

FORUM ON NATURAL CAPITAL ACCOUNTING

November 11, 2019

Ministry of Statistics and Programme Implementation (MoSPI)

Government of India



Starting Point

- Interaction with different agencies on activities to be taken up under the project
- Stock-taking landscape assessment of
 - existing ecosystem accounting initiatives and literature in India
 - data sources for compiling ecosystem accounts
 - institutions and agencies active in this field
 - states where a detailed study for compilation of ecosystem accounts could be launched

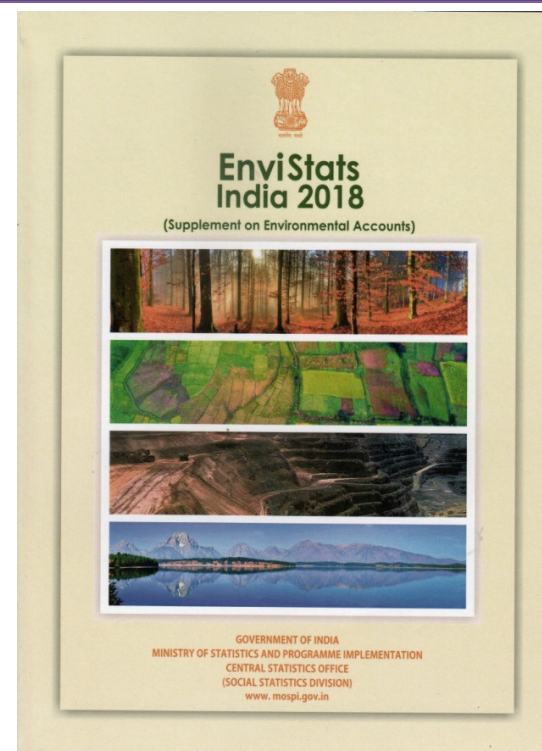
https://seea.un.org/sites/seea.un.org/files/india_assessment_2019.pdf



EnviStats India 2018

Supplement on Environmental Accounts

- Asset Accounts - Combination of environment and ecosystem accounts
- Land account - land cover: stock and change
- Mineral account - proved and probable reserves, remaining resources
- Water account - availability in river basins and groundwater
- Forest accounts - forest cover, growing stock of timber and carbon
- (link: <http://mospi.nic.in/publication/envistats-india-2018-supplement-environmental-accounts-0>)



Highlights of the Asset Accounts

- **Changes in Assets**
 - Change from fallow to farmland, increases in forest cover, carbon stock, proven reserves and resources of minerals
 - Decline in Growing stock in some States and groundwater resources
- **Effect of climate change**
 - Fluctuations in land under 'snow and glacier' and 'wetlands/water bodies'
- **Urbanization**
 - Increase in built-up area - in some cases, at the cost of farmland

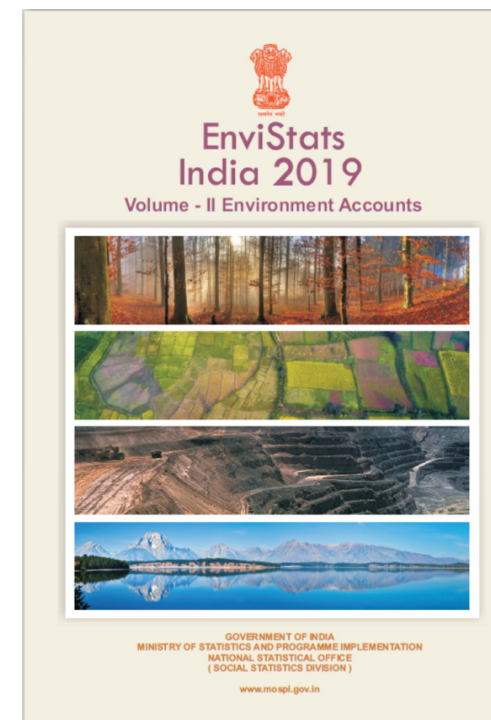


EnviStats India 2019

Volume II : Environment Accounts

- **Soil Nutrition Indices, for the various macro and micro-nutrients**
- **Water Quality Accounts of river water in select River Basins**
- **Water Quality Accounts of groundwater in some States of India**
- **Water Quality Indices of seawater across certain coastal monitoring sites**
- **District-wise values of the ecosystem service provided by land in the 'provisioning of crops'**
- **State-wise values of nature based tourism services**

(link: <http://mospi.nic.in/publication/envistats-india-2019-volii-environment-accounts>)



Soil Nutrient Indices



Soil Nutrient Index

- Nutrient index introduced by Parker et al.(1951)

$$\text{Nutrient Index (N.I.)} = (N_L \times 1 + N_M \times 2 + N_H \times 3) / N_T$$

L- Low, M – Medium, H – High, T – Total

- Data reported for Cycle I (2015 to 2017) and Cycle II (2017-2019) of the Soil Health Card Scheme analysed for compiling the Soil Nutrient Index.

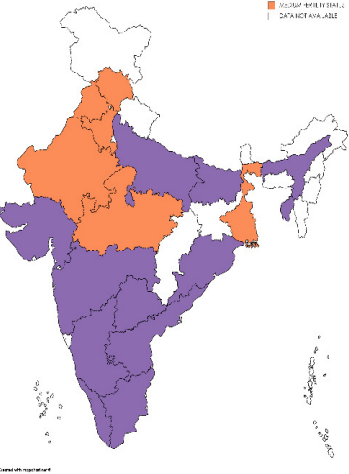
Rating Chart of Nutrient Index			
S.No.	Nutrient Index	Value	Interpretation
1	High	>2.33	High fertility Status of the area
2	Low	<1.67	Low fertility Status of the area
3	Medium	1.67-2.33	Medium fertility Status of the area



Phosphorous Fertility Status

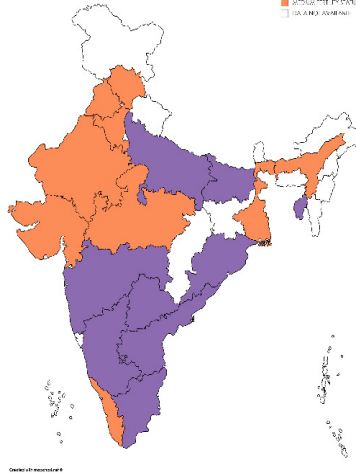
1967

1967 PHOSPHORUS FERTILITY STATUS
 ■ LOW FERTILITY STATUS
 ■ MEDIUM FERTILITY STATUS
 ■ DATA NOT AVAILABLE



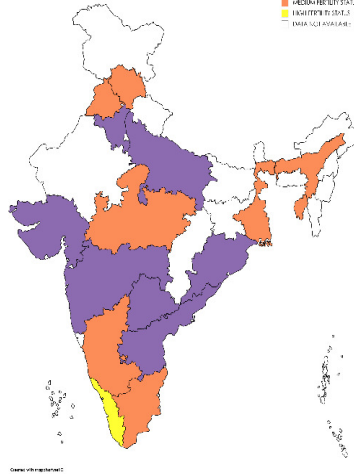
1977

1977 PHOSPHORUS FERTILITY STATUS
 ■ LOW FERTILITY STATUS
 ■ MEDIUM FERTILITY STATUS
 ■ DATA NOT AVAILABLE



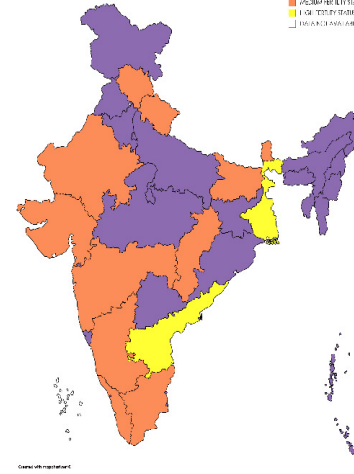
1997

1997 PHOSPHORUS FERTILITY STATUS
 ■ LOW FERTILITY STATUS
 ■ MEDIUM FERTILITY STATUS
 ■ HIGH FERTILITY STATUS
 ■ DATA NOT AVAILABLE



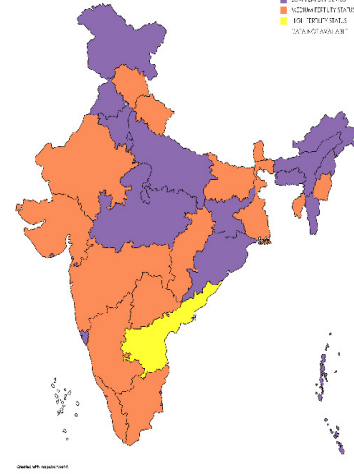
2015-2017

2015-16 to 2016-17 (CYCLE II) PHOSPHORUS FERTILITY STATUS
 ■ LOW FERTILITY STATUS
 ■ MEDIUM FERTILITY STATUS
 ■ HIGH FERTILITY STATUS
 ■ DATA NOT AVAILABLE



2017-2019

2017-18 to 2018-19 (CYCLE III) PHOSPHORUS FERTILITY STATUS
 ■ LOW FERTILITY STATUS
 ■ MEDIUM FERTILITY STATUS
 ■ HIGH FERTILITY STATUS
 ■ DATA NOT AVAILABLE



Rating Chart of Nutrient Index

Legend	Nutrient Index	Value	Interpretation
	Low	<1.67	Low fertility status of the area
	Medium	1.67-2.33	Medium fertility status of the area
	High	>2.33	High fertility status of the area
	Data not available		



Water Quality Accounts



Quality Account for India

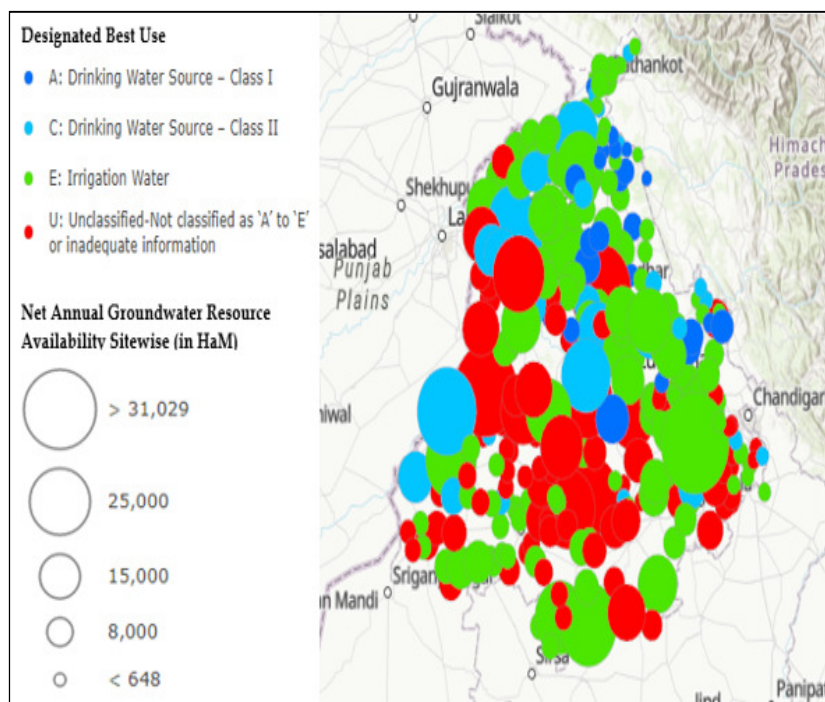
- Designated Best Use Classification

	Year1						Year2					
Quality Class	A	B	C	D	E	U	A	B	C	D	E	U
Monitoring Site 1												
Month1												
Month2												
....												
Monitoring Site 2												
Month1												
Month2												
....												

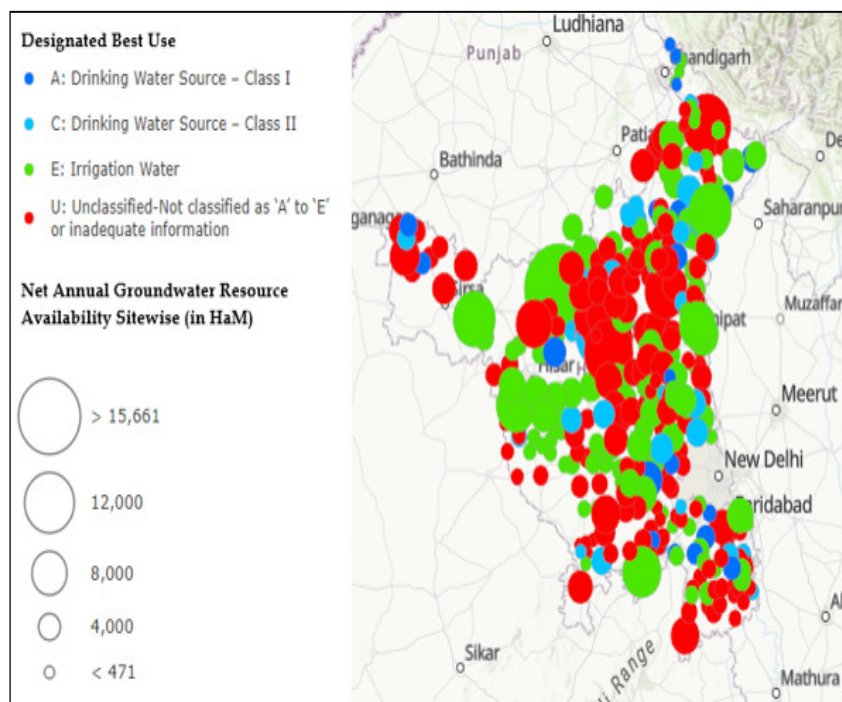


Status of Groundwater Quality 2015

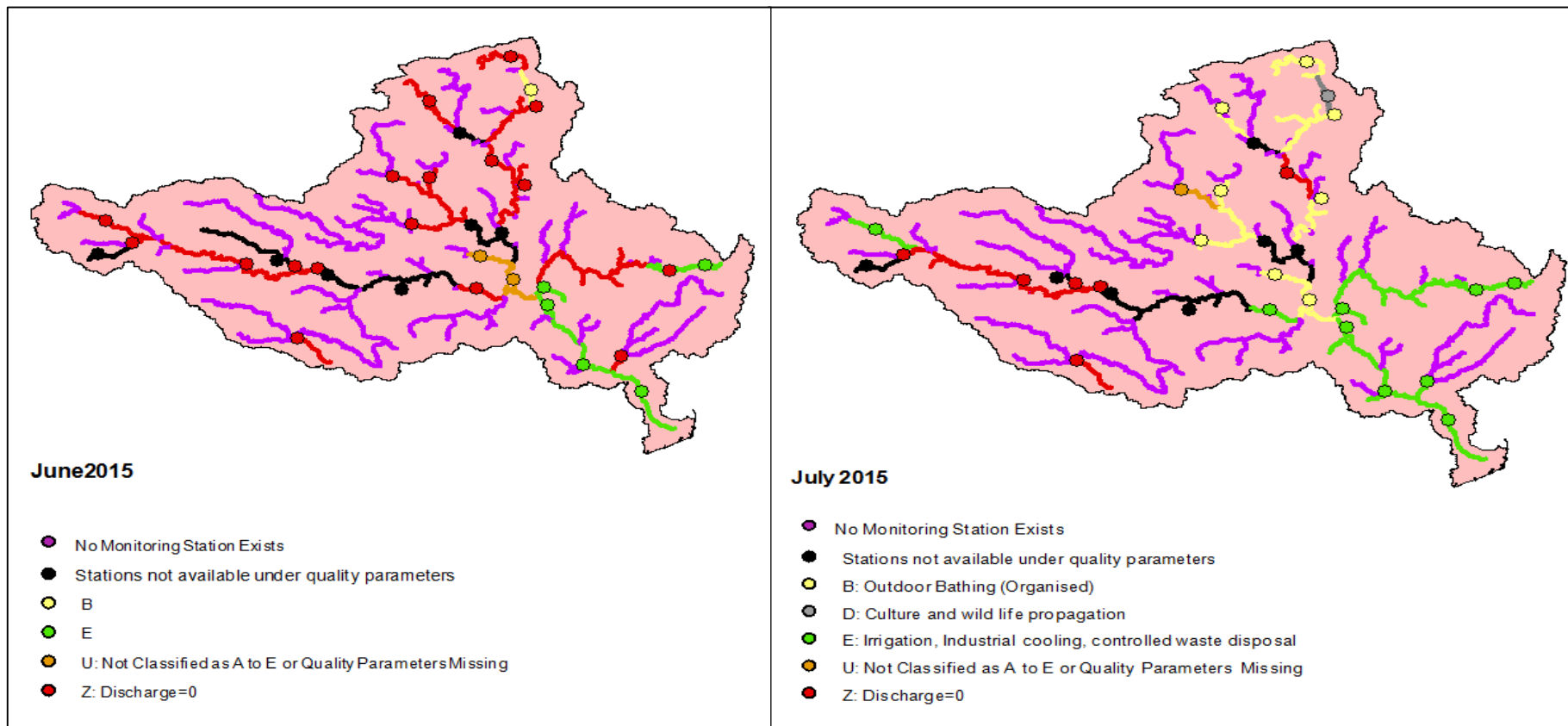
Punjab



Haryana



Surface Water Quality Status of Godavari River Basin (month of June and July 2015)



Valuation of Cropland Ecosystem Services



Measuring “Provisioning of Crops”

- **SEEA prescribes the use of ‘resource rent method’**
- **Appropriation method - Actual payments made to owners in terms of rental value of owned land or rent paid for leased-in land**

Sources of information in India:

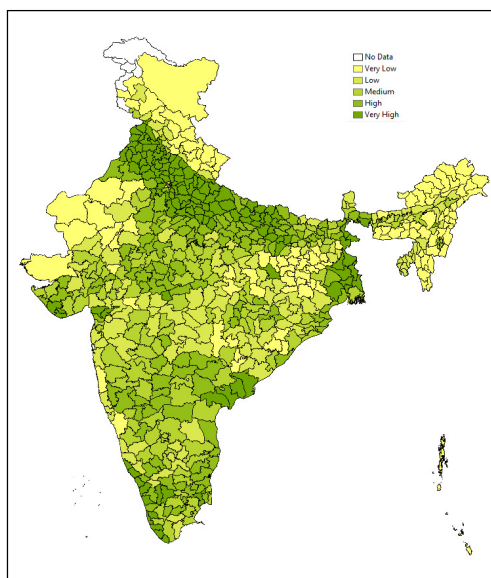
- **Cost of Cultivation Studies**
- **Information on Area, Production and Yield (APY) of major crops**
- **Land Use Statistics**



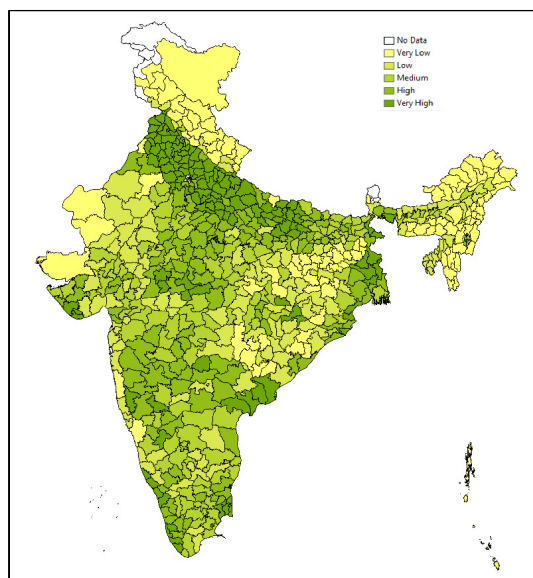
Map on crop provisioning service

(Quintile distribution of Cropland Ecosystem Services)

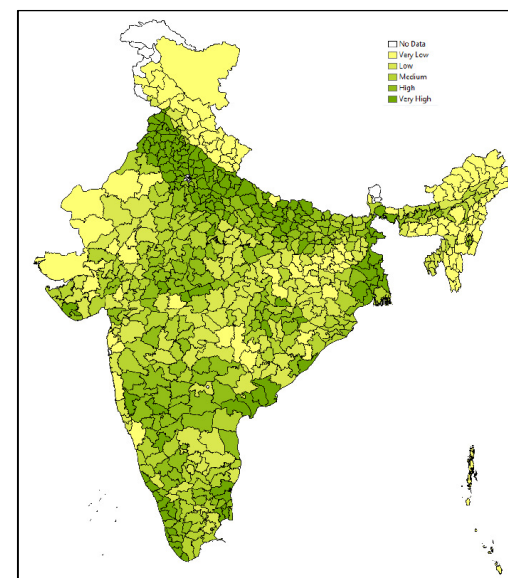
2014-15



2011-12



2005-06



Valuation of Nature-based Tourism Services



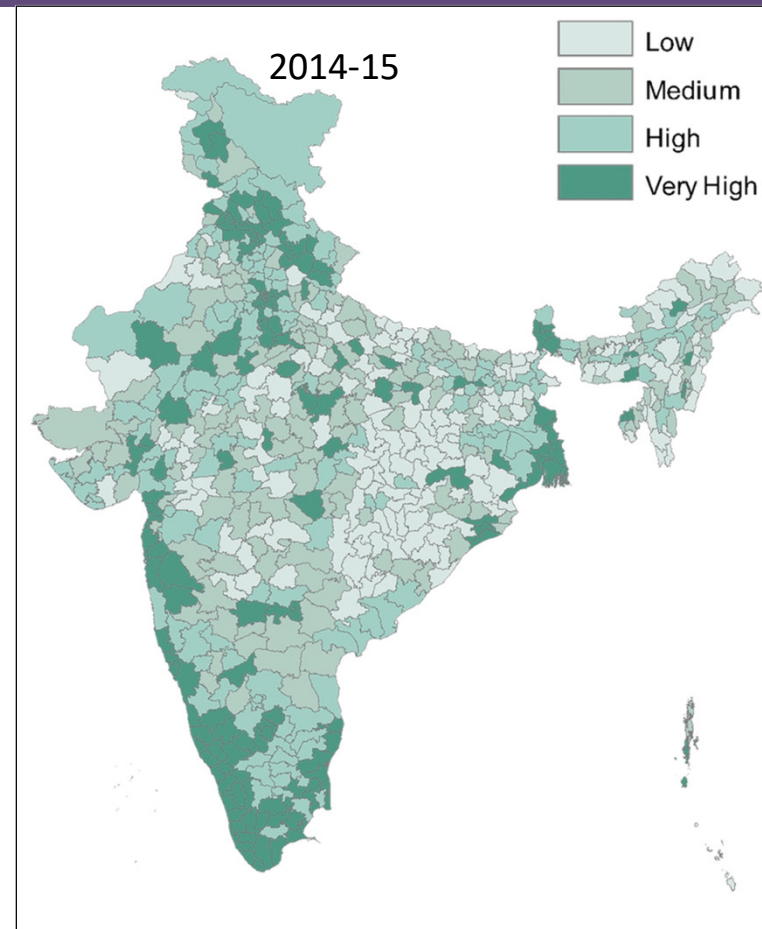
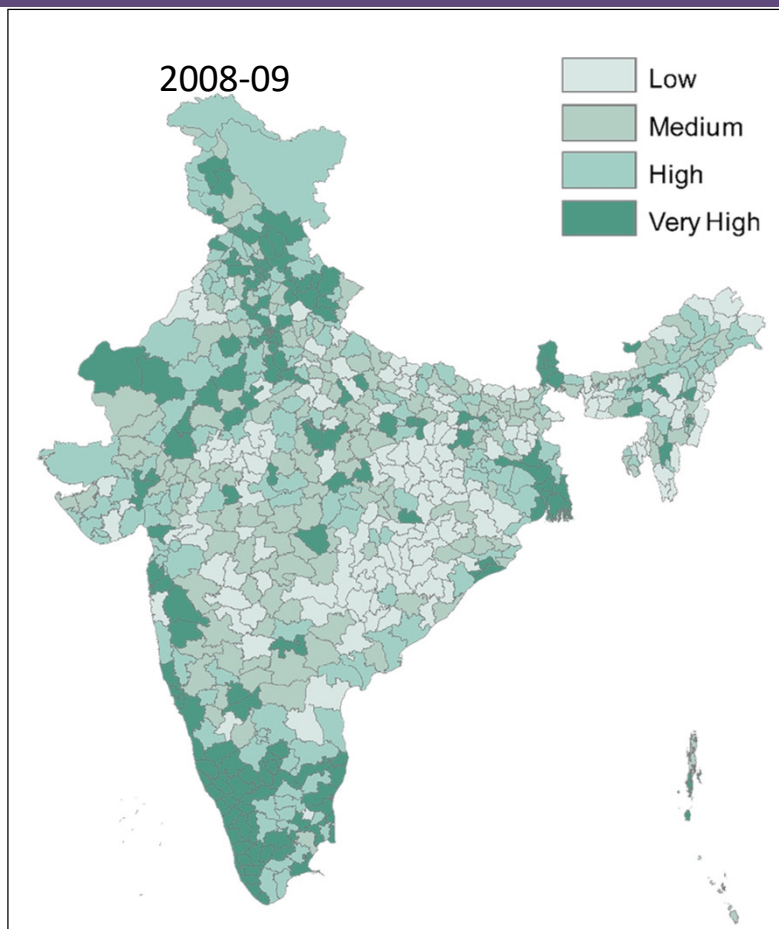
Valuation of Nature-based Tourism Services

Estimates derived for the years 2008-09 and 2014-15 for nature-based tourism

- Tourists with 'holidaying, leisure and recreation' and 'pilgrimage and religion' as purpose
- Values derived as product of –
 - Average expenditure incurred per person
 - Number of tourists having the specified purposes
 - Validated using 'Invest' module – Flickr Photo User Days



District Map of Tourism



Pilot Study under NCAVES



Pilot Ecosystem Study in Karnataka

- **Institution:** Indian Institute of Science
- **Objective:** To pilot the use of ecosystem extent and condition and ecosystem services supply accounts in Karnataka State, India and to develop a scenario based assessment of an identified policy interventions.
- **Study Region:** Karnataka, 7 districts (representing 4 agro-climatic zones and part of Western Ghats – one among 36 global Biodiversity hotspots)



Pilot Ecosystem Study in Karnataka

Ecosystem Services	Entity	
Provisioning Services	<ul style="list-style-type: none"> i. Raw material ii. Food iii. Fresh water iv. Timber 	<ul style="list-style-type: none"> v. NTFP vi. Litter vii. Fishery viii. Fuel wood
Regulating Services	<ul style="list-style-type: none"> i. Local climate ii. Air quality iii. Carbon sequestration 	<ul style="list-style-type: none"> iv. Erosion prevention v. Maintenance of soil fertility vi. Pollination
Cultural Services	<ul style="list-style-type: none"> i. Tourism ii. Aesthetic appreciation and inspiration for culture, art and design iii. Habitat services 	



Institutional Arrangements

Ministry	Information/ data provided
Ministry of Mines	Metallic and non-metallic minerals (Proved, probable & remaining reserves of 85 minerals)
Ministry of Environment, Forests and Climate Change	Forest cover & area, growing stock, carbon stock, status of flora & fauna species, level of SO ₂ , NO ₂ , PM ₁₀ & PM _{2.5} etc
Ministry of Jal Shakti	Ground and surface water resources
Department of Agriculture and Co-operation	Production & yield, , status nutrient of soil (micro & macro nutrients)
Department of Animal Husbandry and Dairying	Livestock data
Department of Fisheries	Marine fisheries



Institutional Arrangements

Team Member	Information/ data provided
Ministry of Petroleum and Natural Gas	Availability of crude oil, petroleum products & natural gas
Ministry of Earth Sciences	Meteorological data, Major natural disasters in India
Ministry of Coal	Geological reserves of coal & lignite
National Remote Sensing Centre	Area under different land cover classes
Ministry of New and Renewable Energy	Solar photovoltaic systems, hydropower projects, potential of renewable power (State-wise), etc.
Department of Land Resources	Wasteland mapping and restoration



THANKS

