ENVIRONMENTAL STATISTICS

Ministry of Environment, Forest and Climate Change

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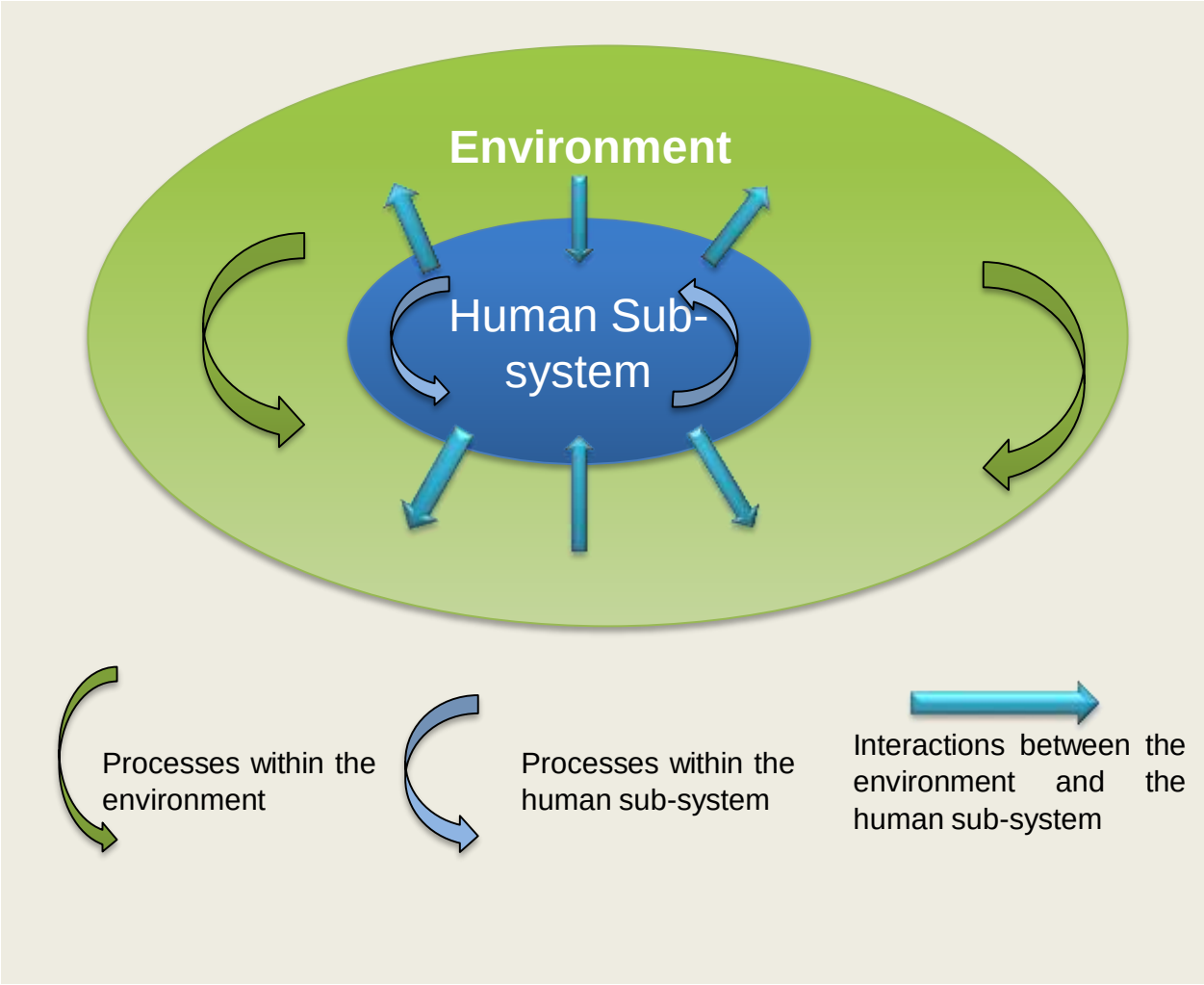
Fundamentals of Environment Statistics

- Environment statistics describe the qualitative and quantitative aspects of the state and changes of the environment and its interaction with human activities and natural events.

- Environment Statistics are integrative, measure human activities and natural events that affect the environment, monitor the impacts on the environment and the social responses to environmental impacts.

- Environment statistics is a domain of statistics, and it is indispensable for evidence based policies and decision making to support sustainable development.

The Environment and the Human Subsystem



Humans use environmental resources for production and consumption and they return residuals and waste to the environment.

As a result of human activities, environmental conditions, natural processes and the capacity of ecosystems to ---provide their goods and— services all experience change.

These changes, in turn, initiate changes in the human subsystem's economic and social processes.

Environmental Conditions and their Changes

- Environment Statistics' usual themes/ topics can include (but are not restricted to):

Atmosphere, Climate, Ambient Air,

Biodiversity and Biota, Land, Forest,

Water, Ocean/Marine, Natural Resources,

Pollution, Environmental Quality, Residuals and Waste,

Environmental Protection Expenditure,

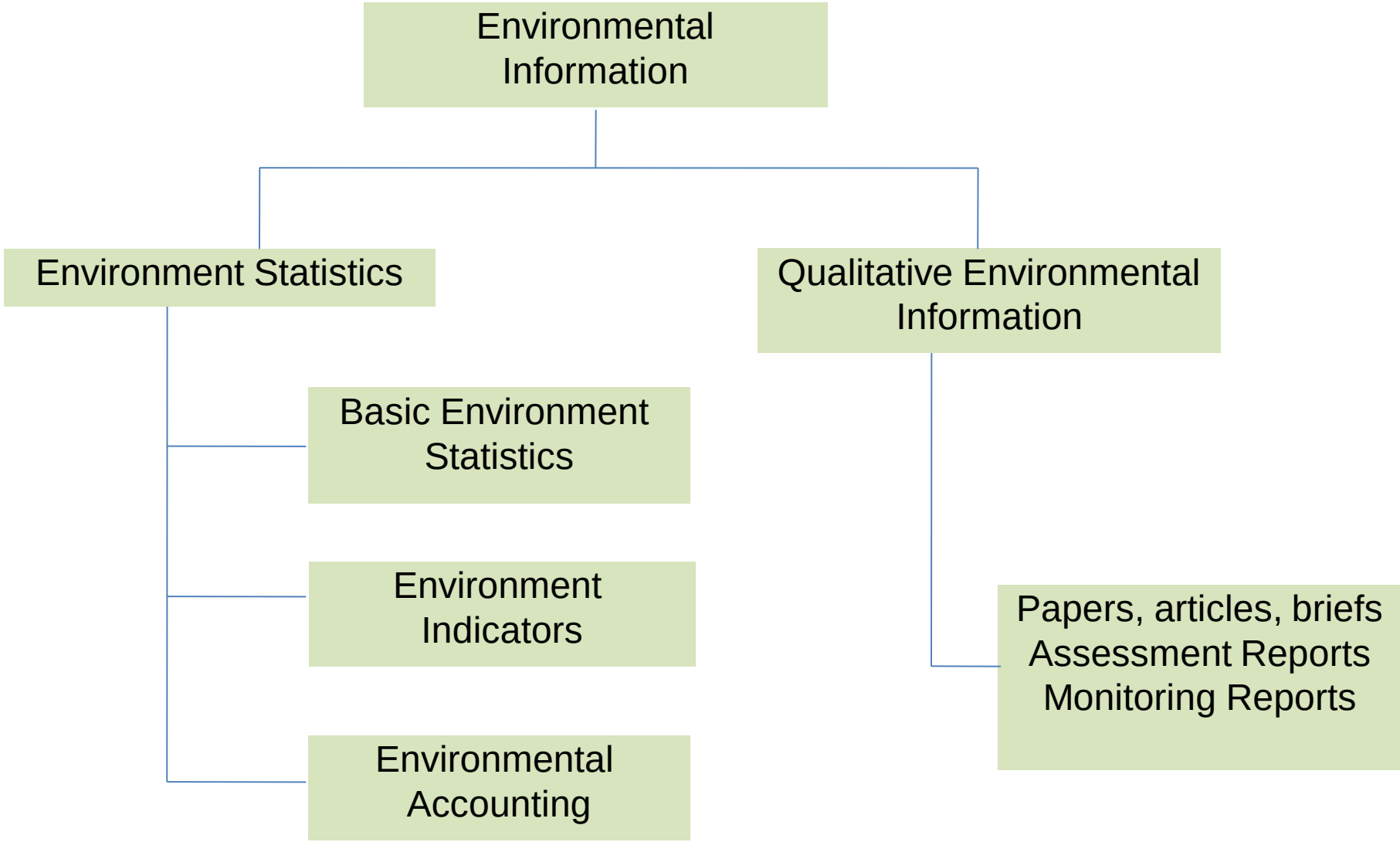
Environmental Management, etc.

The Objectives of Environment Statistics

1. Immediate objective of environment statistics is to provide quantitative information about the environment's state and its most important changes over time and across territories.

2. Aim to provide quality statistical information to improve policy and decision making by different players.

Types of Environmental Information



Main Sources of Environment Statistics

- Administrative records (of government agencies in charge of natural resources and other Ministries)
- Census (of population, housing, livestock, businesses) and surveys (of households, and different aspects of environment management)
- Monitoring systems (of water quality, air pollution, climate, soils, and so on)
- Remote sensing (i.e. satellite imaging of land use, water bodies and forest cover)
- Estimates and modeling (creating different models for estimation, and using methods such as regression, ----extrapolation and interpolation)
- Scientific Research

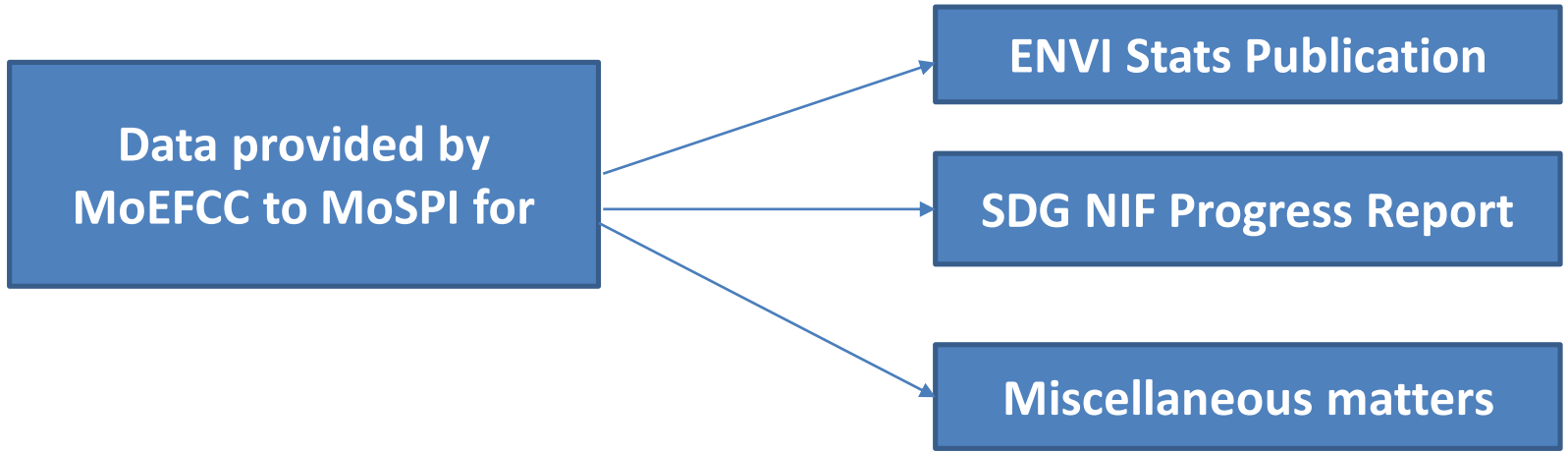
Functions of Statistics Division of MoEFCC

Tasks undertaken by Statistics Division:

1. Sustainable Development Goals (SDGs)
2. Environmental Statistics Coordination
3. Environmental Accounting
4. Global Indices for Reform and Growth (GIRG) (EPI and CCPI)
5. Data Governance Quality Index (DGQI)
6. Annual Report of the Ministry
7. National and State SoERs
8. SGoS (Viksit Bharat@2047, Five Year Action Plan, etc.)

Role of MoEFCC in Environment Statistics

1. Collects, compiles and provides timely information on various Environment aspects to MoS&PI and other Ministries which is used for decision making.



2. MoEFCC is member of Expert Group on Ocean Accounting.

3. MoEFCC looks after the following aspects of Environment Statistics:
   - Climate Change
   - Pollution and Waste
   - Forest and Wildlife

Role of MoEFCC in Environment Statistics (Cont..)

4. Global Indices :

   – Environmental Performance Index (EPI)
   – Climate Change Performance Index (CCPI)

   Countries are ranked at global level based on their performance on various issue category /components.

5. MoEFCC coordinates with several divisions of the Ministry and its attached subordinates offices wherever necessary.

Climate Change

- Climate change refers to long-term shifts in temperatures and weather patterns. The shifts can be natural, due to changes in the sun's activity or large volcanic eruptions as well as human activities.

- India submits its National Communication (NC) and Biennial Updated Report (BUR) to UNFCCC as a part of reporting obligations under the convention.

- These report provide details of Greenhouse Gas inventory of India and other climate change related data and information.

- India is transitioning to the Biennial Transparency Report (BTR) as a requirement under the Enhance Transparency Framework (ETF) mandated by the Article 13 of the Paris Agreement. The BTR are proposed to be submitted by December 2024.

- India has submitted its 3rd National Communication to UNFCCC on 9 December, 2023.

Background

- India is a Party to the **UNFCCC** and its **Paris Agreement**

- Articles 4.1 and 12.1 of the UNFCCC calls for submission of information in the form of a **National Communication** (NC) in every 4 years.

- Subsequently parties were also mandated to submit Biennial Reports (BRs) (by developed countries) and **Biennial Update Reports** (BURs) (by developing countries) every 2 years.

- Further, pursuant to the Decision 18/CMA.1 & 5/CMA.3, all Parties shall submit the **Biennial Transparency Reports** (BTRs) from 2024 onwards superseding the requirement of submitting the BUR/BR.

- India has so far submitted **three National Communications and three Biennial Update Reports**. 3rd NC along with Initial Adaptation Communication was submitted to UNFCCC on 9.12.2023.

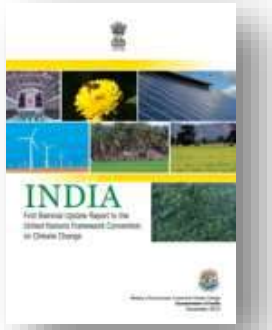
- Deadline for submission of 1st BTR is **31st December 2024.**

BTR Annexures

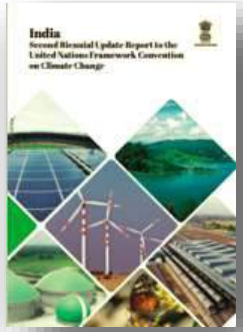
India's Communications to UNFCCC – Plan of Action

1st NC

2nd NC



1st BUR



2nd BUR

3rd BUR

3rd NC

Type	GHG Inventory Year	Submission	Remarks
Initial National Communication	1994	Jun 2004	Initial Communication
2nd National Communication	2000	May 2012	
1st Biennial Update Report	2010	Jan 2016	
2nd Biennial Update Report	2014	Dec 2018	
3rd Biennial Update Report	2016	Feb 2021	
3rd National Communication	2019	Dec 2023	
4th Biennial Update Report*	2020	Sep 2024	Last Report
1st Biennial Transparency Report*	2022	Dec 2024	First Report under Paris Agreement
2nd Biennial Transparency Report	2024	Dec 2026	
4th National Communication*	2025	Dec 2027	
3rd Biennial Transparency Report	2026	Dec 2028	

* *Process has been initiated*

ETF vs Existing Framework (BUR vs NC vs BTR)

Existing MRV arrangements

Enhanced Transparency Framework

Biennial update reports

- National greenhouse gas inventory
- Mitigation actions and their effects
- Finance, technology and capacity-building needs

Cancun Agreements (1/CP.16) and Durban Outcomes (2/CP.17)

National communications

- National greenhouse gas inventory
- Programmes containing measures to facilitate adaptation to climate change
- Programmes containing measures to mitigate climate change
- Transfer of technology
- Research and systematic observation
- Education, training and public awareness
- Capacity-building
- Information and networking
- Constraints and gaps, and related financial, technical and capacity-building needs

Article 4.1 and 12.1 of the Convention; decision 17/CP.8

Biennial transparency reports

- National greenhouse gas inventory
- Progress made in implementing and achieving NDCs
- Climate change impacts and adaptation (as appropriate)
- Financial, technology transfer and capacity-building support needed and received
- *Flexibility*
- *Areas of improvement*

Article 13 of the Paris Agreement; decisions 18/CMA.1, 5/CMA.3

Insights from 3rd National Communication

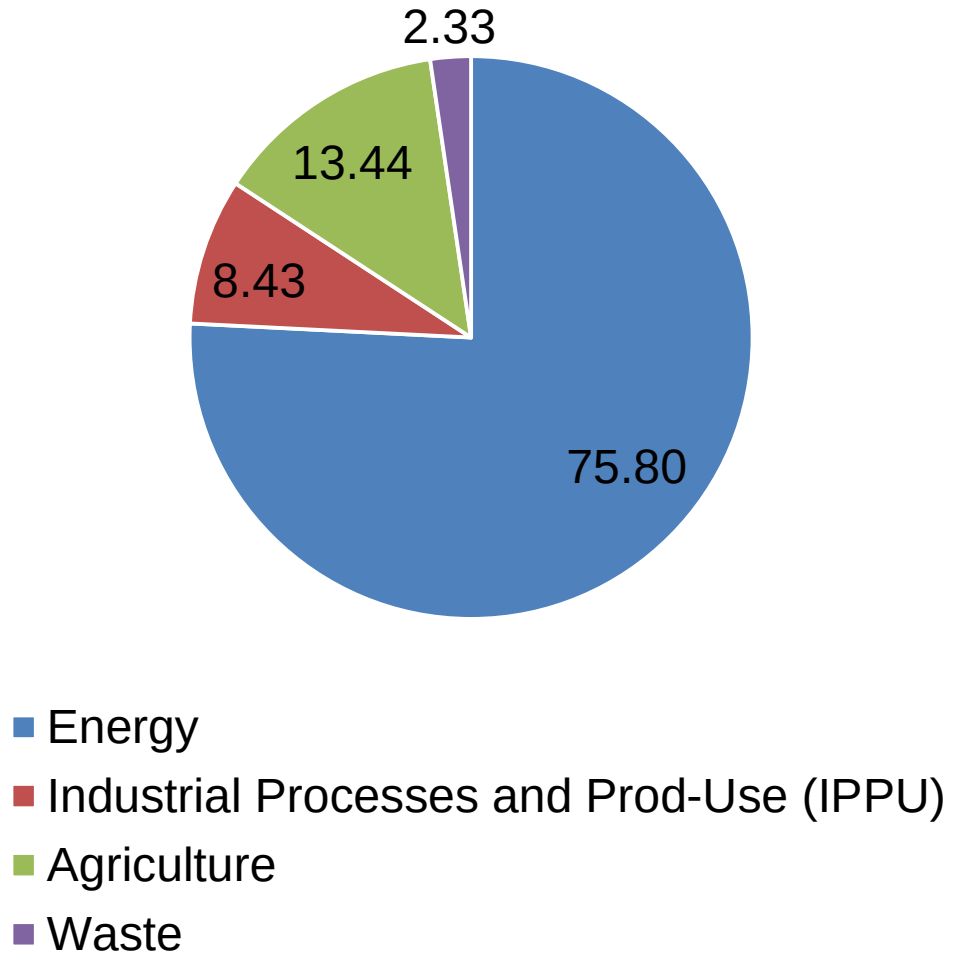
As per the third National Communication the total GHG Emissions for 2019 including LULUCF is 2647 Mt CO2 Eq. and without LULUCF it is 3132 Mt CO2 Eq.

Sector wise GHG emissions in MtCO2e for 1994-2019

GHG Sources and Removals	1994	2000	2007	2010	2014	2016	2017	2018	2019
	Mt CO_2e								
Source	INC	SNC	SNC	BUR1	BUR2	BUR3	TNC	TNC	TNC
Energy	744	1027	1374	1510	1910	2129	2204	2344	2374
Industrial Processes and Product Use (IPPU)	103	89	142	172	202	226	244	263	264
Agriculture	344	356	373	390	417	408	411	417	421
Land Use, Land Use Change and Forests	14	-223	-177	-253	-301	-308	-312	-437	-485
Waste	23	53	58	65	78	75	70	72	73
Total (without LULUCF)	1214	1524	1947	2137	2607	2839	2929	3096	3132
Total (with LULUCF)	1229	1301	1772	1884	2306	2531	2617	2659	2647

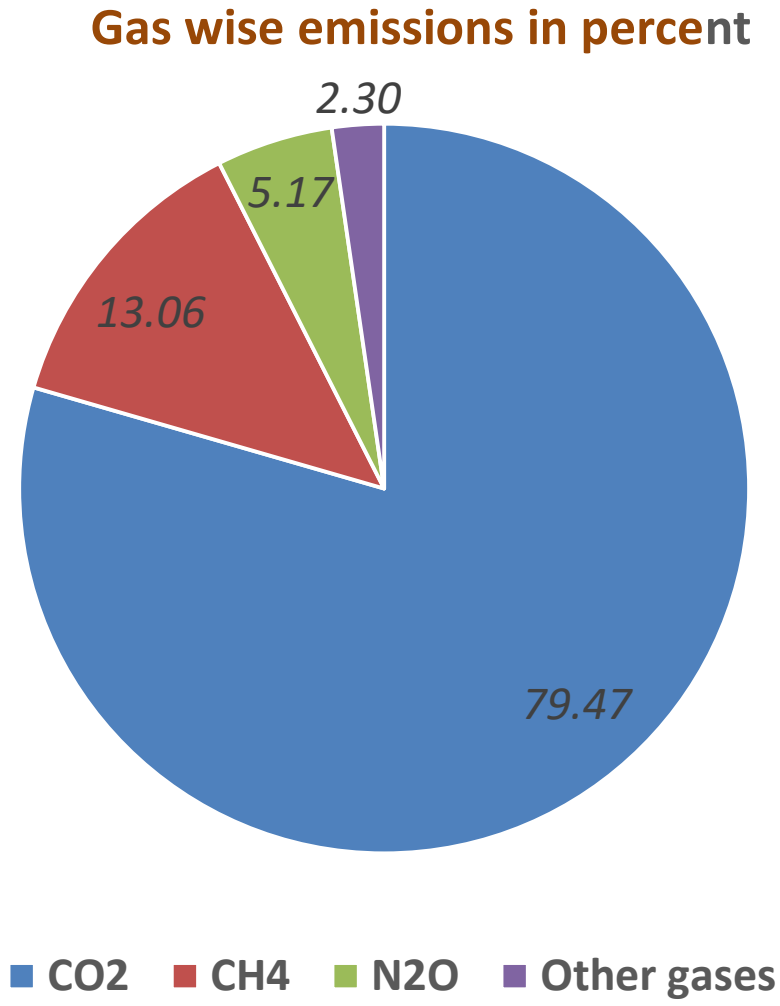
Energy sector accounted for maximum emission of 75.80% followed by Agriculture (13.44%), IPPU (8.43%) and waste (2.33).

Percentage of GHG emission from sources (Without LULUCF)



In 2019, total anthropogenic emissions were estimated for GHGs – Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N2O) and fluorinated gases.

- CO2 accounted for 24,89,043 Gg (79%);
- CH4 emissions accounted for 4,09,127 GgCO2e (13.06%) ;
- N2O emissions accounted for 1,61,841 GgCO2e (5.17%);
- Fluorinated gasses accounted for 72017 GgCO2e (2.30%).



India's updated Nationally Determined Contribution (NDC)

In August 2022, India updated its NDC, India stands committed

i. to reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005 level;

ii. to achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of transfer of technology and low-cost international finance including from Green Climate Fund; and

iii. to put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change.

NDC (2015)	TARGET (2030)	ACHIEVEMENT
Reduce Emissions Intensity of its GDP	33-35% over 2005 level	33% (2019) The original target has been achieved 11 years ahead of schedule
Non-fossil electric installed capacity	40% cumulative	43.8% (2023) The original target has been achieved 9 years ahead of schedule
Additional Carbon Sink	2.5 to 3 billion tonnes	1.97 billion tonnes (2021)

Forest Statistics

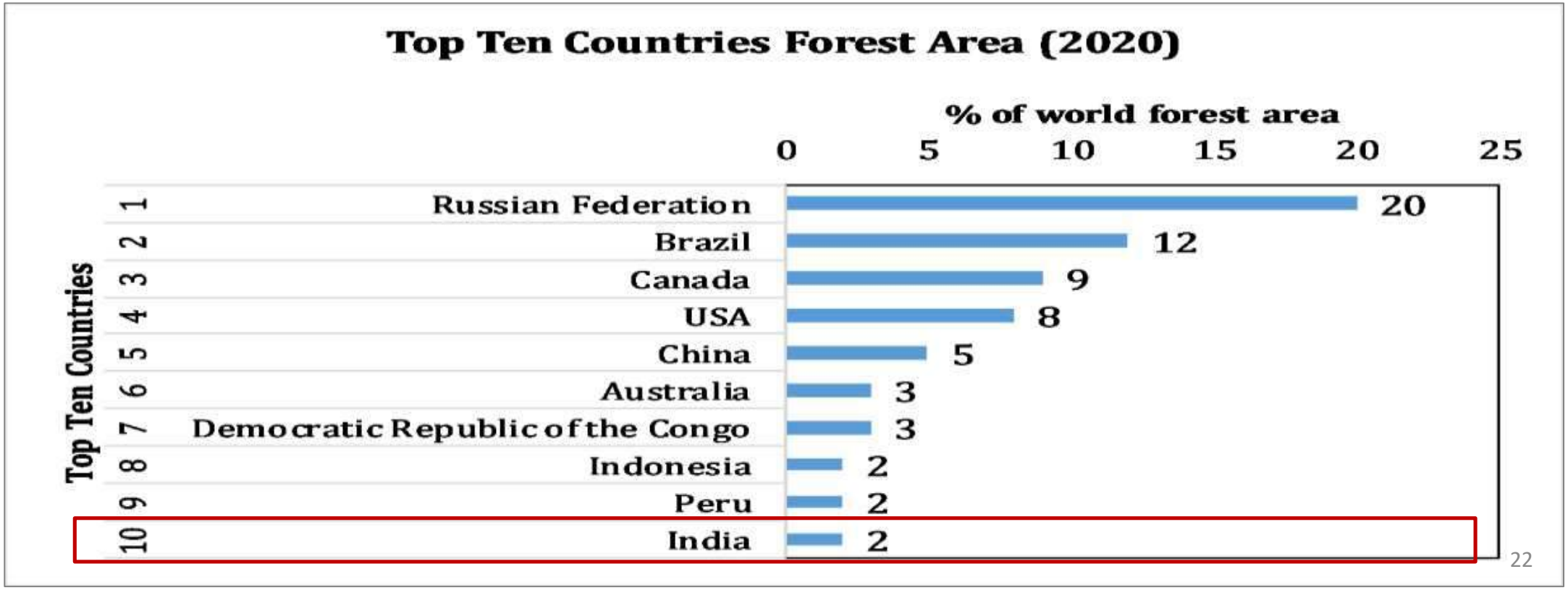
Forest Statistics

- The ISFR report provides information of State of forest in the country on parameters such as extent of forest and tree cover, distribution of timber species, volume, biomass, carbon stock, regeneration status, etc.
- As per ISFR 2021 total forest cover of the country is 7,13,789 sq km which is 21.71% of the geographical area of the country.
- The tree cover of the country is estimated as 95,748 sq km which is 2.91% of the geographical area.
- The total forest and tree cover is 8,09,537 sq km which is 24.62% of the geographical are of the country.
- As per ISFR 2021, total mangrove cover is 4992 sq km. There is increase in 17 sq km from 2019 report.

Forest Statistics

According Global Forest Resource Assessment (GFRA) 2020

- India is among the top 10 most forest-rich countries.
- Increased forest area in the past decade.



Forest Statistics (contd.)

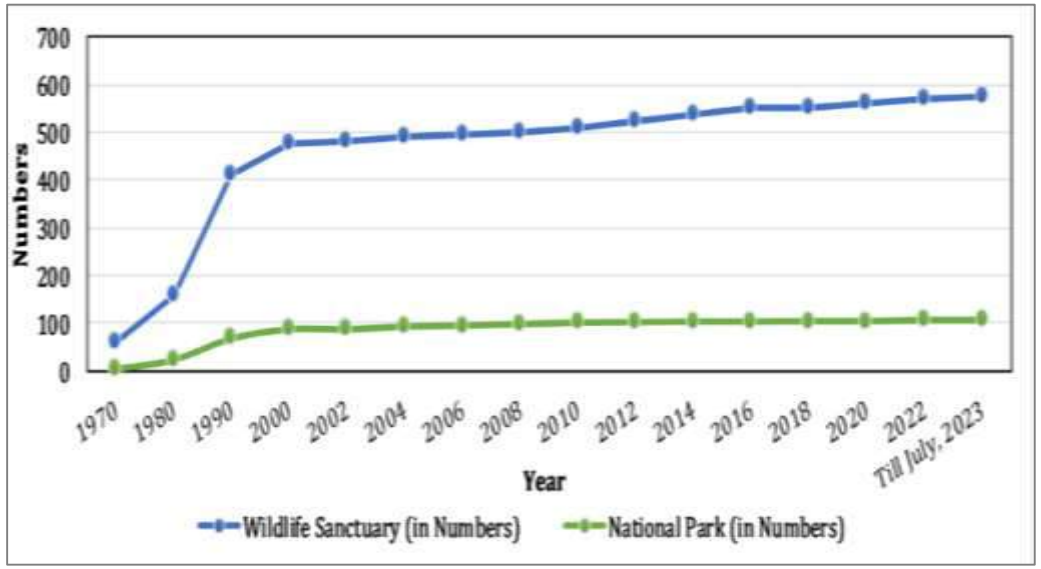
- Integration of Mangrove Data in Ocean Accounts (*Ongoing Work*)
  - **Collaborative Efforts**: The Statistics Division coordinates with the Forest Survey of India (FSI) to gather and integrate mangrove data into ocean accounts.
  - **Data Importance**: Mangrove data, including carbon sequestration rates and ecosystem services, is crucial for accurately assessing ocean health and environmental impacts.

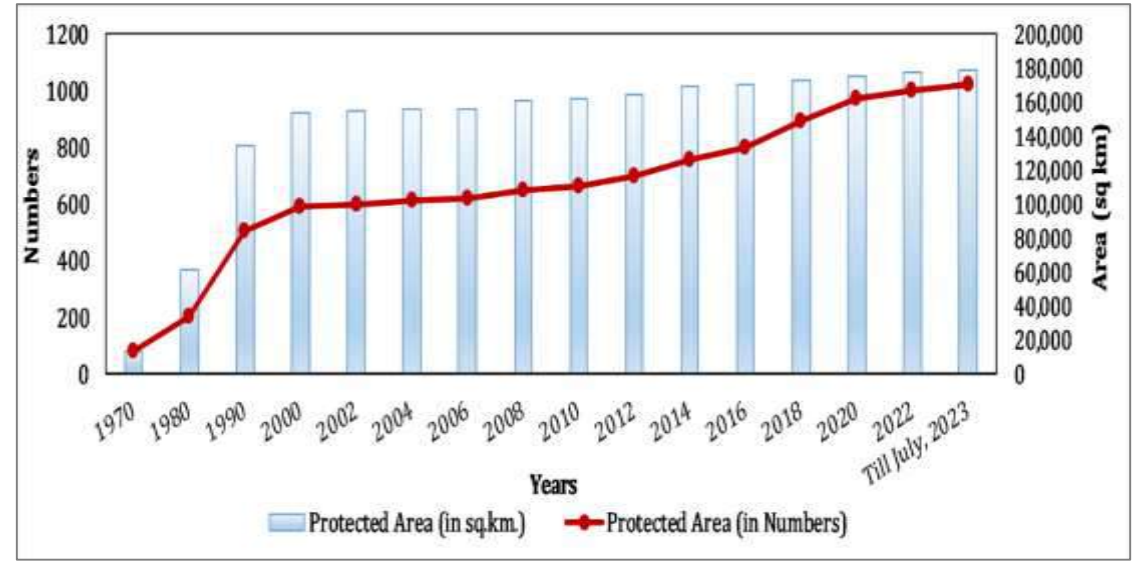
- Enhancing Decision-Making
  - **Comprehensive Insights:** Accurate mangrove data informs policies on coastal management, conservation, and climate change mitigation.
  - **Policy Support:** Collaboration ensures data-driven decisions that enhance sustainable management of mangroves, optimizing their role in protecting coastal environments and supporting local economies.

Wildlife Statistics

- **Insights from Wildlife Statistics for Conservation and Management**
  - **WII-ENVIS Centre on Wildlife & Protected Areas**, aims to create a wildlife science repository, support conservation decision-making, manage India's Protected Area database, and facilitate global wildlife information exchange

Legal Status of Number of Total Protected Area as of July 2023 – 1022 (5.43 Coverage % of Country)





Trend of Protected Areas of India from 1970 to 2023 (As on July, 2023)

Source: https://wiienvis.nic.in/

Wildlife Statistics (contd.)

- Data on **SDG 15.7.1 (Number of cases registered under the Wildlife Protection Act, 1972)** helps identify patterns and hotspots of illegal activities, allowing for targeted interventions and resource allocation.

  - When violations of the Wildlife Protection Act, 1972 are detected by state enforcement agencies, the details are submitted to the Wildlife Crime Control Bureau (WCCB).

- Data on **Endangered fauna and flora**, as per IUCN guidelines, are crucial for conservation efforts.
  - ***Enhanced Conservation Strategies***: Data-driven insights guide targeted actions to protect and rehabilitate endangered species.

  - ***Strengthened Statistical Systems***: Improved data collection and management reinforce state statistical frameworks, ensuring accurate and timely information for effective conservation planning.

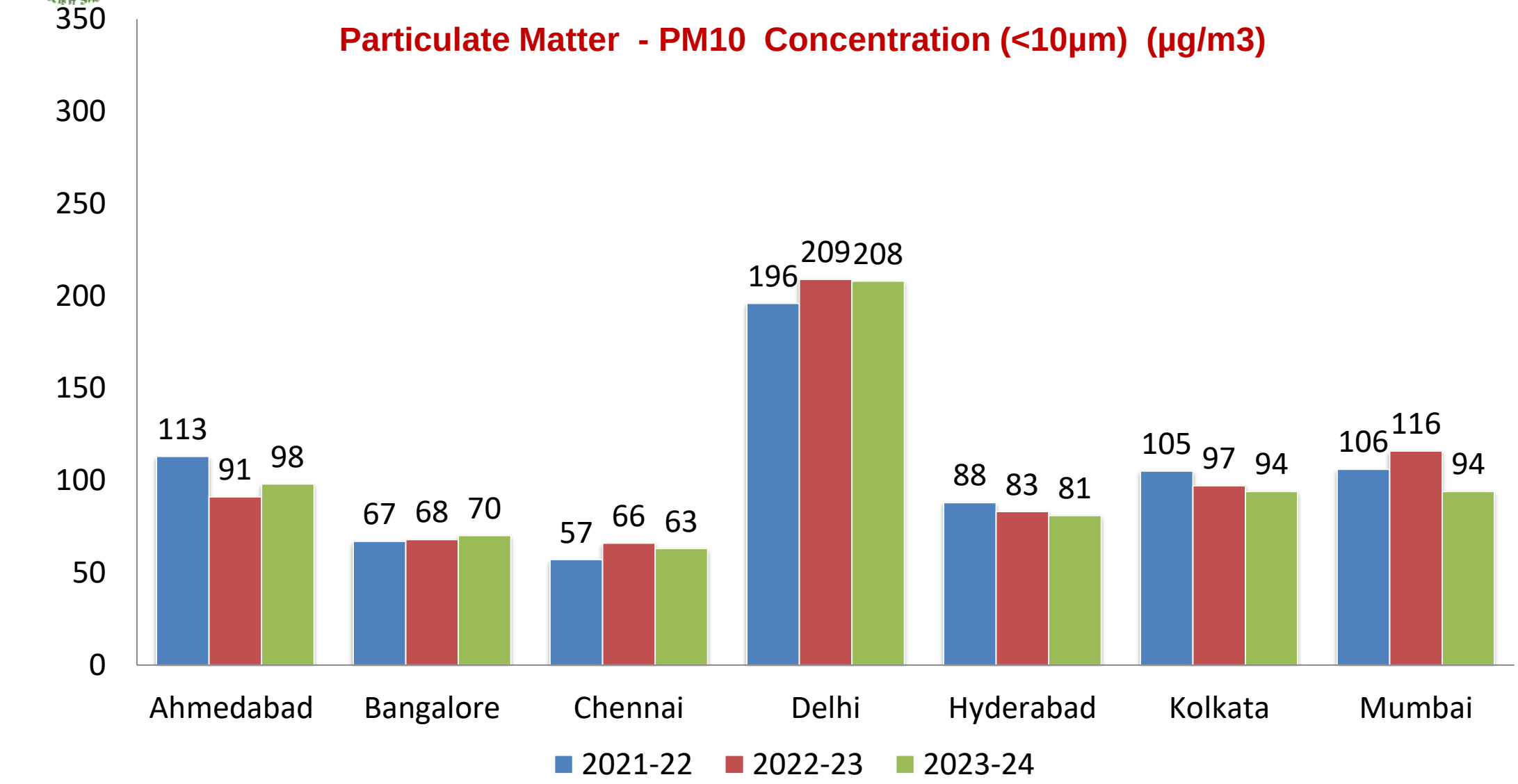
Pollution and Waste

- The Central Pollution Control Board collects, collate and disseminate technical and statistical data relating to Air, Water, Noise Pollution and Waste Management in India.

- The statistical data enable the Ministry to make informed decisions, deriving policies relating to Air, Water, Noise Pollution and different categories of waste. MoEFCC has already notified various rules in direction to curb pollution and reducing waste.

- Pollution and waste related data has also enabled scientists and professionals to optimize processes, and drive sustainable outcomes.

PM10 Concentration of Major Cities



Initiatives for improving Air Quality

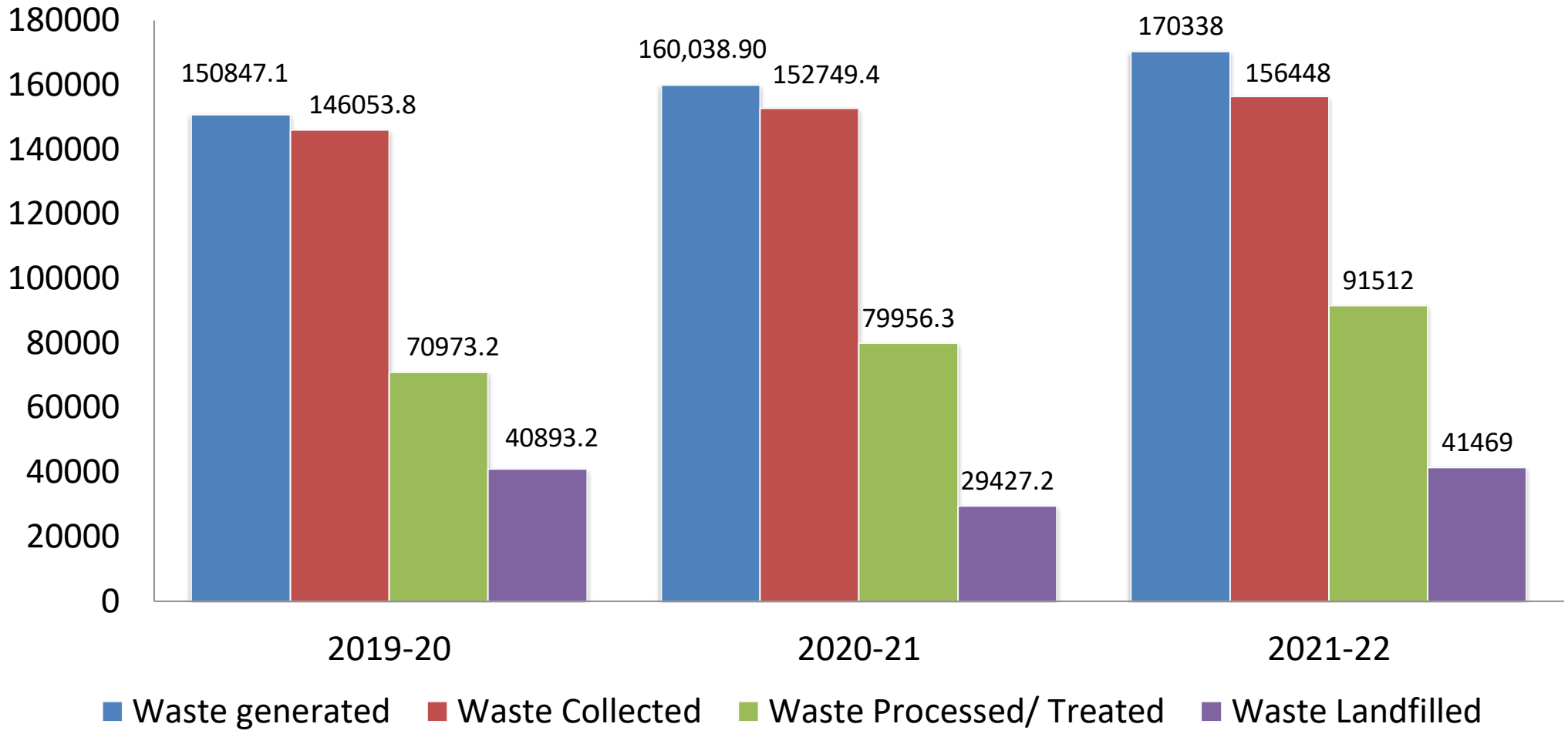
National Clean Air Programme (NCAP)-

- NCAP has been launched by the MoEF&CC as a comprehensive initiative in partnership with various Ministries and States to improve air quality at city, regional and national level.
- Air quality monitoring is carried out in 885 stations (338 continuous and 547 manual) in 131 cities.

Continuous Ambient Air Quality Monitoring Stations (CAAQMS)-

- CAAQMS is a specialized system that is housed in a temperature-controlled container/room and is equipped for monitoring of ambient air pollutants using different analyzers.
- Data of CAAQMS is used to generate daily National Air Quality Index (NAQI) of the cities.
- Under CAAQMS the Particulate Matter (PM10 & PM2.5), Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2), Ammonia (NH3), Carbon Monoxide (CO), Ozone (O3) and Benzene (C6 H6) are being monitored at all locations.

Municipal Solid Waste in India



In TPD : Tonnes per day

Waste Management Rules

1. **Solid Waste Management Rules, 2016:**
   - Applicability extended beyond municipal areas to urban agglomerations, census towns, notified industrial townships, etc.

2. **E-Waste (Management) Rules, 2022:**
   - Covers 106 Electrical and Electronic Equipment (EEE) including Solar PV waste.
   - A transformative step towards Circular Economy.

3. **Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016:**
   - Notified on 4th April, 2016 incorporating waste management hierarchy in the sequence of priority i.e. prevention, minimization, reuse, recycling, recovery, co-processing and safe disposal.

4. **Bio-Medical Waste Management Rules, 2016:**
   - Notified with the objectives to improve segregation, collection, processing, treatment and disposal of infectious bio-medical waste in an environmentally sound and safe manner.

Waste Management Rules

5. Plastic Waste Management Rules, 2016:

- Rules apply to the manufacture, import stocking, distribution, sale and use of carry bags, plastic sheets or multilayered packaging etc. The jurisdiction of applicability have been expanded from municipal area to rural areas as well.

6. Construction & Demolition (C&D) Waste Management Rules, 2016:

- The rules apply to everyone who generates construction and demolition waste such as building materials, debris, and rubble waste resulting from construction, re-modelling, repair and demolition of any civil structure of individual or organization or authority.

7. Battery Waste Management Rules, 2022:

- New rules replace Batteries (Management and Handling) Rules, 2001. The rules cover all types of batteries, viz. Electric Vehicle batteries, portable batteries, automotive batteries and industrial batteries.

8. Ash utilisation notification, 2021:

- Mandates thermal power plants to achieve 100% utilisation of current generation of ash in 3-5 year cycle and legacy ash in 10 years.
- Environmental compensation for non-compliance of provisions.

Waste Management Rules

9. Chemical Safety:

- MoEF&CC notified the Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) (CAEPPR) Rules, 1996 for ensuring chemical safety in the country.
- Objective is to prevent chemical accidents from industrial activities and mitigate impacts of chemical accidents.

10.Public Liability Insurance:

- The Public Liability Insurance Act, 1991 enacted with a purpose to provide immediate relief to the persons affected by accident occurring while handling hazardous substance and for matters connected therewith or incidental thereto.

Circular Economy and Resource Efficiency

- An economic approach aimed at eliminating waste and the continual use of resources, **circular economy** offers a new paradigm that emphasizes on the need to take a comprehensive view of products and processes.

- NITI Aayog had constituted 11 Committees for development of CE action plans for different categories of wastes, and has finalized CE Action Plans for 10 waste categories (Li-ion batteries; E-waste; Toxic and hazardous industrial waste; Scrap metal (ferrous and non-ferrous); Tyre and Rubber; End of Life Vehicles; Gypsum, Used Oil, Municipal solid waste and Solar Panels)

- MoEFCC is the Nodal Ministry for CE Action Plan for Tyre and Rubber, and is stakeholder ministry in other action plans.

- EPR framework has been incorporated by amending existing rules or notifying new rules for waste batteries, electronic waste, solar panel waste, waste tyres and plastic packaging material.

Extended Producer Responsibility (EPR) Framework

EPR means the responsibility of a producer for the environmentally sound management of the product until the end of its life.

- EPR regime is under implementation in Plastic Waste Management Rules, 2016, according to which it is the responsibility of Producers, Importers and Brand-owners to ensure processing of their plastic packaging waste through recycling, re-use or end of life disposal (such as co-processing/Waste-to-energy/Plastic-to-oil/road making/industrial-composting).

- To streamline implementation process of EPR, MoEF&CC, in its fourth Amendment to the Plastic Waste Management Rules, dated February 16, 2022, notified 'Guidelines on Extended Producer Responsibility for Plastic Packaging' in the Schedule II of the Rules.

- As per these guidelines, Producers, Importers and Brand Owners (PIBOs) shall have to register through the online centralized portal developed by the Central Pollution Control Board (CPCB). (eprplastic.cpcb.gov.in)

SDGs and Environment

The following 4 goals are relevant to environment.

- **Goal 12:** Sustainable Consumption and Production.
- **Goal 13:** Climate Change and its Impact.
- **Goal 14:** Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- **Goal 15:** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

MoEFCC is the implementing Ministry for the targets under Goal 12, 13 and 15. Further, some targets in Goal 14 ,Goal 6 and Goal 8 are also under the purview of the MoEFCC.

Major Data Sources for Environment Targets

- The State Forest Department for data in respect of forests.
- India State of Forest Report-FSI
- Other major data sources-BSI, ZSI, State Biodiversity boards, Departments of Water Resources, Agriculture, Climate Change
- The ENVIS Hubs in the State Governments are a major repository of Environment related data.
- DES may liaise with these data source agencies
- Data on waste and Sewage generation and treatment are a major data gap- DES may devise appropriate system to regularly collect data from local bodies on the waste generated ,waste treated and recycling.

National State of Environment Report

- MoEFCC Publishes State of Environment (SoE) Report at National and State level.
- The State of Environment Report aims to provide concrete guidance for environmental action planning, policy setting and resource allocation for the coming decades, based on a sound integrated analysis of the state and trends of the environment.
- The SoE reports are prepared and made available on the website of the concerned State Departments.
- It is a comprehensive document (study, research and editorial inputs) which covers aspects like Forest, Wildlife, Biodiversity & Conservation, Pollution, Agriculture, Health and Climate change etc. along with its recommendations for corrective measures.
- Select key issues and set priorities from the range of environmental concerns that the State is facing.

Monitoring of Global Indices

- MoEFCC monitors Country's performance and carry out analysis of the following indicators and provides data to various international platforms wherever mandatory within its purview.

1) Environmental Performance Index (EPI)
2) Climate Change Performance Index (CCPI)

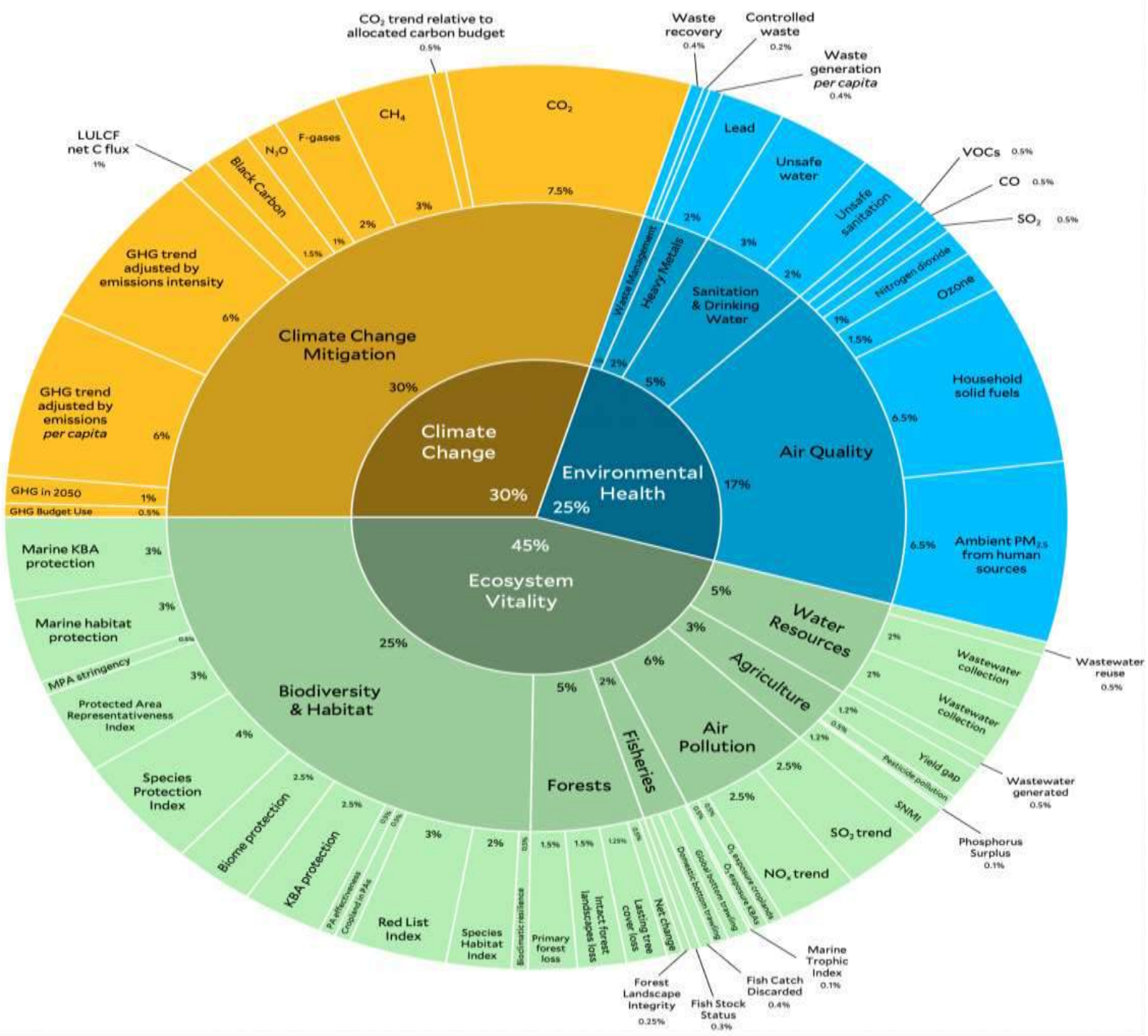
- Monitoring various environmental indicators provides insights to Country's performance at global level and helps in decision making based on scores and ranking of the indicators.

Environmental Performance Index (EPI)

EPI ranks 180 countries on performance indicators covering range of environmental issues. In EPI 2024 edition, ranking of countries was done based on 58 performance indicators under 11 issue categories, with India placed at 176 out of 180 countries.

Publishing Agency (PA)	Yale University
Countries covered	180
No. of Parameters	58
Nodal Ministry/ Department	MoEFCC
Frequency of publishing	Biennial

Year	2024	2022	2020	2018	2016	2014
Index Score	27.6	18.9	27.6	30.57	53.58	31.23
India's Rank	176	180	168	177	141	155
No. of countries	**180**	**180**	**180**	**180**	**180**	**178**



EPI 2024 Indicator weights

Climate Change Performance Index (CCPI)

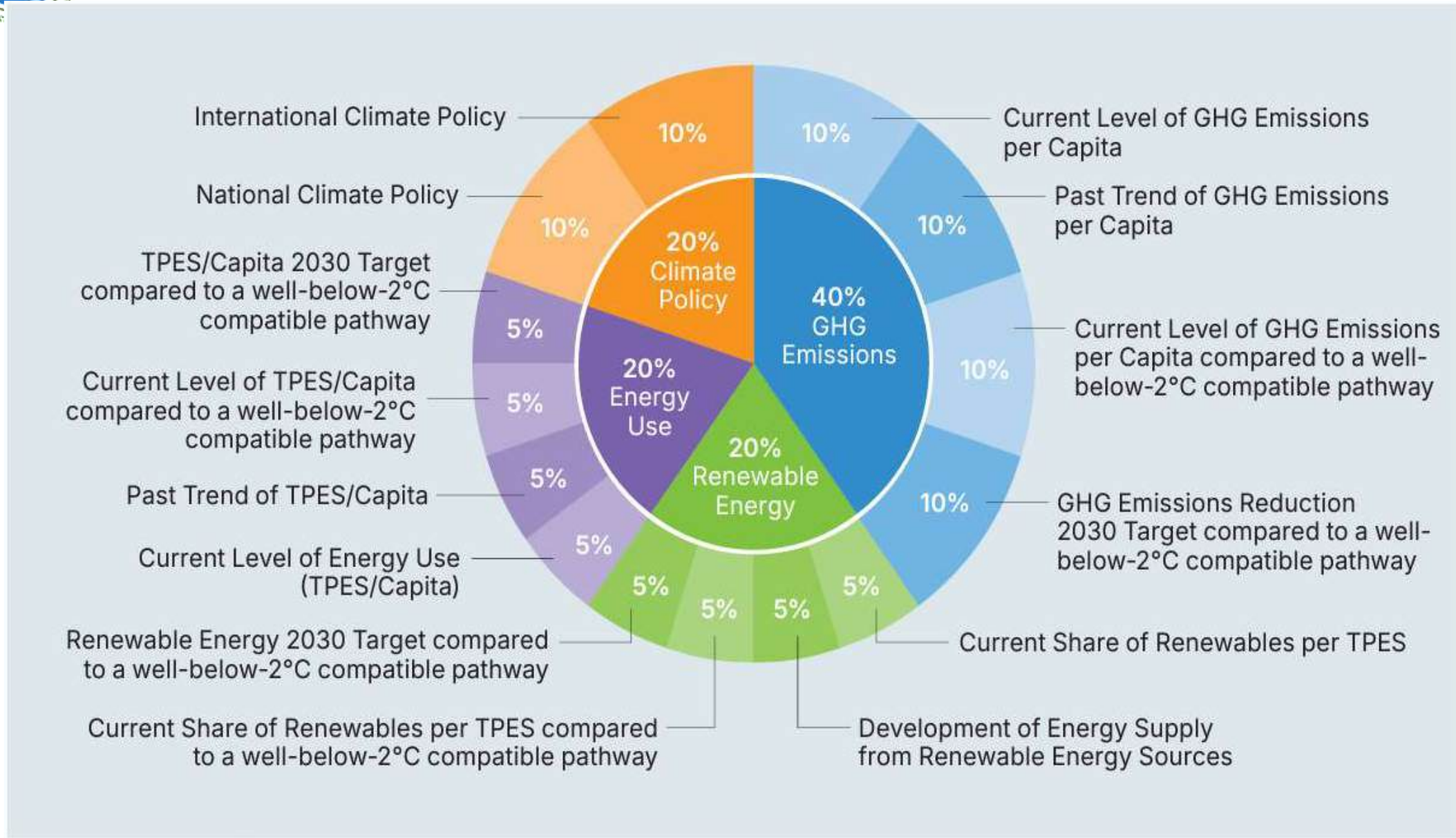
- Published annually since 2005, CCPI is an independent monitoring tool for tracking the climate protection performance of 59 countries and the EU.

- The CCPI aims to enhance transparency in international climate politics and enables comparison of climate protection efforts and progress made by individual countries.

- The climate protection performance of those countries, which together account for 92% of global greenhouse gas (GHG) emissions, is assessed in four categories viz. (i) GHG Emissions, (ii) Renewable Energy, (iii) Energy Use and (iv) Climate Policy

Year	2024	2023	2022	2021	2020	2014
Index Score (Out of 100)	70.25	67.35	69.20	63.98	66.02	62.93
Rank	7 (Out of 63)	8 (Out of 63)	10 (Out of 64)	10 (Out of 61)	9 (Out of 61)	11 (Out of 60)
No. of countries		60	61	58	58	57
Rating	High	High	High	High	High	High

Components of CCPI



GHG = Greenhouse Gases | TPES = Total Primary Energy Supply

Integrated Portal of MoEFCC

- To strengthen the data for decision-making, MoEFCC has initiated the development of an integrated portal which will enable cross-sectoral learning through data visualization.

- The Integrated Dashboard Application has been advancing steadily, with significant progress made in various components including dashboard development, user management, data handling, and reporting functionalities.

MeriLiFE and Ideas4LiFE

- A Mega event 'Ideas4LiFE' was organized on 29th July 2024 in IIT Delhi in which 'Ideas4LiFE' portal was launched by Hon'ble Minister, EFCC with the objective to invite innovative ideas from students, research scholars and faculties linked to themes of Mission LiFE related to products and services for inducing behavioral changes related to environment friendly lifestyles.

- This mega event was attended by Hon'ble Minister of State, EFCC, UGC Chairman, Director, IIT, Delhi and AICTE Chairman. More than 1200 students from 42 colleges had participated in the launch event. This dedicated portal offers a unique opportunity to bring together students, research scholars, faculty members and it is open to all disciplines. The participants can submit their ideas as an individual or as a team related to single or multiple themes of Mission LiFE.

- The last date of the submission of Ideas on the portal is 15th September, 2024. Within a week of its launch, the 'Ideas4LiFE' initiative has garnered significant attention with more than 458 registrations and 78 innovative ideas.

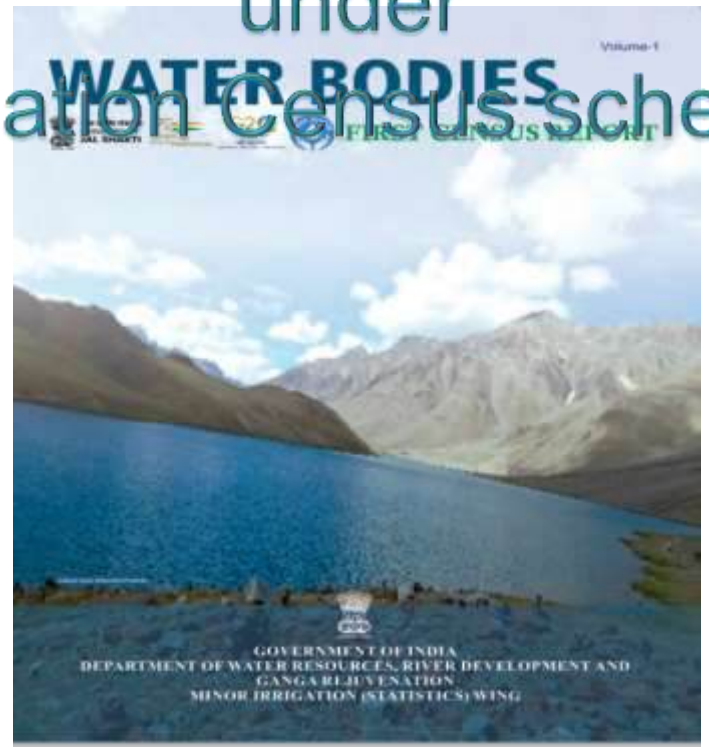
- 26 Central Ministries/Departments have planted 86.78 lakh trees out of 34.37 crore trees as reported from MeriLiFE Portal. States/UTs have planted more than 60 crore trees as against the target of 80 crore by September 2024.

Portals of MoEFCC

S.No	Name of the Application	URL
1.	Climate Change Knowledge Portal (Climate Change Division)	https://cckpindia.nic.in/
2.	e-Green Watch (National Authority Division)	http://egreenwatch.nic.in/
3.	Environmental Information System (Economic Cell)	http://envis.nic.in/
4.	Genetic Engineering Appraisal Committee Approvals (Conservation and Survey Division)	http://www.geacindia.gov.in/
5.	Green Skill Development Programme (Environmental Information Division)	http://gsdp-envis.gov.in/
6.	MIS for Research in Environment (Research in Environment Division)	https://repmismoef.nic.in/
7.	Mission LiFE (LiFE Cell)	https://missionlife-moefcc.nic.in/
8.	National Mission on Himalayan Studies (Mountain Division)	https://nmhs.org.in
9.	National Transit Pass System (Forest Protection Division)	https://ntps.nic.in/
10.	Ozone Depleting Substances Clearances (Ozone cell)	http://ozonecell.nic.in
11.	Parivesh (Impact Assessment Division)	https://parivesh.nic.in
12.	Wetlands of India Portal(Wetlands Division)	https://indianwetlands.in/

Thank You!

First Census of Water bodies under Irrigation Census scheme



D/o Water Resources, RD & GR
Ministry of Jal Shakti

Content

- Overview and background of Scheme
- Need of water bodies census
- Salient features and findings at All India level
- Use of Technology
- Preparatory work done for the forthcoming censuses
- Way forward

Overview and background of Scheme

- Minor Irrigation Statistics Wing in the D/o Water Resources, River Development & Ganga Rejuvenation implements the Centrally Sponsored scheme "Irrigation Census" with 100% Central Assistance to the States/UTs.

- Under the scheme, the Minor Irrigation (MI) Census and census of water bodies are conducted by the State/UT Governments through nodal departments identified in each State /UT for this purpose.

- The main objective of the scheme is to build up a comprehensive and reliable database of Minor Irrigation structures and water bodies for effective planning and policy making.

Overview and background of Scheme contd..

- Based on the financial proposal submitted by concerned States/UTs admissible funds are released for carrying out the census work in States/UTs.

- Funds are also released for Continuation of Statistical cells created within the Nodal Department identified by the State Government to assist the Nodal Department or Census Commissioner in the State in organizing, coordinating and supervising the Census work.

Overview and background of Scheme contd.

- To generate accurate statistics on minor irrigation, the National Commission on Agriculture and Planning Commission recommended that statistics on Minor Irrigation be collected through a quinquennial census.

- Accordingly, a scheme entitled Rationalisation of Minor Irrigation Statistics (RMIS) Scheme was introduced, and the first Census of Minor Irrigation Projects was introduced in all the States/ UTs in 1987-88.

- So far, 6 census of MI schemes have been conducted along with 1st census of water bodies which was conducted in convergence with 6th MI census.

Chronology of Census

Census	Reference Year
1st MI Census	1986-87
2nd MI Census	1993-94
3rd MI Census	2000-01
4th MI Census	2006-07
5th MI Census	2013-14
6th MI Census and 1st census of water bodies	2017-18
7th MI Census and 2nd census of water bodies	2023-24

Need of Water Bodies Census

- The need for conducting census of water bodies was pointed out by the Parliamentary Standing Committee on Water Resources on the subject “Repair, Renovation and Restoration of Water Bodies – Encroachment on water bodies and steps required to remove the encroachment and restore the water bodies”

- The Committee recommended that for objective assessment of water bodies and their condition, there should be separate census of water bodies and thereby creating a Central database on water bodies.

Definition of Water Body used in census

- All natural or man-made units bounded on all sides with some or no masonry work used for storing water for irrigation or other purposes (e.g. industrial, pisciculture, domestic/drinking, recreation, religious, ground water recharge etc.)

- Water bodies are usually of various types like ponds, tanks, lakes, reservoirs, water conservation schemes etc.

Items covered in Water bodies census

- Location (latitude/ Longitude)
- Ownership
- Status of use/ Major Use
- Nature of Water body (natural/ man made)
- Year and cost of repair/ renovation
- Water Spread Area
- Storage Capacity
- Water Use Association (WUA) formed or not
- Area of water body covered under WUA
- Encroachment of water body

Schedules of enquiry

For Water body census, following schedules were canvassed:

- Village schedule
- Urban schedule
- Water body schedule

Stages of conduct of census

- Preparatory work
  - Constitution of steering committee
  - Finalization of schedule and Instruction Manuals
  - State level steering committee along with technical sub committee was constituted in States
  - NIC developed the Online portal for data entry and mobile app for capturing lat/long and photograph of water bodies

- Training programme
  - All India workshop
  - 6 Regional workshops
  - 4 workshops on Data processing/ Software & Mobile App
  - State/District /Block level –By States

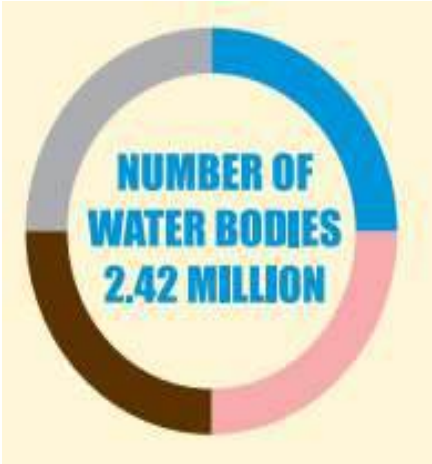
Stages of conduct of census

- Field data collection
  - Conducted under the overall charge of Census Commissioner
  - The fieldwork undertaken by the Nodal department.
  - The primary work carried out by the enumerators-village level workers/ village accountants /Lekhpals/ Patwaries/any other official designated by the State/UT Government.

Stages of conduct of census contd..

- Scrutiny
  - Scrutiny of schedules by BLO & DLO
- Data entry, and validation
  - Data entry/validation done through Online portal
  - Lat/Long and photograph of water bodies captured through mobile app
- Consistency checking at central level
- All India processing and tabulation
  - The tabulated data was again shared with States for final confirmation about their reported data.
- Report generation

Salient findings at All India level



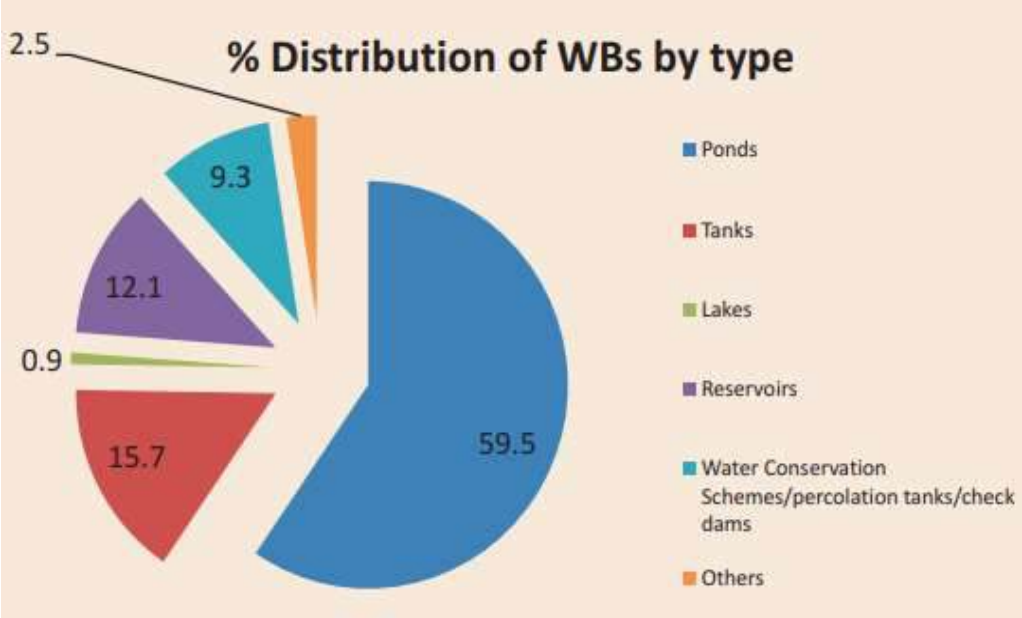
Rural 97%

Urban 3%

- First census of water bodies was completed in 33 States/UTs

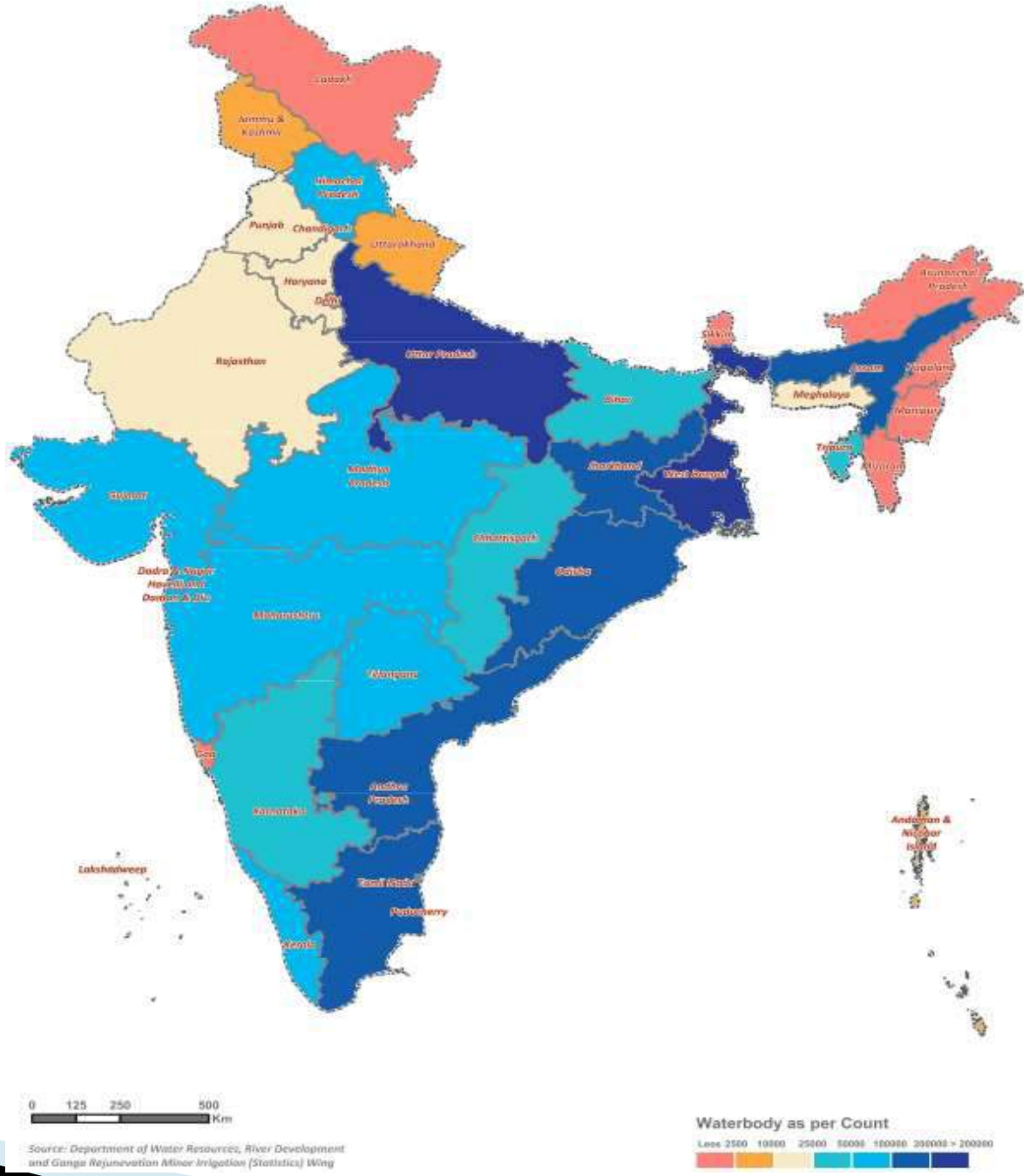
Type of waterbodies and their share:

- Out of the 24,24,540 enumerated water bodies in the country, ponds and tanks constitute ¾ of the total water bodies



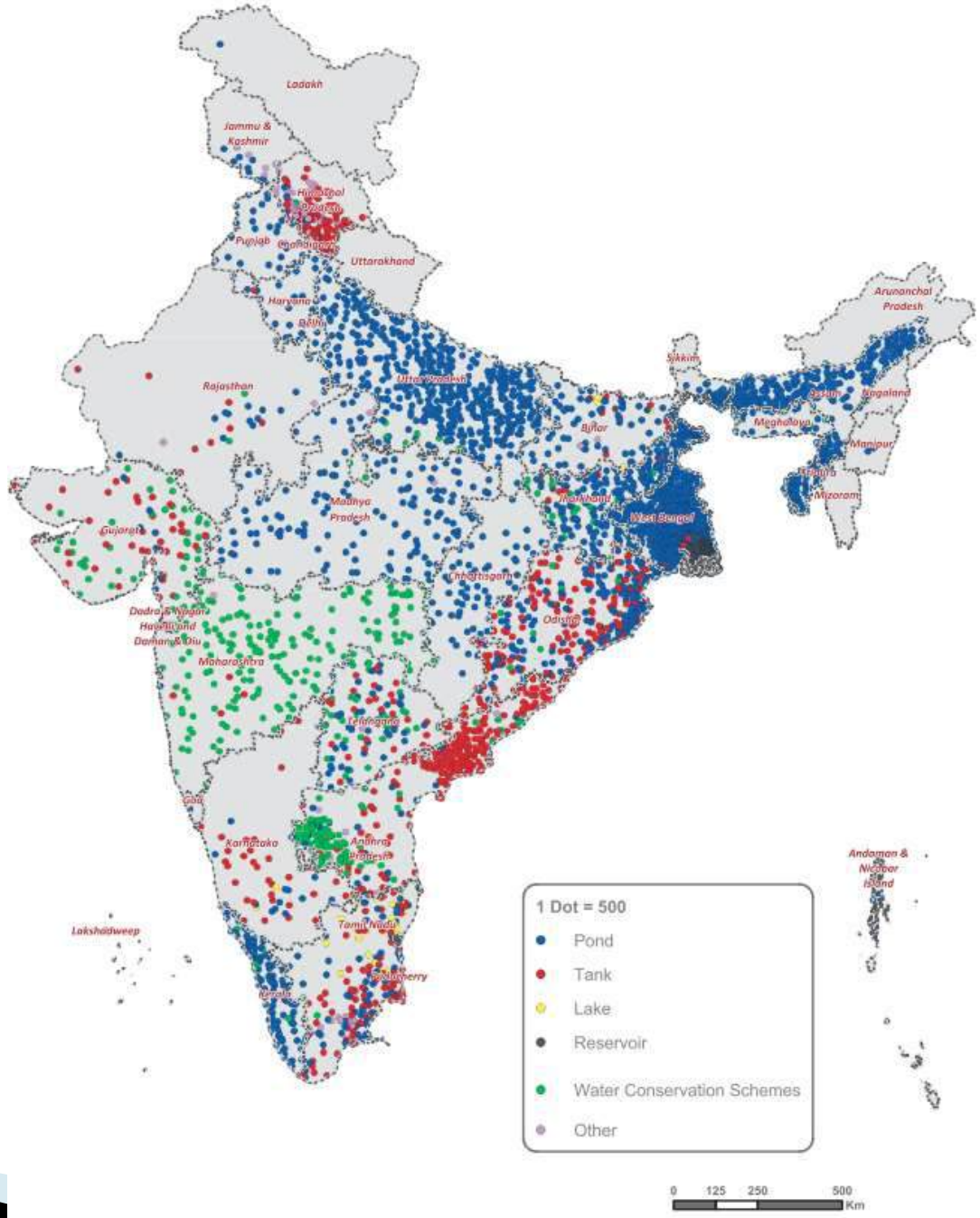
Top 10 States in terms of number of water bodies

Rank	State	No. of water bodies	% share in total water bodies
1	WEST BENGAL	7,47,480	30.83
2	UTTAR PRADESH	2,45,087	10.11
3	ANDHRA PRADESH	1,90,777	7.87
4	ODISHA	1,81,837	7.50
5	ASSAM	1,72,492	7.11
6	JHARKHAND	1,07,598	4.44
7	TAMIL NADU	1,06,957	4.41
8	MAHARASHTRA	97,062	4.00
9	HIMACHAL PRADESH	88,017	3.63
10	MADHYA PRADESH	82,643	3.41


Ladakh
Jammu & Kashmir
Himachal Pradesh
Punjab
Chandigarh
Uttarakhand
Haryana
Delhi
Rajasthan
Uttar Pradesh
Sikkim
Arunachal Pradesh
Assam
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
Bihar
Jharkhand
West Bengal
Madhya Pradesh
Gujarat
Chhattisgarh
Odisha
Dadra & Nagar Haveli and Daman & Diu
Maharashtra
Telangana
Goa
Andhra Pradesh
Karnataka
Andaman & Nicobar Islands
Lakshadweep
Tamil Nadu
Puducherry
Kerala
0 125 250 500
Km
Source: Department of Water Resources, River Development and Ganga Rejuvenation Minor Irrigation (Statistics) Wing
Waterbody as per Count
Less 2500 10000 25000 50000 100000 200000 > 200000

Leading States in different categories

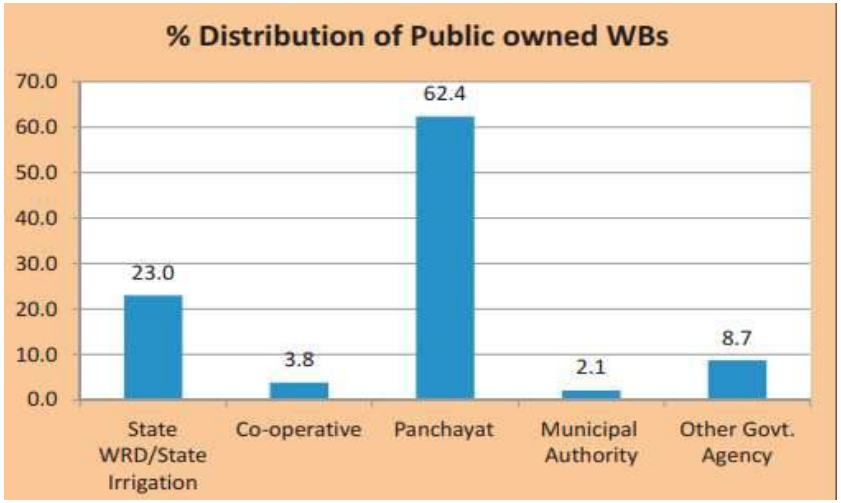
Ponds	Tanks	Lakes	Reservoirs	Water Conservation schemes/ Check Dams
West Bengal	Andhra Pradesh	Tamil Nadu	West Bengal	Maharashtra
Uttar Pradesh	Odisha	Bihar	Jharkhand	Andhra Pradesh
Assam	Himachal Pradesh	Karnataka	Bihar	Gujarat
Odisha	Tamil Nadu	West Bengal	Odisha	Telangana
Jharkhand	Gujarat	Odisha	Andhra Pradesh	Jharkhand


Ladakh
Jammu & Kashmir
Himachal Pradesh
Punjab
Chandigarh
Uttarakhand
Haryana
Delhi
Rajasthan
Uttar Pradesh
Arunanchal Pradesh
Sikkim
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
Bihar
Jharkhand
West Bengal
Madhya Pradesh
Gujarat
Chhattisgarh
Dadra & Nagar Haveli and Daman & Diu
Odisha
Maharashtra
Telangana
Goa
Karnataka
Andhra Pradesh
Tamil Nadu
Puducherry
Kerala
Lakshadweep
Andaman & Nicobar Island
1 Dot = 500
Pond
Tank
Lake
Reservoir
Water Conservation Schemes
Other
0 125 250 500
Km

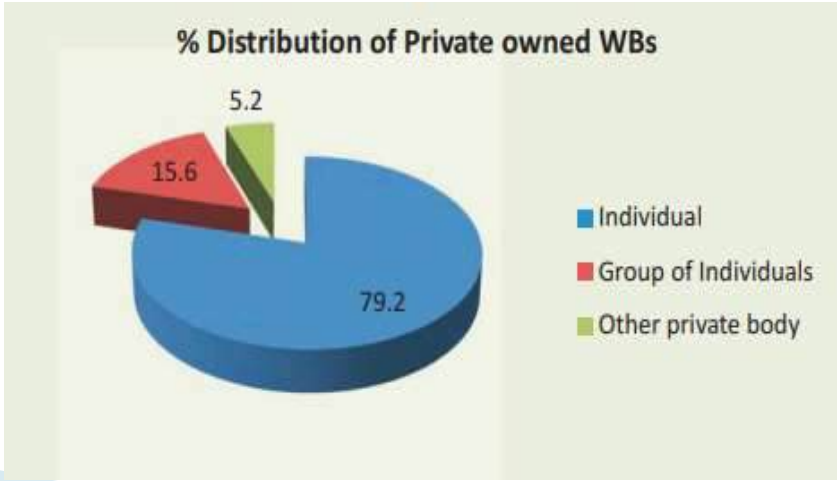
Water Bodies By Nature & Ownership

- 78% water bodies are man-made and remaining 22% are natural WBs

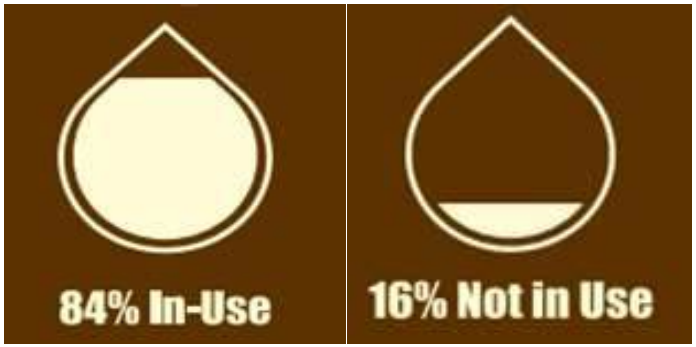
Public
45%



Private
55%

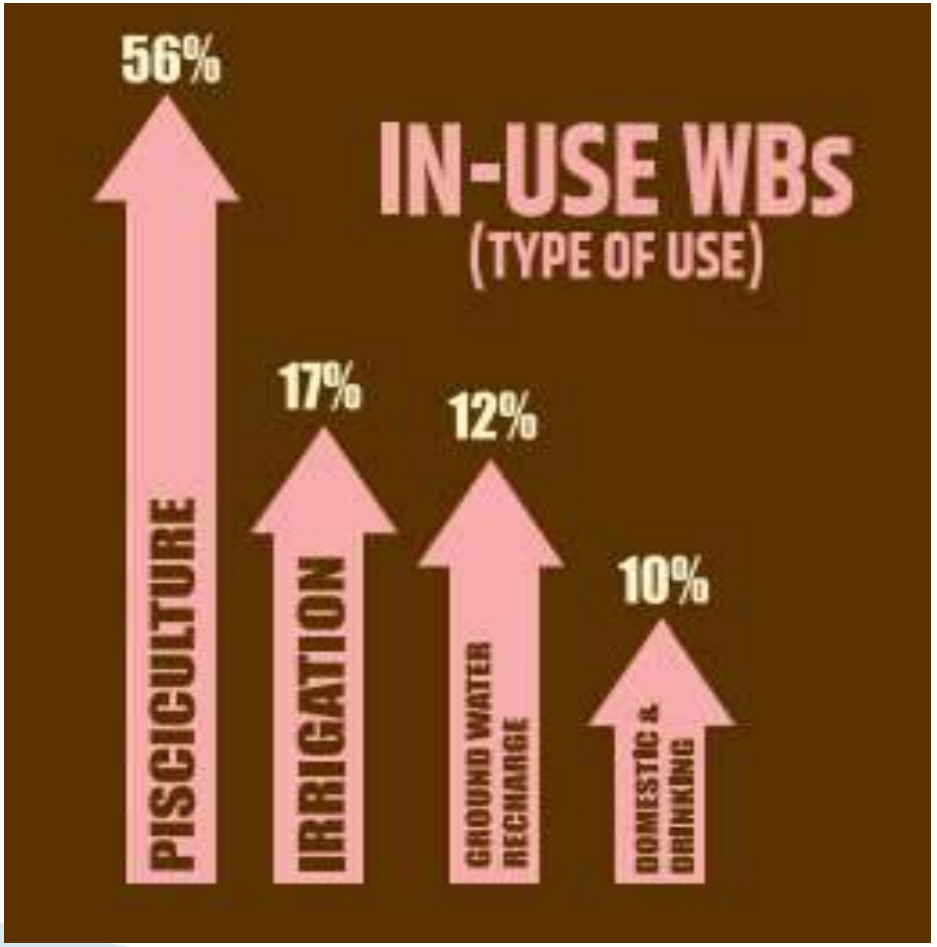


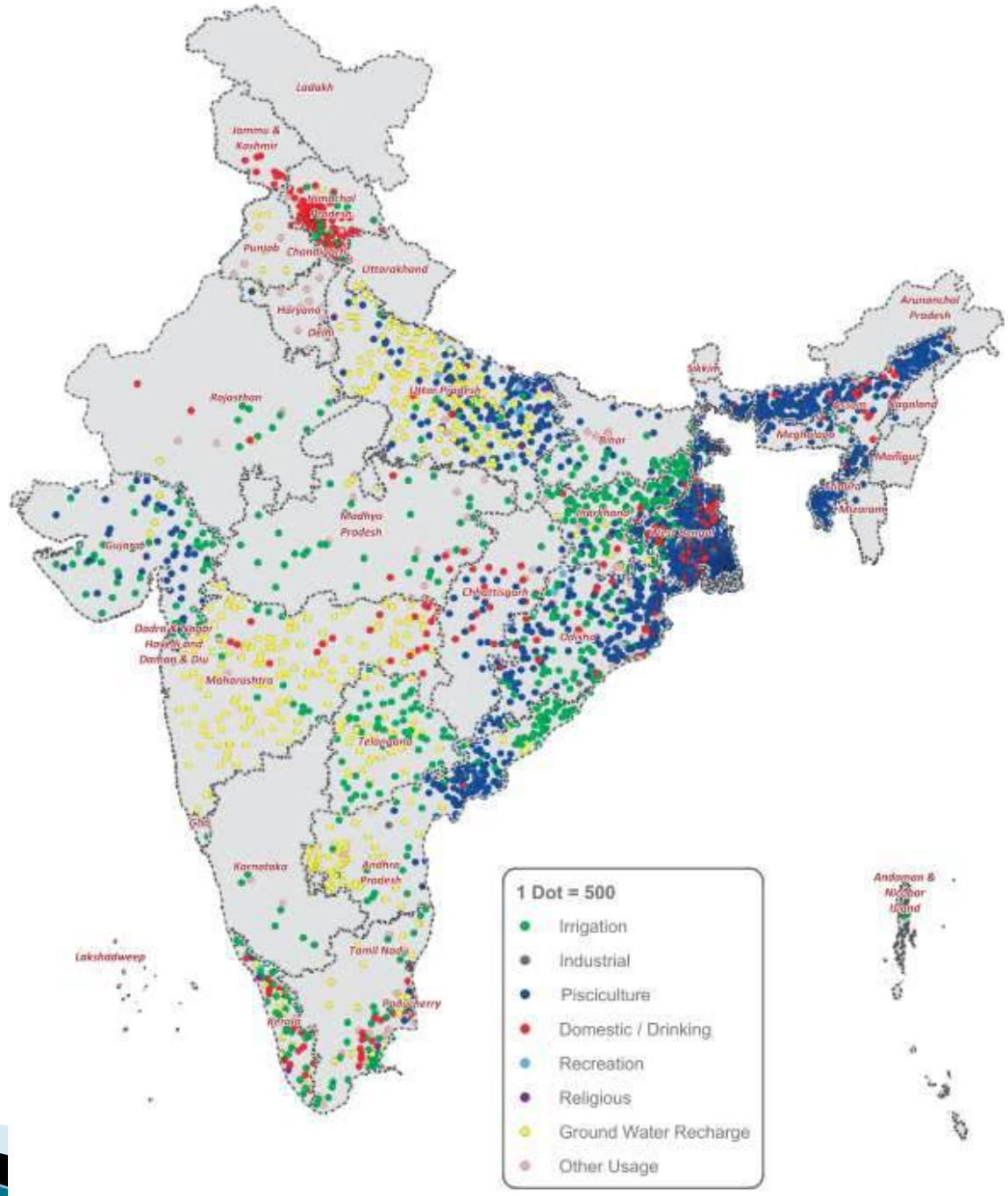
Water Bodies by status and type of use



Top 03 States wherein major use of water bodies is in pisciculture are West Bengal, Assam and Odisha

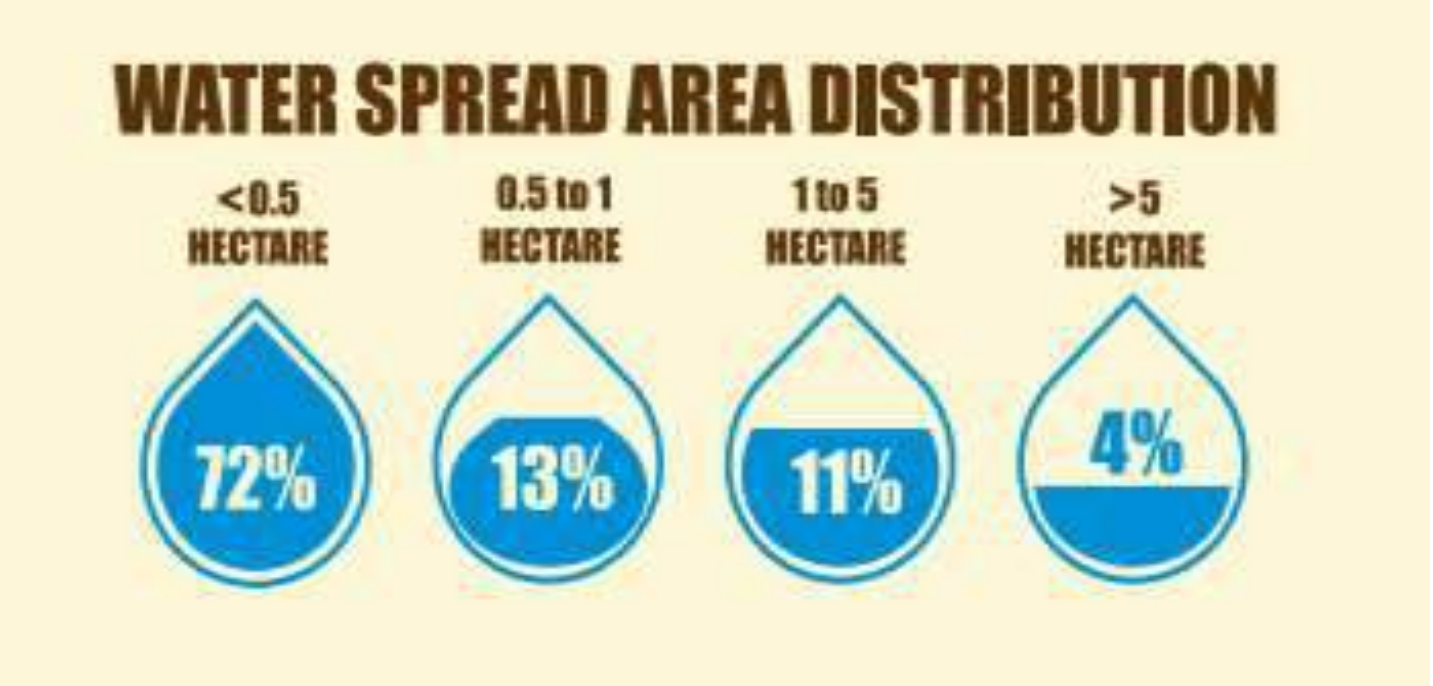
Top 03 States wherein major use of water bodies is in irrigation are Jharkhand, Andhra Pradesh and Telangana




Ladakh
Jammu & Kashmir
Himachal Pradesh
Punjab
Chandigarh
Uttarakhand
Haryana
Delhi
Rajasthan
Uttar Pradesh
Bihar
Sikkim
Arunanchal Pradesh
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
Madhya Pradesh
Jharkhand
West Bengal
Gujarat
Chhattisgarh
Odisha
Dadra & Nagar Haveli and Daman & Diu
Maharashtra
Telangana
Goa
Karnataka
Andhra Pradesh
Tamil Nadu
Puducherry
Kerala
Lakshadweep
Andaman & Nicobar Island
1 Dot = 500
Irrigation
Industrial
Pisciculture
Domestic / Drinking
Recreation
Religious
Ground Water Recharge
Other Usage

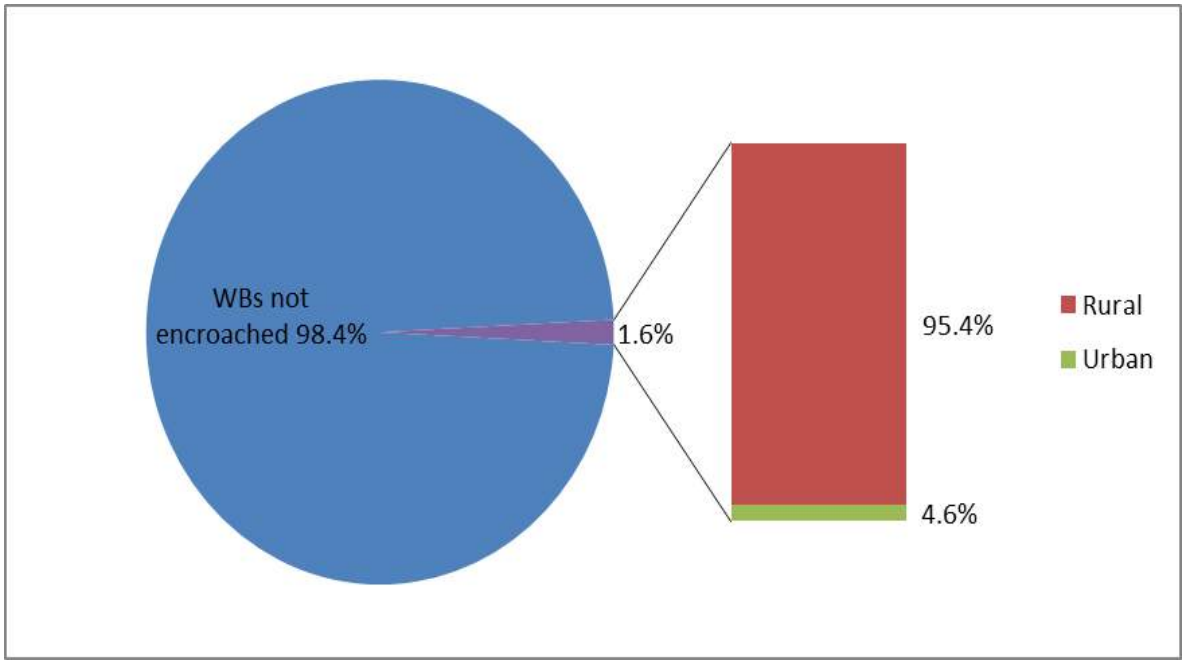
Water Bodies by water spread area

- The information on water spread area was reported in respect of 23,37,638 water bodies.



Encroachment of Water Bodies

- 1.6% i.e. 38,496 water bodies are reported as encroached.



- However, among rural water bodies, only 1.6% are encroached where as among Urban water bodies 2.5% Encroached.

Usage of census data

- A national level database of water bodies has been prepared and disseminated through various platforms, which would be useful for effective planning and policy making in water resource sector.

- The information can serve as important inputs for estimation of recharge of ground water, for assessment of Gram Panchayat-wise water budgets, preparation of realistic water security Plans etc.

- The Department of Fisheries has informed that the results of First Census of Water bodies will be immensely useful to them for planning and executing Pradhan Mantri Matsya Sampada Yojana.












Forthcoming Censuses
(reference Year 2023-24)

- 7th MI census
- 2nd census of Water bodies
- 1st census of Major and Medium Irrigation Projects
- 1st census of Springs

Use of Technology

- All previous census were done using traditional methodology of canvassing paper schedules.
- In First census of Water Bodies mobile App was also used for capturing images along with the lat/long of water bodies.
- Along with geo-tagging of water bodies it is now proposed to carryout geotagging of minor irrigation structures, major medium irrigation projects along with springs.
- In the upcoming censuses, the entire process of data entry, scrutiny etc. will be done completely in digital mode using Mobile.
- Monitoring of census work can be done on real time basis with improved quality and timeliness .

Preparatory work done

- A steering committee was constituted under the chairmanship of Secretary, DOWR, RD&GR to guide the conduct of census.
- Identified Nodal departments in each State/UT for the censuses.
- The feedback and suggestions received from States regarding the conduct of MI &WB census was thoroughly discussed in the meeting of national level steering committee.
- Discussions were held regarding proposed inclusion of Census of Major, Medium irrigation projects along with the census of springs under “Irrigation Census” scheme.

Prep work done

- Discussions were done with CWC/CGWB/NIH and concerned officials for conduct of MMI/Spring and draft schedules were prepared.

- All India Training workshop for the conduct of 7th Census of Minor Irrigation, 2nd Census of Water Bodies, 1st Census of Major & Medium Irrigation Projects & 1st Census of Springs was held in August, 2023.

- Schedules and Operational guidelines were finalised and circulated to States/UTs.

Present Status

- Constitution of Steering Committee in each State with Secretary of the nodal Department as Chairman to implement guidelines issued by GoI regarding conduct of census- In progress

- Constitution of technical Sub committee in each State under the Chairmanship of Regional Chief Engineer of CWC in charge of the State to provide technical inputs and guide the State Nodal Departments during the Census operations- In progress

Present Status contd..

- Development of mobile app and web portal for the censuses by NIC- In progress
- Use of LGD codes will be ensured in the upcoming censuses
- Discussions with ISRO is in progress for the anticipated integration of satellite data in the upcoming 2nd census of water bodies

Tentative Timeline of the censuses

1.	Release of Central grant by the Centre	:	As and when demanded by States/UTs
2.	All India Training Workshop	:	August 2023
3.	Pilot testing of mobile app	:	September 2024
4.	06 Regional Training Workshops	:	November-December 2024
5.	State /District Training programmes	:	January 2025
6.	Start of field work of census on ground	:	February 2025
7.	Cleaning, validation and scrutiny of data	:	February to July 2025
8.	Examining of tables by Central Ministry	:	August to October 2025
9.	Report drafting and Publication	:	by December 2025

Thank you

Overview of Environment Statistics & Natural Resource Accounts in India

28th Conference of Central and State Statistical Organisations (COCSSO)

12-13 August, 2024

New Delhi

SSD, MoSPI

Contents

- Mandate
- Environment Statistics
- FDES Framework
- Environment Economic Accounting
- SEEA Frameworks
- History of Environment Accounting in India
- Inter Ministerial Group on Environment Accounting in India
- Environment Accounts in India
- Inter Departmental Group at sub-national level
- Challenges
- Conclusion

Mandate

- Allocation of the Business Rules: MoSPI has the mandate for the development of **Environment Statistics**, development of the methodology, concepts and preparation of the **National Resource Accounts** in India.

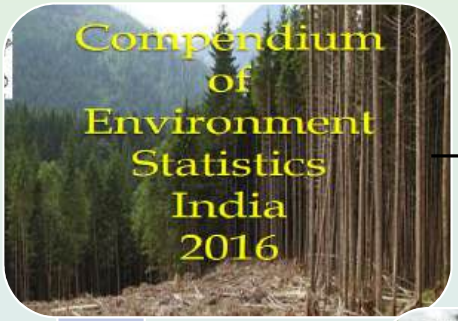
Environment Statistics-What?

- State and changes of environmental conditions
- Quality and availability of environmental resources
- Impact of human activities and natural events on the environment
- Impact of changing environmental conditions
- Social actions and economic measures taken by societies to avoid or mitigate impacts.

Environment Statistics-Why?

- ✓ Knowledge of the environment
- ✓ Support evidence-based decision-making
- ✓ Provide information about the state of the environment and the factors that influence it.

Environment Statistics-History



FDES-1984 framework

16 issues published: since 1997

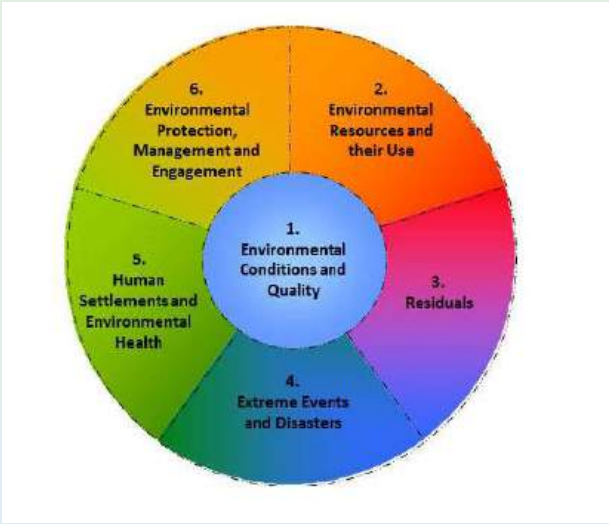
DPSIR framework

2 issues published: 2013 and 2015

FDES-2013 framework

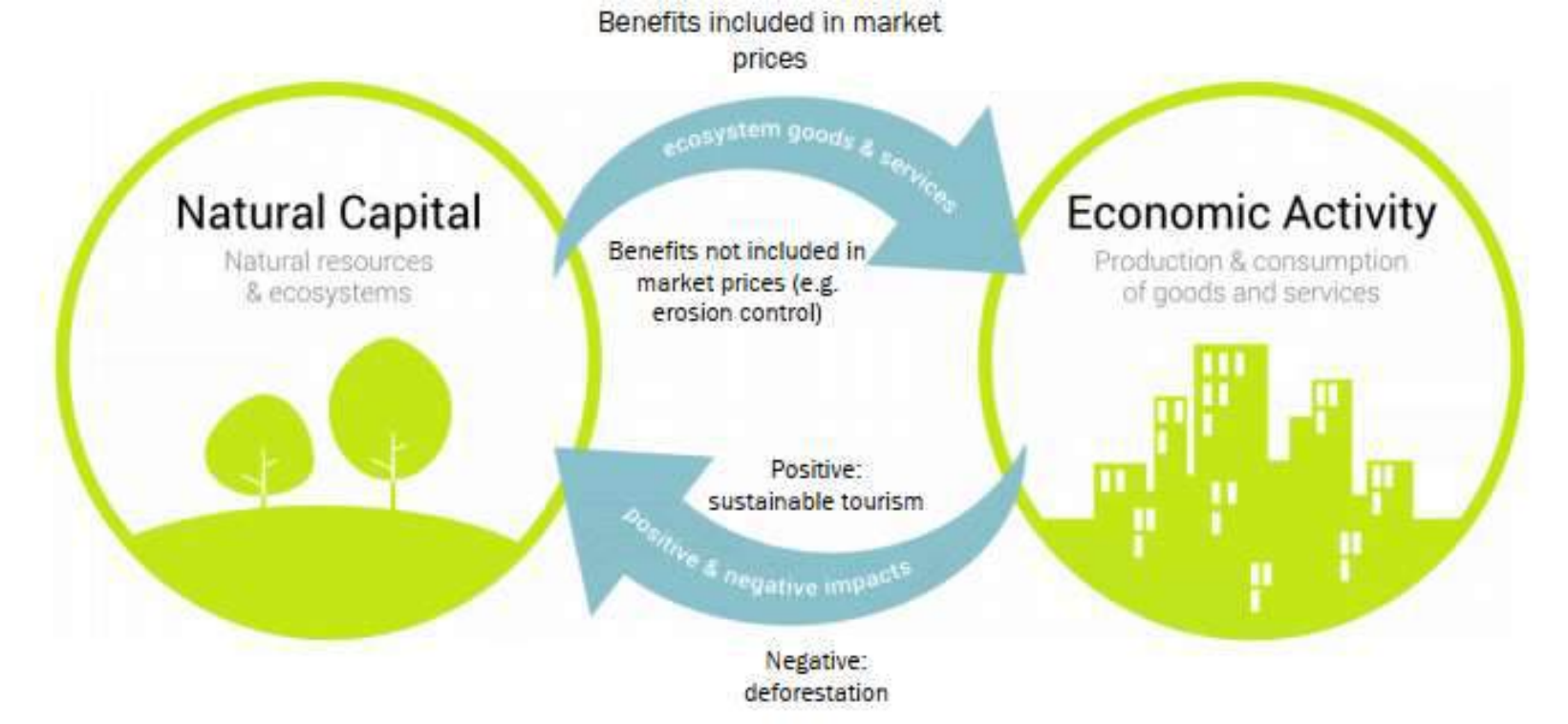
Framework for the Development of Environment Statistics (FDES 2013)

- Prepared by the UNSD and released in 2016.
- FDES 2013 is structured in a way that allows links to economic and social domains.
- Compatible with other frameworks and systems, such as the System of Environmental - Economic Accounting (SEEA).



Environment Statistics released till date

Environment and Economic Activity



Environment Accounting-Why?

- GDP: Developed in 1930s is the best known measure of macro-economic activity.
- A proxy indicator for overall societal development and progress in general.
- Does it measure environmental sustainability or social inclusion? - No

AN ILLUSTRATION:

"A country could exhaust its mineral resources, cut down its forests, erode its soils, pollute its aquifers, and hunt its wildlife and fisheries to extinction but measured income would not be affected as these assets disappeared."

Repetto et.al. (1989)

Environmental- Economic Accounting

- Integrated statistics that illuminate the relationship between the environment and the economy, both the impacts of the economy on the environment and the contribution of the environment to the economy.
- Provide information about the extraction of natural resources, their use within the economy, natural resource stock levels, the changes in those stocks during a specific period and economic activity related to the environment.
- These accounts present the information in physical and monetary terms.

What is SEEA?

•System of Environmental-Economic Accounting (SEEA) is the first international statistical standard for environmental economic accounting.

•Adopted in 2012 by UN Statistical Commission.

•A conceptual framework for

- understanding the interactions between the economy and the environment,
- describing stocks and changes of environmental assets.

About SEEA

- Based on agreed-upon concepts, definitions, classifications and accounting rules.
- Coherent and complementary with other international standards, recommendations and classifications.
- Applicable across all countries, regardless of their level of economic and statistical development, their economic structure, or the composition of their environment.
- Links environmental and socio-economic data which is essential for integrated policy-making.

Parts of SEEA

SEEA has two broader frameworks:

i. SEEA - Central Framework

ii. SEEA - Ecosystem Accounting

And some other companion documents

i. SEEA – Application and Extensions

ii. SEEA Water

iii. SEEA Energy

iv. SEEA Agriculture, Forestry and Fisheries

Ecosystems

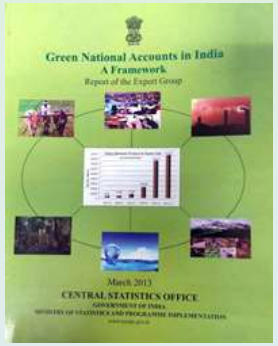
- A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
- It can be identified on different spatial scales e.g. small pond as well as Tundra stretching over millions of hectares.
- They are interconnected, nested and overlapping.
- Includes natural as well as man-dominated systems such as croplands or intensive pastures.

SEEA-Ecosystem Accounting

- Adopted in March 2021 by UNSC
- Tool to understand and monitor the contributions of ecosystems to economic and human activity

- A spatially based, integrated statistical framework for organizing biophysical information about ecosystems, measuring ecosystem services, tracking changes in ecosystem extent and condition, valuing ecosystem services and assets and linking this information to measures of economic and human activity.

Environment Accounts in India



1997-2009

Different studies conducted under the aegis of Technical Working Group on NRA. Studies- disparate in nature – a strategy was required

2011

Expert Group under Prof. Sir Partha Dasgupta constituted for preparing roadmap

2013

Expert Group released report, "Green National Accounts in India-A Framework" and recommended compilation of the SEEA accounts in phased manner

2016

Inter-Ministerial Group (IMG) constituted

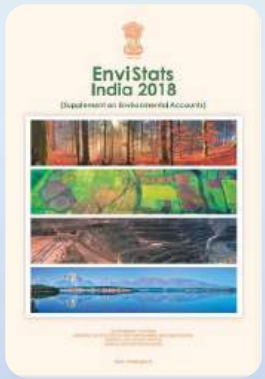
2018

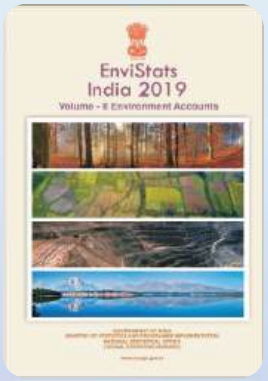
MoSPI started compiling Environment Accounts following the SEEA Framework

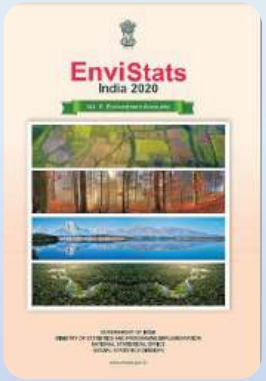
Inter Ministerial Group on Environment Accounting in India

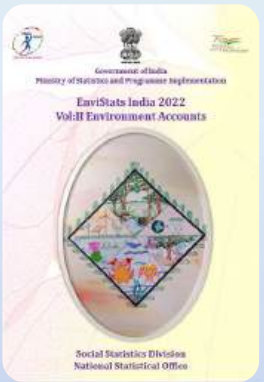
- Constituted in 2016 and reconstituted in 2018 & 2019
- Chaired by DG (Statistics)
- Represented by various Ministries/Departments and Agencies
- Provides technical as well as data support for compilation of Environment Economic Accounts.

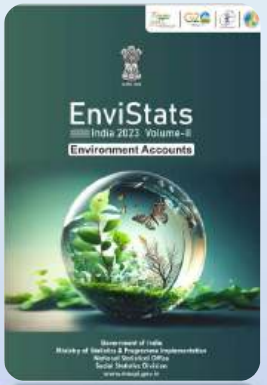
Environment Accounts released till date



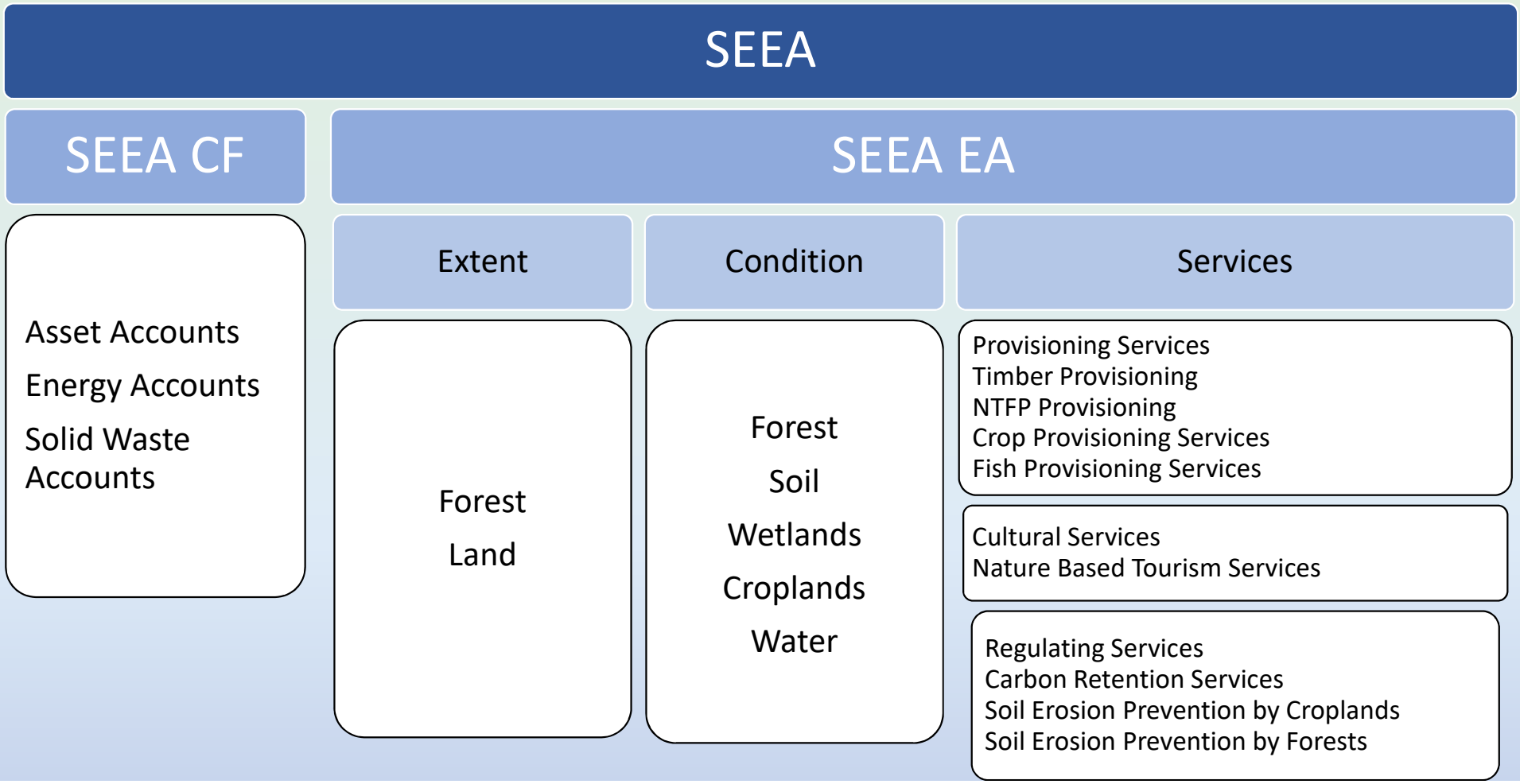








SEEA Ecosystem Accounts in India



Inter-Departmental Group by States

- MoSPI requested all the States / UTs to constitute an Inter-Departmental Group, in the line of IMG at centre with DES as the nodal agency, for better coordination and easy flow of data for the compilation of Environment Accounts.

- As per information available with MoSPI following States / UTs have constituted the Inter-Departmental Group for compilation of Environment Accounts till date:

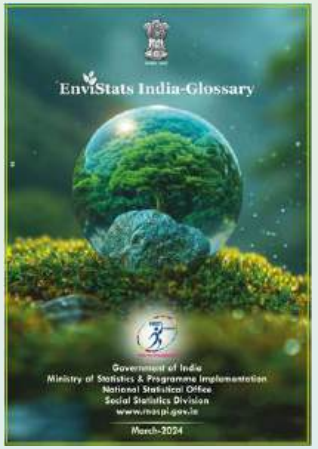
Sl. No.	State / UT
1	Himachal Pradesh
2	Andaman and Nicobar Islands
3	Bihar
4	Tripura
5	Rajasthan
6	Jammu and Kashmir
7	Uttar Pradesh
8	Uttarakhand

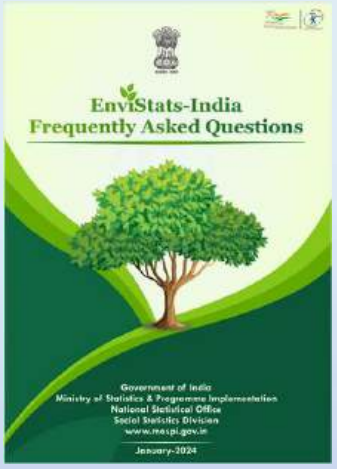
Challenges

- Data gaps
- Lack of Timeliness in receiving data
- Information constrained in silos
- Need of Capacity building

Conclusions

- SEEA Implementation is necessary to address the Environmental Concerns
- Policies backed by data/indicators on Environment will ensure sustainability
- Need to be aware about the Environment and the SEEA Framework.
- Support from the various ministries/department/Research Agencies is utmost required.
- Start with the simplest account possible which can be improved at a later stage.
- The development of the State wise accounts will strengthen the National Level Estimates.






THANK YOU