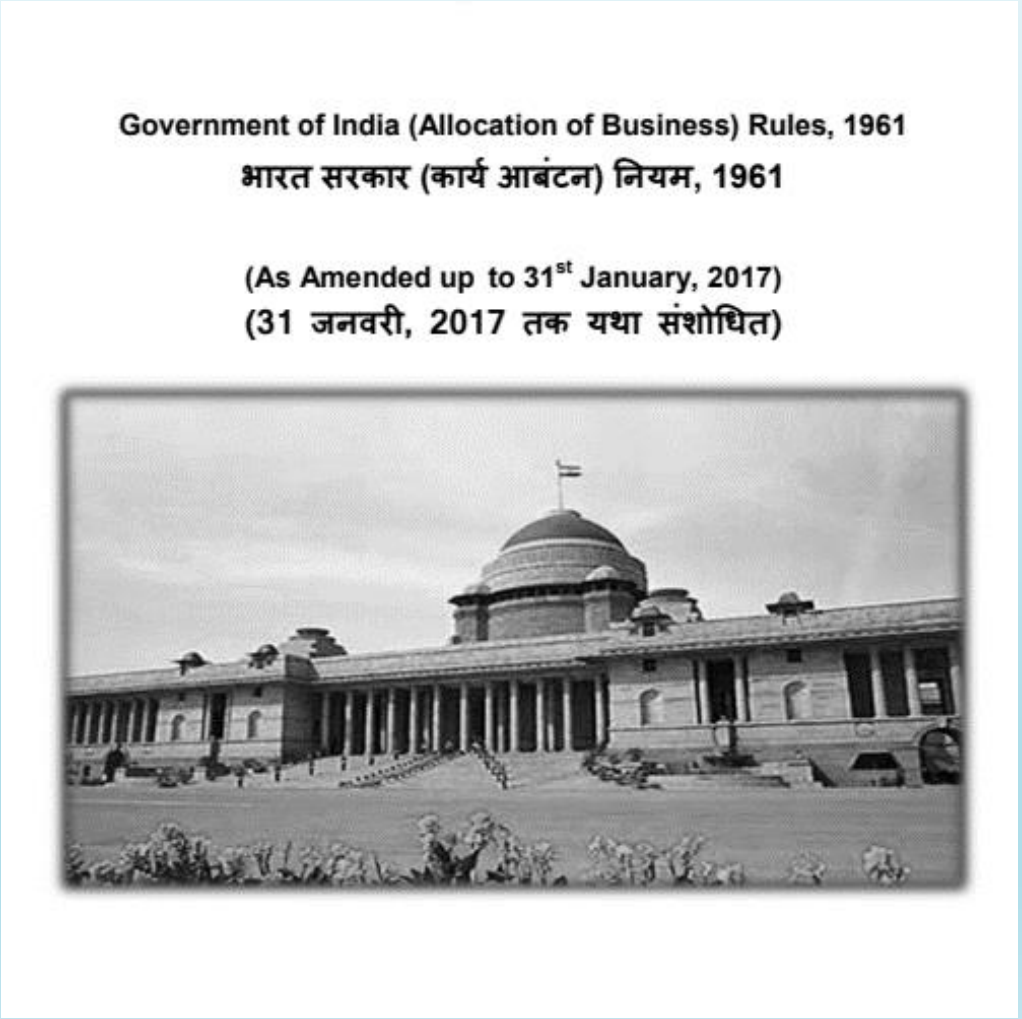
Valuing Nature: India's Experience with SEEA Asset Accounts

Outline of the Presentation

- Mandate
- Environment Accounting in India
- Inter-Ministerial Group (IMG) on Environment Accounting in India
- Inter-Departmental Groups (IDG) at sub-national level
- Capacity Building Workshops
- Recent Initiatives
- Challenges
- Way Forward

Mandate

- India has an abundance of natural resources and biodiversity wealth that is closely interlinked with the lives and livelihoods of the people.
- Realizing this, the environmental issues are embedded in India's Constitutional guidelines adopted in 1950.
- The Article 48A of the Directive Principles of State Policy, given in the Constitution of India contains provisions that reflect the States' commitment to protect the environment including forests and wildlife and which enjoins upon the citizens of India the responsibility to protect and improve the environment.
- As per the **Allocation of the Business rules**, Ministry of Statistics and Programme Implementation (MoSPI) has the mandate for development of **Environment Statistics**, development of the methodology, concepts and preparation of **National Resource Accounts** in India.



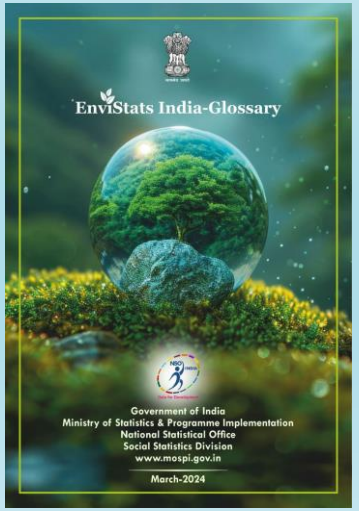
India's Progress Toward Environmental Economic Accounting: Embracing the SEEA Framework

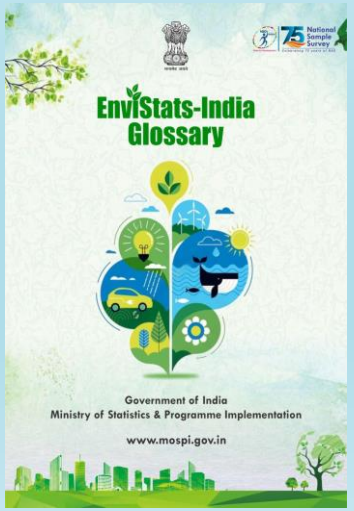
2018	**MoSPI** started **compiling Environment Accounts following the SEEA Framework** 7 issues have been released till date.
2016	**Inter-Ministerial Group (IMG) constituted**
2013	Expert Group released report, "**Green National Accounts in India – A Framework**" and recommended **compilation of the SEEA accounts in phased manner**
2011	**Expert Group constituted** for preparing a roadmap
1997-2009	Different studies conducted under the aegis of **Technical Working Group on NRA**. Studies-disparate in nature – a strategy was required

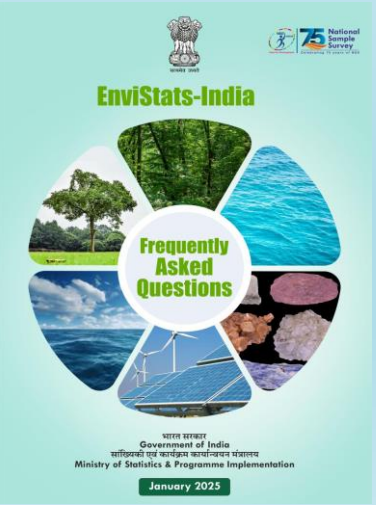
Contd.

Additional resources are made regularly available to the data users for ease of understanding technical terms related to environment such as:

- Explainer Series:
  - Measuring Cropland Fragmentation through Gini Index of Land Concentration
  - Measuring Crop Diversification through Effective Number of Crop Species
  - Soil Erosion Prevention Services
- EnviStats India Glossary, and
- EnviStats India Frequently Asked Questions (FAQs)



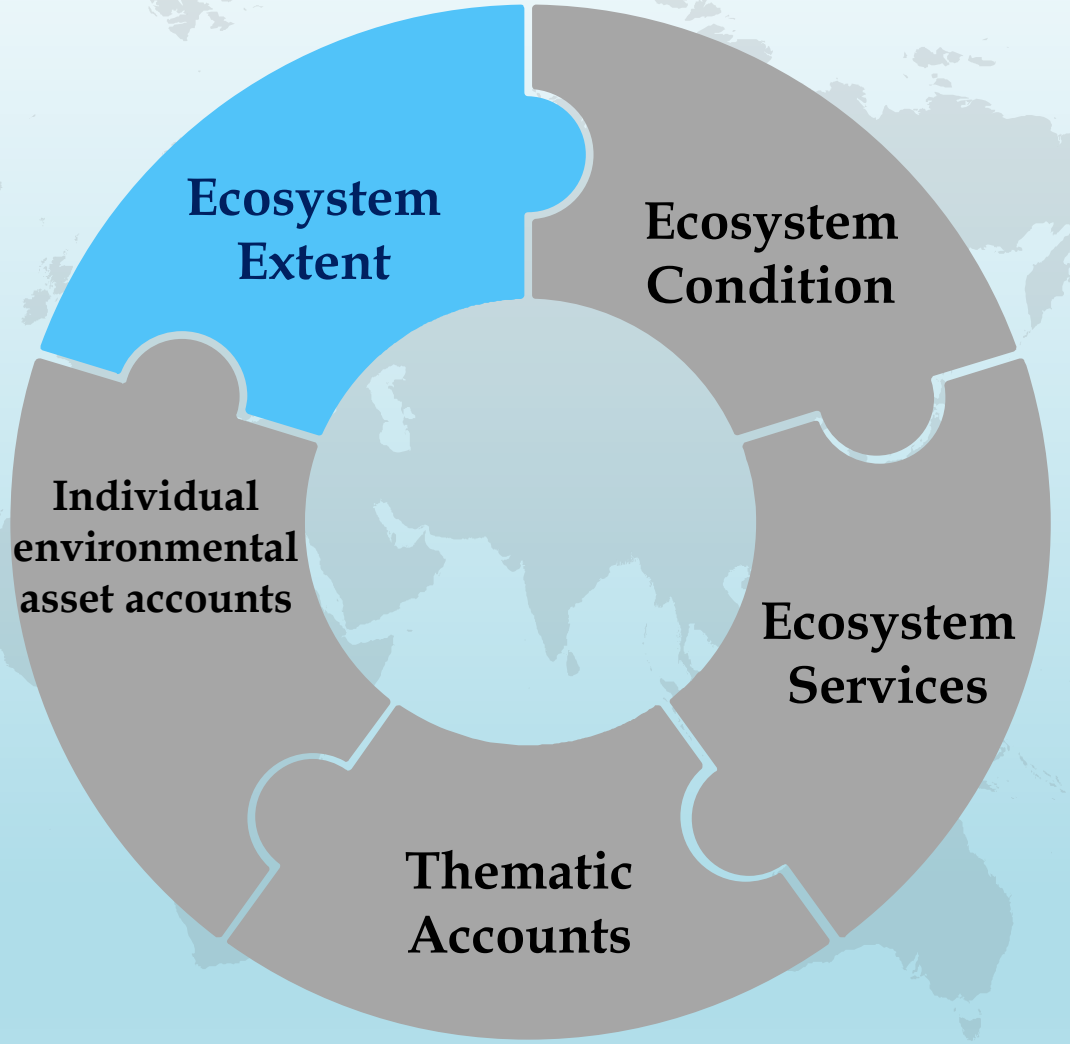




SEEA Ecosystem Accounts in India

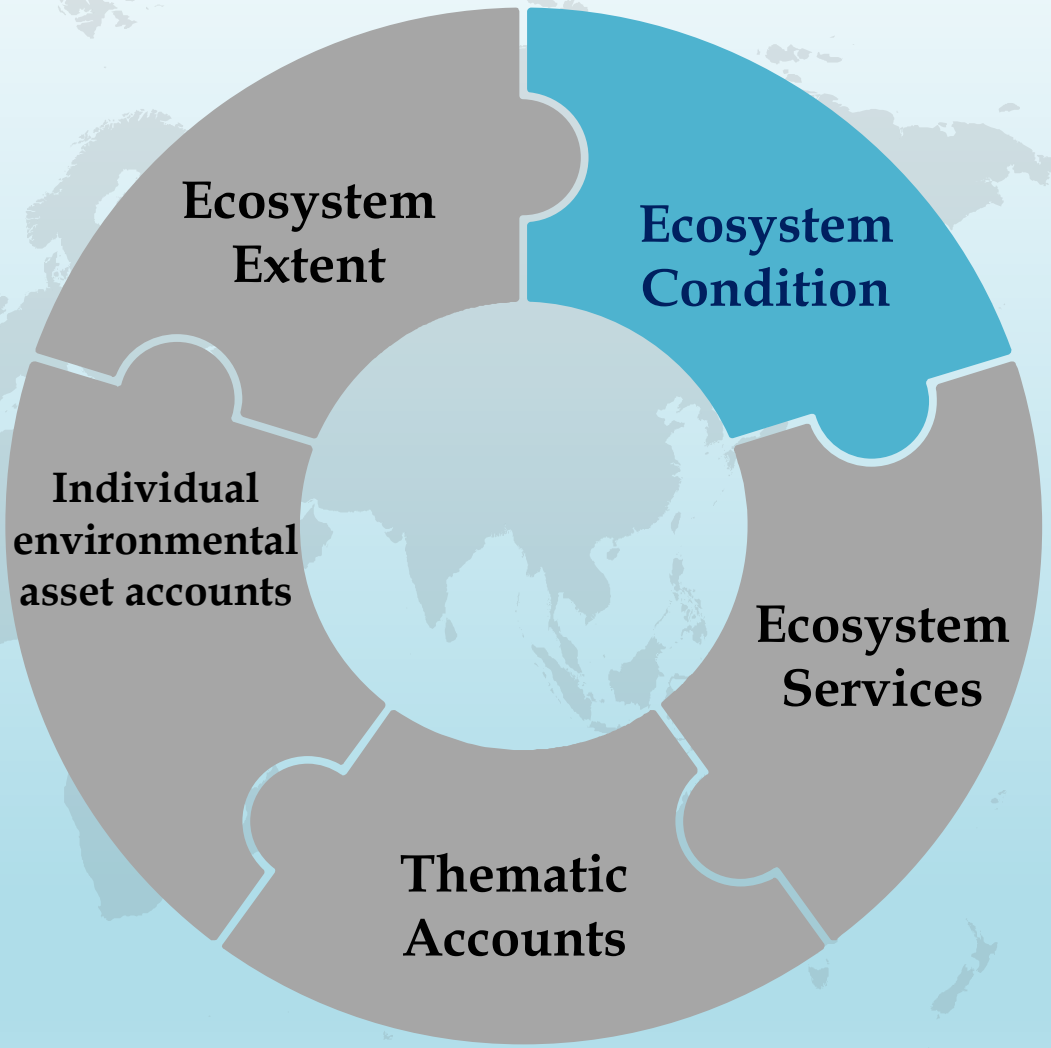
Ecosystem Extent

- Change matrix of Land Use–Land Cover (LULC) from 2005-06 to 2011-12 and 2011-12 to 2015-16 (2018, 2020)
- Asset Account for Land Use–Land Cover (LULC), 2005-06, 2011-12 and 2015-16 (2018, 2020)
- Accounts related to the Land Degradation, 2005-06 and 2015-16 (2020)
- Wetland Extent Account, 2006-07 (2020), 2016-17 (2020, 2022)



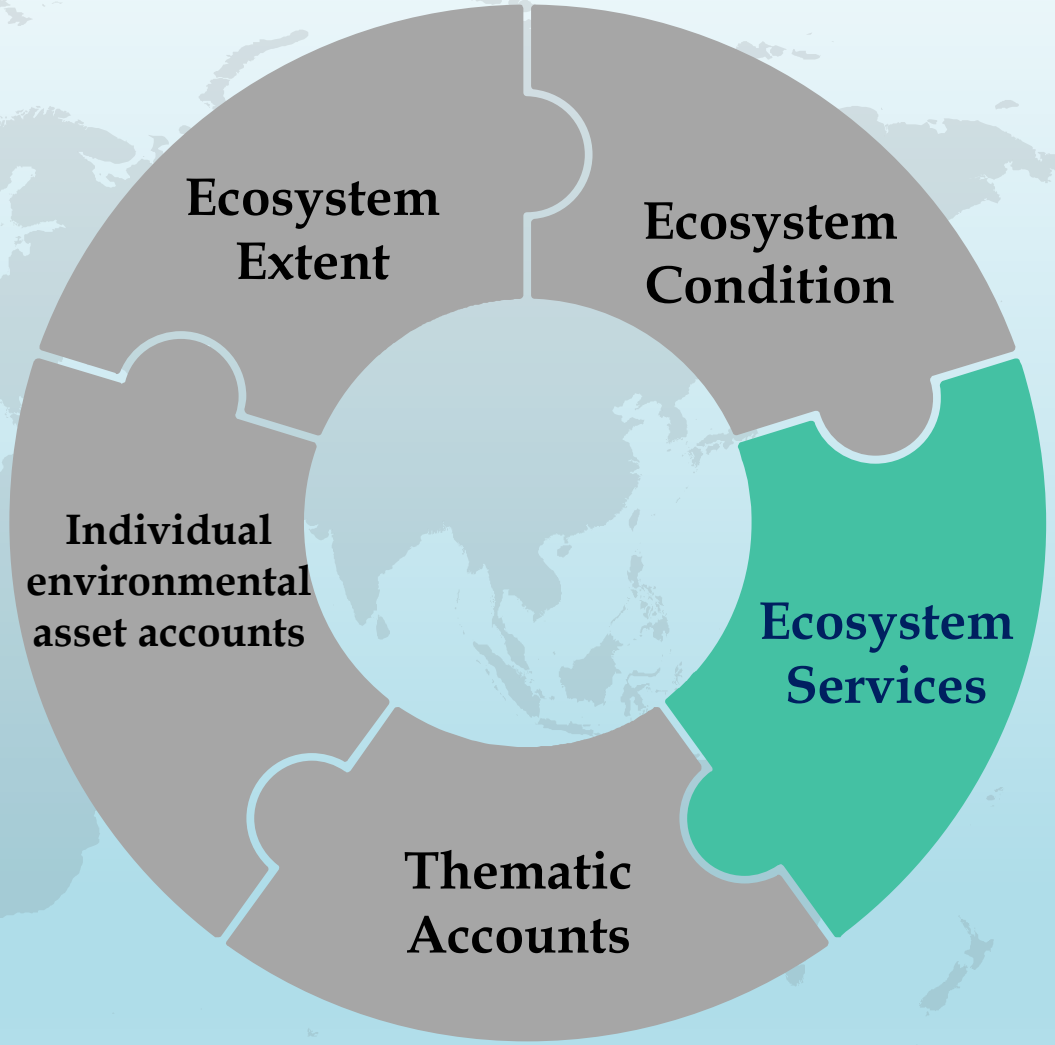
Ecosystem Condition

- Soil nutrient indices (2019, 2021, 2024)
- Water quality accounts (2019, 2021)
- Forest condition accounts (2020)
- Cropland condition accounts (2020)
- Wetland Condition Accounts (2020)



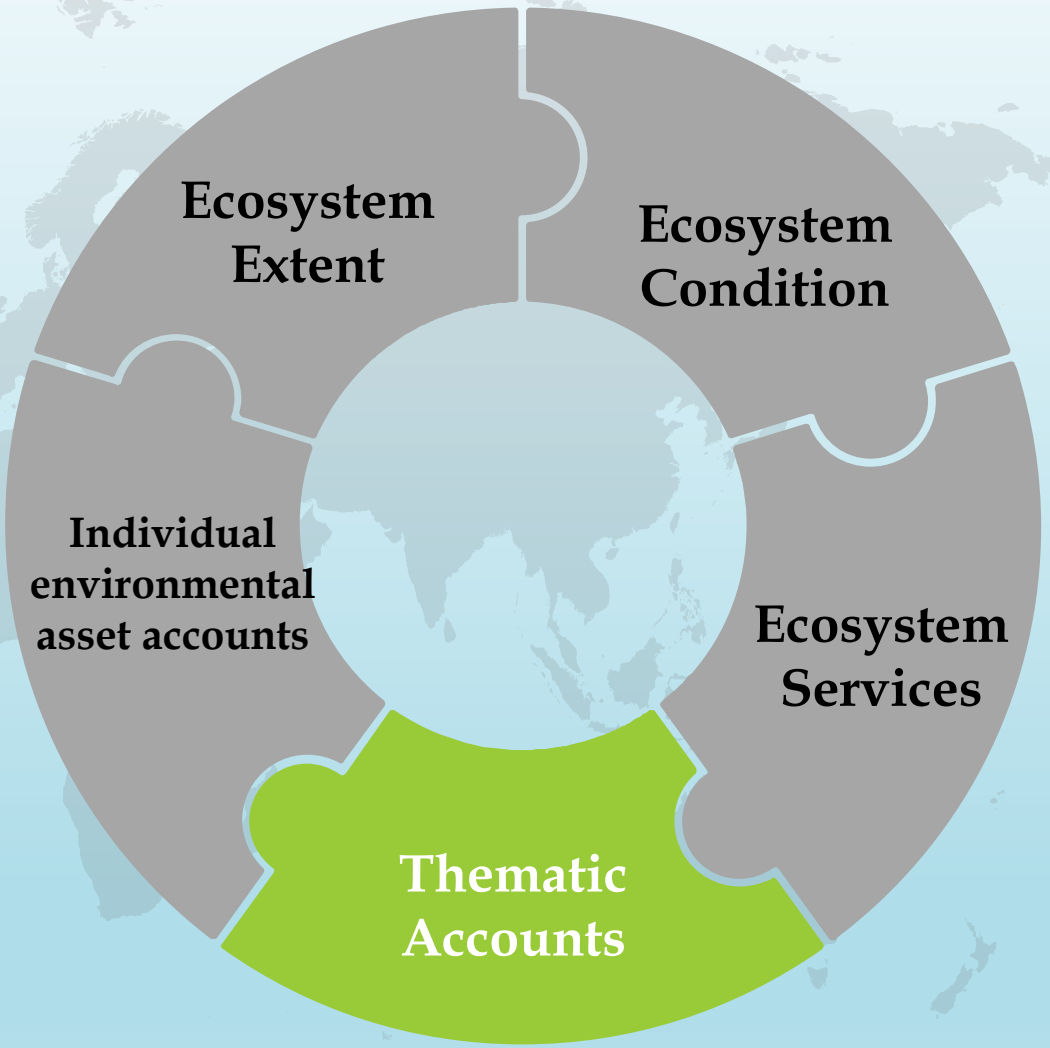
Ecosystem Services

- Crop provisioning services (monetary) (2019, 2021)
- Timber provisioning services (monetary) (2020, 2022)
- Non-Timber Forest Products (NTFP) provisioning services (monetary) (2020, 2022)
- Fish Provisioning services (monetary) (2022, 2023)
- Carbon retention services provided by forests (physical and monetary) (2020, 2022)
- Nature-based tourism (monetary) (2019)
- Soil erosion prevention services provided by croplands/ Forests (physical) (2020, 2023)



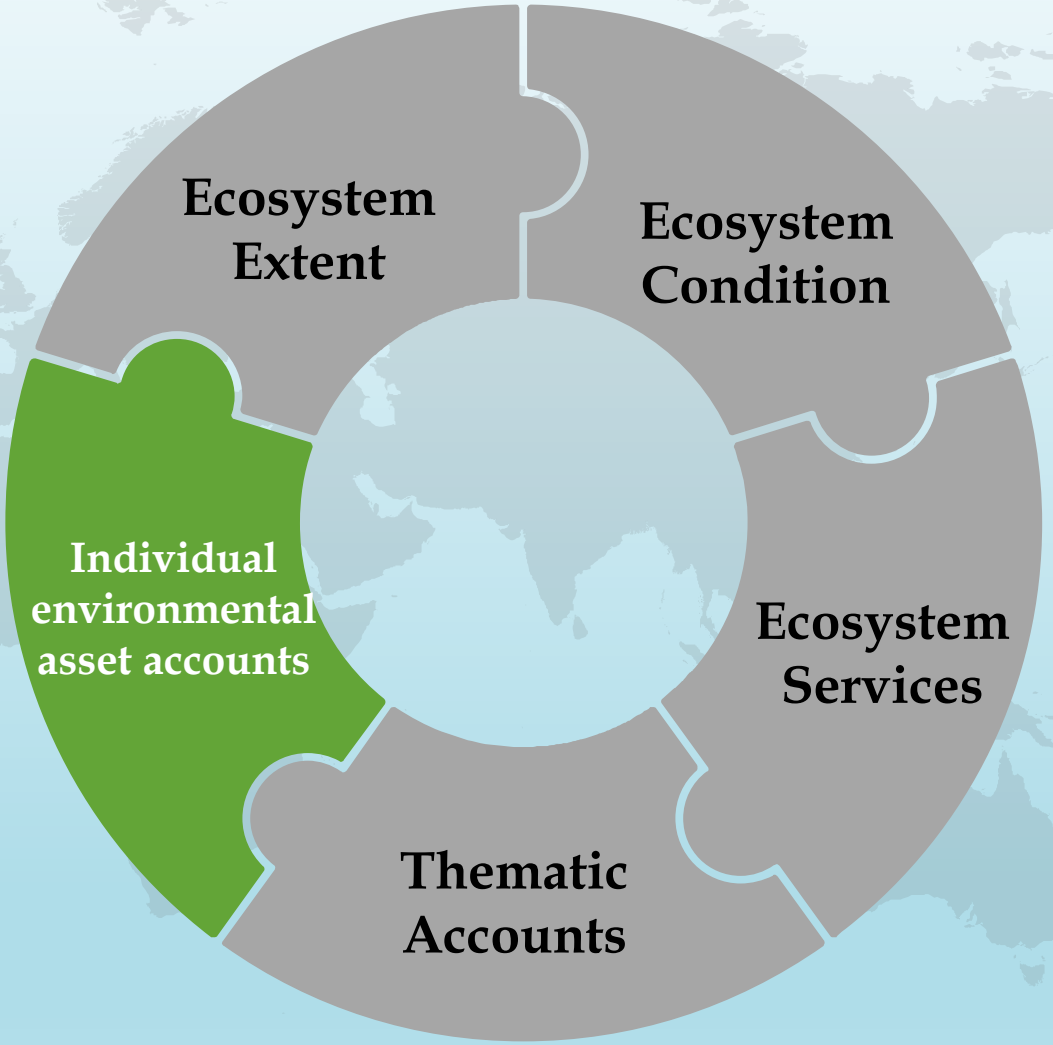
Thematic Accounts

- Biodiversity (2020, 2021, 2022, 2024)
- State-wise floral and faunal species accounts (2020)
- Species Richness of IUCN Red List species (2020, 2021, 2022, 2024)
- Ocean Ecosystem Accounts (2024)



Individual environmental asset accounts (SEEA CF)

- Forests – Growing Stocks of Timber and Carbon (2018, 2020, 2022)
- Water (2018)
- Minerals (2018)
- Energy Accounts (2022, 2024)
- Solid Waste Accounts (2022, 2023)
- Material Flow Accounts (2022, 2023)



Asset Accounts Illustration: Land

Table 1.6: Asset Account for Land Cover (Sq. Kms)					
INDIA					
		Opening Stock (2005-06)	Addition to Stock	Reduction in Stock	Closing Stock (2011-12)
Agriculture	Crop land	1519600.64	78227.66	39541.78	1558286.52
	Current Shifting cultivation	5155.97	2927.64	3546.70	4536.90
	Plantation	81840.63	3459.89	1268.86	84031.66
	Farmland(subtotal)	1606597.23	84615.18	44357.33	1646855.08
	Fallow	198242.26	31018.47	67905.01	161355.73
	Sub Total 1	***1804839.50***	***115633.66***	***112262.34***	***1808210.82***
Barren/ unculturable/ Wastelands	Barren Rocky	119482.81	17580.40	2169.66	134893.55
	Gullied / Ravinous Land	10425.99	96.23	537.49	9984.74
	Rann	17065.02	0.10	0.28	17064.83
	Salt Affected Land	9232.56	230.47	1112.38	**8350.65**
	Sandy Area	34025.43	269.21	5778.04	28516.60
	Scrub Land	200499.06	8676.76	11583.50	197592.32
	Sub Total 2	***390730.87***	***26853.17***	***21181.35***	***396402.69***
Built-up	Mining	4045.99	1068.01	25.09	5088.91

Table 1.6: Asset Account for Land Cover (Sq. Kms)					
INDIA					
		Opening Stock (2005-06)	Addition to Stock	Reduction in Stock	Closing Stock (2011-12)
	Rural	66403.71	661.00	250.24	66814.47
	Urban	31663.85	4393.62	2.16	**36055.31**
	Sub Total 3	***102113.55***	***6122.64***	***277.50***	***107958.69***
Forest	Deciduous	416187.55	30340.93	16907.44	429621.05
	Evergreen/Semi evergreen	186560.87	13359.06	29642.20	170277.74
	Forest Plantation	11396.09	474.30	149.98	11720.41
	Scrub Forest	114596.56	8859.55	3509.24	119946.86
	Swamp / Mangroves	5172.92	151.51	31.36	5293.07
	Sub Total 4	***733913.99***	***53185.35***	***50240.21***	***736859.13***
Grass / Grazing	Grass / Grazing	35788.81	2194.09	2522.42	35460.48
	Sub Total 5	***35788.81***	***2194.09***	***2522.42***	***35460.48***
Snow and Glacier	Snow and Glacier	84107.93	2660.73	22815.05	63953.61
	Sub Total 6	***84107.93***	***2660.73***	***22815.05***	***63953.61***
Wet lands / Water bodies	Inland Wetland	10545.98	757.58	1428.20	9875.36
	Coastal Wetland	14340.61	59.37	256.23	14143.74
	River/Stream/Canals	60369.63	2988.01	2810.46	60547.18
	Water bodies	50512.13	4030.88	691.72	53851.29
	Sub Total 7	***135768.35***	***7835.84***	***5186.61***	***138417.58***
	Grand Total	**3287263.00**	**214485.47**	**214485.47**	**3287263.00**

Government of India
National Remote Sensing Centre
Indian Space Research Organisation
ISO 9001:2015

Change Matrix

LULC-CLASSES		INDIA 2011-12								
		FL	1.1.4	1.2	1.3	1.4	1.5	1.6	1.7	Grand Total
2005-06	Farmland (FL)	**1565.43**	28.97	1.56	3.20	3.32	0.06		4.05	**1606.60**
	1.1.4 Fallow	65.10	**130.34**	0.55	1.11	0.01			1.13	**198.24**
	1.2:Barren/unculturable/Wastelands	9.98	1.69	**374.30**	1.08	0.57	0.17	1.89	1.06	**390.73**
	1.3: Built-up				**102.09**	0.01			0.01	**102.11**
	1.4: Forest	3.61	0.01	0.92	0.24	**728.29**	0.18	0.16	0.50	**733.91**
	1.5: Grass / Grazing	0.35	0.21	0.29	0.13	0.38	**33.27**	0.60	0.57	**35.79**
	1.6:Snow and Glacier			17.88		4.11	0.82	**61.29**	0.01	**84.11**
	1.7: Wet lands / Water bodies	2.37	0.14	0.91	0.11	0.17	0.97		**131.09**	**135.77**
	Grand Total	**1646.85**	**161.36**	**396.40**	**107.96**	**736.86**	**35.46**	**63.95**	**138.42**	**3287.26**

Note: Farmland includes Cropland, Current Shifting Cultivation and Plantation

Asset Accounts Illustration: Forest

2019-20 (Area in sq. km)				
Type of Forest	**Opening**	**Addition**	**Reduction**	**Closing**
Very Dense Forest	99,278	2,009	1,508	99,779
Moderately Dense Forest	3,08,472	4,674	6,256	3,06,890
Open Forest	3,04,499	12,920	10,299	3,07,120
Scrub	46,297	5,562	5,320	46,539
Non-Forest	25,28,923	9,267	11,049	25,27,141
2017-18				
Type of Forest	**Opening**	**Addition**	**Reduction**	**Closing**
Very Dense Forest	98,158	1,969	849	99,278
Moderately Dense Forest	3,08,318	4,691	4,537	3,08,472
Open Forest	3,01,797	15,141	12,439	3,04,499
Scrub	45,979	4,466	4,148	46,297
Non-Forest	25,33,217	13,510	17,804	25,28,923
2015-16				
Type of Forest	**Opening**	**Addition**	**Reduction**	**Closing**
Very Dense Forest	88,633	13,673	4,148	98,158
Moderately Dense Forest	3,12,739	25,282	29,703	3,08,318
Open Forest	3,00,123	37,975	36,301	3,01,797
Scrub	42,302	14,542	10,865	45,979
Non-Forest	25,43,672	25,559	36,014	25,33,217

Classification of Forest Cover	
Very Dense Forest	All lands with tree canopy density of 70% and above
Moderately Dense Forest	All lands with tree canopy density of 40% and more but less than 70%
Open Forest	All lands with tree canopy density of 10% and more but less than 40%
Scrub	Forest lands with canopy density less than 10%
Non-Forest	Lands not included in any of the above classes (includes water)

Asset Accounts Illustration: Energy

	Type of Energy Resource			
	Coal (Proved Category)	Lignite (Proved Category)	Crude Oil	Natural Gas
	Million tonnes	Million tonnes	'000 Barrels	Million CuM
Opening Stock of Mineral and energy resources (Geological for last FY) as per National Inventory	**69,818.0**	**2,159.0**	**46,58,874.7**	**12,51,990.0**
Addition in stock:				
Discoveries	11.1		1,79,731.6	43,080.0
Upward Appraisal	6,462.0	359.0		
TOTAL ADDITION TO THE STOCK	**6,473.1**	**359.0**	**1,79,731.6**	**43,080.0**
Total Geological resource	**76,291.1**	**2,518.0**	**48,38,606.3**	**12,95,070.0**
Reduction in Stock:				
Extraction	638.0	44.0	2,70,916.8	32,249.2
Sterilization Loss	2,360.6	152.2		
Downward reappraisals			13,707.1	35,320.8
TOTAL REDUCTION IN STOCK	**2,998.6**	**196.2**	**2,84,623.9**	**67,570.0**
Closing stock of mineral and energy resources	**73,292.5**	**2,321.8**	**45,53,982.4**	**12,27,500.0**

Coal and Lignite data are obtained from Geological Survey of India.
*Sterilization Loss for Coal = Extraction*3.7*
*Sterilization Loss for Lignite = Extraction*3.46*

Data Source:

(i) Office of Coal Controller
(ii) Geological Survey of India
(iii) M/o Petroleum and NG

- **For Coal and Lignite, the Proved Category has been considered.**

Proved Mineral Reserve refers to the economically minable part of the measured mineral resource

- **Data not available for:**
  - Reclassifications
  - Catastrophic Losses
  - Atomic Energy not included due to data confidentiality issue

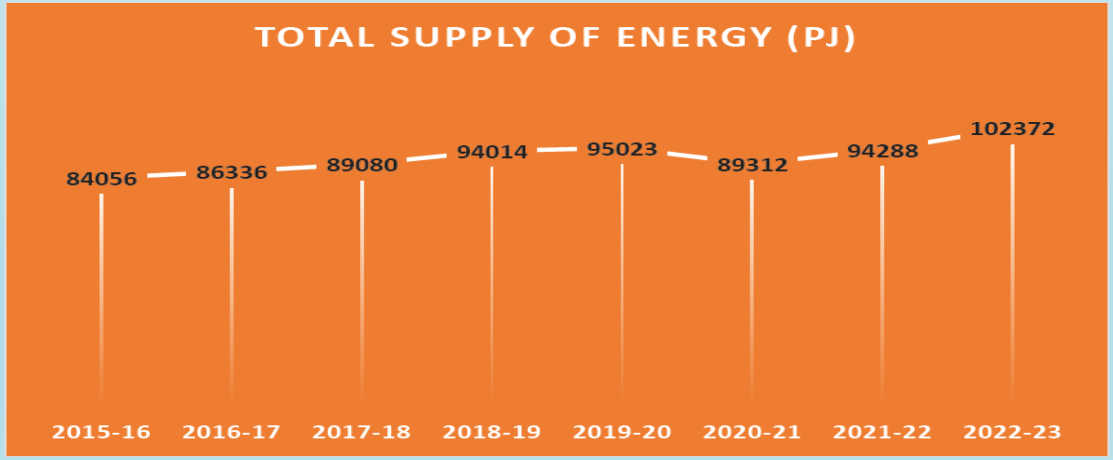
Physical Supply and Use Tables Illustration: Energy

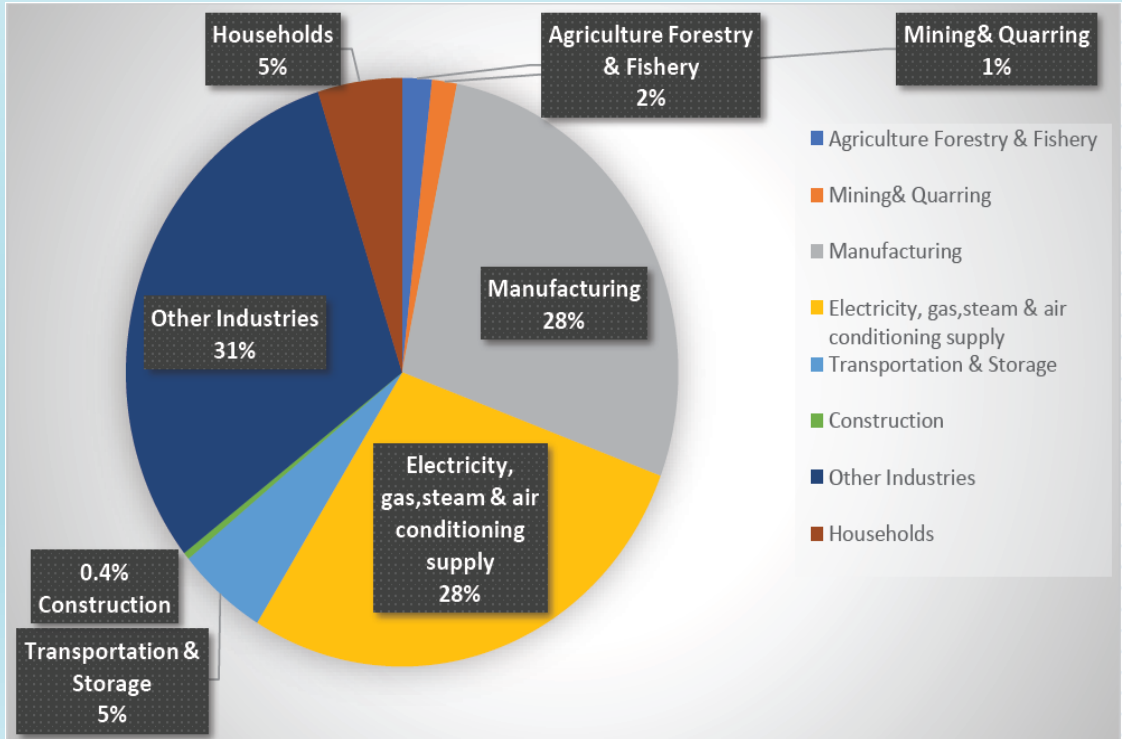
Some Energy indicators

- Energy Intensity for an industry (Energy intensity is a ratio of energy consumed per unit of economic output (GVA))
- Energy use per capita, Energy use per GDP etc.
- Changes in the energy intensity can give a fair amount of idea about the efficiency and structural change in industry contribution.

Data Source:

(i) Office of Coal Controller
(ii) M/o Petroleum and NG
(iii) Central Bureau of Electricity, M/o Power





IMG & IDG for Environment Accounting in India

Inter Ministerial Group (IMG) on Environment Accounting in India

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

Inter-Departmental Group (IDG) by States

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

Capacity Building Workshops

- MoSPI has been organizing state-level and national level capacity development workshops to create awareness about the environment accounts at the sub-national level and to promote state collaboration and cooperation.

- Recently, MoSPI organized a ‘Capacity Building Workshop on Monitoring Frameworks of Sustainable Development Goals, Compilation of Environment Accounts, and Gender Statistics’ during January, 2025 in Bhopal, Madhya Pradesh.

Recent Initiatives

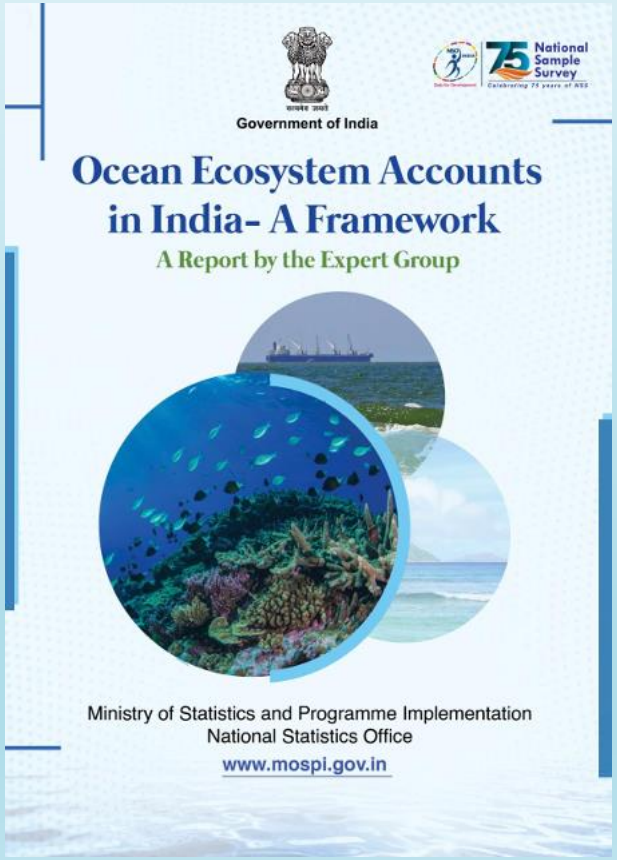
(i) Ocean Ecosystem Accounting

Ocean Accounts - Integrated records of regularly compiled and comparable data concerning ocean environment conditions, economic activity and social conditions.

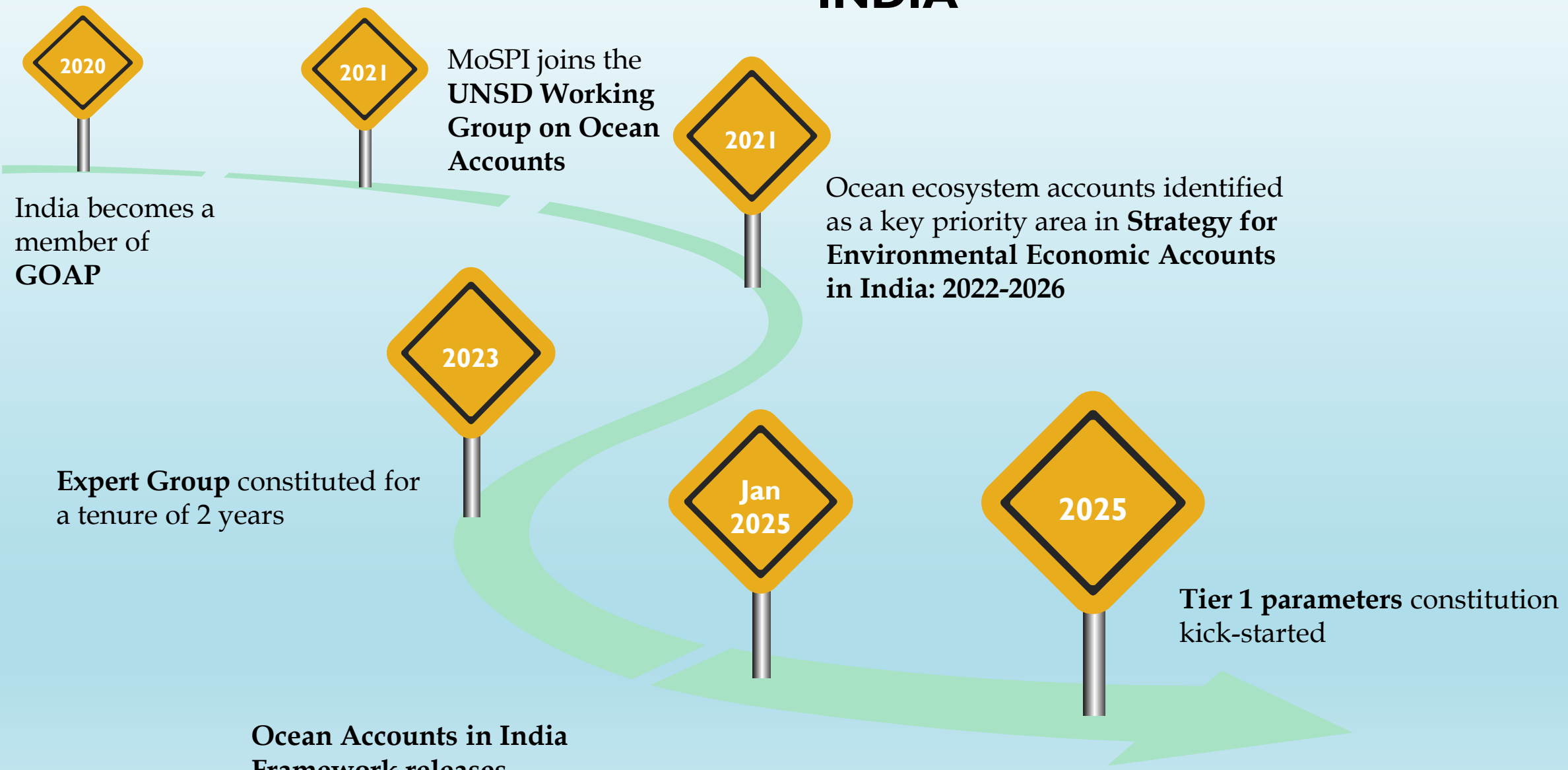
- Provide coherent structure for standardizing fragmented data
- Produce reliable integrated indicators for public policy decision-making about oceans, related analysis and research
- Highlight how ocean ecosystems contribute to the economy and society as well as the impact of economic activities on these ecosystems
- Particularly important for India: Uniquely positioned, bordered by oceans on three sides with a vast coastline and rich marine biodiversity supporting millions of livelihoods
- Helps to achieve UN SDGs 14, 15.9 and 17.19 towards the management of a healthy and resilient ocean

OVERVIEW of the OCEAN ECOSYSTEM ACCOUNTS FRAMEWORK

- Highlights the significance of ocean ecosystem accounts for sustainable management and policy development.
- Presents India's ocean accounts framework in line with SEEA framework:
  - Structure and parameters required for extent and condition accounts of ocean ecosystems best suited for the Indian scenario;
  - Ocean Ecosystem Services and their appropriate valuation techniques suitable for the Indian context and the Ocean Assets;
- Explores linkages with government initiatives and Sustainable Development Goals and provides strategic recommendations for future enhancement of the accounts.



OCEAN ECOSYSTEM ACCOUNTING IN INDIA



(ii) Urban Ecosystem Accounts in India

- NSO, India released the Strategy for Environmental Economic Accounting.
- To provide a road–map for development of Environmental Economic Accounting in India.

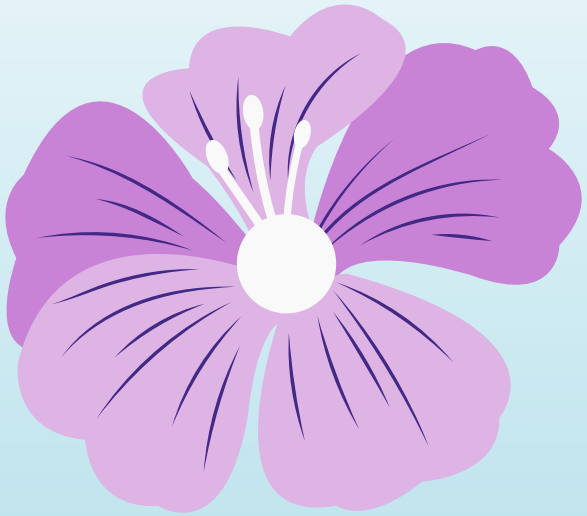
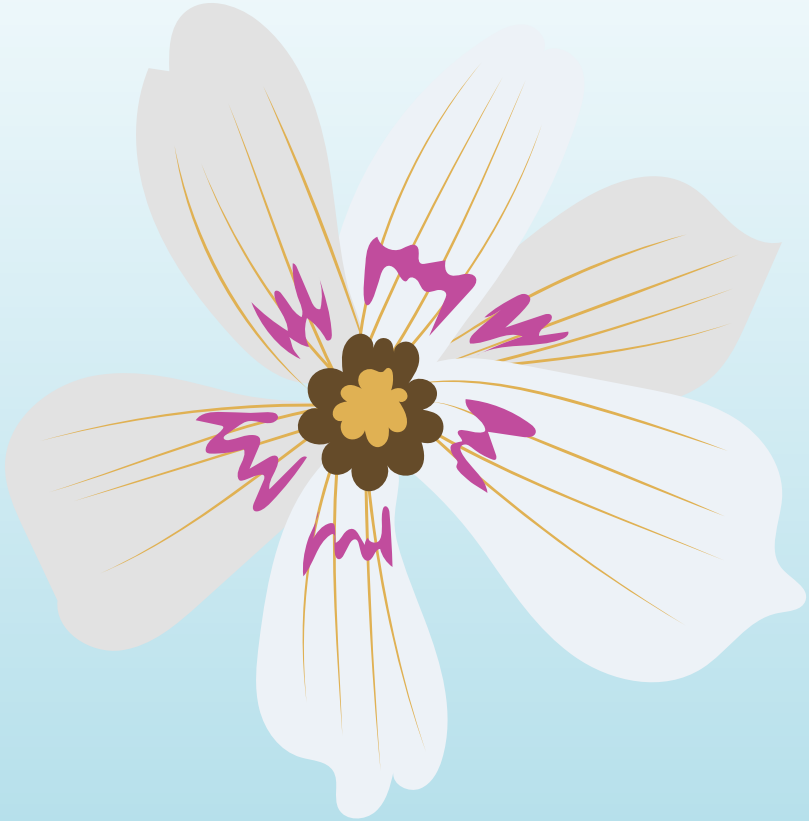
- NSO India- started to explore **Urban Ecosystem Accounts**
- Consultations with stakeholders
- MoU with other agencies for advanced and updated data.

Challenges

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

Way Forward

- Beginning with simplest account and improving it further with time;
- Continuous collaboration and co-ordination with various ministries/department/research organizations and experts;
- Pilot studies;
- Capacity Building;
- Updating and expansion of existing accounts and exploration of new accounts;
- Development of state-level accounts strengthening national-level estimates;
- Environment Accounts Dashboard.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