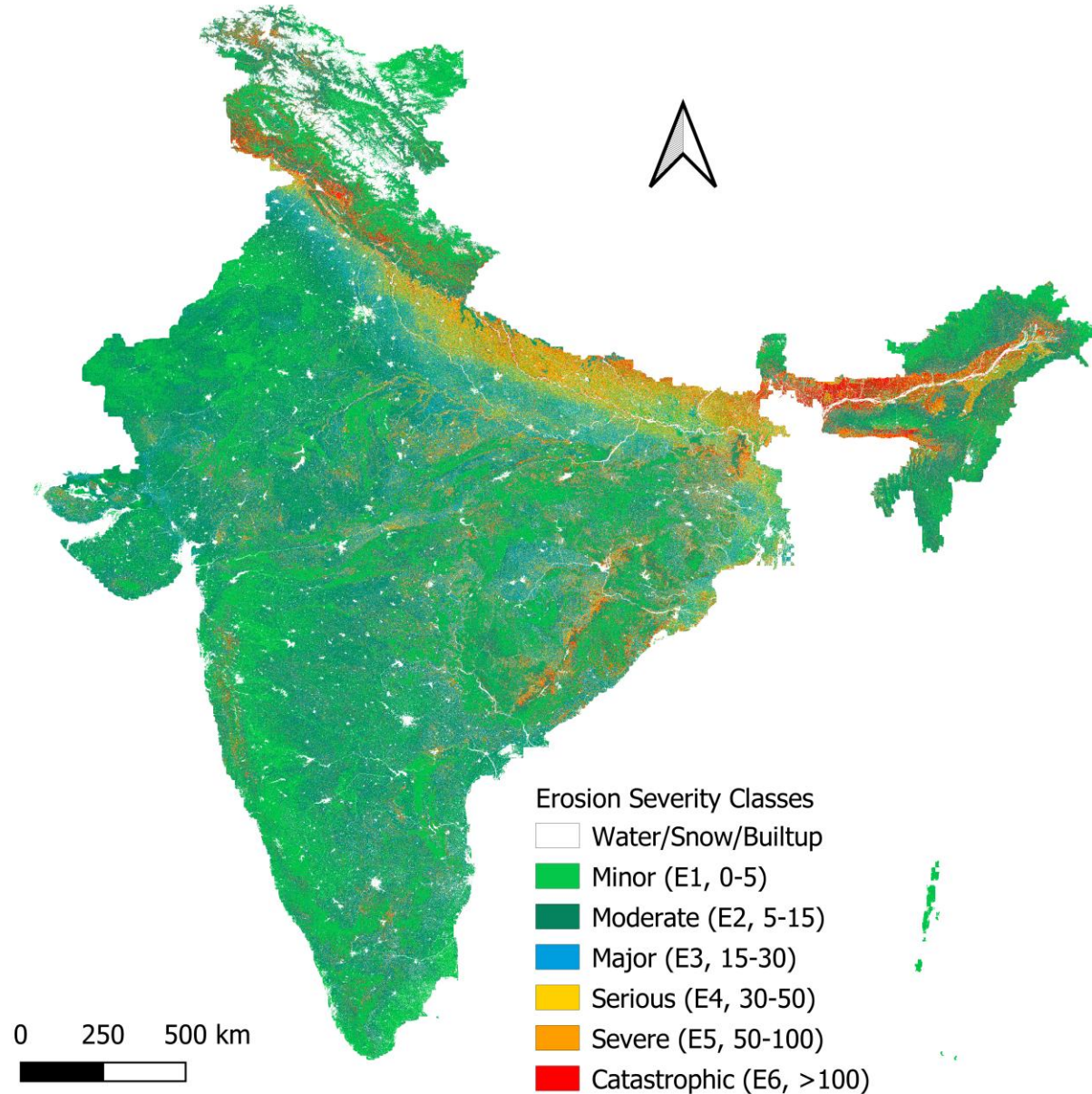
What is Soil Erosion?

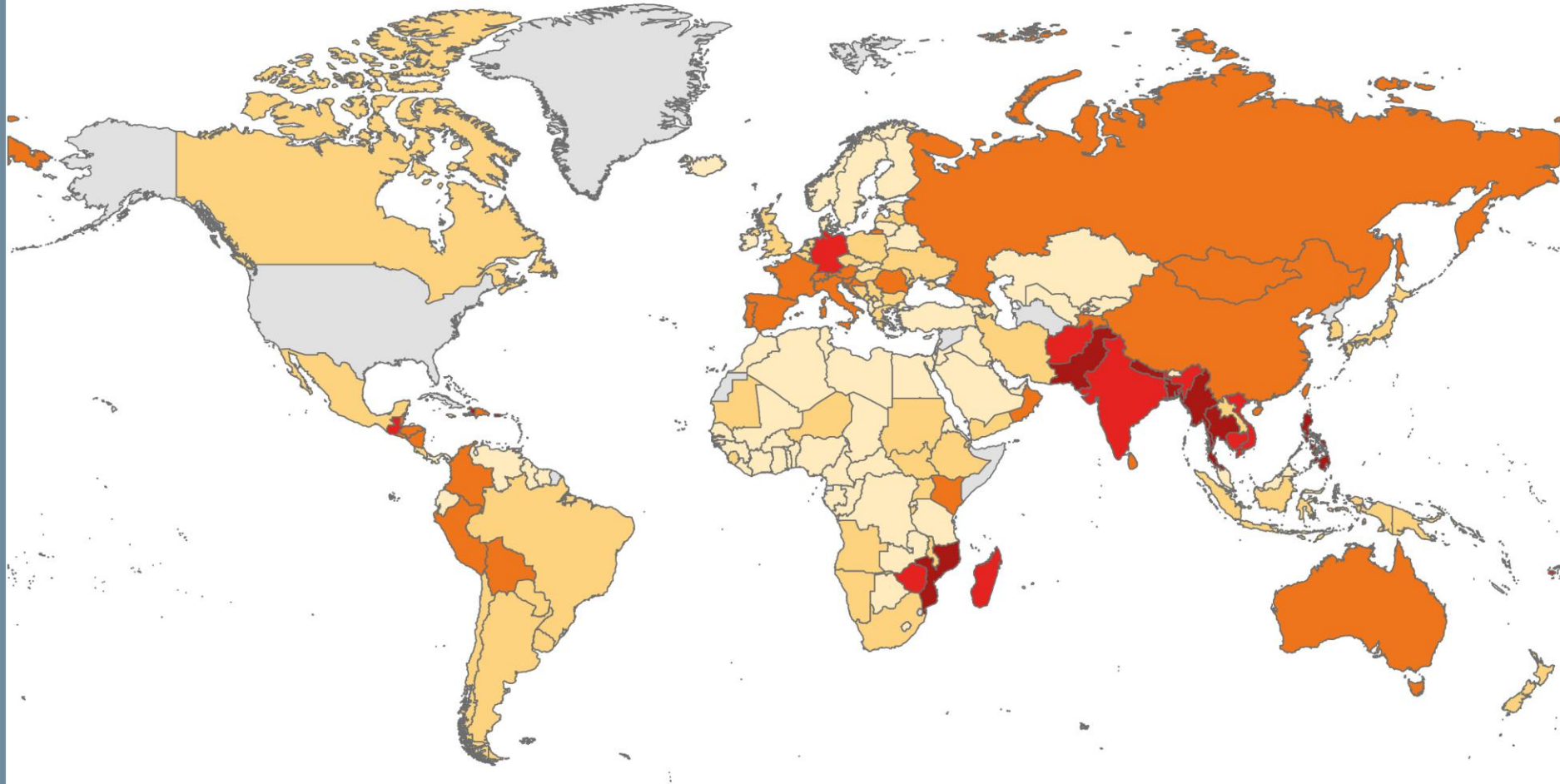
- Soil erosion is the process of detachment and transportation of soil particles from the soil mass due to natural factors such as strong winds, heavy rains, flowing rivers, glaciers as well as human activities like deforestation, over grazing, shifting cultivation, over-ploughing of land and other faulty agricultural practices and removal of topsoil for industrial or infrastructural purposes.
- The yearly potential soil loss for India is calculated at 21 t/ha/yr, with a total possible loss of 1408 million tons annually.
- According to the Centre Soil and Water Conservation, Research and Training Institute (CSWCRTI), Dogra, 2011 report, around 68.4% of the total eroded land of India is due to water induced erosion, with approximately 29% of this eroded soil being transported to sea and permanently loss (Narayana and Babu, 1983).
- More than 78 million hectares of agricultural land in India experience an average productivity loss of eight percent.

Soil Erosion - India

Nearly 30% of the country's landmass is experiencing 'minor' soil erosion, while a critical 3% faces 'Catastrophic' topsoil loss, according to research.

Source: Geospatial Modelling and Mapping of Soil Erosion In India, Ravi Raj





Global Climate Risk Index: Ranking 2000 - 2019

1 - 10 11 - 20 21 - 50 51 - 100 >100 No data

Global Climate Risk Index

www.germanwatch.org/en/cri

Source: Global Climate Risk Index 2021

<https://www.germanwatch.org/en/19777>

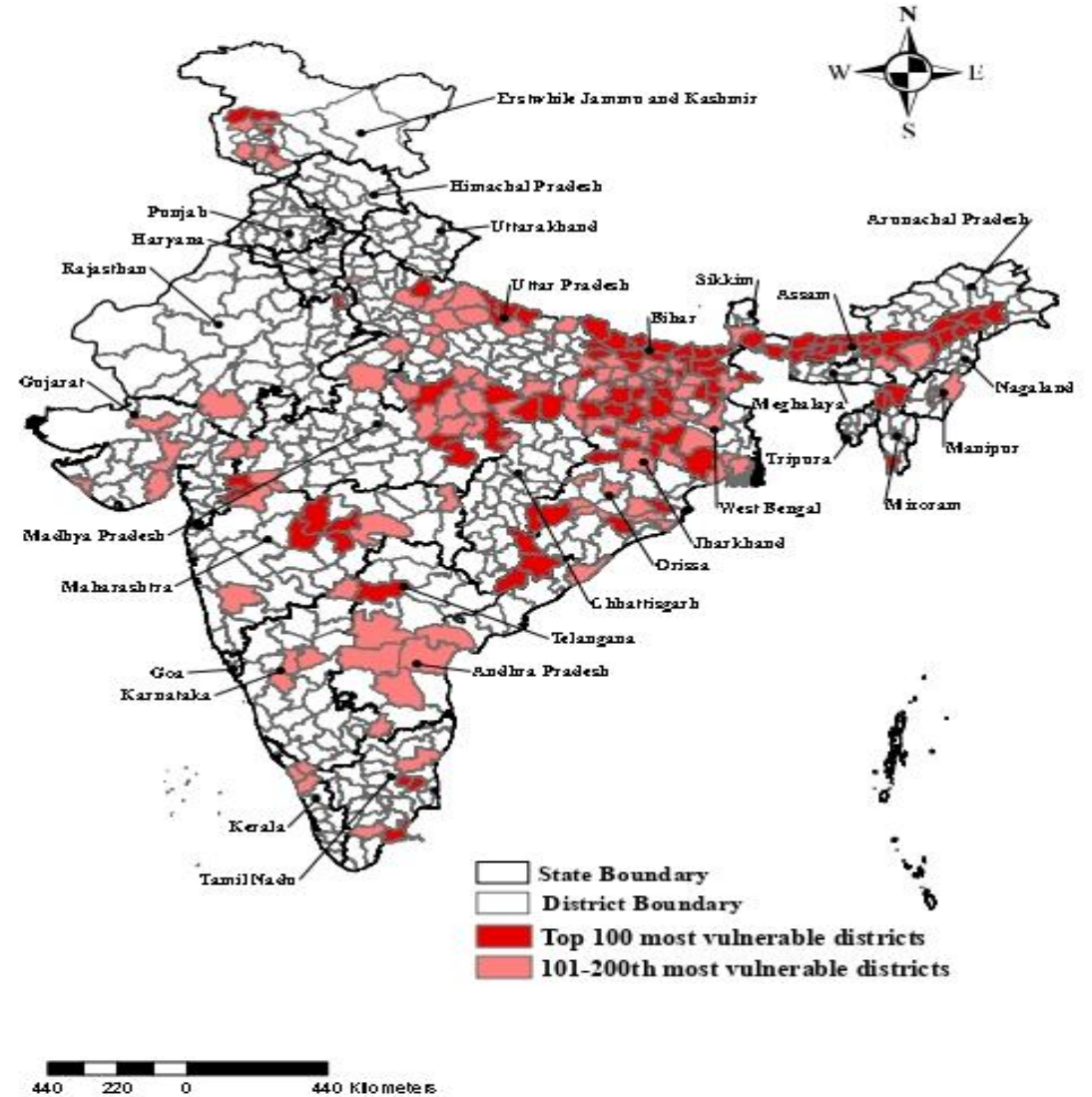
Climate Vulnerability Assessment - India

Table 6: Vulnerability Indices, ranking, and the major drivers of vulnerability for 50 most vulnerable districts

Districts	States	VI	Rank	Drivers of vulnerability
Karimganj	Assam	0.753	1	Rainfed agriculture, lack of crop insurance, small area under horticulture, lack of improved drinking water sources
Goalpara	Assam	0.752	2	Yield variability of food grains, small area under horticulture, low forest area, lack of implementation of MGNREGA
Dhubri	Assam	0.734	3	Rainfed agriculture, small area under horticulture, low forest area
Darrang	Assam	0.732	4	Yield variability of food grains, small area under horticulture, low forest area
Katihar	Bihar	0.725	5	Marginal and small operational landholdings, lack of crop insurance, low forest area
Sonitpur	Assam	0.720	6	Rainfed agriculture, yield variability of food grains, lack of crop insurance, low forest area, low road density
Araria	Bihar	0.707	7	Marginal and small operational landholdings, lack of crop insurance, small area under horticulture, low forest area
Kishanganj	Bihar	0.707	8	Marginal and small operational landholdings, lack of crop insurance, low forest area
Golaghat	Assam	0.707	9	Rainfed agriculture, yield variability of food grains, lack of crop insurance, low forest area, lack of implementation of MGNREGA
Cachar	Assam	0.703	10	Rainfed agriculture
Barpeta	Assam	0.703	11	Yield variability of food grains, small area under horticulture, low forest area
Purnia	Bihar	0.701	12	Marginal and small operational holdings, yield variability of food grains, lack of crop insurance, low forest area
Jamui	Bihar	0.700	13	Marginal and small operational landholdings, lack of crop insurance, lack of area under horticulture, low forest area
Nuapada	Orissa	0.699	14	Low household income, marginal and small operational landholding, rainfed agriculture, lack of area under horticulture, lack of women's participation in workforce, low road density

Source: Climate Vulnerability Assessment for Adaptation Planning in India Using a Common Framework

<https://dst.gov.in/sites/default/files/Full%20Report%20%281%29.pdf>



200 most vulnerable districts (right panel) in India

Climate and Agriculture in India

- Agriculture contributes – 18% of total emissions plus uses 20% of total electricity production
- SOC potential – 2 acres of land, NF managed can sequester emissions of one Indian in one year.
- Climate affects agriculture: (RBI, 2023)
 - 75% of monsoon affected, occurrence of extreme events increasing
 - It has been estimated that without **adaptation**, rain-fed rice yields will fall 20% by 2050, wheat yields by 19% and maize by 18%. To add to that already significant problem, climate change also reduces the nutritional value of the produce.
- Contradictory asks: Donors/investors are focused on Mitigation, Govt have excluded agriculture from emission reduction targets, Farmers need more resilience.

Climate pathway framework, we'll be using



For Each intervention, ask -

- Does it primarily reduce emissions or enhance carbon sinks? (Mitigation)
- Does it help adjust to or manage climate risks? (Adaptation)
- Does it build capacity to cope, recover, or transform in the face of climate shocks? (Resilience)

Thank You!

