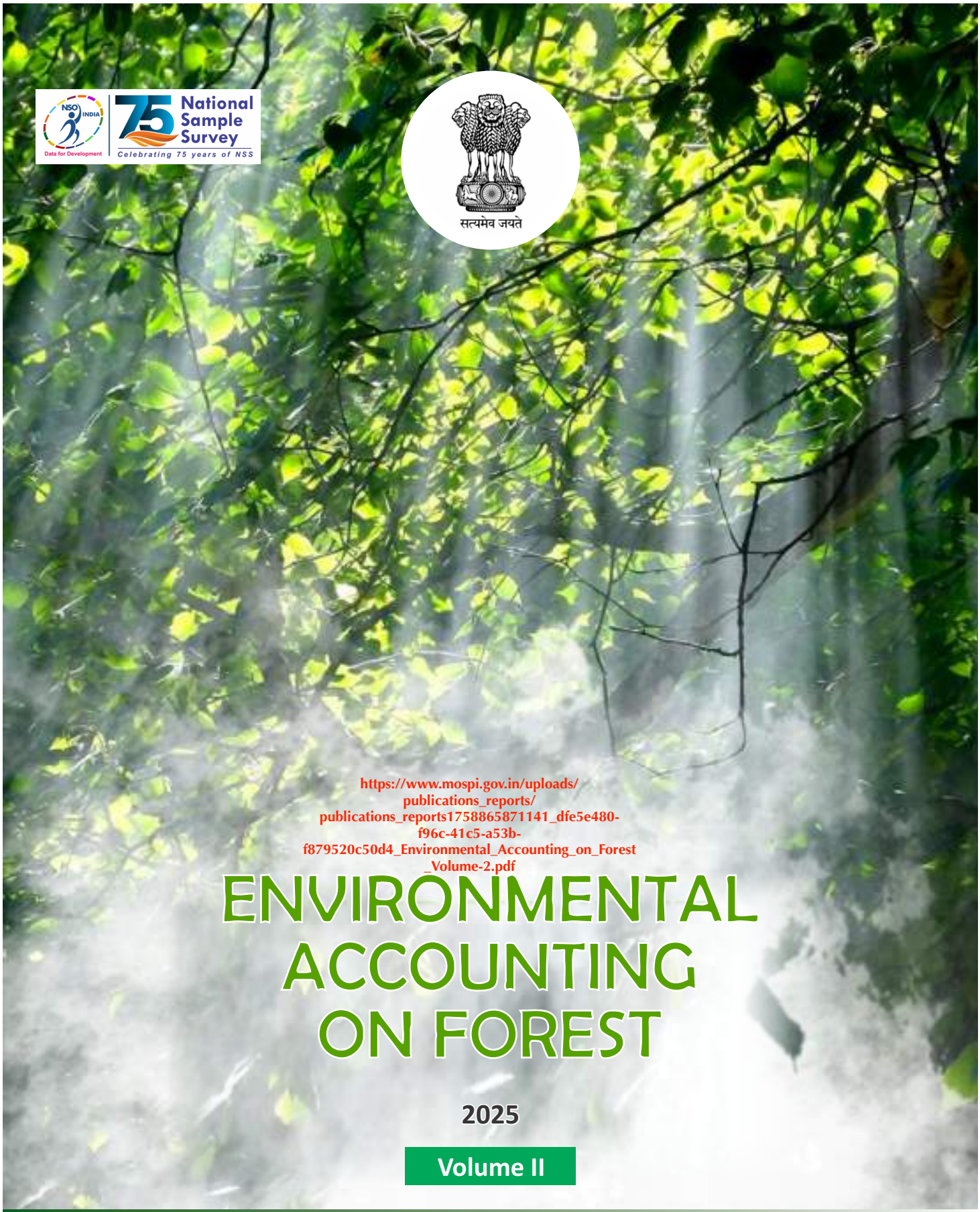

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ENVIRONMENTAL ACCOUNTING ON FOREST

2025

Volume II

Government of India
Ministry of Statistics and Programme Implementation
National Statistics Office
Social Statistics Division

ENVIRONMENTAL

Accounting on Forest - 2025

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Feedback and suggestions for the publication are welcomed by the Environment unit team at ssd-mospi@gov.in

Abbreviations

AGB	Above-Ground Biomass
BGB	Below-Ground Biomass
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CICES	Common International Classification of Ecosystem Services
CUM	Cubic Meter
DCU	data collection unit
ECT	Ecosystem condition Typology
EFGs	Ecosystem Functional Group
ENS	Effective number of species
EXP	Exponential
FAO	Food and Agriculture Organization
FRA	Forest Rights Act
FSI	Forest Survey of India
GA	Geographical Area
GDP	Gross Domestic Product
GIS	Geographic Information System
GPG	Good Practice Guidance
GVA	Gross Value Added
GVO	Gross value of Output
HA	Hectare
ICFRE	Indian Council of Forestry Research and Education
IDF	International Day of Forests
IPCC	Intergovernmental Panel for Climate Change
ISFR	India State of Forest Report
ISIC	International Standard Industrial Classification of All Economic Activities
IUCN	International Union for Conservation of Nature
LUS	Land Use Statistics
MDF	Moderately Dense Forest
MIS	Management Information System
MoAFW	The Ministry of Agriculture and Farmer's Welfare

Abbreviations

MODIS	Moderate Resolution Imaging Spectro-radiometer
MoEF&CC	Ministry of Environment, Forest & Climate Change
MoSPI	Ministry of Statistics and Programme Implementation
MSUT	Monetary Supply and Use Tables
NCAVES	Natural Capital Accounting and Valuation of Ecosystem Services
NDC	Nationally Determined Contributions
NPA	Non-Performing Asset
NTFP	Non-timber forest products
NTUs	Nephelometric turbidity units
OF	Open Forest
PF	Protected Forest
PSUT	Physical Supply and Use Tables
RF	Reserved Forests
RFA	Recorded Forest Area
SCC	social cost of carbon
SDGs	Sustainable Development Goals
SEEA CF	System of Environmental-Economic Accounting Central Framework
SEEA EA	System of Environmental-Economic Accounting – Ecosystem Accounting
SFDs	State Forest Departments
SGDP	State Gross Domestic Product
SNA	System of National Accounts
SNPP-VIIRS	Suomi National Polar-orbiting Partnership - Visible Infrared Imaging Radiometer Suite
SOC	Soil Organic Carbon
T C/HA	Tonnes of Carbon per Hectare
TOF	trees outside forests
UNESCO	United Nations Educational, Scientific and Cultural Organization
VDF	Very Dense Forest
WAVES	Wealth Accounting and Valuation of Ecosystem Services
WTA	Willingness to Accept
WTP	Willingness to Pay

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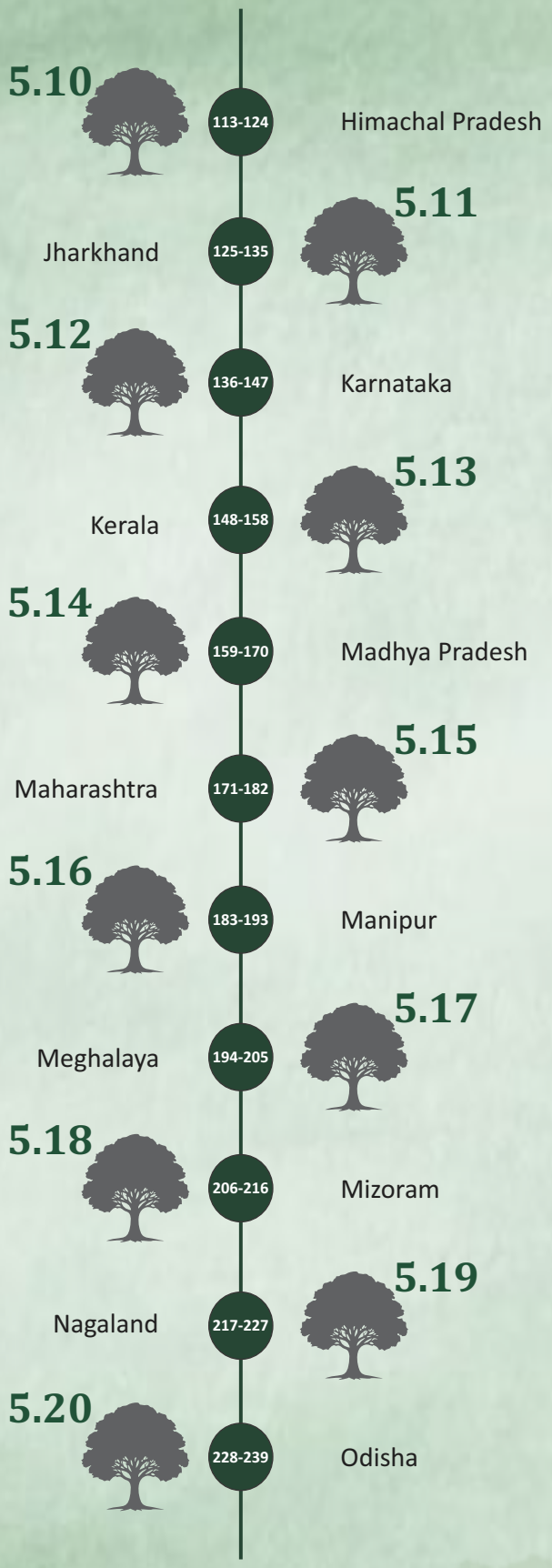
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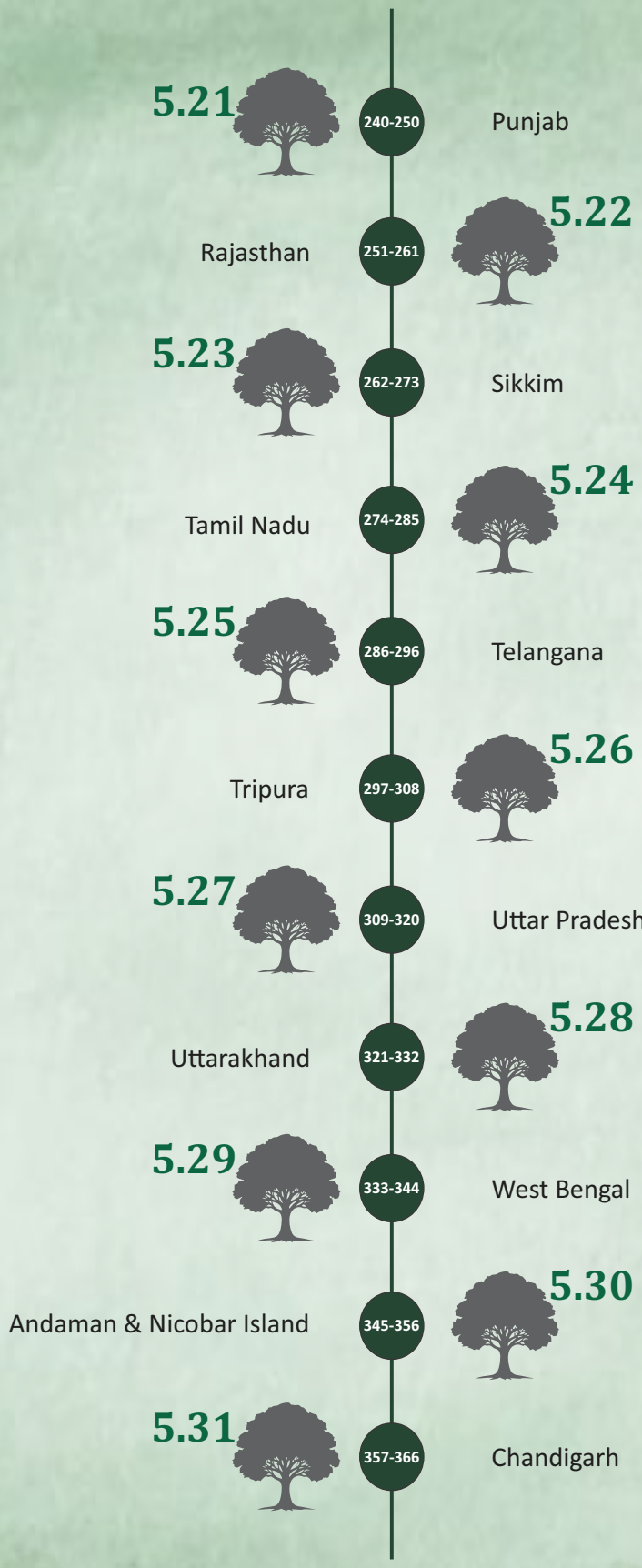
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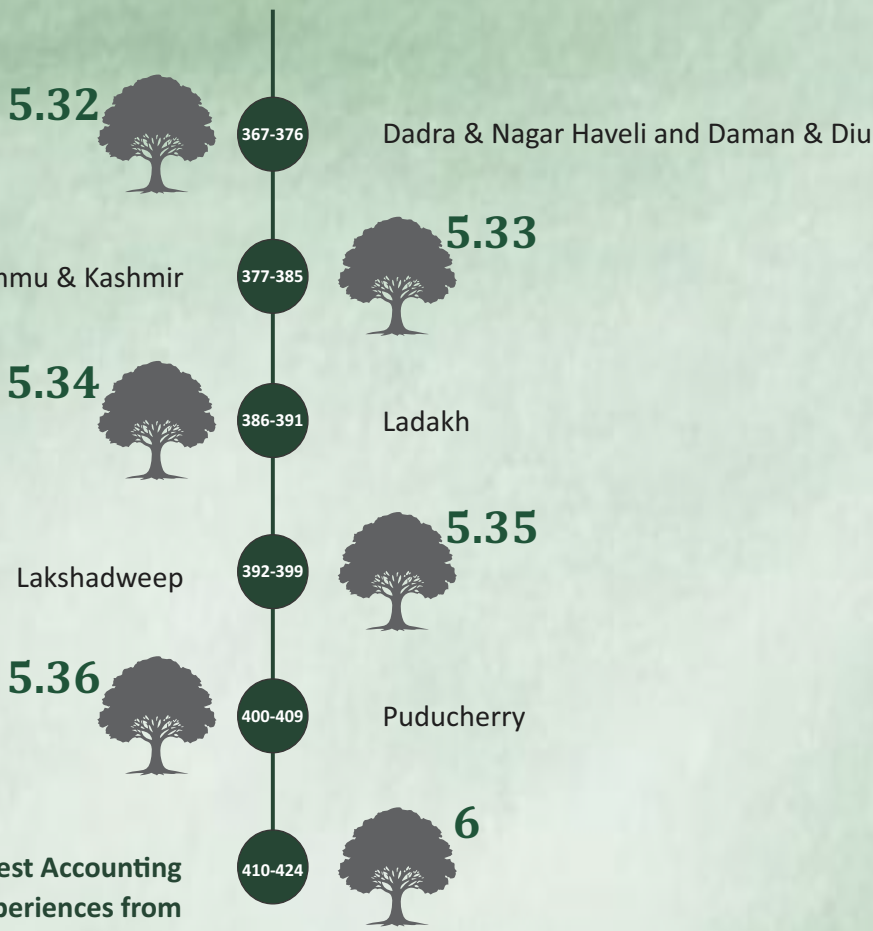

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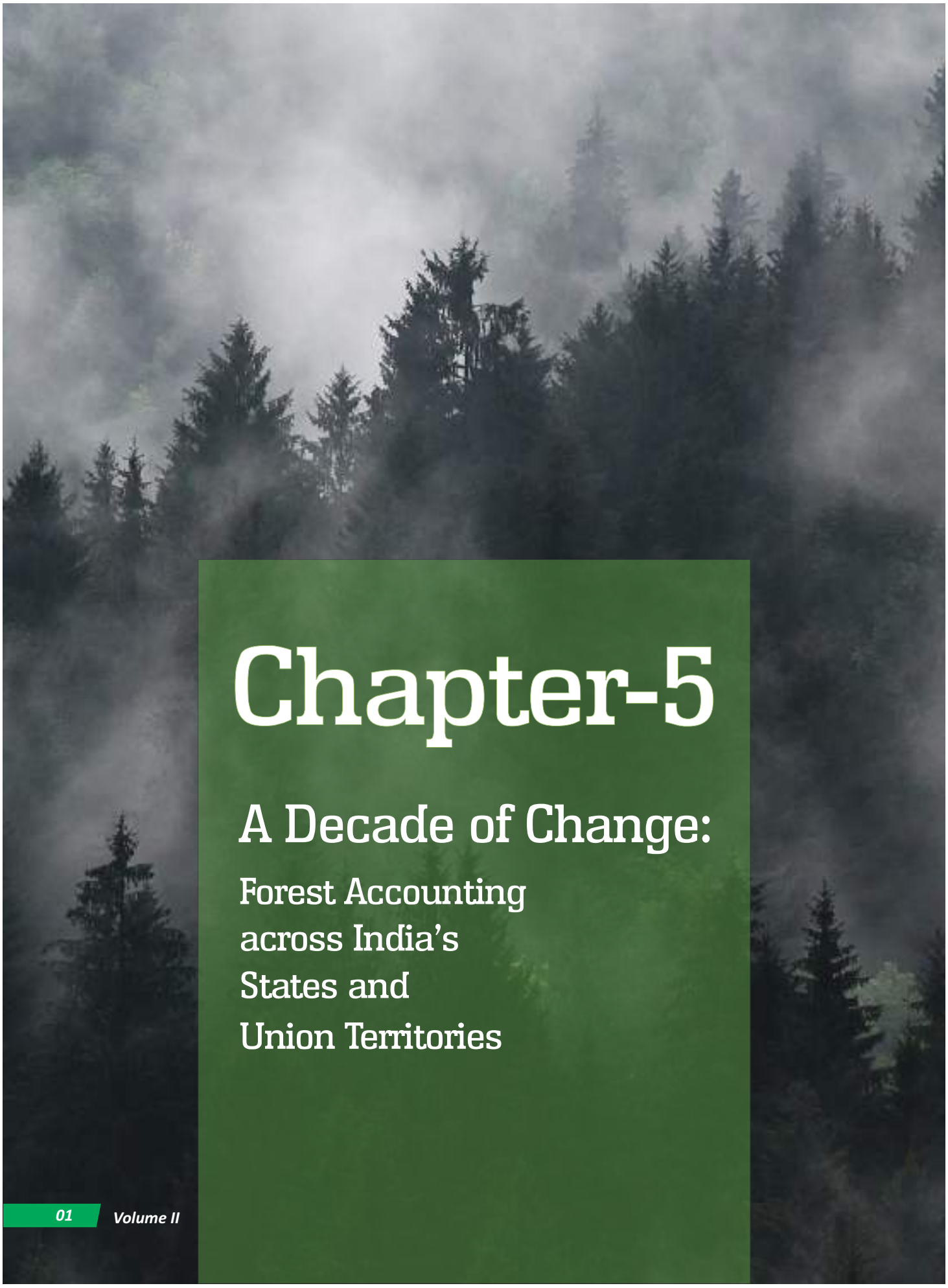


Chapter-5

A Decade of Change:

Forest Accounting across India's States and Union Territories

Introduction

The Volume I present a comprehensive overview of the definitions and methodological foundation of India's forest accounting. It outlines the methodological approaches adopted in this report for forest ecosystem accounting in accordance with the System of Environmental-Economic Accounting Central Framework (SEEA CF) and SEEA Ecosystem Accounting (SEEA-EA) frameworks. It provides the applicability and contextual adaptation of various indicators discussed under SEEA-CF and SEEA-EA for forest accounting and selecting the indicators most suitable for the Indian context, ensuring the framework's relevance and applicability at national and state level. It also provides detailed assessment of various methodological approaches for the asset account, extent account, condition account, and ecosystem services account, including timber provisioning services and non-timber forest product provisioning services, carbon retention services as well as ecotourism. It also includes an assessment of India, applying these methodologies to provide a comprehensive national perspective.

The Volume II provides information on the forest accounting of all States and Union Territories similar to the national-level data for India, it includes details related to the extent, assets, condition, and service accounts for each State and Union Territory. It also presents insights into the experiences of various states with forest resource accounting, drawing from previous studies conducted. Additionally, the volume includes statistics such as total population, average population density, and administrative details.

In forest accounting based on the SEEA framework, four accounts are considered: Asset, Extent, Condition, and Services accounts. The Physical Asset account measures the physical forest assets available during the accounting period. For compilation of these accounts, information is organized under four categories: the opening stock of forest, which indicates the total forest cover at the beginning of the accounting period; additions, which reflect increases in forest cover due to plantation, natural regeneration, or reclassification; reductions, representing decreases in forest cover resulting from deforestation, degradation, or conversion to other land uses; and closing stock, which denotes the total forest cover remaining at the end of the accounting period. Forest cover refers to tree patches with a canopy density above 10% and an area of at least one hectare, regardless of land use, legal status, or ownership. Forest cover is divided into five types based on canopy density:

- **Very Dense Forest**
  (70% and above)

- **Moderately Dense Forest**
  (40%<MDF<70%)

- **Open Forest**
  (10%<OF<40%)

- **Scrub**
  (below 10%)

- **Non-forest**
  (land not classified in the above categories).

The Extent Account records the stretch of forest available during the accounting period. Here,forest extent is examined in terms of Recorded Forest Area (RFA), comprising all land officially designated as forest in government records. RFA is further categorized into reserved, protected, and unclassed forests based on their legal protection and allowed levels of disturbance.

The Condition account provides a comprehensive view of the state of the forest, based on various indicators. These include growing stock (the amount of usable wood), carbon stock (the carbon stored in forests), forest fragmentation (the division of forests into smaller patches), forest fire incidence, forest fire-prone classes (levels of vulnerability to forest fires), status of regeneration (the natural ability of forests to regenerate), biotic influences (the impact of living organisms on forests), invasive species, and biodiversity assessments, including total species count, the Shannon-Weiner Index, and the effective number of species (reflecting species diversity and evenness). These indicators together offer a complete picture of forest condition during the accounting period.

The Ecosystem Services Account addresses the monetary valuation of the various services provided by forests. These services are classified into three categories: provisioning, regulating, and cultural services. Provisioning services include material and energy outputs from forests, such as timber and non-timber forest products. Regulating services include those that help regulate climate, hydrological, and biochemical cycles; in this report, carbon retention services are highlighted. Cultural services encompass the intellectual and symbolic benefits forests provide, with eco-tourism included as an example for selected states. The table compiles all key indicators along with their definitions, reference level, and expected trends compiled on the basis of literature review from various available documents. Each indicator reflects an essential aspect of forest accounting, offering insights into the state and services of our forests. For more details related to methodologies, please refer to chapter 2 of Volume-I.

Table 5.1: Key Indicators of Forest Account

Indicator	*Definition*	*Reference Level*	*Expected Trends*
Forest Asset Account			
Net change	Change in the forests and tree cover area each year.	Add 200,00 ha of forests and tree cover per year[1]	↑
Extent Account			
Recorded Forest Area (RFA)	Legally recorded forest land, regardless of actual tree cover.		↑
% of GA	Percentage of a state or country's land is officially covered by forests	>33% of GA	↑
Type of Protection			
Reserved Forests (RF)	Forests with the highest legal protection		↔ or ↑
Protected Forest (PF)	Forests with moderate protection; some local rights like grazing or collection may be permitted.		↑
Unclassed Forests	Forest land not classified under RF or PF; without formal status.		↓
Forest Cover Class			
Very Dense Forest (VDF)	70% of the land area is covered with tree canopy.	Continuous increase because they represent the healthiest forests.	↑

[1] https://www.un.org/esa/forests/wp-content/uploads/2021/08/Global-Forest-Goals-Report-2021.pdf

Indicator	*Definition*	*Reference Level*	*Expected Trends*
Moderately Dense Forest (MDF)	Forest areas where the canopy cover ranges between 40% and 70%.	Maintain/ > current level (transition to VDF)	↑
Open Forest (OF)	Forests where trees are more scattered or sparse (10–40% canopy cover).	< current level (transition to MDF)	↓
Scrub	Lands with small bushes or very short plants—not proper forests.	< current level (transition to OF)	↓
Non-Forest	Lands with no forests at all—cities, farms, deserts, etc.	< current level	↓
Condition Accounts			
Growing Stock [How much wood stock (timber) is present. It's also a proxy for carbon storage and forest productivity.]			
Volume of Growing Stock (Million cum)	Total amount of wood stock present in living trees, usually measured in cubic meters (m^3).	Increase volume—healthy forests produce more biomass and store more carbon.	↑
Growing Stock in Forest (Cum/ha)	It reflects how much wood is available in a standard area—serving as a measure of forest density and health.	Continuous increase-shows good forest regeneration and growth.	↑
Carbon Stock (Total) [Total amount of carbon stored in a forest ecosystem, both in plants and soil.]			

Indicator	*Definition*	*Reference Level*	*Expected Trends*
Above-Ground Biomass (AGB)	Carbon in tree trunks, branches, leaves.	Increase total stock to enhance forests' role as carbon sinks in climate change mitigation.	↑
Below-Ground Biomass (BGB)	Carbon in roots.		
Deadwood and Litter	Fallen branches, leaf litter, dead logs.	SOC and AGB are most crucial for long-term carbon retention and biodiversity.	
Soil Organic Carbon (SOC)	Carbon in soil from decayed plants.		
Carbon Stock per hectare (Total)	The amount of carbon stored in one hectare of forest. Measured in tons of carbon per hectare (t C/ha). It helps assess how efficient and healthy a forest is in storing carbon.	>100 t C/ha (Global average for tropical forests: 100–150 t C/ha) as normative target	↑
Forest Fragmentation [How forests are divided into separate patches due to deforestation, roads, or development.]			
≥ 0.01 ≤ 1.0 Km^2	Very small patches	Reduce small fragments and restore large, continuous forest patches.	↓ (Reduce—too fragmented)
>1.0 ≤ 10 km^2			
>10 ≤ 100 km^2	Small patches		↔ or ↓
>100 ≤ 500 km^2	Medium patches		↑

Indicator	Definition	Reference Level	Expected Trends
>500 ≤ 1000 km²	Large patches	Larger, connected forests support more wildlife, are more climate-resilient, and provide stable services	↑
>1000 ≤ 5000 km²	Large patches		↑
>5000 ≤ 10000 km²	Very large patches		↑
>10000 km²	Mega patches (intact forests)		↑
Forest Fires	Measures how often forest fires happen. Fewer fires = healthier forests.	Benchmark to reduce hotspots below historical 5-year average	↓
Forest Fire Prone Classes			
Extremely fire prone	Categories that show how likely a forest is to catch fire-from extremely prone to less prone.	Minimize spread	↓
Very highly fire prone			↓
Highly fire prone			↓
Moderately fire prone		Maintain or reduce with early alerts	↔ or ↓
Less fire prone		Maximize share through fuel management & restoration	↑

Indicator	Definition	Reference Level	Expected Trends
Status of Regeneration (Shows whether forests are growing back naturally after being cut or damaged.)			
Adequate	Forests are naturally regenerating well, with seedlings and young trees growing healthily	Maximize Share as adequate regeneration is a "precondition" for India's Bonn Challenge pledge to restore 26 million ha of degraded land by 2030.	↑
Inadequate	Regrowth is patchy or insufficient; native species are present but not thriving		↑
Absent	No visible regrowth; forest floor is barren or overrun by weeds/invasives	Minimize Share	↓
Biotic Influence [Impact of animals, insects, or human activities that damage forests (like grazing, cutting trees).]			
Heavily degraded	Forest shows severe damage from grazing, logging, or human use; canopy and soil are disturbed.	Minimize share to meet the target of at least the prioritized 30 % areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration.	↓ (control & remove)
Moderately degraded	Signs of partial degradation like reduced regeneration or soil compaction		↓
Mildly degraded	Forest is slightly disturbed but retains most of its ecological function		↔ or ↓
Not degraded	Forest is in natural, undisturbed condition	Maximize share	↑

Indicator	Definition	Reference Level	Expected Trends
Invasive Species			
Very Dense	Non-native plants or animals that harm the forest by taking over native ones.	Reduction in the introduction of invasive alien species by 50% and minimize their impact.	↓ (control & remove)
Dense			↓
Moderate			↓
Scanty			↔ or ↓
Absent			↑
Wetlands within RFA	Areas in forests that are swampy or waterlogged—important for biodiversity and water storage.	1-5% of forest land as a normative target based on wetland as percentage of GA.	↑ (increase wetland retention) ↑ (priority zones)
Biodiversity Assessment (Herb, Shrubs and Trees) [different types of plants (herbs, shrubs, trees) in a forest. More types = healthier forests]			
Total Number of species		Maintain or increase total flora species richness	↑
Shannon Weiner Index	It indicates how many different types of plants (like herbs, shrubs, and trees) are in a forest and how evenly they are spread out. If a forest has many species and no single species dominates, the index will be high. If the forest has only a few species, or one species is found much more than the others, the index will be low.	H' > 2.5 indicates moderate to high diversity	↑

Indicator	*Definition*	*Reference Level*	*Expected Trends*
Effective number of species (ENS)	ENS indicate whether biodiversity is dominated by a few species or well-balanced across many. A higher ENS means the ecosystem has both many species and even distribution, which indicates greater ecological stability and resilience.	ENS = exp(H') where H' = Shannon-Wiener Index. ENS value of >10–12 (derived from H' > 2.5) indicates moderate to high diversity in vegetation structure.	↑
Ecosystem Services Accounts			
Value of output of Industrial wood (forest and trees outside forest)	Value obtained from selling wood used in industries (furniture, paper, etc.).	Increase sustainable yield. Sustainable yield as the volume logged above the net natural growth[2]	↑
Value of Timber Provisioning Services	Total economic value of wood forests	Increase sustainable yield	↑
Value of output of non-timber forest products	Value obtained from forest items like honey, fruits, leaves, or bamboo.	Increase	↑
Value of non-timber forest Product	Total value of all forest resources other than timber.	Increase	↑
Value of Carbon Retention Service	Monetary value of the forest's ability to capture and store carbon dioxide from the atmosphere.	Increase and monetize carbon retention through afforestation and improved forest management.	↑

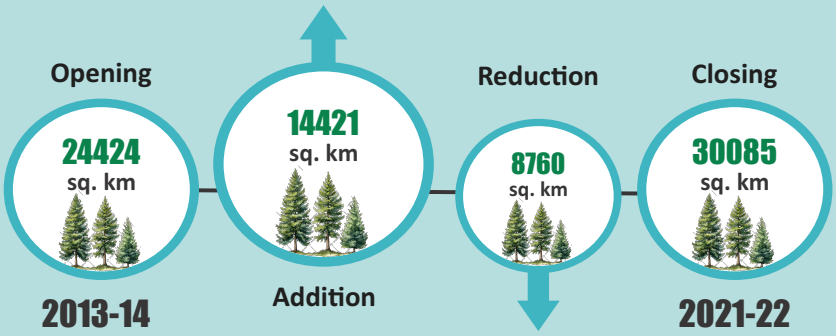
[2] https://www.mospi.gov.in/sites/default/files/publication_reports/Green_National_Accouts_in_India_1may13.pdf

Andhra Pradesh

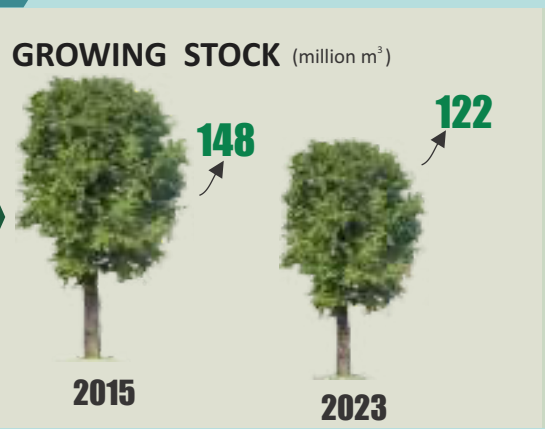
FOREST EXTENT ACCOUNT

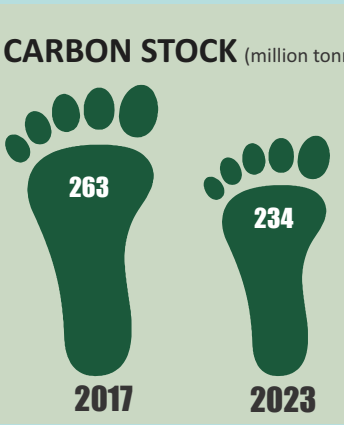
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2015	2023
162923 Sq. Km	23.25%	22.87%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.16%	2015-16	2.51%
2021-22	0.09 %	2021-22	1.76%

5.1 Andhra Pradesh, located along the southeastern coast of India, is characterized by a diverse landscape comprising the Eastern Ghats and Nallamala ranges, extensive coastal plains, and a long shoreline along the Bay of Bengal. As per the Champion & Seth Classification of Forest Types (1968), Andhra Pradesh's forests are organized into 5 Type Groups, further classified into 20 distinct Forest Types. Tropical dry mixed deciduous forests constitute the most widespread formation, while tropical moist mixed deciduous forests occur in higher rainfall tracts of the Eastern Ghats. Dry evergreen forests are found in select hill slopes and valleys, and thorn forests are present in drier interior regions. The coastal zone supports littoral forests.

State Profile

Indicator	Unit	2015	2023
Geographical Area	**Sq. km**	160204	162923
Population (as per Census 2011)	**Million**	49.39	
Average Population Density	**per sq. km**	308	
No. of Districts		13	26
No. of Hill Districts		0	
No. of Tribal Districts		5	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Andhra Pradesh changed from 160204 sq. km in 2015 to 162923 sq. km with a population of 49.39 million and an average population density of 308 persons per square kilometre, as per Census 2011 data. The change in area may be attributed to improved mapping techniques, revisions to administrative boundaries, and other related factors. During the assessment period of 2015 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 13 to 26 and number of tribal districts remained at 5.

5.1.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2013-14	375	13093	10956	8562	127218
Addition	1680.4	4086.58	8653.84	5944.4	6652.86
Reduction	59.69	3453.83	5246.34	6154.78	9384.87
Closing 2021-22	1995.71	13725.75	14363.5	8351.62	124486
Net change	1620.71	632.75	3407.5	-210.38	-2732.01
% Change	432.19%	4.83%	31.10%	-2.46%	-2.15%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2013-14 and 2021-22, Andhra Pradesh's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 432.19%. This is mainly due to major shift of 1515 sq. km from MDF in 2017 assessment period. Open forest areas grew substantially, a net gain of 31.10%. For most forest cover class, it shows a positive trend, while scrub and non-forest experienced some level of decrease during this period, with the most notable change in the VDF category.

5.1.2 Extent Account

Indicator (area in sq. km)	2015	2023
Recorded Forest Area (RFA)	37258	
% of GA	23.25	22.87
Type of Protection		
Reserved Forests (RF)	31959	
Protected Forest (PF)	5069	
Unclassed Forests	230	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remained at 37258 sq. km with a slight reduction from 23.26% to 22.87% of the state's geographical area due to change in GA during observed period . During this period, all the three categories of forest based on type of protection remain unchanged. These trends reflect consistency in the categorization of forest areas over the given period.

5.1.3 Condition Accounts

The condition account for the forests of Andhra Pradesh for 2015 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2015	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	148.113	122.26	-25.853	-17.45
Growing Stock in Forest per unit area	m^3/ha	-	49.54		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	2,62,690	233592	-29098	-11.08
Above Ground Biomass	'000 tonnes	1,00,539	64135	-36404	-36.21
Below Ground Biomass	'000 tonnes	38,585	25007	-13578	-35.19
Dead Wood	'000 tonnes	568	2247	1679	295.6
Litter	'000 tonnes	4,527	2846	-1681	-37.13
Soil Organic Carbon	'000 tonnes	1,18,471	139357	20886	17.63

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	93.33	77.65	-15.68	-16.8
Above Ground Biomass	Per hectare stock in tonnes	35.72	21.32	-14.4	-40.31
Below Ground Biomass	Per hectare stock in tonnes	13.71	8.31	-5.4	-39.39
Dead Wood	Per hectare stock in tonnes	0.2	0.75	0.55	275
Litter	Per hectare stock in tonnes	1.61	0.95	-0.66	-40.99
Soil Organic Carbon	Per hectare stock in tonnes	42.09	46.32	4.23	10.05

Forest Fragmentation					
Indicator	**Unit**	**2015**	**2017**		
Average Patch Size#	Sq. km	1.48	1.55		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	96.08	95.60		
Patch Size Range (in sq. km)	**% of forest cover**	**2015**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	4.92	5.06	0.14	
> 1.0 ≤ 10	%	6.15	6.73	0.58	
> 10 ≤ 100	%	14.72	14.44	-0.28	
> 100 ≤ 500	%	9.86	11.31	1.45	
> 500 ≤ 1000	%	12.46	8.76	-3.7	
> 1000 ≤ 5000	%	28.91	12.57	-16.34	
> 5000 ≤ 10000	%	22.98	41.13	18.15	
>10000	%				

Forest Fires

Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	1748	1716	-32	-1.83
SNPP-VIIRS Detections	Number of fire cases	15746	14138	-1608	-10.21

Forest Fire Prone Classes

Indicators	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	4.27	2.75	-1.52
Very highly fire prone	%	13.04	15.44	2.4
Highly fire prone	%	15.27	19.15	3.88
Moderately fire prone	%	18.72	14.58	-4.14
Less fire prone	%	48.7	48.08	-0.62

Wetlands within RFA

Indicator	2019
Number	1174
Area (in ha)	72358
% of RFA	1.91

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	58	64	242
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	2.89	2.13	3.15
Tropical Dry Deciduous Forests	2.63	2.92	4.07
Tropical Thorn Forest	2.25	2.37	3.74
Tropical Dry Evergreen Forests	2.07	2.55	3.28
Littoral and Swamp Forests	-	1.43	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	17.99	8.41	23.34
Tropical Dry Deciduous Forests	13.87	18.54	58.56
Tropical Thorn Forest	9.49	10.7	42.1
Tropical Dry Evergreen Forests	7.92	12.81	26.58
Littoral and Swamp Forests	-	4.18	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	49.67
Inadequate	21.88
Absent	4.72
NA	23.73
Biotic Influence [Distribution of RFA (%)	
Heavily degraded	5.4
Moderately degraded	31.69
Mildly degraded	44.38
Not degraded	12.43
NA	6.1
Invasive Species [Distribution of RFA (%)]	
Very Dense	2.31
Dense	6.47
Moderate	15.05
Scanty	14.2
Absent	29.71
NA	32.26

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.1.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	73.36	0.02%	674.76	0.06%	601.40	819.82%
Value of non-timber forest products (NTFP)	(₹in crore)	539.74	0.14%	384.85	0.03%	-154.89	-28.70%
Total Timber+ NTFP Services	(₹in crore)	613.1	0.16%	1059.61	0.09%	446.51	72.83%

**For methodology refer table 2.2 , in chapter 2, Vol I.*

The timber provisioning services as % of SGDP increased from 0.02% in 2011-12 to 0.06% in 2021-22, and its absolute monetary value has also increased drastically by 819.82%. The non-timber forest product provisioning services showed a decrease in value by 28.70%, and its value as % of SGDP has also declined, from 0.14% to 0.03%. Collectively, the combined timber and NTFP services in SGDP fell from 0.16% to 0.09%, even as their overall absolute value increased by nearly 72.83%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	15171.03	2.51%	19909.9	1.76%	4738.87	31.24%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP reduce from 2.51% in 2015-16 to 1.76% in 2021-22, while the absolute value registered an increase of 31.24%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	73.36	0.02%	94.54	0.01%	21.18	28.87%
Value of non-timber forest products (NTFP)	(₹ in crore)	539.74	0.14%	244.34	0.03%	-295.4	-54.73%
Total Timber+ NTFP Services	(₹ in crore)	613.1	0.16%	338.88	0.04%	-274.22	-44.73%

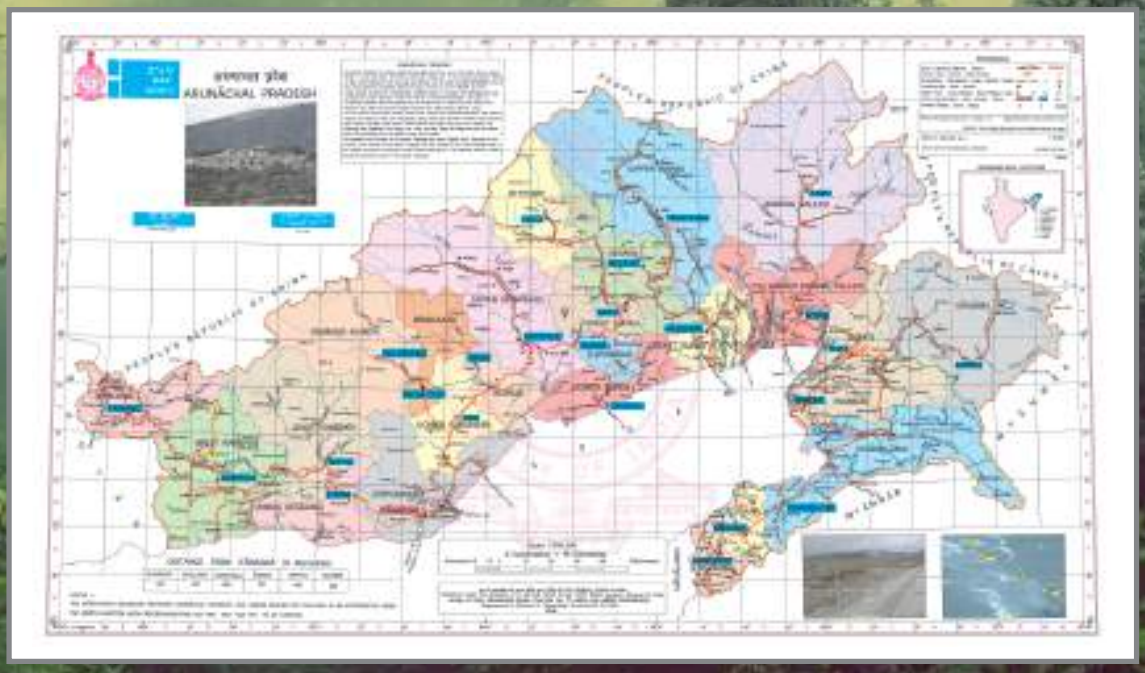
At constant price, the absolute monetary value of timber provisioning services has increased by 28.87% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.02% to 0.01%. In case of NFTP services, it had shown reduction in absolute by 45.73% and in SGDP by 0.11%. This causes fall in the overall provisioning services, which reduce by 44.73% in absolute terms and from 0.16% to 0.04% as % of SGDP. This pattern indicates that, despite moderate growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	9168.06	1.84%	8152.52	1.15%	-1015.54	-11.08%

At constant prices, the carbon retention services in % of SGDP decreased marginally from 1.84% in 2015-16 to 1.15% in 2021-22, and the absolute value also showed a decrease of 11.08%.

Note- Through its notification dated 1 March 2014, the Government of India bifurcated the erstwhile State of Andhra Pradesh into two separate States: Andhra Pradesh and Telangana.

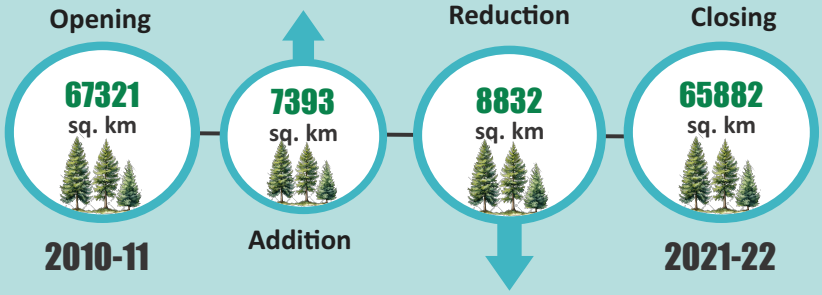
Arunachal Pradesh



FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
83743 Sq. Km	61.55 %	61.55 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	3.69 %
2021-22	2 %

REGULATING SERVICES
Carbon Retention Service

2015-16	243.75%
2021-22	191.11%

5.2 Arunachal Pradesh, located in the northeastern part of India, is the largest state in the region. The state is renowned for its mountainous terrain, which forms part of the Eastern Himalayas and includes several major river valleys. Arunachal Pradesh is characterized by remarkable ecological and biological diversity, hosting a wide array of flora and fauna across its vast landscape. According to the Champion & Seth Classification of Forest Types (1968), the forests in Arunachal Pradesh belong to 11 Type Groups which are further divided into 23 different Forest Types. Dense evergreen and semi-evergreen forests dominate the lower and middle elevations, while the higher altitudes are characterized by temperate forests and alpine meadows, making Arunachal Pradesh one of the richest states in India in terms of forest cover and biodiversity.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	83743	
Population (as per Census 2011)	**Million**	1.38	
Average Population Density	**Per sq. km**	17	
No. of Districts		13	25
No. of Hill Districts		13	25
No. of Tribal Districts		13	25

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Arunachal Pradesh is at 83,743 square kilometres, with a population of 1.38 million and an average population density of 17 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 and 2023, the administrative structure underwent significant changes: the number of districts increased from 13 to 25, and all districts are classified as both hill districts and tribal districts.

5.2.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	20828	31414	15079	121	16301
Addition	1749.01	2158.66	3485.22	1238.34	3451.68
Reduction	1591.69	3957.57	3283.06	300.36	2950.01
Closing 2021-22	20985.32	29615.09	15281.16	1058.98	16802.67
Net change	157.32	-1798.91	202.16	937.98	501.67
% Change	0.76%	-5.73%	1.34%	775.19%	3.08%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Arunachal Pradesh's forest cover underwent several changes across different forest types. MDF saw marginal decrease, falling by 5.73%. Scrub areas grew substantially, a net gain of 775.19%. This resulted due to shift from non-forest (693.35 sq. km) and open forest (209.77 sq. km) in different assessment periods. For most forest cover class, it shows a positive trend, while MDF experienced marginal decrease during this period, with the most notable change in the Scrub category.

5.2.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	51541			
% of GA	61.55			
Type of Protection				
Reserved Forests (RF)	10723	12371	1648	15.37
Protected Forest (PF)	9779	11857	2078	21.25
Unclassed Forests	31039	27312	-3727	-12.01

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remained at 51,541 sq. km, which is 61.55% of the state's geographical area during observed period. During this period, Reserved Forests increased by 15.37%, and Protected Forests increased by 2,078 sq. km. In contrast, the area classified as Unclassed Forests decreased by 12.01%. These trends reflect a shift in the categorization of forest areas, with increases in formally protected forest categories and a reduction in unclassed forests.

5.2.3 Condition Accounts

The condition account for the forests of Arunachal Pradesh for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	439.510	457.83	18.32	4.17
Growing Stock in Forest per unit area	m^3/ha	-	97.16		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	9,94,539	10,21,160	27,621	2.68
Above Ground Biomass	'000 tonnes	243462	3,55,100	1,11,638	45.85
Below Ground Biomass	'000 tonnes	53,378	1,05,818	52,440	98.24
Dead Wood	'000 tonnes	4,305	4,542	237	5.51
Litter	'000 tonnes	16,231	11,133	-5,098	-31.41
Soil Organic Carbon	'000 tonnes	6,77,163	5,44,567	-1,32,596	-19.58

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	148.52	155.00	6.48	4.36
Above Ground Biomass	Per hectare stock in tonnes	36.36	53.90	17.54	48.24
Below Ground Biomass	Per hectare stock in tonnes	7.97	16.06	8.09	101.51
Dead Wood	Per hectare stock in tonnes	0.64	0.69	0.05	7.81
Litter	Per hectare stock in tonnes	2.42	1.69	-0.73	-30.17
Soil Organic Carbon	Per hectare stock in tonnes	101.12	82.66	-18.46	-18.26

Forest Fragmentation				
Indicator	**Unit**	**2013**	**2017**	
Average Patch Size#	Sq. km	-	2.15	
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.18	
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**
≥ 0.01 ≤ 1.0	%	1.37	3.02	-
> 1.0 ≤ 10	%		2.24	
> 10 ≤ 100	%	0.46	2.19	1.73
> 100 ≤ 500	%	0.34	1.26	0.92
> 500 ≤ 1000	%	0	0.87	0.87
> 1000 ≤ 5000	%	1.73	4.59	2.86
> 5000 ≤ 10000	%	0	0	0
>10000	%	96.1	85.83	-10.27

Forest Fires

Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	926	1116	190	20.52
SNPP-VIIRS Detections	Number of fire cases	2617	3449	832	31.79

Forest Fire Prone Classes

Indicators	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	0.02	0.04	0.02
Very highly fire prone	%	0.97	0.18	-0.79
Highly fire prone	%	3.49	1.61	-1.88
Moderately fire prone	%	6.87	4.49	-2.38
Less fire prone	%	88.65	93.68	5.03

Wetlands within RFA

Indicator	2019
Number	1343
Area (in ha)	68022
% of RFA	1.07

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	192	435	110
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.99	3.62	3.18
Tropical Semi-Evergreen Forests	4.05	4.50	3.33
Tropical Moist Deciduous Forests	3.09	3.81	2.13
Subtropical Broadleaved Hill Forests	2.96	3.57	1.49
Subtropical Pine Forests	2.01	3.09	-
Himalayan Moist Temperate Forests	2.41	3.11	2.06
Himalayan Dry Temperate Forests	1.76	2.80	-
Sub Alpine Forests	1.88	3.16	-
Moist Alpine Scrub	-	1.60	-
Montane Wet Temperate Forests	-	-	0.93
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	19.89	37.34	24.05
Tropical Semi-Evergreen Forests	57.40	90.02	27.94
Tropical Moist Deciduous Forests	21.98	45.15	8.41
Subtropical Broadleaved Hill Forests	19.30	35.52	4.44
Subtropical Pine Forests	7.46	21.98	-
Himalayan Moist Temperate Forests	11.13	22.42	7.85
Himalayan Dry Temperate Forests	5.81	16.44	-
Sub Alpine Forests	6.55	23.57	-
Moist Alpine Scrub	-	4.95	-
Montane Wet Temperate Forests	-	-	2.53

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	19.21
Inadequate	52.32
Absent	15.66
NA	12.81
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	4.92
Moderately degraded	16.92
Mildly degraded	50.51
Not degraded	19.49
NA	8.16
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.47
Dense	10.89
Moderate	23.54
Scanty	18.84
Absent	27.96
NA	17.30

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.2.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	327.9	2.96%	574.49	1.76%	246.59	75.2%
Value of non-timber forest products (NTFP)	(₹ in crore)	80.67	0.73%	78.99	0.24%	-1.68	-2.08%
Total Timber+ NTFP Services	(₹ in crore)	408.57	3.69%	653.48	2%	244.91	59.94%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 75.20% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 2.96% to 1.76%. In case of NFTP services, it had shown marginal reduction in absolute by 2.08% and in SGDP by 0.49%. Collectively, the combined absolute timber and NTFP services increased by nearly 59.94%, while its value as % of SGDP has a nominal fall from 3.69% to 2%. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	34710.1	243.75%	35639.19	191.11%	929.09	2.68%

** For methodology refer table 2.3, in chapter 2, Vol I*

Approximately 61% of the geographical area (GA) of Arunachal Pradesh is classified as recorded forest, while about 80% is under overall forest cover. This extensive forest presence contributes significantly to carbon retention services, with their imputed value estimated to be nearly twice the State Gross Domestic Product (SGDP) of Arunachal Pradesh. Between 2015–16 and 2021–22, the absolute value of these carbon retention services saw a modest increase of 2.7%. However, when expressed as a percentage of SGDP, their value declined from 243.75% in 2015–16 to 191.11% in 2021–22.

2) Ecosystem services (at constant prices)

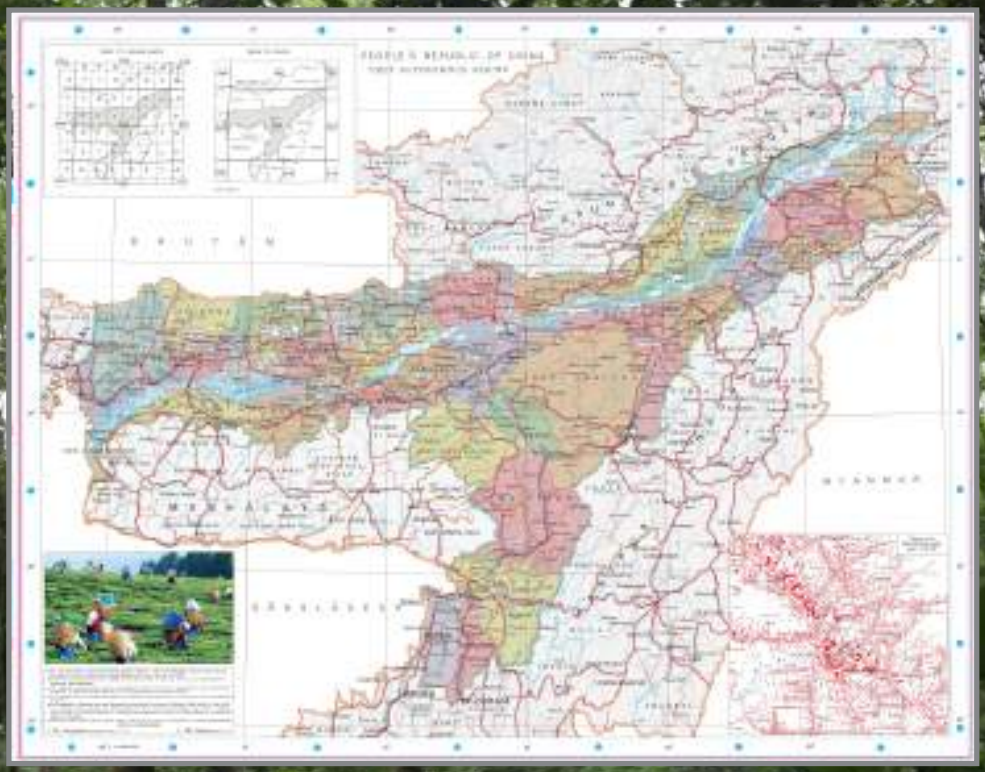
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	327.9	2.96%	308.47	1.65%	-19.43	-5.92%
Value of non-timber forest products (NTFP)	(₹ in crore)	80.67	0.73%	46.69	0.25%	-33.98	-42.13%
Total Timber+ NTFP Services	(₹ in crore)	408.57	3.69%	355.16	1.9%	-53.41	-13.07%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 2.96% in 2011-12 to 1.65% in 2021-22, and 5.9% reduction in absolute value as well. The NTFPs has registered a significant reduction of 42.13% in their value, while in terms of % of SGDP it has a nominal reduction from 0.73% to 0.25%. Collectively, the combined timber and NTFP services as % of SGDP fell from 3.69% to 1.9%, and their total value decreased by 13.1%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	34710.1	243.75%	35639.19	191.11%	929.09	2.68%

At constant prices, the carbon retention services as % of SGDP has decreased from 243.75% in 2015-16 to 191.11% in 2021-22, while the absolute value showed a marginal increased by 2.68%.

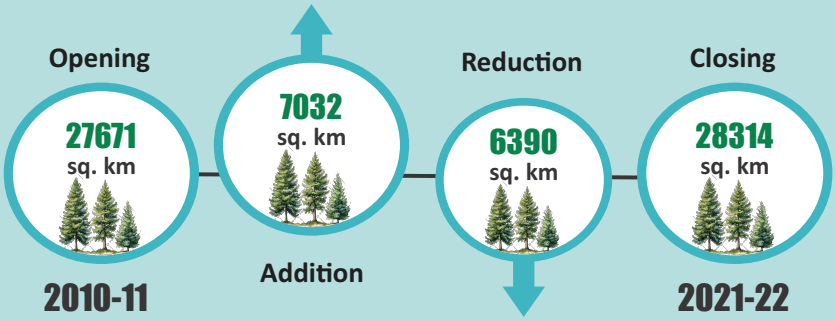
ASSAM



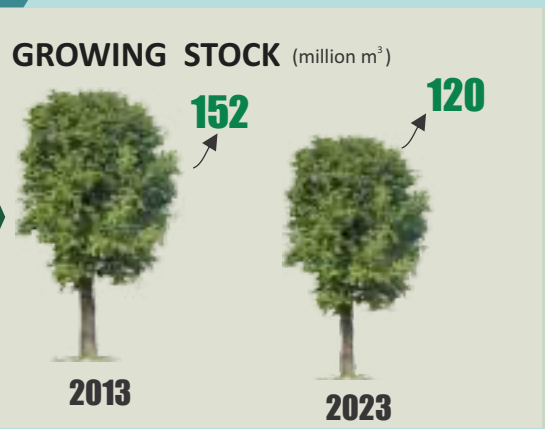
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
78438 Sq. Km	34.21%	34.21%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.40%
2021-22	0.17%

REGULATING SERVICES
Carbon Retention Service

2015-16	4.48%
2021-22	5.65%

5.3 Assam, located in the northeastern region of India, is renowned for its extensive forest cover and remarkable biodiversity, supporting a wide variety of flora and fauna, including several endemic and endangered species. According to the Champion & Seth Classification of Forest Types (1968), the forests of Assam belong to seven Forest Type Groups further divided into 25 different Forest Types. The Brahmaputra Valley is known for its lush tropical wet evergreen and semi-evergreen forests, while the hill areas are characterized by Tropical Evergreen Forest and Sal forests, and the Barak Valley is rich in moist deciduous forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	78438	
Population (as per Census 2011)	**Million**	31.21	
Average Population Density	**Per sq. km**	398	
No. of Districts		23	33
No. of Hill Districts		3	5
No. of Tribal Districts		16	19

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Assam is at 78438 square kilometres, with a population of 31.21 million and an average population density of 398 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 and 2023, the administrative structure underwent significant changes: the number of districts increased from 23 to 33, and hill districts from 3 to 5 and tribal districts from 16 to 19.

5.3.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	1444	11345	14882	182	50585
Addition	2161.71	1411.95	3458.45	431.99	2594.93
Reduction	416	2992.41	2981.15	373.06	3296.41
Closing 2021-22	3189.71	9764.54	15359.3	240.93	49883.52
Net change	1745.71	-1580.46	477.3	58.93	-701.48
% Change	120.89%	-13.93%	3.21%	32.38%	-1.39%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, Vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Assam's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 120.89%. this is because of shift of 1590 sq. km from MDF in 2017 assessment period. Scrub areas also grew substantially, a net gain of 32.38%. For most forest cover class, it shows a positive trend, while MDF and non-forest experienced some level of decrease during this period, with the most notable change in the VDF category.

5.3.2 Extent Account

Indicator (area in sq. km)	2013	2023
Recorded Forest Area (RFA)	26832	26836
% of GA	34.21	
Type of Protection		
Reserved Forests (RF)	17864	
Protected Forest (PF)	0	
Unclassed Forests	8968	8972

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased nominal by 4 sq. km, 34.21% of the state's geographical area during observed period. During this period, Reserved Forests and Protected Forests remained unchanged. The Unclassed Forest category saw slight increase of 4 sq. km. These trends reflect stagnancy in the categorization of forest areas.

5.3.3 Condition Accounts

The condition account for the forests of Assam for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	151.904	120.27	-31.634	-20.82
Growing Stock in Forest per unit area	m^3/ha	-	63.52		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,76,852	2,72,310	95,458	53.98
Above Ground Biomass	'000 tonnes	47,343	88,653	41,310	87.26
Below Ground Biomass	'000 tonnes	10,824	21,816	10,992	101.55
Dead Wood	'000 tonnes	1,093	2,683	1,590	145.47
Litter	'000 tonnes	5,240	4,795	-445	-8.49
Soil Organic Carbon	'000 tonnes	1,12,352	1,54,363	42,011	37.39

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	62.93	96.18	33.25	52.84
Above Ground Biomass	Per hectare stock in tonnes	16.85	31.31	14.46	85.82
Below Ground Biomass	Per hectare stock in tonnes	3.85	7.71	3.86	100.26
Dead Wood	Per hectare stock in tonnes	0.39	0.95	0.56	143.59
Litter	Per hectare stock in tonnes	1.86	1.69	-0.17	-9.14
Soil Organic Carbon	Per hectare stock in tonnes	39.98	54.52	14.54	36.37

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.58		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.14		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	16.48	12.18	-	
> 1.0 ≤ 10	%		7.44		
> 10 ≤ 100	%	11.76	11.55	-0.21	
> 100 ≤ 500	%	17.2	17.81	0.61	
> 500 ≤ 1000	%	4.38	2.27	-2.11	
> 1000 ≤ 5000	%	7.86	7.65	-0.21	
> 5000 ≤ 10000	%	0	0.00	0.00	
>10000	%	42.32	41.10	-1.22	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	1940	2305	365	18.81
SNPP-VIIRS Detections	Number of fire cases	5935	8158	2223	37.46

Forest Fire Prone Classes				
Indicators	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	21.98	1.4	-20.58
Very highly fire prone	%	6.1	11.74	5.64
Highly fire prone	%	14.48	16.81	2.33
Moderately fire prone	%	13.72	12.33	-1.39
Less fire prone	%	43.72	57.72	14

Wetlands within RFA	
Indicator	**2019**
Number	1584
Area (in ha)	67857
% of RFA	2.46

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	153	149	143
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	3.16	2.99	2.63
Tropical Semi-Evergreen Forests	3.47	3.17	3.5
Tropical Moist Deciduous Forests	2.85	2.64	3.58
Littoral & Swamp Forests	2.38	2.2	1.37
Tropical Dry Deciduous Forests	2.82	2.77	-
Subtropical Broadleaved Hill Forests	2.25	2.44	0.5
Subtropical Pine Forests	3.07	2.54	1.56
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	23.57	19.89	13.87
Tropical Semi-Evergreen Forests	32.14	23.81	33.12
Tropical Moist Deciduous Forests	17.29	14.01	35.87
Littoral & Swamp Forests	10.8	9.03	3.94
Tropical Dry Deciduous Forests	16.78	15.96	-
Subtropical Broadleaved Hill Forests	9.49	11.47	1.65
Subtropical Pine Forests	21.54	12.68	4.76

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	17.12
Inadequate	32.64
Absent	14.43
NA	35.81
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	3.03
Moderately degraded	15.93
Mildly degraded	56
Not degraded	12.44
NA	12.6
Invasive Species [Distribution of RFA (%)]	
Very Dense	3.28
Dense	7.83
Moderate	21.77
Scanty	31.8
Absent	19.42
NA	15.9

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.3.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	157.98	0.11%	397.26	0.10%	239.27	151.45%
Value of non-timber forest products (NTFP)	(₹in crore)	413.2	0.29%	296.18	0.07%	-117.02	-28.32%
Total Timber+ NTFP Services	(₹in crore)	571.18	0.40%	693.44	0.17%	122.26	21.40%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 151.45% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.11% to 0.10%. In case of NFTP services, it had shown a reduction in absolute by 28.32% and in SGDP by 0.22%. Collectively, the combined absolute timber and NTFP services increased by nearly 21.40%, while its value as % of SGDP has a nominal fall from 0.40% to 0.17%.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	10213.66	4.48%	23209.98	5.65%	12996.32	127.24%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP has increase from 4.48% in 2015-16 to 5.65% in 2021-22, while the absolute value registered an increase of 127.24%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their absolute value during the period.

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2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	157.98	0.11%	80.25	0.03%	-77.74	-49.21%
Value of non-timber forest products (NTFP)	(₹ in crore)	413.2	0.29%	222.4	0.09%	-190.8	-46.18%.
Total Timber+ NTFP Services	(₹ in crore)	571.18	0.40%	302.65	0.12%	-268.54	-47.015%

At constant prices, the timber provisioning services as % of SGDP has reported a decline from 0.11% in 2011-12 to 0.03% in 2021-22, and 49.21% noteworthy reduction in absolute value as well. The NTFPs has also registered a significant reduction of 46.18% in their value, while in terms of % of SGDP it has a reduction from 0.29% to 0.09%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.40% to 0.12%, and their total value decreased by 47.015%.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	6172.26	3.23%	9503.81	3.68%	3331.55	53.98%

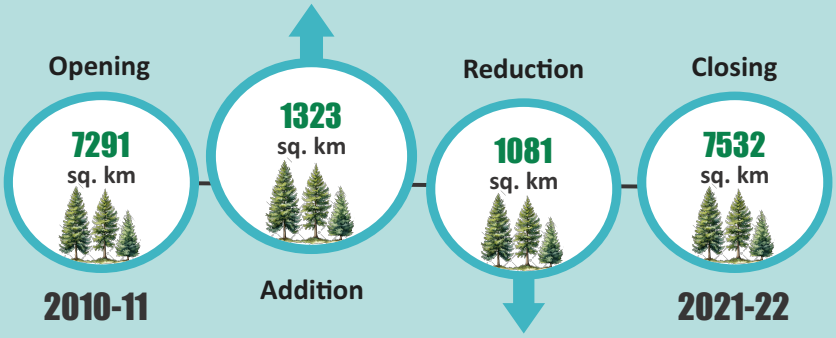
At constant prices, the carbon retention services (% of SGDP) has increased from 3.23% in 2015-16 to 3.68% in 2021-22, while the absolute value showed an increase of 53.98%. This highlights a substantial rise in the relative economic contribution of carbon retention services during the period.

BIHAR

FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
94163 Sq. Km	6.87%	7.9%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.42%	2015-16	0.86%
2021-22	0.23%	2021-22	0.77%

5.4 Bihar, located in the eastern part of the country is the 13th largest in terms of geographical area and 3rd largest by population. It is a part of Gangetic Plains and the Ganga River, divides it into northern and southern regions, each with its own distinct ecological characteristics. Although Bihar is predominantly an agrarian state with a high population density, it supports a notable diversity of flora and fauna, particularly within its forested regions and riverine ecosystems. According to the Champion & Seth Classification of Forest Types (1968), forests in Bihar are classified into four forest type groups, further divided into 13 distinct forest types. The West Champaran district has moist deciduous Sal Forest while South Bihar has dry deciduous Sal Forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	94163	
Population (as per Census 2011)	**Million**	104.1	
Average Population Density	**Per sq. km**	1106	
No. of Districts		37	38
No. of Hill Districts		0	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Bihar is at 94163 square kilometres, with a population of 104.1 million and an average population density of 1106 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 37 to 38.

5.4.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	247	3380	3664	115	86757
Addition	157.04	326.24	839.57	342.16	587.8
Reduction	17.04	422.03	642.33	196.36	975.05
Closing 2021-22	387	3284.21	3861.24	260.8	86369.75
Net change	140	-95.79	197.24	145.80	-387.25
% Change	56.68%	-2.83%	5.38%	126.78%	-0.45%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Bihar's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 56.68%. Scrub areas grew substantially, a net gain of 126.78%. This is due to shift of 111 sq. km from non-forest in 2017 assessment period. For most forest cover class, it shows a positive trend, while MDF and non-forest experienced marginal decrease during this period, with the most notable change in the Scrub category.

5.4.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	6473	7442	969	14.97
% of GA	6.87	7.9	1.03	
Type of Protection				
Reserved Forests (RF)	693			
Protected Forest (PF)	5779	6183	404	6.99
Unclassed Forests	1	566	565	56500

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 969 sq. km, marking a 14.97% rise and expanding from 6.87% to 7.90% of the state's geographical area during observed period. During this period, Reserved Forests remained unchanged, and Protected Forests grew by 6.99%. The Unclassed Forest category saw a dramatic increase of 566 sq. km, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas, with increases in the protected and unclassed forests.

5.4.3 Condition Accounts

The condition account for the forests of Bihar for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	29.328	27.63	-1.7	-5.79
Growing Stock in Forest per unit area	m^3/ha	-	46.41		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	55,397	58,451	3,054	5.51
Above Ground Biomass	'000 tonnes	19,063	15,166	-3,897	-20.44
Below Ground Biomass	'000 tonnes	6,707	5,330	-1,377	-20.53
Dead Wood	'000 tonnes	138	741	603	436.96
Litter	'000 tonnes	625	621	-4	-0.64
Soil Organic Carbon	'000 tonnes	28,864	36,593	7,729	26.78

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	75.9	77.59	1.69	2.23
Above Ground Biomass	Per hectare stock in tonnes	26.12	20.13	-5.99	-22.93
Below Ground Biomass	Per hectare stock in tonnes	9.19	7.08	-2.11	-22.96
Dead Wood	Per hectare stock in tonnes	0.19	0.98	0.79	415.79
Litter	Per hectare stock in tonnes	0.86	0.82	-0.04	-4.65
Soil Organic Carbon	Per hectare stock in tonnes	39.55	48.58	9.03	22.83

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.25		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	99.38		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	27.22	27.78	-	
> 1.0 ≤ 10	%		4.90		
> 10 ≤ 100	%	5.34	4.32	-1.02	
> 100 ≤ 500	%	21.77	20.30	-1.47	
> 500 ≤ 1000	%	20.23	18.71	-1.52	
> 1000 ≤ 5000	%	25.44	23.99	-1.45	
> 5000 ≤ 10000	%	0	0	-	
>10000	%	0	0	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	203	222	19	9.36
SNPP-VIIRS Detections	Number of fire cases	2450	3024	574	23.43

Forest Fire Prone Classes				
Indicators	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	4.41	4.41
Very highly fire prone	%	7.15	15.62	8.47
Highly fire prone	%	17.68	17.48	-0.2
Moderately fire prone	%	22.74	12.65	-10.09
Less fire prone	%	52.43	49.84	-2.59

Wetlands within RFA	
Indicator	**2019**
Number	285
Area (in ha)	3992
% of RFA	0.63

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	52	42	113
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	2.85	2.22	-
Tropical Moist Deciduous Forests	2.02	2.65	3.1
Littoral and Swamp Forests	2.72	1.58	-
Tropical Dry Deciduous Forests	1.21	2.25	3.42
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	17.29	9.21	-
Tropical Moist Deciduous Forests	7.54	14.15	22.2
Littoral and Swamp Forests	15.18	4.85	-
Tropical Dry Deciduous Forests	3.35	9.49	30.57

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	39.81
Inadequate	27.49
Absent	13.84
NA	18.86
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	8.14
Moderately degraded	32.11
Mildly degraded	47.73
Not degraded	5.13
NA	6.89
Invasive Species [Distribution of RFA (%)]	
Very Dense	3.21
Dense	10.29
Moderate	19.71
Scanty	15.43
Absent	24.85
NA	26.51

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.4.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	329.78	0.13%	431.28	0.07%	101.5	30.78%
Value of non-timber forest products (NTFP)	(₹in crore)	704.77	0.29%	1023.93	0.16%	319.16	45.29%
Total Timber+ NTFP Services	(₹in crore)	1034.55	0.42%	1455.21	0.23%	420.66	40.66%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 30.78% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.13% to 0.07%. In case of NFTP services, it had shown growth in absolute by 45.29%, while reduction in SGDP by 0.13%. This causes rise in the overall provisioning services, which improve by 40.66% in absolute terms, but reduced from 0.42% to 0.23% as % of SGDP. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	3199.32	0.86%	4981.99	0.77%	1782.67	55.72%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in % of SGDP decline from 0.86% in 2015-16 to 0.77% in 2021-22, while the absolute value registered an increase of 55.72%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

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Cultural Services	Unit	2019-20
Tourist inflow for ecotourism	Number of tourists	475665
Revenue from ecotourism	(₹ in lakh)	44.61

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change

In 2019-20, tourist inflow for ecotourism reached 475,665 visitors, generating a revenue of ₹44.61 lakh. These figures indicate a significant potential for engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	329.78	0.13%	309.04	0.08%	-20.74	-6.29%
Value of non-timber forest products (NTFP)	(₹ in crore)	704.77	0.29%	512.86	0.13%	-191.91	-27.23%
Total Timber+ NTFP Services	(₹ in crore)	1034.55	0.42%	821.90	0.21%	-212.65	-20.55%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 0.13% in 2011-12 to 0.08% in 2021-22, and 6.29% reduction in absolute value as well. The NTFPs has registered a reduction of 27.23% in their value, while in terms of % of SGDP it has a reduction from 0.29% to 0.13%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.42% to 0.21%, and their total value decreased by 20.55%. This trend indicates that, despite the relatively smaller decline in timber services, the reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	1933.39	0.65%	2039.98	0.53%	106.59	5.51%

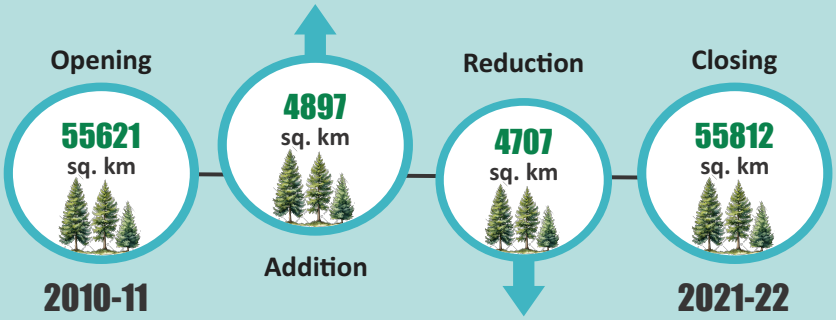
At constant prices, the carbon retention services in % of SGDP decreased from 0.65% in 2015-16 to 0.53% in 2021-22, while the absolute value showed an increase of 5.51%. This highlights a decline in the relative economic contribution of carbon retention services during the period, despite a slight growth in their absolute value.

CHHATTISGARH

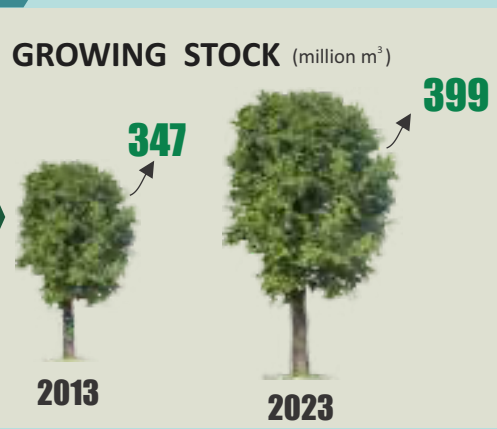
FOREST EXTENT ACCOUNT

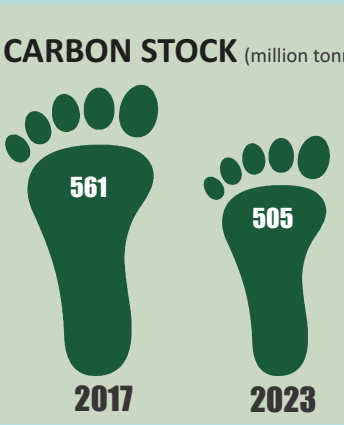
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
135191 Sq. Km	44.21%	44.25%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.66%	2015-16	14.39%
2021-22	0.44%	2021-22	10.45%

5.5 Chhattisgarh, located in central India, is distinguished by its extensive forest cover, rich biodiversity, and varied terrain that includes hills, plateaus, and fertile plains. Chhattisgarh's forests are home to a wide array of flora and fauna, including many endemics and threatened species. According to the Champion & Seth Classification of Forest Types (1968), the forests in Chhattisgarh are grouped into two major type groups, further divided into 12 forest types. Chhattisgarh's Forest is dominated by Tropical Moist Deciduous Forests and Tropical Dry Deciduous Forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	135191	
Population (as per Census 2011)	**Million**	25.55	
Average Population Density	**Per sq. km**	189	
No. of Districts		16	28
No. of Hill Districts		0	0
No. of Tribal Districts		9	11

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Chhattisgarh is at 135191 square kilometres, with a population of 25.55 million and an average population density of 189 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent significant changes: the number of districts increased from 16 to 28, and tribal districts from 9 to 11.

5.5.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	4153	34865	16603	117	79453
Addition	3372.55	584.5	940.41	755.62	440.24
Reduction	108.98	3465.7	1132.03	262.21	1123.4
Closing 2021-22	7416.57	31983.8	16411.38	610.41	78769.84
Net change	3263.57	-2881.2	-191.62	493.41	-683.16
% Change	78.58%	-8.26%	-1.15%	421.72%	-0.86%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Chhattisgarh's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 78.58%. Scrub areas grew substantially, a net gain of 421.72%. This is due to shift from open forest (109.52 sq. km) in 2019 assessment period and from non-forest equivalent to 218.61 sq. km in different assessment period. For most forest cover class, it shows a negative trend, while VDF and scrub experienced some level of increase during this period, with the most notable change in the Scrub category.

5.5.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	59772	59816	44	0.07
% of GA	44.21	44.25	0.04	
Type of Protection				
Reserved Forests (RF)	25782	25899	117	0.45
Protected Forest (PF)	24036	24554	518	2.16
Unclassed Forests	9954	9363	-591	-5.94

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by only 44 sq. km, marking a 0.07% rise and remaining almost at 44.25% of the state's geographical area during observed period. During this period, Reserved Forests grew by 0.45%, and Protected Forests increased by 2.16%. The Unclassed Forest category saw a decrease of 591 sq. km. These trends reflect a consistency in the categorization of forest areas.

5.5.3 Condition Accounts

The condition account for the forests of Chhattisgarh for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	347.106	398.54	51.434	14.82
Growing Stock in Forest per unit area	m^3/ha	-	93.51		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	5,60,980	5,04,614	-56,366	-10.05
Above Ground Biomass	'000 tonnes	2,06,678	1,55,051	-51,627	-24.98
Below Ground Biomass	'000 tonnes	68,159	49,428	-18,731	-27.48
Dead Wood	'000 tonnes	2,588	3,498	910	35.16
Litter	'000 tonnes	7,628	9,643	2,015	26.42
Soil Organic Carbon	'000 tonnes	2,75,927	2,86,994	11,067	4.01

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	100.99	90.42	-10.57	-10.47
Above Ground Biomass	Per hectare stock in tonnes	37.21	27.78	-9.43	-25.34
Below Ground Biomass	Per hectare stock in tonnes	12.27	8.86	-3.41	-27.79
Dead Wood	Per hectare stock in tonnes	0.47	0.63	0.16	34.04
Litter	Per hectare stock in tonnes	1.37	1.73	0.36	26.28
Soil Organic Carbon	Per hectare stock in tonnes	49.67	51.42	1.75	3.52

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	1.70		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	96.23		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	9.11	4.52	-	
> 1.0 ≤ 10	%		4.94		
> 10 ≤ 100	%	8.48	8.44	-0.04	
> 100 ≤ 500	%	9.49	8.67	-0.82	
> 500 ≤ 1000	%	6.63	4.30	-2.33	
> 1000 ≤ 5000	%	39.14	37.42	-1.72	
> 5000 ≤ 10000	%	27.15	31.71	4.56	
>10000	%	0	0	-	

Forest Fires

Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	1608	1942	334	20.77
SNPP-VIIRS Detections	Number of fire cases	25750	25792	42	0.16

Forest Fire Prone Classes

Indicators	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	3.9	4.01	0.11
Very highly fire prone	%	6.04	18.53	12.49
Highly fire prone	%	13.55	28.93	15.38
Moderately fire prone	%	22.34	23.46	1.12
Less fire prone	%	54.17	25.07	-29.1

Wetlands within RFA

Indicator	2019
Number	3698
Area (in ha)	64398
% of RFA	1.22

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	50	48	129
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	2.59	2.62	3.17
Tropical Dry Deciduous Forests	2.61	2.89	3.07
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	13.33	13.74	23.81
Tropical Dry Deciduous Forests	13.6	17.99	21.54

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	71
Inadequate	8.03
Absent	3.4
NA	17.57
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	9.68
Moderately degraded	27.31
Mildly degraded	54.15
Not degraded	5.75
NA	3.11
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.82
Dense	12.56
Moderate	30.47
Scanty	24.77
Absent	13.78
NA	16.6

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.5.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	528.47	0.33%	1135.74	0.28%	607.28	114.91%
Value of non-timber forest products (NTFP)	(₹ in crore)	523.48	0.33%	650.96	0.16%	127.48	24.35%
Total Timber+ NTFP Services	(₹ in crore)	1051.95	0.66%	1786.7	0.44%	734.76	69.85%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has registered a substantial growth of 114.91% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.33% to 0.28%. In case of NFTP services, it had shown growth in absolute by 24.35%, while reduction in SGDP by 0.17%. This causes rise in the overall provisioning services, which improve by 69.85% in absolute terms, but reduced from 0.66% to 0.44% as % of SGDP. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	32398.05	14.39%	43010.1	10.45%	10612.05	32.76%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in % of SGDP fall from 14.39% in 2015-16 to 10.45% in 2021-22, while the absolute value registered an increase of 32.76%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

2) Ecosystem services (at constant prices)

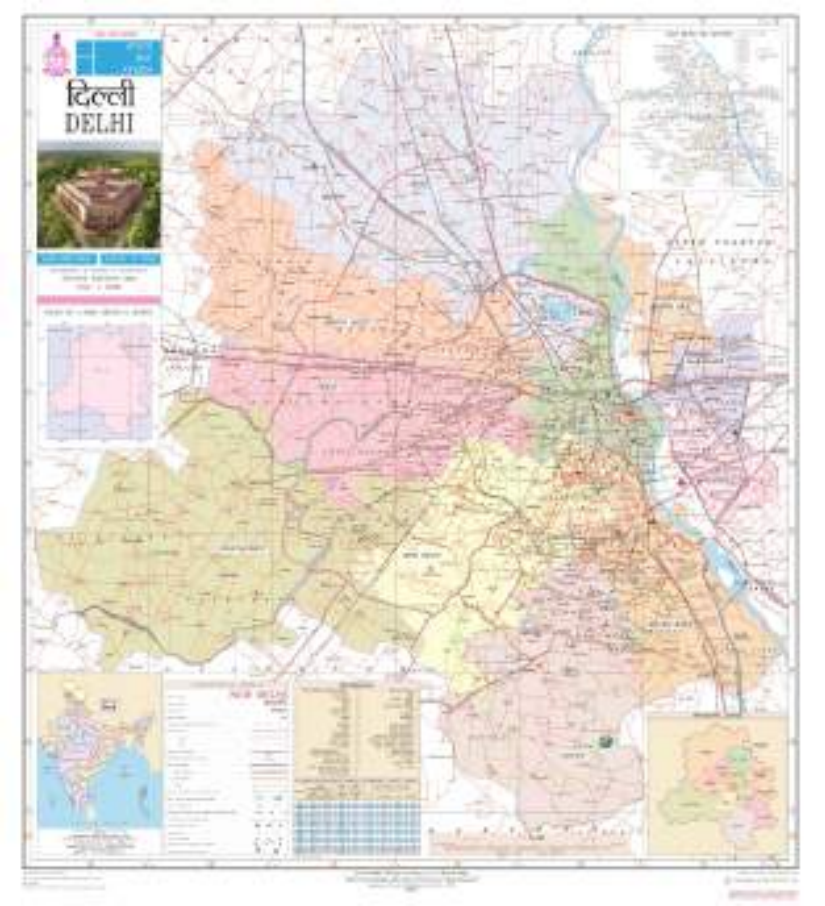
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	528.47	0.33%	788.42	0.30%	259.95	49.19%
Value of non-timber forest products (NTFP)	(₹ in crore)	523.48	0.33%	319.65	0.12%	-203.83	-38.94%
Total Timber+ NTFP Services	(₹ in crore)	1051.95	0.66%	1108.07	0.42%	56.12	5.33%

At constant price, the absolute monetary value of timber provisioning services has increased sharply by 49.19% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.33% to 0.30%. In case of NFTP services, it had shown reduction in absolute by 38.94% and in SGDP by 0.21%. The overall provisioning services has increased by 5.33% in absolute terms, but declined from 0.66% to 0.42% as % of SGDP. This pattern indicates that, despite growth in timber provisioning, the significant contraction in NTFP output has driven an overall smaller improvement in the absolute economic importance of forest provisioning services, their relative share in the economy compared to other sectors registered a marginal decline. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	19578.59	10.27%	17611.38	6.60%	-1967.21	-10.05%

At constant prices, the carbon retention services as % of SGDP reduced from 10.27% in 2015-16 to 6.60% in 2021-22, while the absolute value showed a decrease of 10.05%.

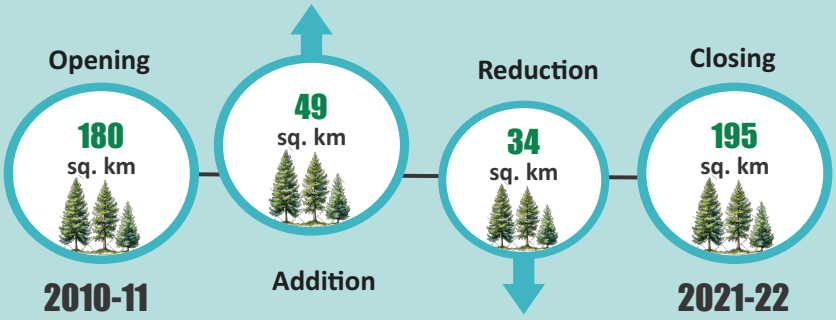
DELHI



FOREST EXTENT ACCOUNT

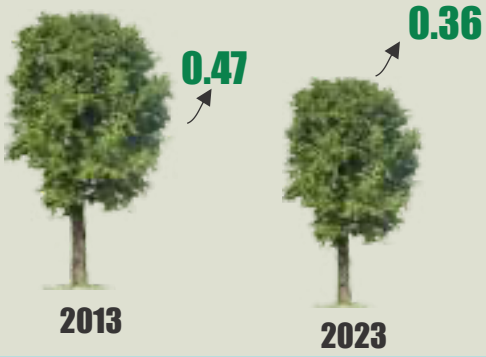
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
1483 Sq. Km	5.73%	7.01%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m^3)



CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.001% (only NTFP)
2021-22	0.003 %

REGULATING SERVICES
Carbon Retention Service

2015-16	0.01%
2021-22	0.01%

5.6 Delhi, situated in the northern part of India, is a metropolitan region known for its unique urban landscape, interspersed with remnants of natural ecosystems. Despite its dense population and extensive built-up area, Delhi maintains ecological significance due to its diverse pockets of forests and green cover, which contribute to regional biodiversity. As per the Champion & Seth Classification of Forest Types (1968), the forests in Delhi belong to the Type Group 5, Tropical Dry Deciduous Forest and Type Group 6 Tropical Thorn Forests, is ecologically critical, supporting a mosaic of forest types and acting as a vital green lung for the city.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	1483	
Population (as per Census 2011)	**Million**	16.79	
Average Population Density	**Per sq. km**	11320	
No. of Districts		9	11
No. of Hill Districts		0	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Delhi is at 1483 square kilometres, with a population of 16.79 million and an average population density of 11320 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent some changes: the number of districts increased from 9 to 11.

5.6.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	6.76	49.38	123.67	2.24	1300.95
Addition	0.28	15.44	33.63	3.55	21.65
Reduction	0.57	11.27	22.04	3.4	37.27
Closing 2021-22	6.47	53.55	135.26	2.39	1285.33
Net change	-0.29	4.17	11.59	0.15	-15.62
% Change	-4.29%	8.44%	9.37%	6.70%	-1.20%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Delhi's Forest cover underwent several changes across different forest types. MDF saw a more notable increase, rising by 8.44%. Open forest areas grew substantially, a net gain of 9.37%. For most forest cover class, it shows a positive trend, while VDF and non-forest experienced some level of decrease during this period, with the most notable change in open forest category.

5.6.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	85	104	19	22.35
% of GA	5.73	7.01	1.28	
Type of Protection				
Reserved Forests (RF)	78	85	7	8.97
Protected Forest (PF)	7	13	6	85.71
Unclassed Forests	0	6	6	100

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 19 sq. km, marking a 22.35% rise and expanding from 5.73% to 7.01% of the state's geographical area during observed period. During this period, Reserved Forests grew by 8.97%. The Unclassed Forest and Protected Forests category saw a dramatic increase of 100% and 85.71%, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas, with increase in all the 3 categories of forests.

5.6.3 Condition Accounts

The condition account for the forests of Delhi for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	0.47	0.36	-0.11	-23.4
Growing Stock in Forest per unit area	m^3/ha	-	55.65		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	948	1,221	273	28.8
Above Ground Biomass	'000 tonnes	230	277	47	20.43
Below Ground Biomass	'000 tonnes	52	82	30	57.69
Dead Wood	'000 tonnes	2	26	24	1200
Litter	'000 tonnes	11	11	0	0
Soil Organic Carbon	'000 tonnes	653	825	172	26.34

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	49.38	62.42	13.04	26.41
Above Ground Biomass	Per hectare stock in tonnes	11.98	14.16	2.18	18.2
Below Ground Biomass	Per hectare stock in tonnes	2.71	4.18	1.47	54.24
Dead Wood	Per hectare stock in tonnes	0.1	1.31	1.21	1210
Litter	Per hectare stock in tonnes	0.57	0.55	-0.02	-3.51
Soil Organic Carbon	Per hectare stock in tonnes	34.01	42.22	8.21	24.14

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	0.18		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	98.36		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	55.31	40.44	-	
> 1.0 ≤ 10	%		22.90		
> 10 ≤ 100	%	44.69	36.66	-8.03	
> 100 ≤ 500	%	0	0	-	
> 500 ≤ 1000	%	0	0	-	
> 1000 ≤ 5000	%	0	0	-	
> 5000 ≤ 10000	%	0	0	-	
>10000	%	0	0	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	2	5	3	150
SNPP-VIIRS Detections	Number of fire cases	20	3	-17	-85

Forest Fire Prone Classes			
Indicators	**% of Total Forest Cover & Scrub**	**2019**	**2023**
Extremely fire prone	%	0	0
Very highly fire prone	%	0	0
Highly fire prone	%	0	0
Moderately fire prone	%	0	0
Less fire prone	%	100	100

Wetlands within RFA	
Indicator	**2019**
Number	17
Area (in ha)	18
% of RFA	0.18

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	36	11	16
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Thorn Forests	3.38	2.07	0.99
Tropical Dry Deciduous Forests	-	-	1.56
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Thorn Forests	29.37	7.92	2.69
Tropical Dry Deciduous Forests	-	-	4.76

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	21.24
Inadequate	34.22
Absent	11.8
NA	32.74
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.25
Moderately degraded	2.5
Mildly degraded	43.78
Not degraded	26.27
NA	26.2
Invasive Species [Distribution of RFA (%)]	
Very Dense	4.98
Dense	12.44
Moderate	24.85
Scanty	13.69
Absent	12.49
NA	31.55

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.6.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	NA	NA	29.71	0.003%		
Value of non-timber forest products (NTFP)	(₹ in crore)	2.49	0.001%	0.89	0.0001%	-1.59	-64.04%

**For methodology refer table 2.2, in chapter 2, Vol I.*

NA- Not available

The timber provisioning services in % of SGDP is 0.003% in 2021-22. The non-timber forest provisioning service showed a decrease in value by 64.04% reflecting declined from 0.001% to 0.0001% as a % of SGDP. Overall, forest provisioning services in 2021–22 contributed a small yet measurable share to the state's economic output.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	54.75	0.01%	104.07	0.01%	49.32	90.08%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in % of SGDP remained stagnant at 0.01% during the observed periods, while the absolute value registered an increase of 90.08%. This reflects a consistency in the relative economic contribution of carbon retention services, with the growth in their total value during the period.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	NA	NA	14.69	0.003%		
Value of non-timber forest products (NTFP)	(₹ in crore)	2.49	0.001%	0.6	0.0001%	-1.89	-76.01%

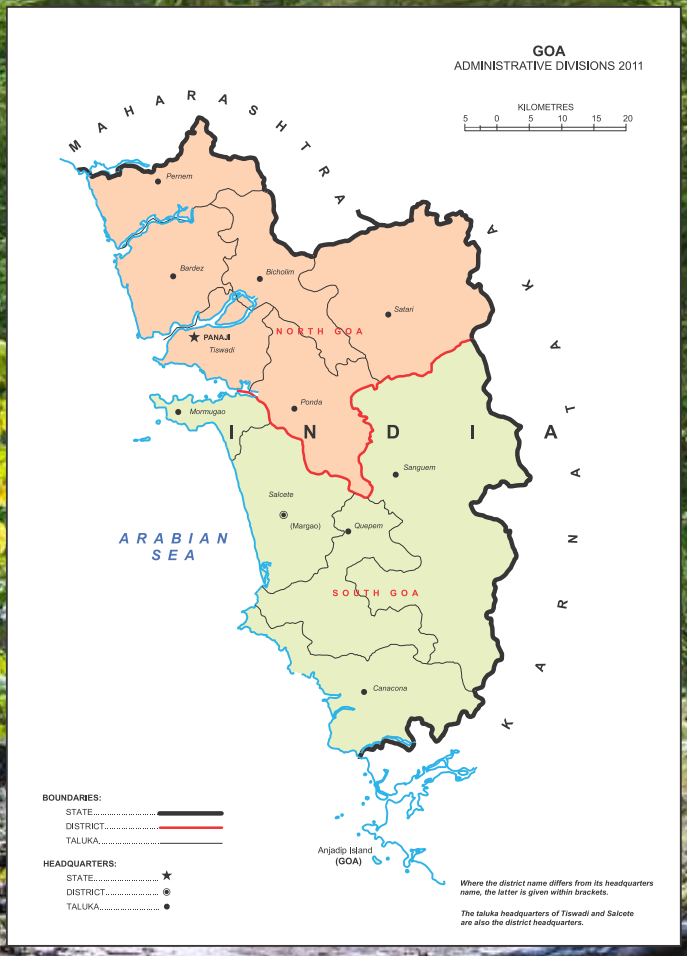
NA- Not Available

At constant prices, the timber provisioning services in SGDP is 0.003% in 2021-22. The non-timber forest resources dropped from 0.001% to 0.0001%, with a 76.01% reduction in value. Overall, forest provisioning services continued to contribute a modest share to the total economy during the period.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	33.09	0.01%	42.61	0.01%	9.53	28.8%

At constant prices, the carbon retention services in SGDP remained at 0.01%, while the absolute value showed an increase of 28.80%. This highlights the relative economic contribution of carbon retention services during the period remain same, despite a growth in their total value.

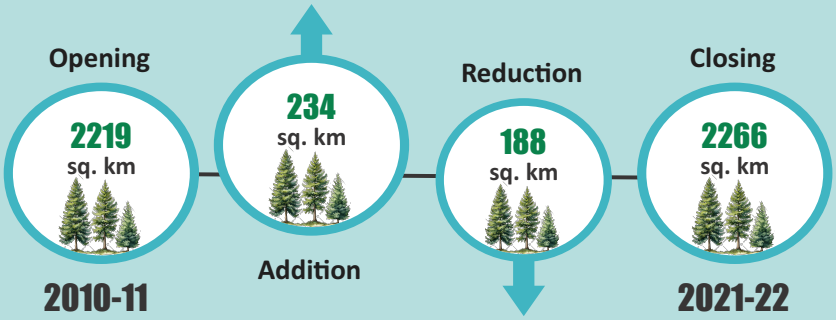
GOA


GOA
ADMINISTRATIVE DIVISIONS 2011
KILOMETRES
5 0 5 10 15 20
MAHARASHTRA
KARNATAKA
INDIA
ARABIAN SEA
Pernem
Bardez
Bicholim
Satari
PANAJI
Tiswadi
NORTH GOA
Mormugao
Ponda
Sanguem
Salcete
(Margao)
Quepem
SOUTH GOA
Canacona
Anjadip Island
(GOA)
BOUNDARIES:
STATE
DISTRICT
TALUKA
HEADQUARTERS:
STATE
DISTRICT
TALUKA
Where the district name differs from its headquarters name, the latter is given within brackets.
The taluka headquarters of Tiswadi and Salcete are also the district headquarters.

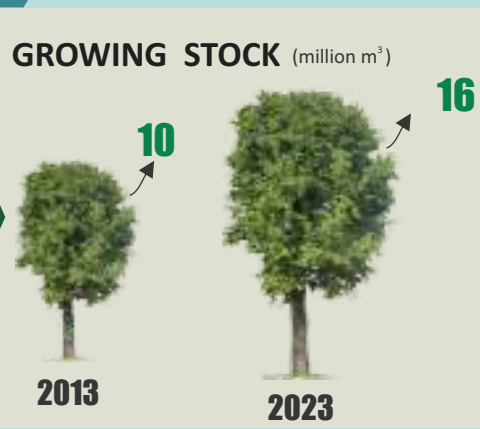
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
3702 Sq. Km	33.09%	34.33%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.07%
2021-22	0.3%

REGULATING SERVICES
Carbon Retention Service

2015-16	1.99%
2021-22	2.68%

5.7 Goa, located on the western coast of India, is a coastal state distinguished by its terrain, low-lying hills, and a tropical monsoon climate influenced by the Western Ghats. According to the Champion & Seth Classification of Forest Types (1968), Goa's forests are categorized into 5 major Type Groups, further divided into 5 distinct Forest Types. The lowland and foothill regions are predominantly covered by tropical semi-evergreen and moist mixed deciduous forests. In contrast, the higher elevations along the Western Ghats support patches of tropical evergreen forests and laterite thorn forest, contributing significantly to the state's biodiversity and ecological functions.

State Profile

Indicator	Unit	2013-2023
Geographical Area	**Sq. km**	3702
Population (as per Census 2011)	**Million**	1.46
Average Population Density	**Per sq. km**	394
No. of Districts		2
No. of Hill Districts		0
No. of Tribal Districts		0

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Goa is at 3702 square kilometres, with a population of 1.46 million and an average population density of 394 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023 this period, the state comprises of 2 districts.

5.7.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	543	585	1091	0	1483
Addition	34.7	72.37	127.21	21.69	48.41
Reduction	22.24	67.94	97.38	0	116.82
Closing 2021-22	555.46	589.43	1120.83	21.69	1414.59
Net change	12.46	4.43	29.83	21.69	-68.41
% Change	2.29%	0.76%	2.73%	-	-4.61%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Goa's Forest cover underwent several changes across different forest types. Non-forest saw a more notable decrease, falling by 4.61%. VDF areas grew substantially, a net gain of 2.29%. For most forest cover class, it shows a positive trend, while non-forest experienced some level of decrease during this period, with the most notable change in the non-forest category.

5.7.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	1225	1271	46	3.76
% of GA	33.09	34.33	1.24	
Type of Protection				
Reserved Forests (RF)	253	119	-134	-52.96
Protected Forest (PF)	0	755		
Unclassed Forests	972	397	-575	-59.16

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 47 sq. km, marking a 3.84% rise and expanding from 33.09% to 34.33% of the state's geographical area during observed period. During this period, Reserved Forests and Unclassed Forest reduced sharply by 52.96% and 59.16% respectively. The Protected Forests show a dramatic increase from 0 to 755 sq. km, reflecting a significant reclassification. These trends reflect a shift in the categorization of forest areas, with increase in the protected forests.

5.7.3 Condition Accounts

The condition account for the forests of Goa for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	10.331	15.69	5.359	51.87
Growing Stock in Forest per unit area	m^3/ha	-	134.73		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	19,016	25,513	6,497	34.17
Above Ground Biomass	'000 tonnes	5,153	9,000	3,847	74.66
Below Ground Biomass	'000 tonnes	1,512	2,627	1,115	73.74
Dead Wood	'000 tonnes	250	299	49	19.6
Litter	'000 tonnes	417	496	79	18.94
Soil Organic Carbon	'000 tonnes	11,684	13,091	1,407	12.04

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	85.31	112.6	27.29	31.99
Above Ground Biomass	Per hectare stock in tonnes	23.12	39.72	16.6	71.8
Below Ground Biomass	Per hectare stock in tonnes	6.78	11.59	4.81	70.94
Dead Wood	Per hectare stock in tonnes	1.12	1.32	0.2	17.86
Litter	Per hectare stock in tonnes	1.87	2.19	0.32	17.11
Soil Organic Carbon	Per hectare stock in tonnes	52.42	57.78	5.36	10.23

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	1.06		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	96.87		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	13.29	8.34	-	
> 1.0 ≤ 10	%		5.07		
> 10 ≤ 100	%	6.35	9.42	3.07	
> 100 ≤ 500	%	0	0	-	
> 500 ≤ 1000	%	0	0	-	
> 1000 ≤ 5000	%	80.36	77.17	-3.19	
> 5000 ≤ 10000	%	0	0	-	
>10000	%	0	0	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	11	5	-6	-54.55
SNPP-VIIRS Detections	Number of fire cases	140	20	-120	-85.71

Forest Fire Prone Classes				
Indicators	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0.03	0.03
Very highly fire prone	%	0	0	-
Highly fire prone	%	0	0	-
Moderately fire prone	%	0.05	2.98	2.93
Less fire prone	%	99.95	96.99	-2.96

Wetlands within RFA	
Indicator	**2019**
Number	71
Area (in ha)	1025
% of RFA	0.78

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	38	50	118
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.61	2.54	2.86
Tropical Semi-Evergreen Forests	2.28	2.16	3.14
Tropical Moist Deciduous Forests	1.83	2.65	3.13
Littoral & Swamp Forests	0.67	0.23	-
Tropical Dry Deciduous Forests	0.41	1.23	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	13.6	12.68	17.46
Tropical Semi-Evergreen Forests	9.78	8.67	23.1
Tropical Moist Deciduous Forests	6.23	14.15	22.87
Littoral & Swamp Forests	1.95	1.26	-
Tropical Dry Deciduous Forests	1.51	3.42	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	73.39
Inadequate	16.18
Absent	2.48
NA	7.95
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.91
Moderately degraded	6.38
Mildly degraded	55.55
Not degraded	31.28
NA	4.88
Invasive Species [Distribution of RFA (%)]	
Very Dense	2.28
Dense	5.32
Moderate	19.75
Scanty	26.58
Absent	23.55
NA	22.52

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.7.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	25.14	0.06%	237.54	0.29%	212.4	845%
Value of non-timber forest products (NTFP)	(₹ in crore)	4.18	0.01%	4.36	0.01%	0.18	4.42%
Total Timber+ NTFP Services	(₹ in crore)	29.32	0.07%	241.9	0.3%	212.58	725.03%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services in % of SGDP increased from 0.06% in 2011-12 to 0.29% in 2021-22, while the monetary value of the services shows a drastic increase by 845%. The non-timber forest provisioning service showed slight increase in value by 4.42%, while its value as a % of SGDP remained stagnant at 0.01%. Collectively, the combined timber and NTFP services as % of SGDP rose from 0.07% to 0.30%, as their overall value increased by nearly 725.03 %. This indicates a rising relative economic contribution of forest-based services over the period.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	1098.22	1.99%	2174.57	2.68%	1076.34	98.01%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in SGDP rose from 1.99% in 2015-16 to 2.68% in 2021-22, while the absolute value registered an increase of 98.01%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their total value during the period.

Cultural Services	Unit	2011-12	2019-20	Net-Change	% Change
Tourist inflow for ecotourism	Number of tourists	225157	454976	229819	102.07%
Revenue from ecotourism	(₹ in lakh)	67.16	-	-	-

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change

The inflow of tourists for ecotourism shows a substantial rise of 102.07% from 2011-12 to 2019-20. The revenue generated from ecotourism activities was registered 67.16 lakh in 2011-12. These figures indicate a significant potential for engagement with ecotourism activities, reflecting both the sector's economic contribution and it experienced a sharp rise in tourist numbers.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	25.14	0.06%	80.82	0.15%	55.69	221.54%
Value of non-timber forest products (NTFP)	(₹ in crore)	4.18	0.01%	1.66	0.003%	-2.52	-60.35%
Total Timber+ NTFP Services	(₹ in crore)	29.32	0.07%	82.48	0.153%	53.17	181.34%

At constant prices, the timber provisioning services in SGDP rise from 0.06% in 2011-12 to 0.15% in 2021-22, reflecting a 0.09% increase. The non-timber forest resources dropped from 0.01% to 0.003%, with a 60.35% reduction in value. Collectively, the combined timber and NTFP services in % of SGDP increased from 0.07% to 0.153%, and their total value increased by 181.34%, indicating a significant improvement in their relative economic contribution over the period.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	663.67	1.44%	890.42	1.67%	226.75	34.17%

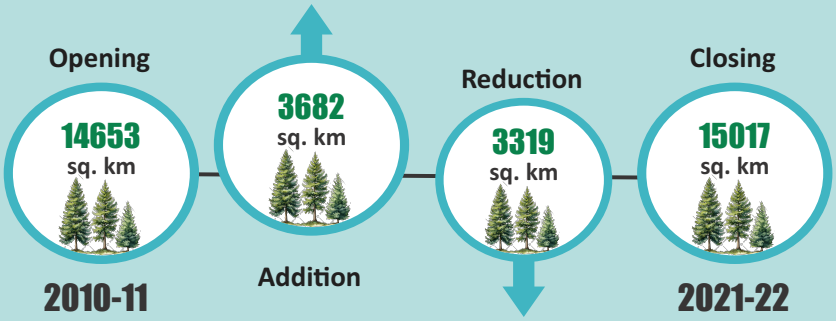
At constant prices, the carbon retention services as % of SGDP increased from 1.44% in 2015-16 to 1.67% in 2021-22, while the absolute value showed an increase of 34.17%. This highlights a substantial improvement in the relative economic contribution of carbon retention services during the period, with the growth in their

GUJARAT

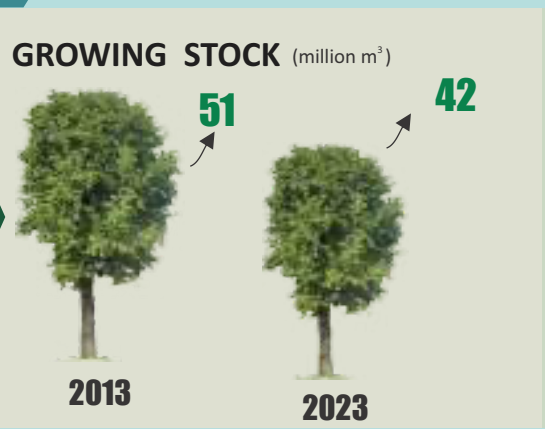
FOREST EXTENT ACCOUNT

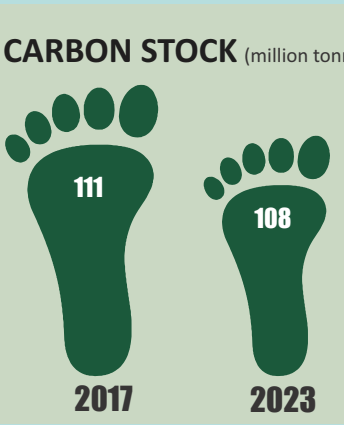
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
196244 Sq. Km	11.04%	11.14%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	0.24%	2015-16	0.62%
2021-22	0.16%	2021-22	0.48%

5.8 Gujarat, located in the western part of India, is a state characterized by a predominantly arid to semi-arid climate and a varied topography that includes extensive coastal plains, dry deciduous forests, and saline desert landscapes. According to the Champion & Seth Classification of Forest Types (1968), Gujarat's forests are classified into 4 Type Groups, further subdivided into 25 distinct Forest Types. The state's forested regions are primarily composed of dry deciduous forests and thorn forests. The coastal zones, are distinguished by significant stretches of mangrove forests and scrub, while the arid districts in the north and east are typified by scrub and grassland.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	196022	196244
Population (as per Census 2011)	**Million**	60.44	
Average Population Density	**per sq. km**	308	
No. of Districts		25	33
No. of Hill Districts		0	0
No. of Tribal Districts		8	9

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Gujarat changed from 196022 sq. km in 2013 to 196244 sq. km with a population of 60.44 million and an average population density of 308 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 25 to 33 and number of tribal districts from 8 to 9.

5.8.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	376	5220	9057	1492	179877
Addition	52.41	271.3	3358.61	2717.19	3501.68
Reduction	8.7	589.1	2720.88	2179.24	4181.27
Closing 2021-22	419.71	4902.2	9694.73	2029.95	179197.4
Net change	43.71	-317.8	637.73	537.95	-679.59
% Change	11.63%	-6.09%	7.04%	36.06%	-0.38%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Gujrat's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 11.63%. Scrub areas grew substantially, a net gain of 36.06%. For most forest cover class, it shows a positive trend, while MDF and non-forest experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.8.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	21647	21870	223	1.03
% of GA	11.04	11.14	0.1	
Type of Protection				
Reserved Forests (RF)	14373	14574	201	1.4
Protected Forest (PF)	2886	2898	12	0.42
Unclassed Forests	4388	4398	10	0.23

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 223 sq. km, marking a 1.03% rise and expanding from 11.04% to 11.14% of the state's geographical area during observed period. During this period, all the three forest categories show some marginal increment, notable in reserved forest with an increase of 1.4%. These trends indicate consistency in the classification of forests over the given period.

5.8.3 Condition Accounts

The condition account for the forests of Gujrat for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	50.62	42.11	-8.51	-16.81
Growing Stock in Forest per unit area	m^3/ha	-	37.83		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,10,697	1,08,322	-2,375	-2.15
Above Ground Biomass	'000 tonnes	32,668	28,497	-4,171	-12.77
Below Ground Biomass	'000 tonnes	11,719	9,653	-2,066	-17.63
Dead Wood	'000 tonnes	322	1,476	1,154	358.39
Litter	'000 tonnes	993	1,282	289	29.1
Soil Organic Carbon	'000 tonnes	64,995	67,414	2,419	3.72

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	75.01	72.13	-2.88	-3.84
Above Ground Biomass	Per hectare stock in tonnes	22.14	18.98	-3.16	-14.27
Below Ground Biomass	Per hectare stock in tonnes	7.94	6.43	-1.51	-19.02
Dead Wood	Per hectare stock in tonnes	0.22	0.98	0.76	345.45
Litter	Per hectare stock in tonnes	0.67	0.85	0.18	26.87
Soil Organic Carbon	Per hectare stock in tonnes	44.04	44.89	0.85	1.93

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.21		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.43		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	30.8	34.23	-	
> 1.0 ≤ 10	%		27.09		
> 10 ≤ 100	%	19.35	24.79	5.44	
> 100 ≤ 500	%	19.7	8.56	-11.14	
> 500 ≤ 1000	%	8.82	5.33	-3.49	
> 1000 ≤ 5000	%	21.33	0	-	
> 5000 ≤ 10000	%	0	0	-	
>10000	%	0	0	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
▯▯	▯▯	▯	▯	▯	▯
SNPP-VIIRS Detections	Number of fire cases	2885	2769	-116	-4.02

Forest Fire Prone Classes				
Indicators	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	0.25	0.07	-0.18
Very highly fire prone	%	2.69	4.14	1.45
Highly fire prone	%	3.45	7.19	3.74
Moderately fire prone	%	8.43	8.76	0.33
Less fire prone	%	85.18	79.84	-5.34

Wetlands within RFA	
Indicator	2019
Number	3529
Area (in ha)	1210675
% of RFA	39.88

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	73	37	102
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	2.02	2.4	2.8
Littoral and Swamp Forests	1.8	0.86	-
Tropical Dry Deciduous Forests	3.3	2.14	3.09
Tropical Thorn Forests	2.58	1.44	1.93
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	7.54	11.02	16.44
Littoral and Swamp Forests	6.05	2.36	-
Tropical Dry Deciduous Forests	27.11	8.5	21.98
Tropical Thorn Forests	13.2	4.22	6.89

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	27.93
Inadequate	36.35
Absent	19.84
NA	15.88
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	8.54
Moderately degraded	13.27
Mildly degraded	59.51
Not degraded	7.19
NA	11.49
Invasive Species [Distribution of RFA (%)]	
Very Dense	2.56
Dense	11.31
Moderate	25.45
Scanty	12.99
Absent	21.21
NA	26.48

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.8.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	746.09	0.12%	2031.45	0.11%	1285.37	172.28%
Value of non-timber forest products (NTFP)	(₹ in crore)	762.96	0.12%	892.23	0.05%	129.27	16.94%
Total Timber+ NTFP Services	(₹ in crore)	1509.05	0.24%	2923.68	0.16%	1414.64	93.74%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has drastically increased by 172.28% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.12% to 0.11%. In case of NFTP services, it had shown growth in absolute by 16.94%, while reduction in SGDP by 0.07%. This causes rise in the overall provisioning services, which improve by 93.74% in absolute terms, but reduced from 0.24% to 0.16% as % of SGDP. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	6393.04	0.62%	9232.68	0.48%	2839.64	44.42%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP fall from 0.62% in 2015-16 to 0.48% in 2021-22, while the absolute value registered an increase of 44.42%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	1358249
Revenue from ecotourism	(₹ in lakh)	-	1200.26

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2019-20, tourist inflow for ecotourism reached 13.6 lakh visitors, generating a revenue of approx. ₹ 12 crore. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

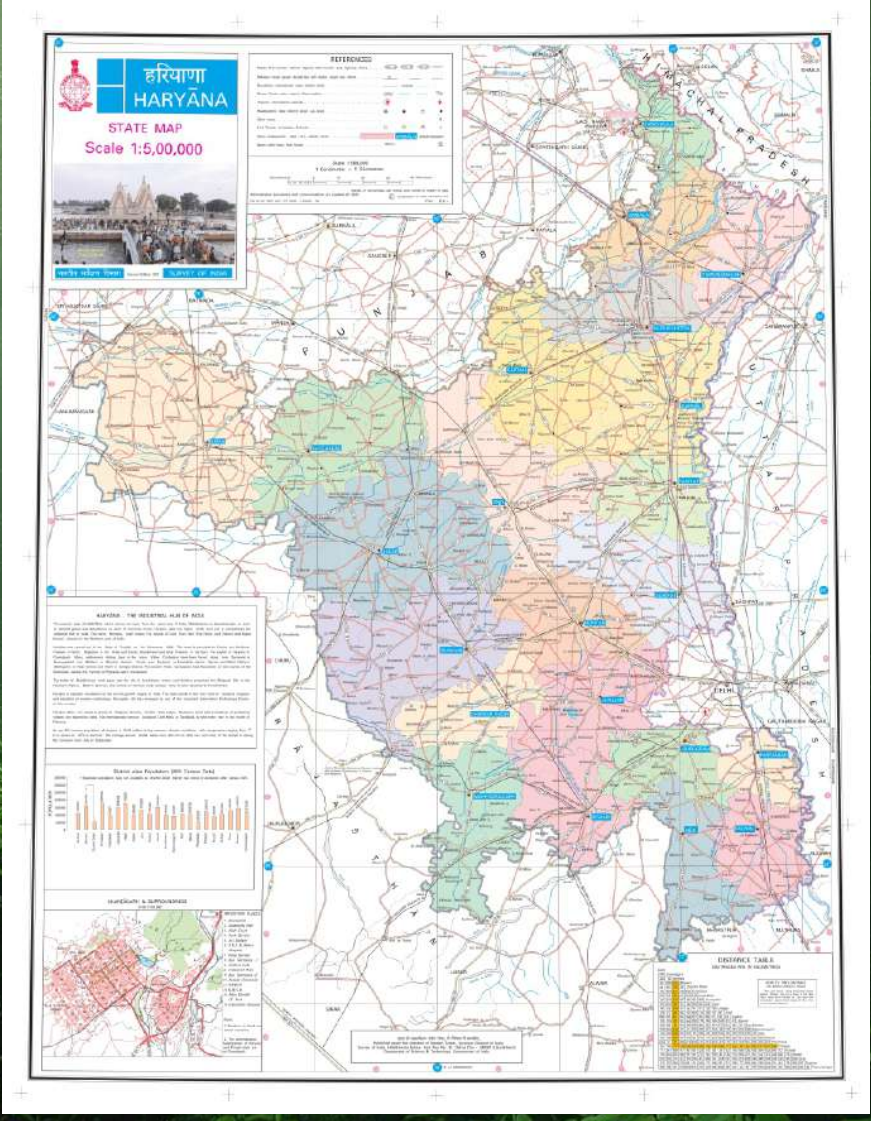
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	746.09	0.12%	582.04	0.04%	-164.05	-21.99%
Value of non-timber forest products (NTFP)	(₹ in crore)	762.96	0.12%	583.27	0.04%	-179.69	-23.55%
Total Timber+ NTFP Services	(₹ in crore)	1509.05	0.24%	1165.31	0.08%	-343.74	-22.78%

At constant prices, the timber provisioning services as % of SGDP has reported a decline from 0.12% in 2011-12 to 0.04% in 2021-22, and 21.99% reduction in absolute value as well. The NTFPs has registered a reduction of 23.55% in their value, while in terms of % of SGDP it has a nominal reduction from 0.12% to 0.04%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.24% to 0.08%, and their absolute value decreased by 22.78%. This trend indicates a consistent contraction in both the absolute and relative economic contribution of forest provisioning services, reflecting their diminishing role within the broader state economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	3863.4	0.43%	3780.51	0.28%	-82.89	-2.15%

At constant prices, the carbon retention services in % of SGDP decreased from 0.43% in 2015-16 to 0.28% in 2021-22, while the absolute value showed a decrease of 2.15%. This highlights a decline in the relative economic contribution of carbon retention services during the period.

HARYANA


हरियाणा
HARYĀNA
STATE MAP
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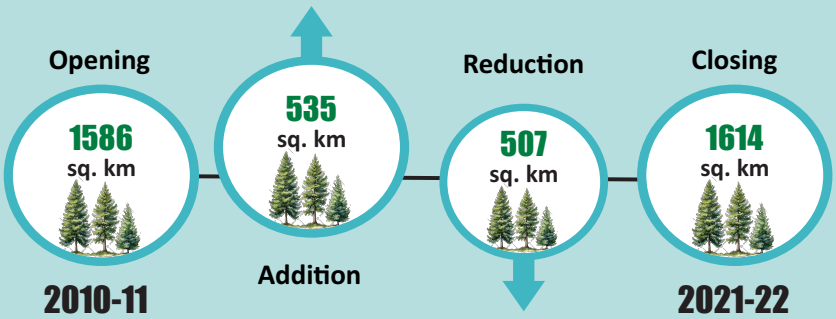
REFERENCES
HIMACHAL PRADESH
PUNJAB
UTTARAKHAND
DISTANCE TABLE

FOREST EXTENT ACCOUNT

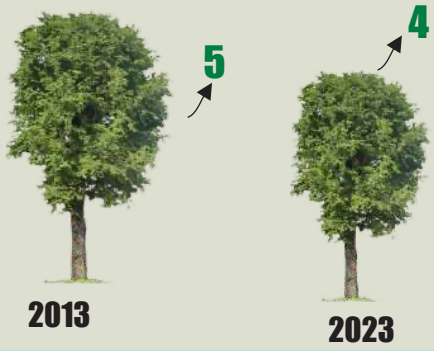
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
44212 Sq. Km	3.53%	3.53%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m^3)



CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

REGULATING SERVICES
Carbon Retention Service

5.9 Haryana, located in northern India, is a state predominantly characterized by a sub-tropical climate and largely alluvial plains. The state's forest cover is relatively limited but ecologically significant, supporting fragments of natural woodland amidst extensive agricultural landscapes. According to the Champion & Seth Classification of Forest Types (1968), Haryana's forests are grouped into 3 Type Groups, further subdivided into 10 distinct Forest Types. The predominant forest formations in Haryana are tropical dry deciduous forests, tropical thorn forests and subtropical pine forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	44212	
Population (as per Census 2011)	**Million**	25.35	
Average Population Density	**Per sq. km**	573	
No. of Districts		19	22
No. of Hill Districts		0	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Haryana is at 44212 square kilometres, with a population of 25.35 million and an average population density of 573 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 19 to 22.

5.9.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	27	453	1106	150	42476
Addition	4	119.23	412.05	117.18	311.47
Reduction	3.83	131.05	372.14	92.8	364.11
Closing 2021-22	27.17	441.18	1145.91	174.38	42423.36
Net change	0.17	-11.82	39.91	24.38	-52.64
% Change	0.63%	-2.61%	3.61%	16.25%	-0.12%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Haryana's Forest cover underwent several changes across different forest types. Open forest saw a most notable increase, rising by 3.61%. Scrub areas grew substantially, a net gain of 16.25%. For most forest cover class, it shows a positive trend, while MDF and non-forest experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.9.2-Extent Account

Indicator (area in sq. km)	2013-2023
Recorded Forest Area (RFA)	1559
% of GA	3.53
Type of Protection	
Reserved Forests (RF)	249
Protected Forest (PF)	1158
Unclassed Forests	152

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remain consistent at 1559 sq. km covering 3.53% of the state's geographical area during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.9.3 Condition Accounts

The condition account for the forests of Haryana for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	5.388	4.16	-1.228	-22.79
Growing Stock in Forest per unit area	m^3/ha	-	43.39		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	12,411	10,476	-1,935	-15.59
Above Ground Biomass	'000 tonnes	3,736	2,406	-1,330	-35.6
Below Ground Biomass	'000 tonnes	1,269	858	-411	-32.39
Dead Wood	'000 tonnes	20	189	169	845
Litter	'000 tonnes	74	91	17	22.97
Soil Organic Carbon	'000 tonnes	7,312	6,932	-380	-5.2

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	78.15	64.89	-13.26	-16.97
Above Ground Biomass	Per hectare stock in tonnes	23.53	14.9	-8.63	-36.68
Below Ground Biomass	Per hectare stock in tonnes	7.99	5.32	-2.67	-33.42
Dead Wood	Per hectare stock in tonnes	0.13	1.17	1.04	800
Litter	Per hectare stock in tonnes	0.47	0.56	0.09	19.15
Soil Organic Carbon	Per hectare stock in tonnes	46.05	42.94	-3.11	-6.75

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.27		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.01		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	49.88	35.08	-	
> 1.0 ≤ 10	%		14.80		
> 10 ≤ 100	%	29.38	29.34	-0.04	
> 100 ≤ 500	%	20.74	20.78	0.04	
> 500 ≤ 1000	%	0	0	-	
> 1000 ≤ 5000	%	0	0	-	
> 5000 ≤ 10000	%	0	0	-	
>10000	%	0	0	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net change**	**% Change**
MODIS Detections	Number of fire cases	24	37	13	54.17
SNPP-VIIRS Detections	Number of fire cases	135			

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0	-
Very highly fire prone	%	2.33	0	-2.33
Highly fire prone	%	5.87	1.62	-4.25
Moderately fire prone	%	18.08	4.46	-13.62
Less fire prone	%	73.72	93.92	20.2

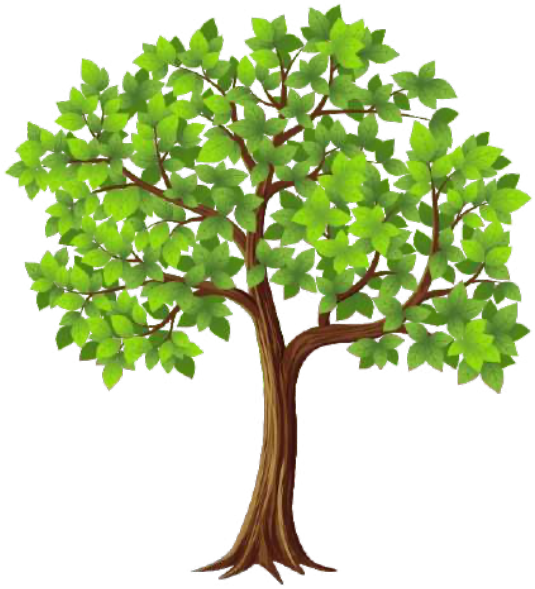
Wetlands within RFA	
Indicator	**2019**
Number	78
Area (in ha)	1885
% of RFA	3.33

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	50	43	45
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	1.7	1.88	2.69
Tropical Thorn Forests	2.24	1.96	1.94
Subtropical Pine Forests	2.23	2.62	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	5.47	6.55	14.73
Tropical Thorn Forests	9.39	7.1	6.96
Subtropical Pine Forests	9.3	13.74	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	16.97
Inadequate	55.31
Absent	16.97
NA	10.75
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	2
Moderately degraded	12.7
Mildly degraded	60.82
Not degraded	16.04
NA	8.44
Invasive Species [Distribution of RFA (%)]	
Very Dense	2.02
Dense	18.85
Moderate	18.18
Scanty	8.75
Absent	41.07
NA	11.13



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.9.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	880.88	0.30%	795.48	0.09%	-85.4	-9.69%
Value of non-timber forest products (NTFP)	(₹in crore)	77.87	0.03%	2.01	0.0002%	-75.86	-97.41%
Total Timber+ NTFP Services	(₹in crore)	958.75	0.33%	797.49	0.0902%	-161.26	-16.82%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP has reported a decline from 0.30% in 2011-12 to 0.09% in 2021-22, and 9.69% reduction in absolute value as well. The NTFPs has registered a significant reduction of 97.41% in their value, while in terms of % of SGDP it has a reduction from 0.03% to 0.0002%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.33% to 0.0902%, and their absolute value decreased by 16.82%.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	716.77	0.14%	892.91	0.10%	176.14	24.57%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP decline from 0.14% in 2015-16 to 0.10% in 2021-22, while the absolute value registered an increase of 24.57%. This reflects a decrease in the relative economic contribution of carbon retention services, with the growth in their total value during the period.

2) Ecosystem services (at constant prices)

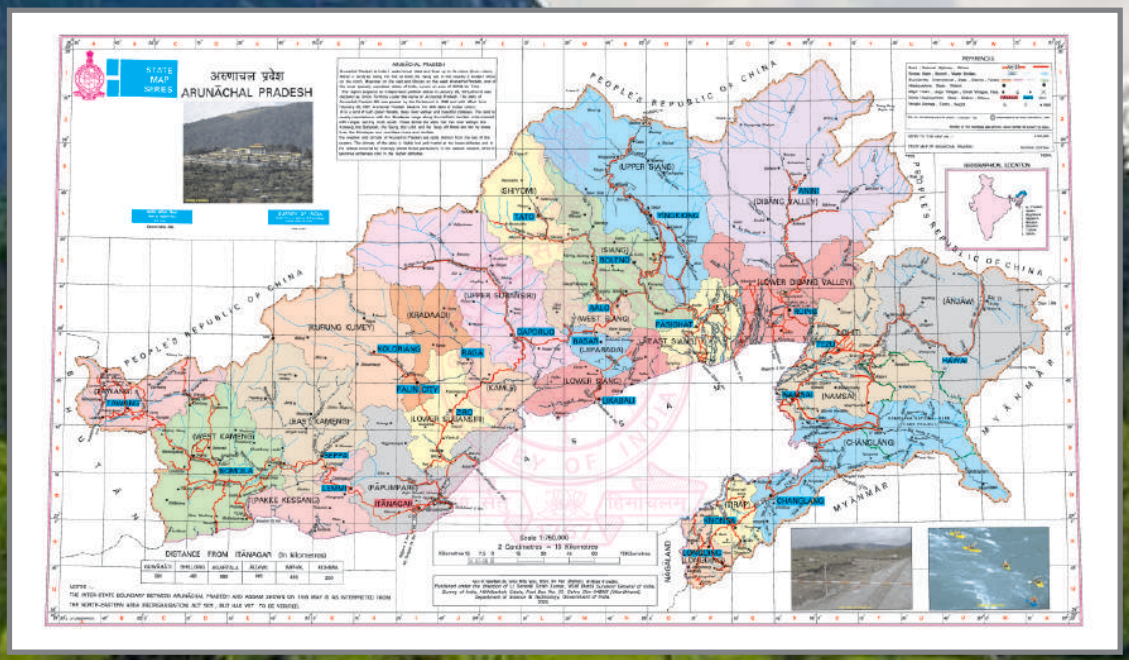
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	880.88	0.30%	596.64	0.11%	-284.23	-32.27%
Value of non-timber forest products (NTFP)	(₹ in crore)	77.87	0.03%	1.67	0.0003%	-76.21	-97.86%
Total Timber+ NTFP Services	(₹ in crore)	958.75	0.33%	598.31	0.1103%	-360.44	-37.59%

At constant price, the absolute monetary value of timber provisioning services has decreased by 32.27% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.30% to 0.11%. In case of NFTP services, it had shown substantial reduction in absolute by 97.86% and in SGDP by 0.0297%. This causes fall in the overall provisioning services, which reduce by 37.59% in absolute terms and from 0.33% to 0.1103% as % of SGDP.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	433.15	0.10%	365.62	0.07%	-67.53	-15.59%

At constant prices, the carbon retention services in % of SGDP decreased from 0.10% in 2015-16 to 0.07% in 2021-22, as a consequence of the decrease in absolute value by 15.59%. This highlights a decrease in the relative economic contribution of carbon retention services during the period.

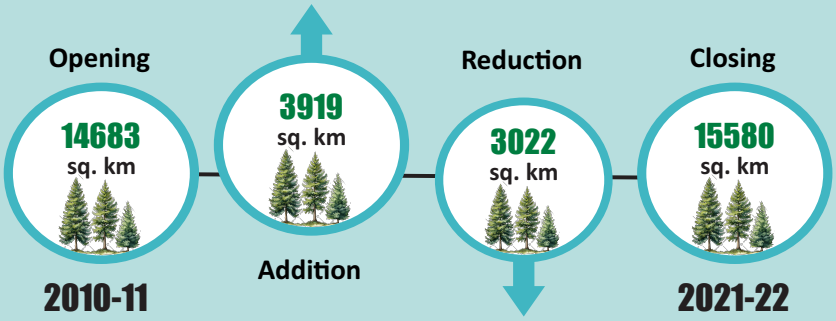
HIMACHAL PRADESH



FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
55673 Sq. Km	66.52%	68.16%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	1.39%
2021-22	0.44%

REGULATING SERVICES
Carbon Retention Service

2015-16	8.89%
2021-22	12.74%

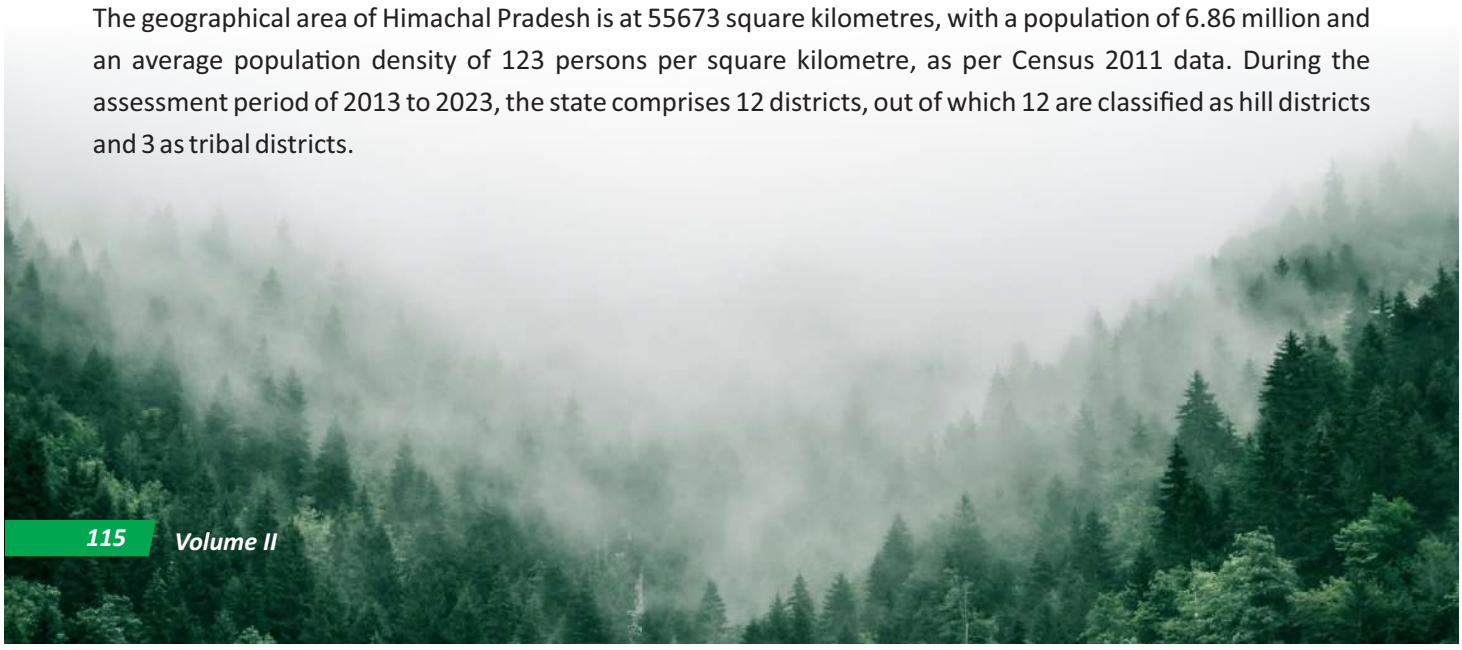
5.10 Himachal Pradesh, located in the western Himalayas of northern India, is distinguished by its rugged mountainous terrain, steep altitudinal gradients, and marked climatic variability ranging from subtropical in the lower valleys to cold temperate and alpine in the higher reaches. According to the Champion & Seth Classification of Forest Types (1968), Himachal Pradesh's forests are classified into 8 Type Groups, further divided into 39 distinct Forest Types. The lower altitudes are characterized by subtropical pine forests, broad-leaved forests, and moist temperate deciduous forests. With increasing elevation, the forest composition transitions to coniferous forests, mixed broad-leaved forests, dry alpine scrub, and alpine pastures.

State Profile

Indicator	Unit	2013-2023
Geographical Area	**Sq. km**	55673
Population (as per Census 2011)	**Million**	6.86
Average Population Density	**Per sq. km**	123
No. of Districts		12
No. of Hill Districts		12
No. of Tribal Districts		3

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Himachal Pradesh is at 55673 square kilometres, with a population of 6.86 million and an average population density of 123 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the state comprises 12 districts, out of which 12 are classified as hill districts and 3 as tribal districts.



5.10.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	3224	6381	5078	298	40692
Addition	612.49	1877.14	1429.69	96.11	366.63
Reduction	718.89	977.85	1325.23	85.42	1274.67
Closing 2021-22	3117.6	7280.29	5182.46	308.69	39783.96
Net change	-106.4	899.29	104.46	10.69	-908.04
% Change	-3.30%	14.09%	2.06%	3.59%	-2.23%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Himachal Pradesh's Forest cover underwent several changes across different forest types. MDF saw a more notable decrease, falling by 14.09%. For most forest cover class, it shows a positive trend, while VDF and non-forest experienced some level of decrease during this period, with the most notable change in the MDF category.

5.10.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	37033	37948	915	2.47%
% of GA	66.52	68.16	1.64	
Type of Protection				
Reserved Forests (RF)	1898	1883	-15	-0.79%
Protected Forest (PF)	33130	28887	-4243	-12.81%
Unclassed Forests	2005	7178	5173	258%

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 915 sq. km, marking a 2.47% rise and expanding from 66.52% to 68.16% of the state's geographical area during observed period. During this period, Reserved Forests reduced by 0.79%, and Protected Forests also reduced by 12.81%. The Unclassed Forest category saw a dramatic increase of 5173 sq. km, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas, with decreases in the reserved and protected forests.

5.10.3 Condition Accounts

The condition account for the forests of Himachal Pradesh for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	317.295	303.94	-13.355	-4.21
Growing Stock in Forest per unit area	m^3/ha	-	219.46		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,75,782	2,55,016	79,234	45.08
Above Ground Biomass	'000 tonnes	70,655	1,12,461	41,806	59.17
Below Ground Biomass	'000 tonnes	18,691	31,390	12,699	67.94
Dead Wood	'000 tonnes	739	1,041	302	40.87
Litter	'000 tonnes	2,511	2,717	206	8.2
Soil Organic Carbon	'000 tonnes	83,186	1,07,407	24,221	29.12

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	116.41	163.68	47.27	40.61
Above Ground Biomass	Per hectare stock in tonnes	46.79	72.18	25.39	54.26
Below Ground Biomass	Per hectare stock in tonnes	12.38	20.15	7.77	62.76
Dead Wood	Per hectare stock in tonnes	0.49	0.67	0.18	36.73
Litter	Per hectare stock in tonnes	1.66	1.74	0.08	4.82
Soil Organic Carbon	Per hectare stock in tonnes	55.09	68.94	13.85	25.14

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.66		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.15		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	19.78	10.45	-	
> 1.0 ≤ 10	%		9.82		
> 10 ≤ 100	%	19.33	15.07	-4.26	
> 100 ≤ 500	%	25.54	10.83	-14.71	
> 500 ≤ 1000	%	14.33	20.00	5.67	
> 1000 ≤ 5000	%	21.02	33.83	12.81	
> 5000 ≤ 10000	%	0	-	-	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	142	601	459	323.24
SNPP-VIIRS Detections	Number of fire cases	1446	5280	3834	265.15

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0.03	0.44	0.41
Highly fire prone	%	1.18	6.92	5.74
Moderately fire prone	%	4.59	16.02	11.43
Less fire prone	%	94.2	76.62	-17.58

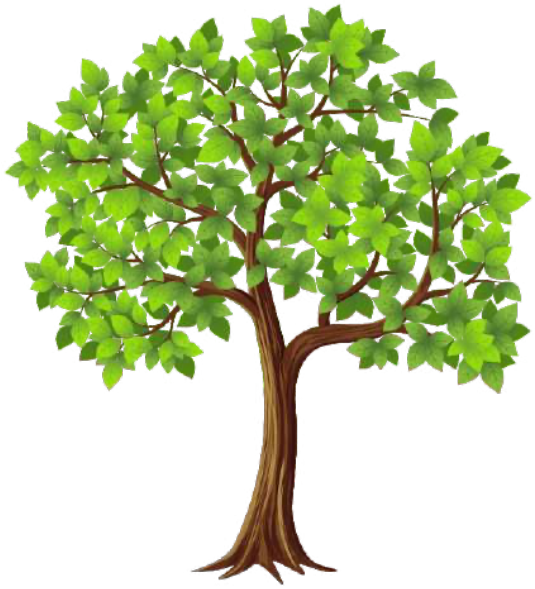
Wetlands within RFA	
Indicator	**2019**
Number	113
Area (in ha)	8221
% of RFA	0.59

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	109	99	116
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	1.71	2.15	1.95
Tropical Wet Deciduous Forests	1.95	2.13	2.87
Subtropical Pine Forests	1.89	2.17	2.63
Himalayan Moist Temperate Forests	3.48	3.25	2.95
Himalayan Dry Temperate Forests	2.51	2.56	2.03
Sub-Alpine Forests	1.87	1.83	1.64
Dry Alpine Scrub	2.3	2.34	0.87
Moist Alpine Scrub	-	-	0.17
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	5.53	8.58	7.03
Tropical Wet Deciduous Forests	7.03	8.41	17.64
Subtropical Pine Forests	6.62	8.76	13.87
Himalayan Moist Temperate Forests	32.46	25.79	19.11
Himalayan Dry Temperate Forests	12.3	12.94	7.61
Sub-Alpine Forests	6.49	6.23	5.16
Dry Alpine Scrub	9.97	10.38	2.39
Moist Alpine Scrub	-	-	1.19

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	26.37
Inadequate	45.27
Absent	17.91
NA	10.45
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.94
Moderately degraded	19.34
Mildly degraded	60.79
Not degraded	12.69
NA	5.24
Invasive Species [Distribution of RFA (%)]	
Very Dense	4.11
Dense	10.81
Moderate	12.47
Scanty	8.37
Absent	33.46
NA	30.78



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.10.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	564.52	0.78%	299.03	0.18%	-265.48	-47.03%
Value of non-timber forest products (NTFP)	(₹ in crore)	443.31	0.61%	445.86	0.26%	2.56	0.58%
Total Timber+ NTFP Services	(₹in crore)	1007.83	1.39%	744.89	0.44%	-262.92	-26.09%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of non-timber forest product provisioning services has increased by 0.58% from 2011-12 to 2021-22, while its value as % of SGDP has decline from 0.61% to 0.26%. In case of timber services, it had shown reduction in absolute by 47.03%, while reduction in SGDP by 0.60%. There is fall in the overall provisioning services by 26.09% in absolute terms, and reduced from 1.39% to 0.44% as % of SGDP. This pattern indicates that, despite moderate growth in NTFPs provisioning, the significant contraction in timber output has driven an overall decline in the absolute and relative economic importance of forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	10151.87	8.89%	21735.95	12.74%	11584.08	114.11%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP rise from 8.89% in 2015-16 to 12.74% in 2021-22, while the absolute value registered an increase of 114.11%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their absolute value during the period.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	8287
Revenue from ecotourism	(₹ in lakh)	5.54	-

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2011-12, tourist inflow for ecotourism reached 8287 visitors and generating a revenue of ₹5.54 lakh in 2019-20. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

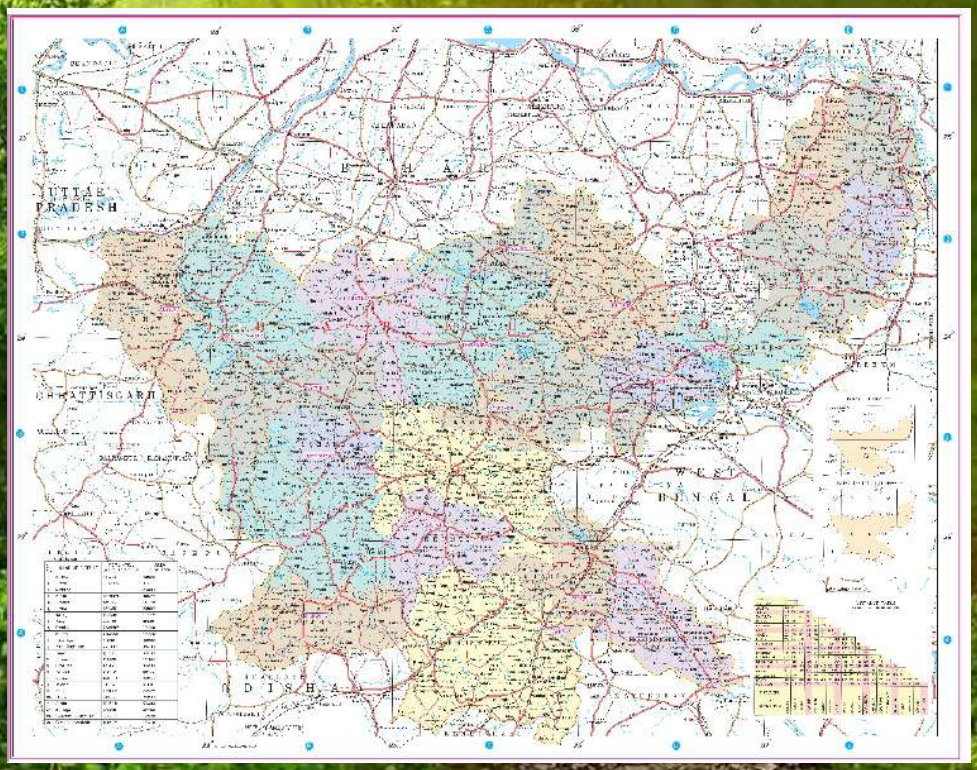
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	564.52	0.78%	477.89	0.39%	-86.63	-15.35%
Value of non-timber forest products (NTFP)	(₹ in crore)	443.31	0.61%	237.44	0.20%	-205.86	-46.44%
Total Timber+ NTFP Services	(₹ in crore)	1007.83	1.39%	715.33	0.59%	-292.49	-29.02%

At constant prices, the timber provisioning services as % of SGDP has reported a decline from 0.78% in 2011-12 to 0.39% in 2021-22, and 15.35% reduction in absolute value as well. The NTFPs has registered a significant reduction of 46.44% in their value, while in terms of % of SGDP it has a nominal reduction from 0.61% to 0.20%. Collectively, the combined timber and NTFP services as % of SGDP fell from 1.39% to 0.59%, and their absolute value decreased by 29.02%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	6134.91	6.37%	8900.23	7.33%	2765.32	45.08%

At constant prices, the carbon retention services in % of SGDP increased from 6.37% in 2015-16 to 7.33% in 2021-22, while the absolute value showed an increase of 45.08%. This highlights a substantial increase in the relative economic contribution of carbon retention services during the period, with a significant growth in their absolute value.

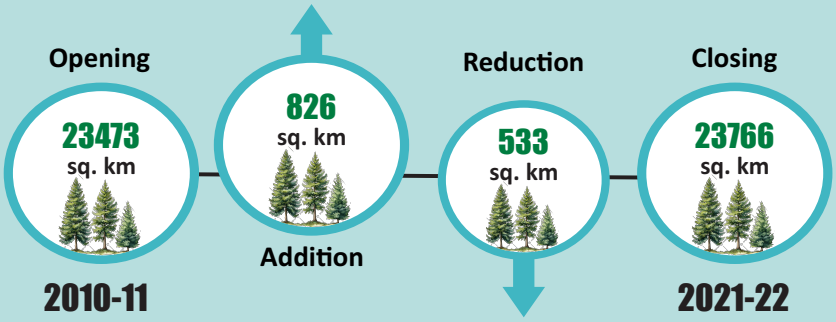
JHARKHAND



FOREST EXTENT ACCOUNT

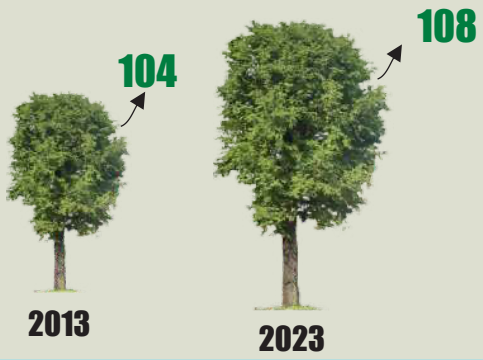
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
79716 Sq. Km	29.61%	31.51%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m³)



CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

REGULATING SERVICES
Carbon Retention Service

5.11 Jharkhand, situated in eastern India, is characterized by its undulating plateau landscape, mineral-rich soils, and a predominantly tropical monsoon climate. As per the Champion & Seth Classification of Forest Types (1968), Jharkhand's forests are categorized into 2 forest type Groups, further subdivided into 8 distinct Forest Types. The dominant formations include dry mixed deciduous forests, and patches of dry peninsular Sal forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	79714	79716
Population (as per Census 2011)	**Million**	32.98	32.99
Average Population Density	**Per sq. km**	414	
No. of Districts		18	24
No. of Hill Districts		0	0
No. of Tribal Districts		8	17

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Jharkhand changed from 79714 sq. km in 2013 to 79716 sq. km , with a population of 32.98 million in 2013 and 32.99 million in 2023 and an average population density of 414 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2013 to 2023, the administrative structure underwent significant changes: the number of districts increased from 18 to 24, and tribal district increased from 8 to 17 districts.

5.11.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	2587	9667	11219	670	55571
Addition	81.69	160.53	583.34	143.8	323.61
Reduction	33.34	186.54	312.9	255.48	502.71
Closing 2021-22	2635.35	9640.99	11489.44	558.32	55391.9
Net change	48.35	-26.01	270.44	-111.68	-179.1
% Change	1.87%	-0.27%	2.41%	-16.67%	-0.32%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Jharkhand's Forest cover underwent several changes across different forest types. Open forest saw a more notable increase, rising by 2.41% followed by VDF (1.87%). Scrub areas reduced substantially, a net loss of 16.67%. For most forest cover class, it shows a negative trend, while VDF and Open Forest experienced some level of increase during this period, with the most notable change in the Scrub category.

5.11.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	0% Change
Recorded Forest Area (RFA)	23605	25118	1513	6.41
% of GA	29.61	31.51	1.90	
Type of Protection				
Reserved Forests (RF)	4387	4500	113	2.58
Protected Forest (PF)	19185	18922	-263	-1.37
Unclassed Forests	33	1696	1663	5039.39

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 1513 sq. km, marking a 6.41% rise and expanding from 29.61% to 31.51% of the state's geographical area during observed period. During this period, Reserved Forests grew by 2.58%, and Protected Forests reduced by 1.37%. The Unclassed Forest category saw a dramatic increase of 1,663 sq. km, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas, with increases in the reserved and unclassed forests.

5.11.3 Condition Accounts

The condition account for the forests of Jharkhand for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	103.734	108.03	4.296	4.14
Growing Stock in Forest per unit area	m^3/ha	-	60.05		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	2,22,882	1,86,434	-36,448	-16.35
Above Ground Biomass	'000 tonnes	8,60,06	50,918	-35088	-40.80
Below Ground Biomass	'000 tonnes	33,173	20,622	-12,551	-37.83
Dead Wood	'000 tonnes	438	1,622	1,184	270.32
Litter	'000 tonnes	1,298	2,843	1,545	119.03
Soil Organic Carbon	'000 tonnes	1,01,967	1,10,429	8,462	8.3

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	94.63	78.45	-16.18	-17.1
Above Ground Biomass	Per hectare stock in tonnes	36.52	21.42	-15.1	-41.35
Below Ground Biomass	Per hectare stock in tonnes	14.08	8.68	-5.4	-38.35
Dead Wood	Per hectare stock in tonnes	0.19	0.68	0.49	257.89
Litter	Per hectare stock in tonnes	0.55	1.2	0.65	118.18
Soil Organic Carbon	Per hectare stock in tonnes	43.29	46.47	3.18	7.35

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	0.67		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	98.04		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	16.92	9.54	-	
> 1.0 ≤ 10	%		7.14		
> 10 ≤ 100	%	8.7	8.73	0.03	
> 100 ≤ 500	%	19.75	22.12	2.37	
> 500 ≤ 1000	%	9.36	4.10	-5.26	
> 1000 ≤ 5000	%	45.27	48.37	3.10	
> 5000 ≤ 10000	%	0	0	0	
> 10000	%	0	0	0	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	363	630	267	73.55
SNPP-VIIRS Detections	Number of fire cases	6221	9419	3198	51.41

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0.21	0.45	0.24
Very highly fire prone	%	2.18	11.33	9.15
Highly fire prone	%	9.16	28.48	19.32
Moderately fire prone	%	19.54	24.45	4.91
Less fire prone	%	68.91	35.29	-33.62

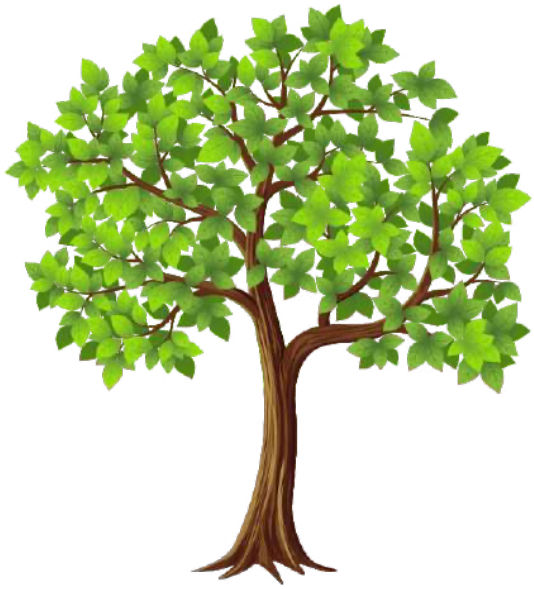
Wetlands within RFA	
Indicator	**2019**
Number	1662
Area (in ha)	16528
% of RFA	0.87

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	40	26	111
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	2.43	1.77	2.18
Tropical Dry Deciduous Forests	3.04	2.04	2.7
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	11.36	5.87	8.85
Tropical Dry Deciduous Forests	20.91	7.69	14.88

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	52.48
Inadequate	14.99
Absent	5.52
NA	27.01
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	3.74
Moderately degraded	26.75
Mildly degraded	58.39
Not degraded	5.1
NA	6.02
Invasive Species [Distribution of RFA (%)]	
Very Dense	3.71
Dense	9.72
Moderate	24.79
Scanty	27.09
Absent	20.1
NA	14.59



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.11.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	406.33	0.27%	372.34	0.10%	-33.99	-8.36%
Value of non-timber forest products (NTFP)	(₹ in crore)	477	0.32%	356.16	0.09%	-120.84	-25.33%
Total Timber+ NTFP Services	(₹ in crore)	883.33	0.59%	728.5	0.19%	-154.83	-17.53%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP has reported a decline from 0.27% in 2011-12 to 0.10% in 2021-22, and 8.36% reduction in absolute value as well. The NTFPs has registered a reduction of 25.33% in their value, while in terms of % of SGDP it has a nominal reduction from 0.32% to 0.09%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.59% to 0.19%, and their absolute value decreased by 17.53%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	12872.01	6.23%	15890.45	4.22%	3018.44	23.45%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP reduced from 6.23% in 2015-16 to 4.22% in 2021-22, while the absolute value registered an increase of 23.45%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

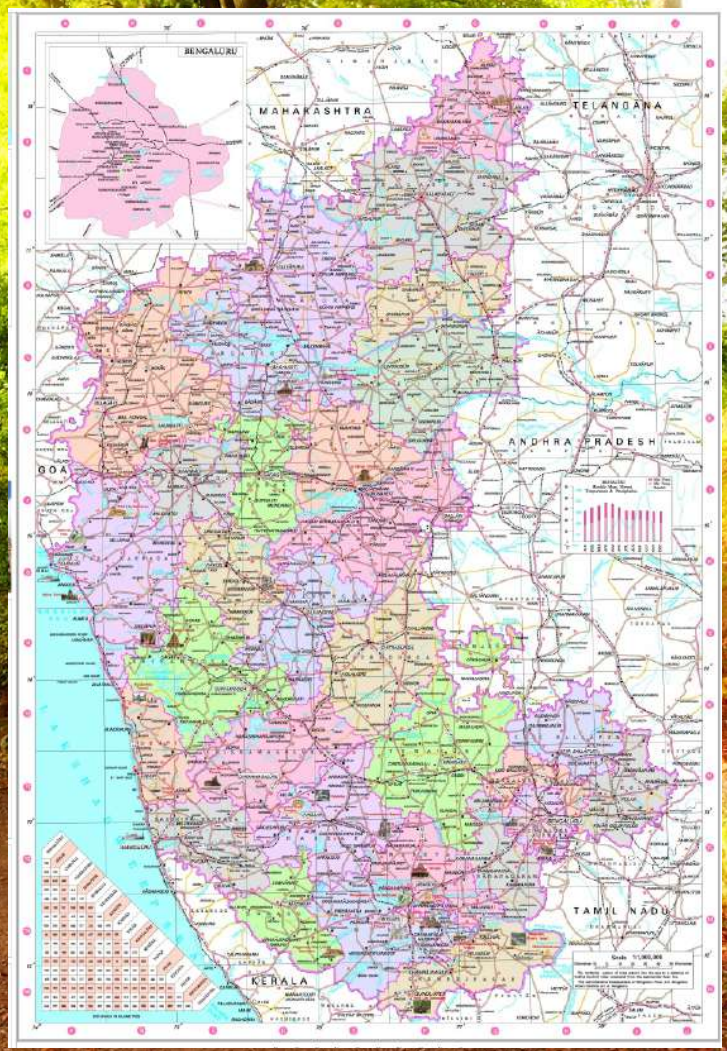
Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	406.33	0.27%	585.67	0.24%	179.35	44.14%
Value of non-timber forest products (NTFP)	(₹ in crore)	477	0.32%	242.41	0.10%	-234.59	-49.18%.
Total Timber+ NTFP Services	(₹ in crore)	883.33	0.59%	828.08	0.34%	-55.24	-6.25%

At constant prices, the timber provisioning services as % of SGDP decreased slightly from 0.27% in 2011-12 to 0.24% in 2021-22, while its absolute monetary value has substantial increase by 44.14%. The non-timber forest product provisioning services showed a decrease in value by 49.18%, and its value as % of SGDP has also declined, from 0.32% to 0.10%. Collectively, the combined timber and NTFP services in SGDP fell from 0.59% to 0.34%, and their overall absolute value also decreased by nearly 6.25%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the absolute and share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	7778.74	4.45%	6506.67	2.65%	-1272.06	-16.35%

At constant prices, the carbon retention services in % of SGDP decreased from 4.45% in 2015-16 to 2.65% in 2021-22, as the absolute value showed a decrease of 16.35%. This highlights a decrease in the relative economic contribution of carbon retention services during the period, with a reduction in their absolute value.

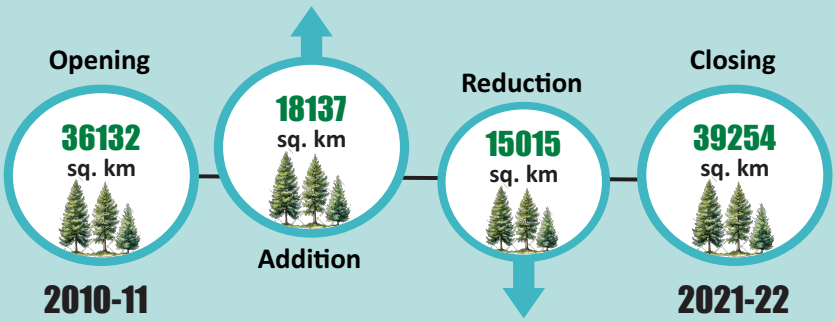
KARNATAKA


BENGALURU
MAHARASHTRA
TELANGANA
ANDHRA PRADESH
GOA
TAMIL NADU
KERALA

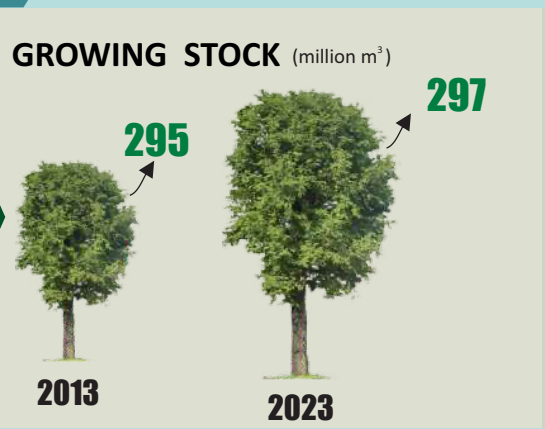
FOREST EXTENT ACCOUNT

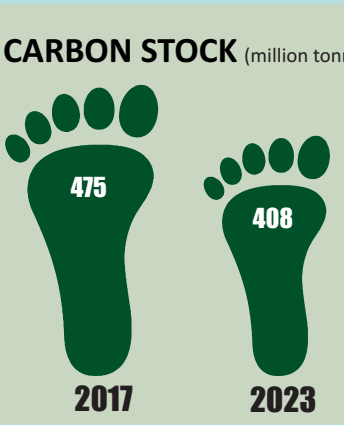
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
191791 Sq. Km	19.96%	19.96%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	0.24%	2015-16	2.63%
2021-22	0.10%	2021-22	1.75%

5.12 Karnataka, located in the southern part of India, encompasses a diverse physiographic setting ranging from the coastal plains of the Arabian Sea to the rugged hills of the Western Ghats and the expansive Deccan Plateau. According to the Champion & Seth Classification of Forest Types (1968), Karnataka's forests are classified into 8 Type Groups, further subdivided into 21 distinct Forest Types. The coastal regions are dominated by tropical evergreen and semi-evergreen forests, while the plateau regions are characterized by tropical moist mixed and dry deciduous forests. The drier districts in the interior support scrub and thorny forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	191791	
Population (as per Census 2011)	**Million**	61.10	
Average Population Density	**Per sq. km**	319	
No. of Districts		27	30
No. of Hill Districts		6	
No. of Tribal Districts		5	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Karnataka remained at 191791 square kilometres, with a population of 61.10 million and an average population density of 319 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 27 to 30, with 6 districts categorized under hill districts and 5 districts as tribal districts.

5.12.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	1777	20179	14176	3216	152443
Addition	3127.13	6921.25	8088.46	2727.83	5371.56
Reduction	366.34	5948.5	8699.73	1430.68	9790.98
Closing 2021-22	4537.79	21151.75	13564.73	4513.15	148023.6
Net change	2760.79	972.75	-611.27	1297.15	-4419.42
% Change	155.36%	4.82%	-4.31%	40.33%	-2.90%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Karnataka's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 155.36%. This growth resulted due to addition of 2713 sq. km area from MDF in 2017 assessment period. Scrub areas grew substantially, a net gain of 40.33%. For most forest cover class, it shows a positive trend, while MDF and Non-forest experienced some level of decrease during this period, with the most notable change in the VDF category.

5.12.2 Extent Account

Indicator (area in sq. km)	2013-2023
Recorded Forest Area (RFA)	38284
% of GA	19.96
Type of Protection	
Reserved Forests (RF)	28690
Protected Forest (PF)	3931
Unclassed Forests	5663

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remained at 38284 sq. km with 19.96% of the state's geographical area during observed period. During this period, all the three categories of forest based on type of protection remain unchanged. These trends reflect consistency in the categorization of forest areas.

5.12.3 Condition Accounts

The condition account for the forests of Karnataka for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	294.631	297.02	2.389	0.81
Growing Stock in Forest per unit area	m^3/ha	-	105.2		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	4,75,085	4,08,255	-66,830	-14.07
Above Ground Biomass	'000 tonnes	1,28,098	1,37,529	9,431	7.36
Below Ground Biomass	'000 tonnes	35,045	44,567	9,522	27.17
Dead Wood	'000 tonnes	2,545	4,500	1,955	76.82
Litter	'000 tonnes	19,745	7,759	-11,986	-60.7
Soil Organic Carbon	'000 tonnes	2,89,652	2,13,900	-75,752	-26.15

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	126.52	104.01	-22.51	-17.79
Above Ground Biomass	Per hectare stock in tonnes	34.11	35.04	0.93	2.73
Below Ground Biomass	Per hectare stock in tonnes	9.33	11.35	2.02	21.65
Dead Wood	Per hectare stock in tonnes	0.68	1.15	0.47	69.12
Litter	Per hectare stock in tonnes	5.26	1.98	-3.28	-62.36
Soil Organic Carbon	Per hectare stock in tonnes	77.14	54.49	-22.65	-29.36

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.95		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.05		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	12.06	8.35	-	
> 1.0 ≤ 10	%		7.51		
> 10 ≤ 100	%	7.4	9.89	2.49	
> 100 ≤ 500	%	4.84	4.71	-0.13	
> 500 ≤ 1000	%	4.06	2.52	-1.54	
> 1000 ≤ 5000	%	5.59	14.72	9.13	
> 5000 ≤ 10000	%	22.86	22.34	-0.52	
>10000	%	43.19	29.95	-13.24	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	1228	800	-428	-34.85
SNPP-VIIRS Detections	Number of fire cases	8078	4973	-3105	-38.44

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0.29	0.01	-0.28
Very highly fire prone	%	2.61	2.58	-0.03
Highly fire prone	%	6.96	7.79	0.83
Moderately fire prone	%	9.99	9.96	-0.03
Less fire prone	%	80.15	79.66	-0.49

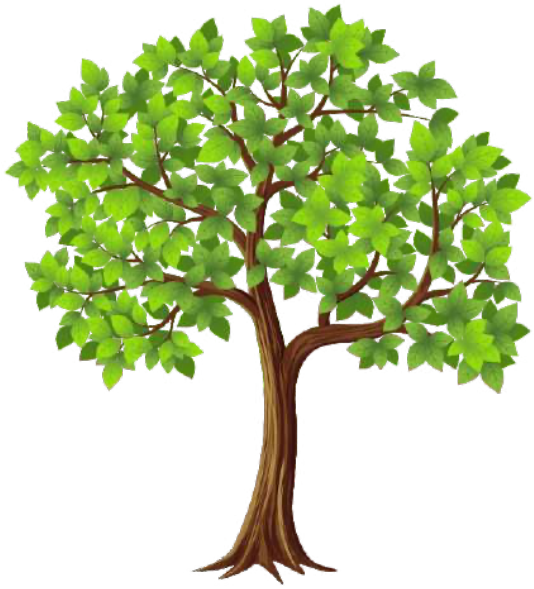
Wetlands within RFA	
Indicator	**2019**
Number	2038
Area (in ha)	53119
% of RFA	1.71

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	40	140	325
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.22	3.09	4.19
Tropical Semi-Evergreen Forest	1.85	2.58	4
Tropical Moist Deciduous Forests	2.24	2.66	3.56
Tropical Dry Deciduous Fores	1.04	2.68	3.66
Tropical Thorn Forests	1.01	2.32	3.09
Subtropical Broadleaved Hill Fores	1.29	2.55	2.53
Montane Wet Temperate Forests	-	-	1.88
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	9.21	21.98	66.02
Tropical Semi-Evergreen Forest	6.36	13.2	54.6
Tropical Moist Deciduous Forests	9.39	14.3	35.16
Tropical Dry Deciduous Fores	2.83	14.59	38.86
Tropical Thorn Forests	2.75	10.18	21.98
Subtropical Broadleaved Hill Fores	3.63	12.81	12.55
Montane Wet Temperate Forests	-	-	6.55

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I

Indicators	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	52.68
Inadequate	26.21
Absent	5.97
NA	15.14
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	5.82
Moderately degraded	27.83
Mildly degraded	52.01
Not degraded	10.37
NA	3.97
Invasive Species [Distribution of RFA (%)]	
Very Dense	4.47
Dense	16.27
Moderate	25.66
Scanty	19.35
Absent	21.12
NA	13.13



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.12.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	454.19	0.07%	1281.76	0.06%	827.57	182.21%
Value of non-timber forest products (NTFP)	(₹ in crore)	1008.58	0.17%	747.32	0.04%	-261.26	-25.9%
Total Timber+ NTFP Services	(₹ in crore)	1462.77	0.24%	2029.08	0.10%	566.31	38.71%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP decreased nominally from 0.07% in 2011-12 to 0.06% in 2021-22, while its absolute monetary value has also increased drastically by 182.21%. The non-timber forest product provisioning services showed a decrease in value by 25.90%, and its value as % of SGDP has also declined, from 0.17% to 0.04%. Collectively, the combined timber and NTFP services in SGDP fell from 0.24% to 0.10%, even as their overall value increased by nearly 38.71%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	27437.39	2.63%	34797.07	1.75%	7359.68	26.82%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP fall from 2.63% in 2015-16 to 1.75% in 2021-22, while the absolute value registered an increase of 26.82%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20	Net Change	% Change
Tourist inflow for ecotourism	Number of tourists	649544	656196	6652	1.02%

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change

Note: Revenue from ecotourism for respective year is not available in the Forestry Statistics 2021.

The inflow of tourists for ecotourism shows a marginal rise of 1.02% from 2011-12 to 2019-20. Ecotourism experienced a slow rise in tourist numbers but it has a significant potential for engagement with ecotourism activities, reflecting both the sector's role in attracting visitors.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	454.19	0.07%	725.01	0.06%	270.82	59.63%
Value of non-timber forest products (NTFP)	(₹ in crore)	1008.58	0.17%	394.16	0.03%	-614.43	-60.92%
Total Timber+ NTFP Services	(₹ in crore)	1462.77	0.24%	1119.17	0.09%	-343.61	-23.49%

At constant price, the absolute monetary value of timber provisioning services has increased by 59.63% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.07% to 0.06%. In case of NFTP services, it had shown significant reduction in absolute by 60.92% and in SGDP by 0.14%. This causes fall in the overall provisioning services, which reduce by 23.49% in absolute terms and from 0.24% to 0.09% as % of SGDP. This pattern indicates that, despite substantial growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the absolute and relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	16580.79	1.99%	14248.38	1.14%	-2332.41	-14.07%

At constant prices, the carbon retention services in % of SGDP decreased marginally from 1.99% in 2015-16 to 1.14% in 2021-22, and the absolute value also show a decrease of 14.07%.

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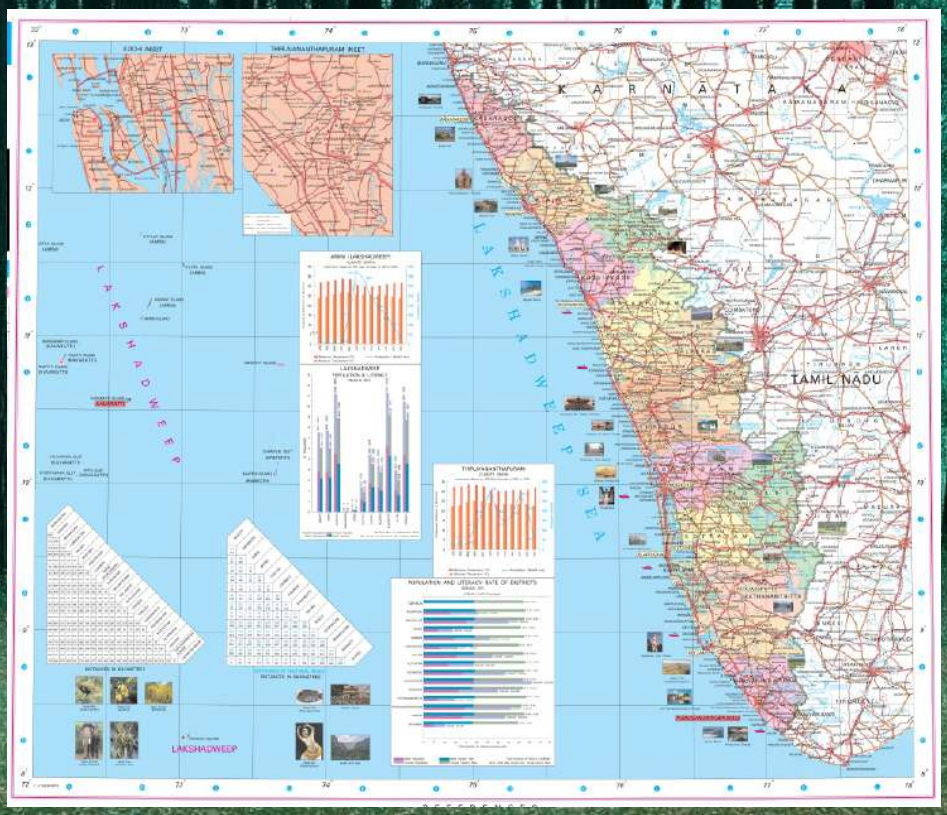
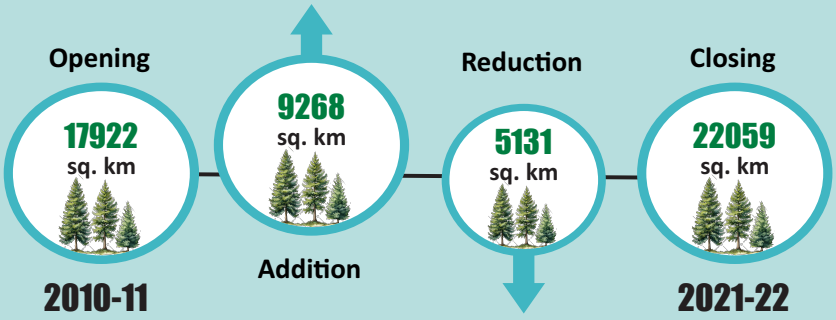


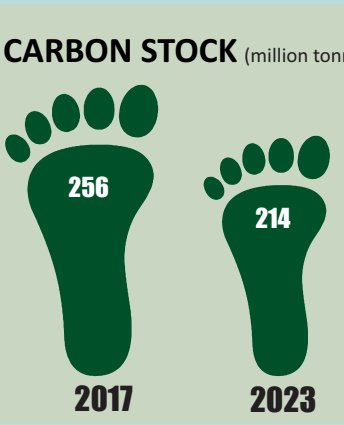
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
38852 Sq. Km	29.1%	29.66%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.24%	2015-16	2.63%
2021-22	0.18%	2021-22	1.97%

5.13 Kerala, located along the southwestern coast of India, is characterized by a narrow coastal plain, the towering Western Ghats, and a tropical monsoon climate with high annual rainfall. According to the Champion & Seth Classification of Forest Types (1968), Kerala's forests are classified into 7 Type Groups, further subdivided into 16 distinct Forest Types. The windward slopes of the Western Ghats are dominated by tropical wet evergreen and semi-evergreen forests, the mid-elevation belts support moist mixed deciduous forests, while the eastern slopes transition into dry mixed deciduous.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	38863	38852
Population (as per Census 2011)	**Million**	33.41	
Average Population Density	**Per sq. km**	860	
No. of Districts		14	
No. of Hill Districts		10	
No. of Tribal Districts		9	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Kerala changed from 38863 sq. km in 2013 to 38852 sq. km with a population of 60.44 million and an average population density of 308 persons per square kilometre, as per Census 2011 data. The change in area may be attributed to improved mapping techniques, revisions to administrative boundaries, and other related factors.During the assessment period of 2013 to 2023, the state comprises 14 districts, out of which 10 are classified as hill districts and 9 classified as tribal districts.

5.13.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	1529	9401	6992	29	20912
Addition	604.04	1419.17	7245.11	33.49	3215.87
Reduction	91.87	1498.35	3540.74	40.61	7357.11
Closing 2021-22	2041.17	9321.82	10696.37	21.88	16770.76
Net change	512.17	-79.18	3704.37	-7.12	-4141.24
% Change	33.50%	-0.84%	52.98%	-24.55%	-19.80%

Note:The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Kerala's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 33.50%. Open forest areas grew substantially, a net gain of 52.98%. For most forest cover class, it shows a negative trend, while VDF and Open Forest experienced some level of increase during this period, with the most notable change in the Open category.

5.13.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	11309	11522	213	1.88
% of GA	29.1	29.66	0.56	
Type of Protection				
Reserved Forests (RF)	11309*	11522	213	1.88
Protected Forest (PF)	0			
Unclassed Forests	0			

Note: * The figure includes 295 sq km of RF and 1838 sq km of deemed RF (Vested Forest and Ecologically Fragile Land).

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 213 sq. km, marking a 1.88% rise and expanding from 29.10% to 29.66% of the state's geographical area during observed period. During this period, Reserved Forests grew by 1.88%.

5.13.3 Condition Accounts

The condition account for the forests of Kerala for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	152.269	168.8	16.531	10.86
Growing Stock in Forest per unit area	m^3/ha	-	179.78		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	2,55,881	2,14,084	-41,797	-16.33
Above Ground Biomass	'000 tonnes	74,166	65,241	-8,925	-12.03
Below Ground Biomass	'000 tonnes	19,245	18,284	-961	-4.99
Dead Wood	'000 tonnes	1,058	3,217	2,159	204.06
Litter	'000 tonnes	7,436	3,319	-4,117	-55.37
Soil Organic Carbon	'000 tonnes	1,53,976	1,24,023	-29,953	-19.45

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	125.92	97.05	-28.87	-22.93
Above Ground Biomass	Per hectare stock in tonnes	36.5	29.58	-6.92	-18.96
Below Ground Biomass	Per hectare stock in tonnes	9.47	8.29	-1.18	-12.46
Dead Wood	Per hectare stock in tonnes	0.52	1.46	0.94	180.77
Litter	Per hectare stock in tonnes	3.66	1.5	-2.16	-59.02
Soil Organic Carbon	Per hectare stock in tonnes	75.77	56.22	-19.55	-25.8

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	0.62		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	98.25		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	17.65	10.25	-	
> 1.0 ≤ 10	%		6.44		
> 10 ≤ 100	%	4.51	4.95	0.44	
> 100 ≤ 500	%	2.27	3.38	1.11	
> 500 ≤ 1000	%	0	5.81	5.81	
> 1000 ≤ 5000	%	22.96	69.17	46.21	
> 5000 ≤ 10000	%	52.61	-	-	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	192	61	-131	-68.23
SNPP-VIIRS Detections	Number of fire cases	1162	504	-658	-56.63

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0.18	0.28	0.1
Highly fire prone	%	3.84	2.32	-1.52
Moderately fire prone	%	11.67	5.99	-5.68
Less fire prone	%	84.31	91.41	7.1

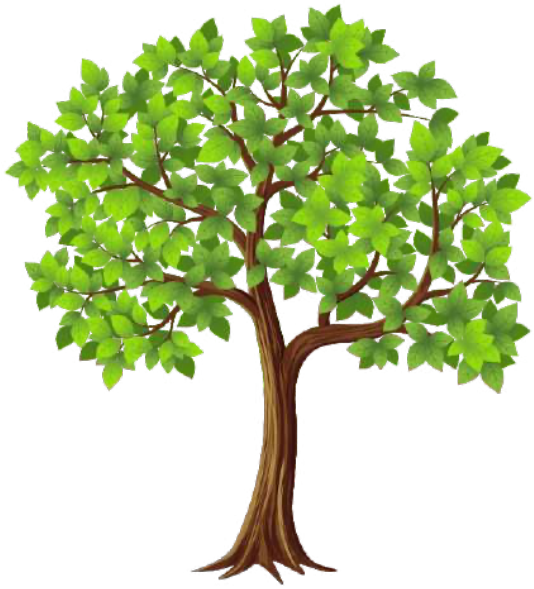
Wetlands within RFA	
Indicator	**2019**
Number	359
Area (in ha)	23157
% of RFA	2.03

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	81	158	238
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.94	3.26	3.78
Tropical Semi-Evergreen Forests	2.15	2.87	3.8
Tropical Moist Deciduous Forests	2.62	2.97	3.48
Littoral & Swamp Forests	0.95	1.42	-
Tropical Dry Deciduous Forests	2.45	2.63	3.1
Tropical Thorn Forests	1.43	2.46	-
Montane Wet Temperate Forests	2.14	2.2	1.84
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	18.92	26.05	43.82
Tropical Semi-Evergreen Forests	8.58	17.64	44.7
Tropical Moist Deciduous Forests	13.74	19.49	32.46
Littoral & Swamp Forests	2.59	4.14	-
Tropical Dry Deciduous Forests	11.59	13.87	22.2
Tropical Thorn Forests	4.18	11.7	-
Montane Wet Temperate Forests	8.5	9.03	6.3

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicators	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	48.84
Inadequate	31.38
Absent	3.49
NA	16.29
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	2.55
Moderately degraded	13.86
Mildly degraded	35.92
Not degraded	41.39
NA	6.28
Invasive Species [Distribution of RFA (%)]	
Very Dense	0.79
Dense	9.79
Moderate	23.5
Scanty	24.87
Absent	16.44
NA	24.61



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.13.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	374.95	0.10%	1154.91	0.12%	779.97	208.02%
Value of non-timber forest products (NTFP)	(₹ in crore)	524.92	0.14%	599.75	0.06%	74.83	14.26%
Total Timber+ NTFP Services	(₹ in crore)	899.87	0.24%	1754.66	0.18%	854.8	94.99%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services showed drastic increase of 208.02% from 2011-12 to 2021-22, and its value as % of SGDP has increased from 0.10% to 0.12%. In case of NFTP services, it had shown growth in absolute by 14.26%, while reduction in SGDP by 0.08%. This causes rise in the overall provisioning services, which improve by 94.99% in absolute terms, but reduced from 0.24% to 0.18% as % of SGDP. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	14777.79	2.63%	18247.16	1.97%	3469.37	23.48%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP fall from 2.63% in 2015-16 to 1.97% in 2021-22, while the absolute value registered an increase of 23.48%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	374.95	0.10%	316.41	0.06%	-58.53	-15.61%
Value of non-timber forest products (NTFP)	(₹ in crore)	524.92	0.14%	286.34	0.05%	-238.58	-45.45%
Total Timber+ NTFP Services	(₹ in crore)	899.87	0.24%	602.75	0.11%	-297.11	-33.017%

At constant prices, the timber provisioning services as % of SGDP has reported a decline from 0.10% in 2011-12 to 0.04% in 2021-22, and 15.61% reduction in absolute value as well. The NTFPs has registered a substantial reduction of 45.45% in their value, while in terms of % of SGDP it has reduced from 0.14% to 0.05%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.24% to 0.11%, and their absolute value decreased by 33.017%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	8930.42	1.98%	7471.68	1.31%	-1458.74	-16.33%

At constant prices, the carbon retention services in % of SGDP nominal decrease from 1.98% in 2015-16 to 1.31% in 2021-22, and the absolute value also showed the decrease of 16.33%.

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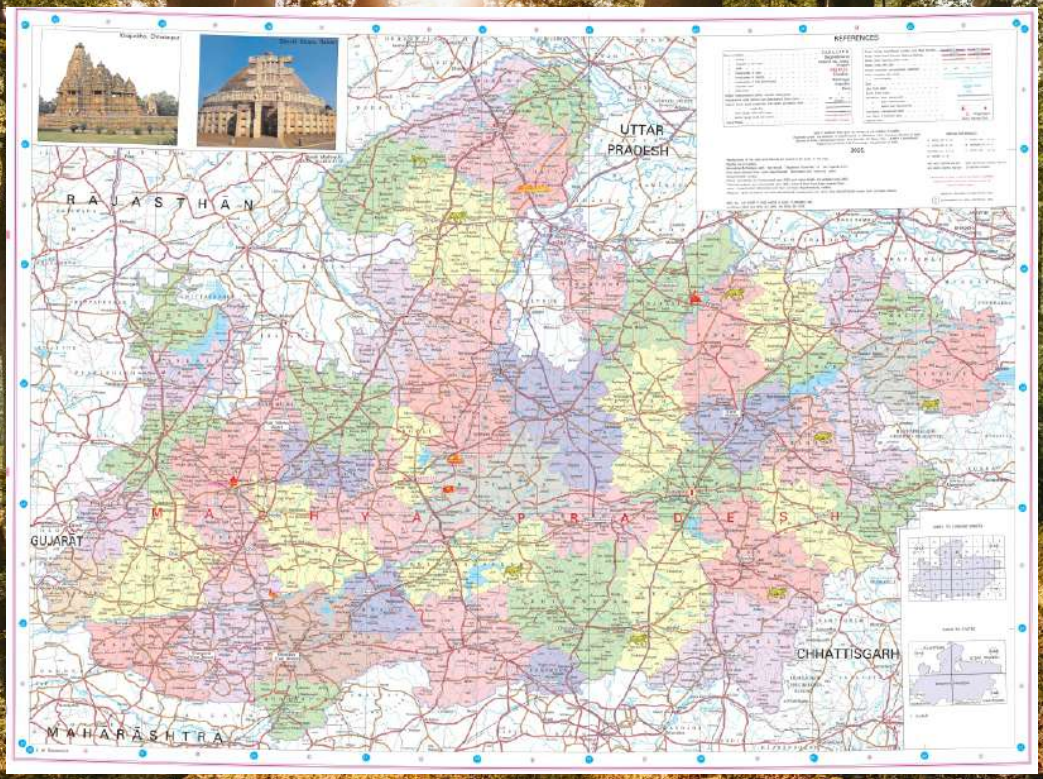
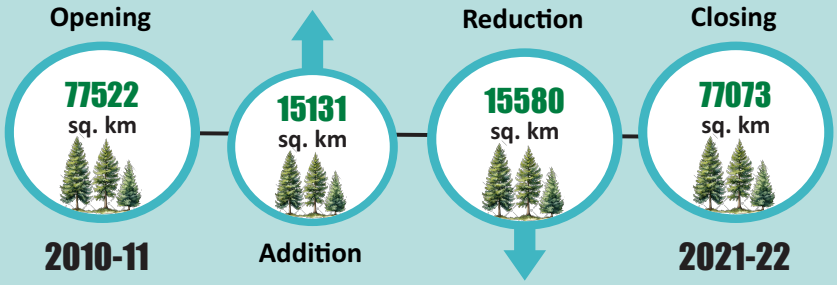


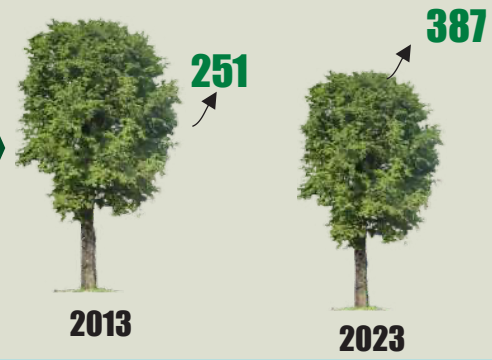
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
308252 Sq. Km	30.72%	30.72%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.73%
2021-22	0.27%

REGULATING SERVICES
Carbon Retention Service

2015-16	7.43%
2021-22	4.71%

5.14 Madhya Pradesh, located in central India, is the country's second-largest state by area, which is 9.38% of the geographical area of the country and is characterized by a varied topography that includes plateaus, hill ranges, river valleys, and fertile plains. According to the Champion & Seth Classification of Forest Types (1968), the state's forests are classified into 5 Type Groups, further subdivided into 21 distinct Forest Types. The dominant formations are tropical moist mixed and dry mixed deciduous forests in the eastern and southern regions, and dry teak forest in the central plateau. The drier western tracts are characterized by ravine thorn forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	308245	308252
Population (as per Census 2011)	**Million**	72.63	
Average Population Density	**Per sq. km**	236	
No. of Districts		45	52
No. of Hill Districts		0	
No. of Tribal Districts		18	24

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Madhya Pradesh changed from 308245 sq. km in 2013 to 308252 sq. km with a population of 72.63 million and an average population density of 236 persons per square kilometre, as per Census 2011 data. Change in area possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 45 to 52 and number of tribal districts from 18 to 24.

5.14.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	6632	34921	35969	6389	224334
Addition	1978.54	4596.09	8556.71	1053.77	8080.79
Reduction	1589.23	6008.45	7982.22	4318.57	4360.32
Closing 2021-22	7021.31	33508.64	36543.49	3124.2	228054.5
Net change	389.31	-1412.36	574.49	-3264.8	3720.47
% Change	5.87%	-4.04%	1.60%	-51.10%	1.66%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Madhya Pradesh's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 5.87%. Scrub areas reduced substantially, a net loss of 51.10%. For most forest cover class, it shows a positive trend, while MDF and Scrub experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.14.2 Extent Account

Indicator (area in sq. km)	2013- 2023
Recorded Forest Area (RFA)	94689
% of GA	30.72
Type of Protection	
Reserved Forests (RF)	61886
Protected Forest (PF)	31098
Unclassed Forests	1705

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remained at 94689 sq. km with 30.72% of the state's geographical area during observed period. During this period, all the three categories of forest based on type of protection remain unchanged. These trends reflect consistency in the categorization of forest areas.

5.14.3 Condition Accounts

The condition account for the forests of Madhya Pradesh for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	251.003	387.18	136.177	54.25
Growing Stock in Forest per unit area	m^3/ha	-	59.53		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	6,95,664	6,08,420	-87,244	-12.54
Above Ground Biomass	'000 tonnes	2,66,040	1,69,594	-96,446	-36.25
Below Ground Biomass	'000 tonnes	1,01,516	66,213	-35,303	-34.78
Dead Wood	'000 tonnes	1,654	5,047	3,393	205.14
Litter	'000 tonnes	7,741	8,354	613	7.92
Soil Organic Carbon	'000 tonnes	3,18,713	3,59,212	40,499	12.71

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	89.86	78.93	-10.93	-12.16
Above Ground Biomass	Per hectare stock in tonnes	34.37	22	-12.37	-35.99
Below Ground Biomass	Per hectare stock in tonnes	13.11	8.59	-4.52	-34.48
Dead Wood	Per hectare stock in tonnes	0.21	0.65	0.44	209.52
Litter	Per hectare stock in tonnes	1	1.08	0.08	8
Soil Organic Carbon	Per hectare stock in tonnes	41.17	46.61	5.44	13.21

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	1.53		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	96.53		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	8.92	4.06	-	
> 1.0 ≤ 10	%		4.21		
> 10 ≤ 100	%	9.15	7.62	-1.53	
> 100 ≤ 500	%	12.8	9.68	-3.12	
> 500 ≤ 1000	%	9.63	7.14	-2.49	
> 1000 ≤ 5000	%	17.12	32.21	15.09	
> 5000 ≤ 10000	%	42.38	35.08	-7.30	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	2723	3908	1185	43.52
SNPP-VIIRS Detections	Number of fire cases	22108	32728	10620	48.04

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0.14	1.42	1.28
Very highly fire prone	%	3.79	13.07	9.28
Highly fire prone	%	11.87	18.59	6.72
Moderately fire prone	%	19.36	18.1	-1.26
Less fire prone	%	64.84	48.82	-16.02

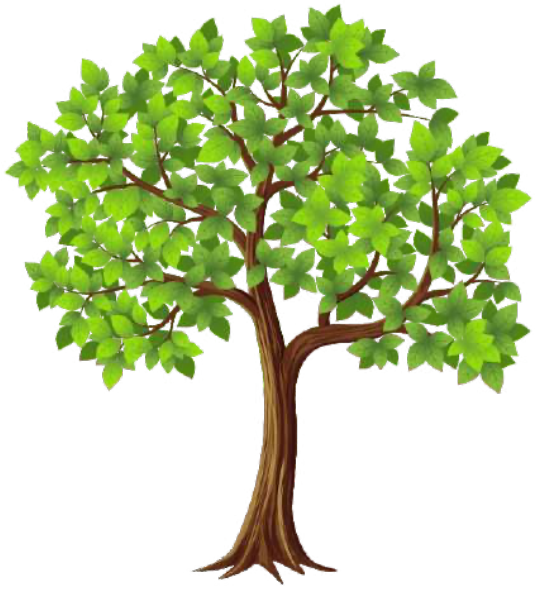
Wetlands within RFA	
Indicator	**2019**
Number	8540
Area (in ha)	162573
% of RFA	1.83

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	72	79	146
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	2.77	2.55	2.91
Tropical Dry Deciduous Forests	2.6	1.21	3.16
Tropical Thorn Forests	2.35	2.11	-
Subtropical Broadleaved Hill Forests	2.09	2.49	-
Littoral and Swamp Forests	-	-	0.94
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	15.96	12.81	18.36
Tropical Dry Deciduous Forests	13.46	3.35	23.57
Tropical Thorn Forests	10.49	8.25	-
Subtropical Broadleaved Hill Forests	8.08	12.06	-
Littoral and Swamp Forests	-	-	2.56

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicators	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	40.98
Inadequate	24.7
Absent	9.97
NA	24.35
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	14.63
Moderately degraded	21.69
Mildly degraded	51.37
Not degraded	6.08
NA	6.23
Invasive Species [Distribution of RFA (%)]	
Very Dense	4.55
Dense	14.54
Moderate	31.22
Scanty	17.82
Absent	14.4
NA	17.47



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.14.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1115.74	0.35%	1702.66	0.15%	586.92	52.60%
Value of non-timber forest products (NTFP)	(₹ in crore)	1201.23	0.38%	1351.73	0.12%	150.51	12.53%
Total Timber+ NTFP Services	(₹ in crore)	2316.97	0.73%	3054.39	0.27%	737.43	31.83%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 52.60% from 2011-12 to 2021-22, while its value as % of SGDP has decline from 0.35% to 0.15%. In case of NFTP services, it had shown growth in absolute by 12.53%, while reduction in SGDP by 0.26%. This causes rise in the overall provisioning services, which improve by 31.83% in absolute terms, but reduced from 0.73% to 0.27% as % of SGDP. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	40176.4	7.43%	51857.86	4.71%	11681.46	29.08%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP falls from 7.43% in 2015-16 to 4.71% in 2021-22, while the absolute value registered an increase of 29.08%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	1096288	-
Revenue from ecotourism	(₹ in lakh)	1844.8	-

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2011-12, tourist inflow for ecotourism reached 10.96 lakh visitors, generating a revenue of ₹18.44 crore. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1115.74	0.35%	1169.58	0.20%	53.84	4.83%
Value of non-timber forest products (NTFP)	(₹ in crore)	1201.23	0.38%	643.48	0.11%	-557.75	-46.43%
Total Timber+ NTFP Services	(₹ in crore)	2316.97	0.73%	1813.06	0.31%	-503.91	-21.75%

At constant price, the absolute monetary value of timber provisioning services has increased by 4.83% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.35% to 0.20%. In case of NFTP services, it had shown reduction in absolute by 46.43% and in SGDP by 0.27%. This causes fall in the overall provisioning services, which reduce by 21.75% in absolute terms and from 0.73% to 0.31% as % of SGDP. This pattern indicates that, despite moderate growth in absolute timber provisioning, the significant contraction in NTFP output has driven an overall decline in the absolute and relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	24279.15	5.80%	21234.28	3.58%	-3044.88	-12.54%

At constant prices, the carbon retention services in % of SGDP decreased from 5.80% in 2015-16 to 3.58% in 2021-22, and the absolute value also showed a decrease of 12.54%.

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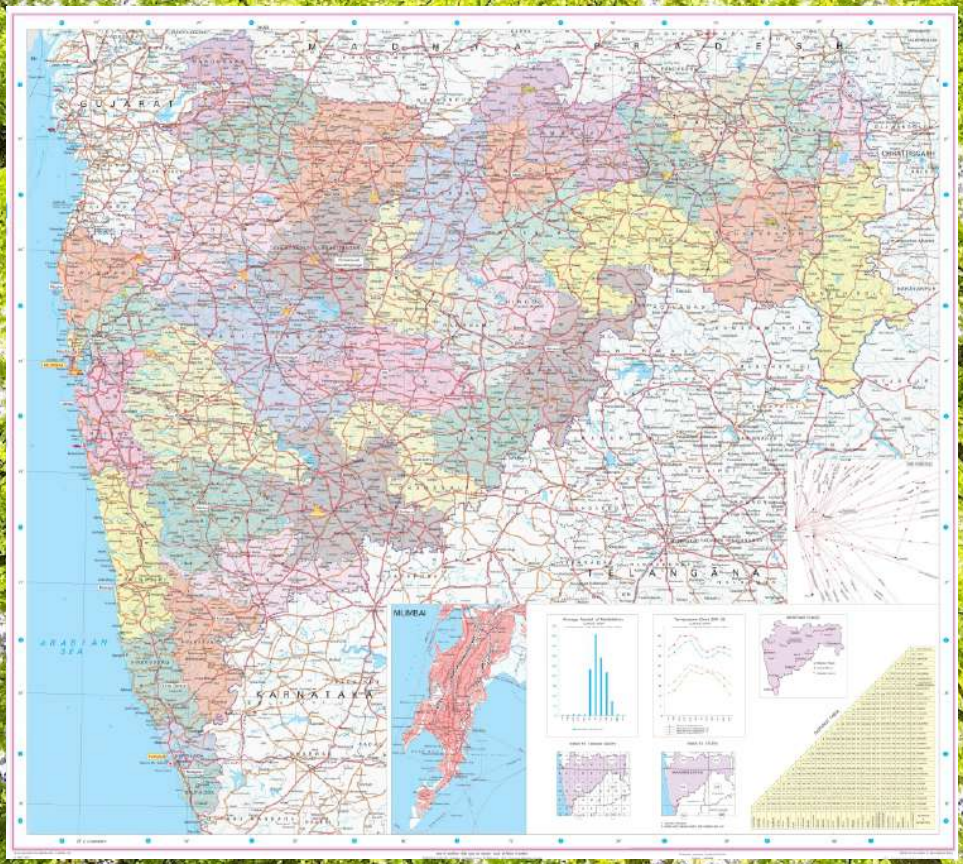
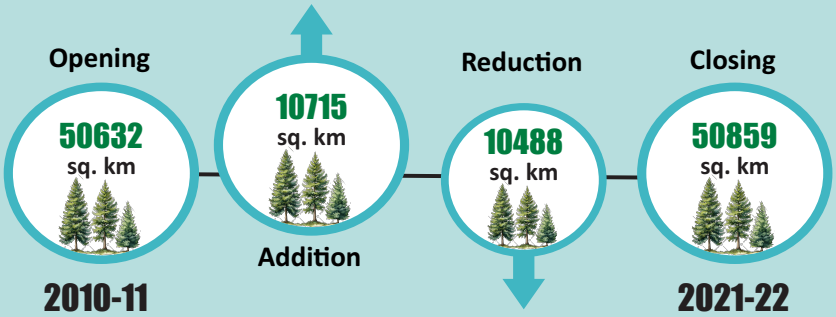


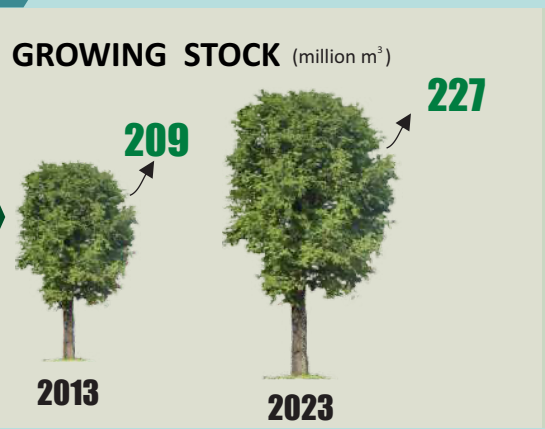
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
307713 Sq. Km	19.94%	20.13%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.29%
2021-22	0.20%

REGULATING SERVICES
Carbon Retention Service

2015-16	1.45%
2021-22	1.26%

5.15 Maharashtra, located in the western peninsular region of India, exhibits a diverse physiography ranging from the coastal Konkan plains and the Western Ghats to the Deccan Plateau and eastern forested uplands. According to the Champion & Seth Classification of Forest Types (1968), Maharashtra's forests are classified into 6 Type Groups, further subdivided into 17 distinct Forest Types. The high-rainfall zones along the Western Ghats are dominated by tropical hill forests and semi-evergreen forests, transitioning inland to moist mixed and dry mixed deciduous forests. The drier regions of the Deccan Plateau and Vidarbha are characterized by thorn forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	307713	
Population (as per Census 2011)	**Million**	112.37	
Average Population Density	**Per sq. km**	365	
No. of Districts		35	36
No. of Hill Districts		7	
No. of Tribal Districts		12	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Maharashtra is at 307713 square kilometres, with a population of 112.37 million and an average population density of 365 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent nominal changes: the number of districts increased from 35 to 36, out of which, 7 districts are hill districts and 12 are tribal districts.

5.15.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	8720	20770	21142	4157	252924
Addition	1657.57	4175.69	4881.75	1050.99	4946.45
Reduction	511.95	3367.9	6608.63	1562.32	4661.65
Closing 2021-22	9865.62	21577.79	19415.12	3645.67	253208.8
Net change	1145.62	807.79	-1726.88	-511.33	284.8
% Change	13.14%	3.89%	-8.17%	-12.30%	0.11%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Maharashtra's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 13.14%. Scrub areas reduce substantially, a net loss of 12.30%. For most forest cover class, it shows a positive trend, while open forest and scrub experienced some level of decrease during this period, with the most notable change in the VDF category.

5.15.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	61357	61952	595	0.97
% of GA	19.94	20.13	0.19	
Type of Protection				
Reserved Forests (RF)	51548	50865	-683	-1.32
Protected Forest (PF)	6727	6433	-294	-4.37
Unclassed Forests	3082	4654	1572	51.01

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 595 sq. km, marking a 0.97% rise and expanding from 19.94% to 20.13% of the state's geographical area during observed period. During this period, Reserved Forests reduced by 1.32%, and Protected Forests fall by 4.37%. The Unclassed Forest category saw a dramatic increase of 1,572 sq. km, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas, with increases in the unclassed forests.

5.15.3 Condition Accounts

The condition account for the forests of Maharashtra for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	208.495	227.07	18.575	8.91
Growing Stock in Forest per unit area	m^3/ha	-	55.04		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	4,93,021	4,64,682	-28,339	-5.75
Above Ground Biomass	'000 tonnes	1,42,651	1,43,901	1,250	0.88
Below Ground Biomass	'000 tonnes	48,947	44,265	-4,682	-9.57
Dead Wood	'000 tonnes	1,986	3,245	1,259	63.39
Litter	'000 tonnes	9,385	10,012	627	6.68
Soil Organic Carbon	'000 tonnes	2,90,052	2,63,259	-26,793	-9.24

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	97.28	91.36	-5.92	-6.09
Above Ground Biomass	Per hectare stock in tonnes	28.15	28.29	0.14	0.5
Below Ground Biomass	Per hectare stock in tonnes	9.66	8.7	-0.96	-9.94
Dead Wood	Per hectare stock in tonnes	0.39	0.64	0.25	64.1
Litter	Per hectare stock in tonnes	1.85	1.97	0.12	6.49
Soil Organic Carbon	Per hectare stock in tonnes	57.23	51.76	-5.47	-9.56

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.21		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.48		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	15.13	36.51	-	
> 1.0 ≤ 10	%		27.92		
> 10 ≤ 100	%	13.48	18.70	5.22	
> 100 ≤ 500	%	17.97	8.31	-9.66	
> 500 ≤ 1000	%	7.27	5.18	-2.09	
> 1000 ≤ 5000	%	13.19	3.38	-9.81	
> 5000 ≤ 10000	%	32.96	-	-	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	2516	2309	-207	-8.23
SNPP-VIIRS Detections	Number of fire cases	26939	22052	-4887	-18.14

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	3.4	2.77	-0.63
Very highly fire prone	%	4.01	12.57	8.56
Highly fire prone	%	15.6	19.07	3.47
Moderately fire prone	%	16.65	20.42	3.77
Less fire prone	%	60.34	45.17	-15.17

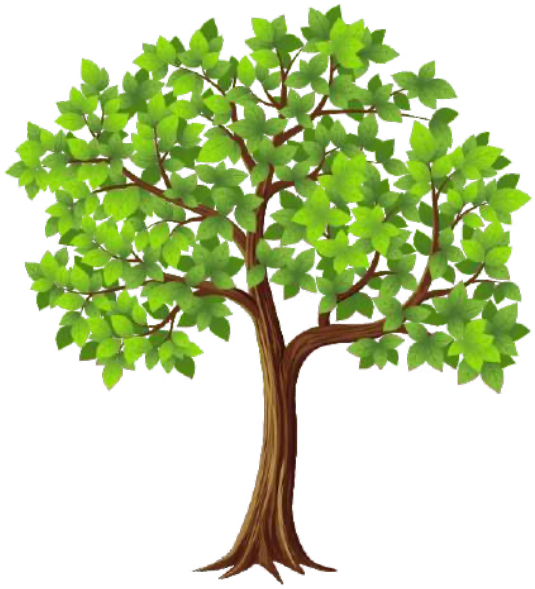
Wetlands within RFA	
Indicator	**2019**
Number	8821
Area (in ha)	116837
% of RFA	2.07

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	54	135	170
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	2.44	2.65	3.38
Tropical Moist Deciduous Forests	2.09	2.6	3.57
Tropical Dry Deciduous Forests	2.76	2.83	3.03
Tropical Thorn Forests	1.96	2.51	1.51
Subtropical Broadleaved Hill Forests	1.07	2.4	0.78
Littoral and Swamp Forests	-	0.77	0.56
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	11.47	14.15	29.37
Tropical Moist Deciduous Forests	8.08	13.46	35.52
Tropical Dry Deciduous Forests	15.8	16.95	20.7
Tropical Thorn Forests	7.7	12.3	4.53
Subtropical Broadleaved Hill Forests	2.92	11.2	2.18
Littoral and Swamp Forests	-	2.16	1.75

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	33.95
Inadequate	20.03
Absent	11.98
NA	34.04
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	8.21
Moderately degraded	23.09
Mildly degraded	51.84
Not degraded	10.23
NA	6.63
Invasive Species [Distribution of RFA (%)]	
Very Dense	3.07
Dense	12.4
Moderate	30.49
Scanty	19.48
Absent	14.63
NA	19.93



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.15.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1755.58	0.14%	4940.86	0.16%	3185.27	181.44%
Value of non-timber forest products (NTFP)	(₹ in crore)	1980.59	0.15%	1173.17	0.04%	-807.42	-40.77%
Total Timber+ NTFP Services	(₹ in crore)	3736.17	0.29%	6114.03	0.20%	2377.85	63.64%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services in % of SGDP increased from 0.14% in 2011-12 to 0.16% in 2021-22, while the monetary value of the services shows a drastic increase by 181.44%. In case of NFTP services, it had shown a noteworthy reduction in absolute by 40.77% and in SGDP by 0.11%. Collectively, the combined absolute timber and NTFP services increased by nearly 63.64%, and its value as % of SGDP has a nominal fall from 0.29% to 0.20%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	28473.24	1.45%	39606.55	1.26%	11133.31	39.1%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP fall from 1.45% in 2015-16 to 1.26% in 2021-22, while the absolute value registered an increase of 39.10%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	1956000
Revenue from ecotourism	(₹ in lakh)	-	2232.19

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2019-20, tourist inflow for ecotourism reached 19.56 lakh visitors, generating a revenue of ₹22.32 crore. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1755.58	0.14%	3089.53	0.15%	1333.95	75.98%
Value of non-timber forest products (NTFP)	(₹ in crore)	1980.59	0.15%	752.17	0.04%	-1228.42	-62.02%
Total Timber+ NTFP Services	(₹ in crore)	3736.17	0.29%	3841.7	0.19%	105.53	2.82%

At constant price, the timber provisioning services in % of SGDP increased from 0.14% in 2011-12 to 0.15% in 2021-22, and the monetary value of the services shows a increase by75.98%. In case of NFTP services, it had shown reduction in absolute by 62.02% and in SGDP by 0.11%. This causes reduction in the absolute increment of 2.82% in the overall provisioning services, while it reduces from 0.29% to 0.19% as % of SGDP. This pattern indicates that, despite moderate growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	17206.77	1.04%	16217.72	0.79%	-989.05	-5.75%

At constant prices, the carbon retention services in % of SGDP decreased from 1.04% in 2015-16 to 0.79% in 2021-22, and the absolute value also showed a decrease of 5.75%.

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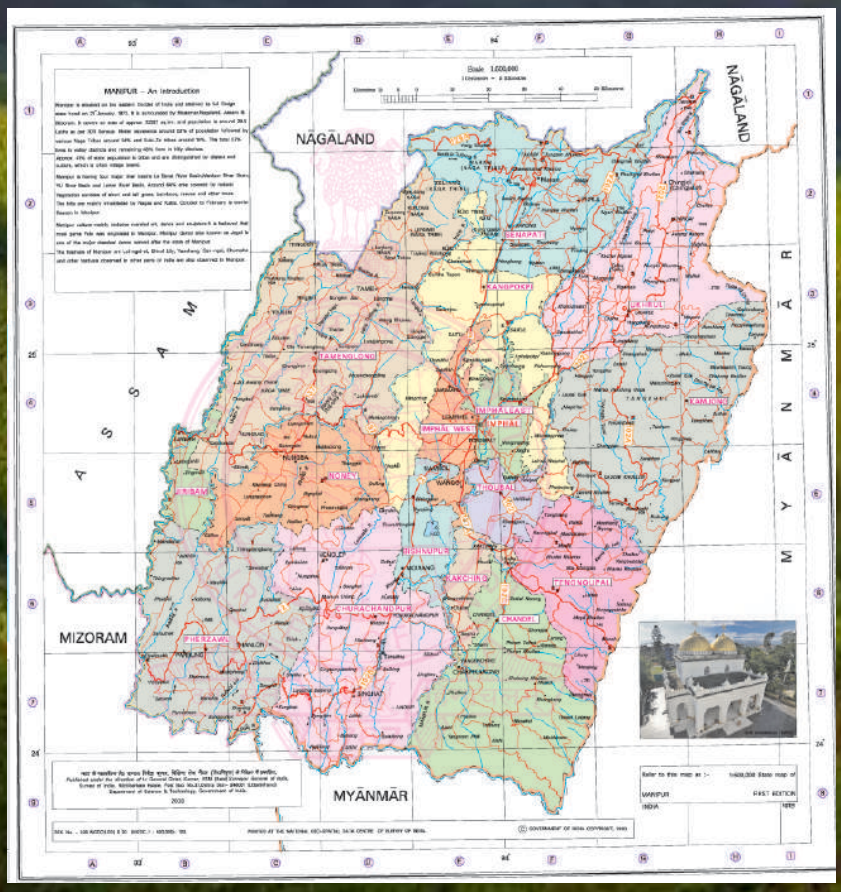
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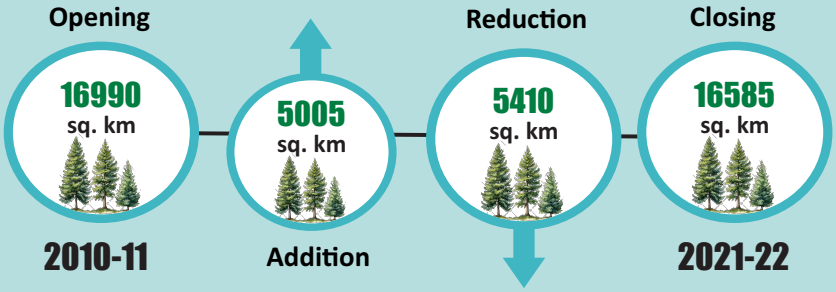
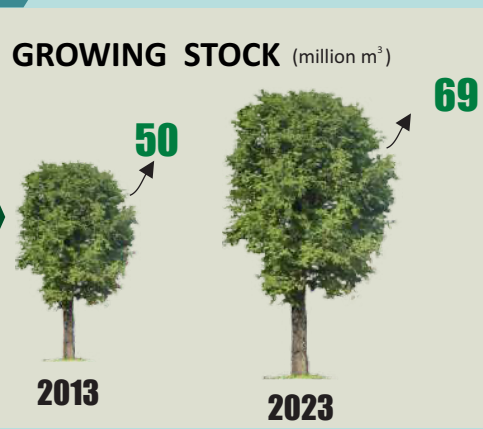
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
22327 Sq. Km	78.01%	78.01%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.81%
2021-22	0.14 %

REGULATING SERVICES
Carbon Retention Service

2015-16	42.31%
2021-22	42.81%

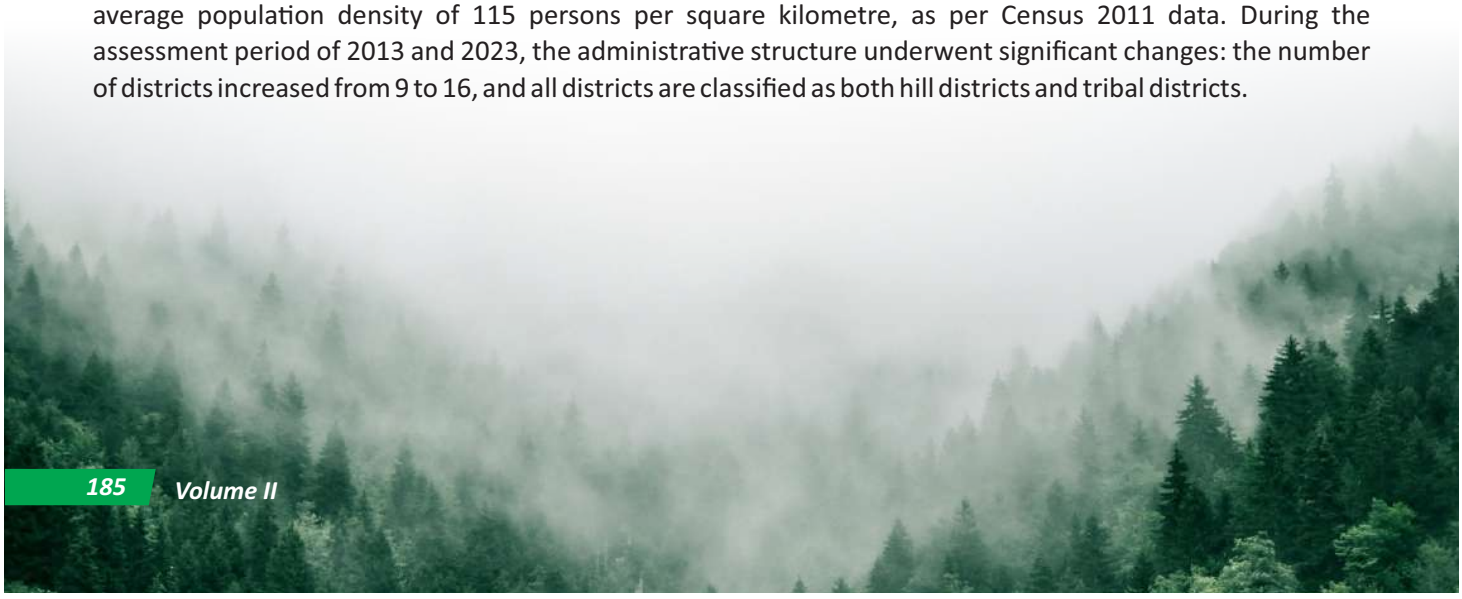
5.16 Manipur, located in the northeastern region of India, is a predominantly hilly state interspersed with fertile alluvial valleys, notably the central Imphal Valley. According to the Champion & Seth Classification of Forest Types (1968), the state's forests are classified into 5 Type Groups, further subdivided into 11 distinct Forest Types. The lower elevations are dominated by Sub-Tropical wet hill forest and semi-evergreen forests, while the mid-altitude belts support subtropical pine forests and moist mixed deciduous forests. Higher elevations are characterized by wet temperate forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	22327	
Population (as per Census 2011)	**Million**	2.86	
Average Population Density	**Per sq. km**	115	
No. of Districts		9	16
No. of Hill Districts		9	16
No. of Tribal Districts		9	16

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Chang

The geographical area of Manipur is at 22327 square kilometres, with a population of 2.86 million and an average population density of 115 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 and 2023, the administrative structure underwent significant changes: the number of districts increased from 9 to 16, and all districts are classified as both hill districts and tribal districts.



5.16.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	728	6094	10168	1	5336
Addition	247.04	1688.08	3069.86	2439.55	2795.26
Reduction	70.99	1564.53	3774	1466.9	3363.37
Closing 2021-22	904.05	6217.55	9463.86	973.65	4767.89
Net change	176.05	123.55	-704.14	972.65	-568.11
% Change	24.18%	2.03%	-6.93%	97265%	-10.65%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Manipur's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 24.18%. Scrub areas grew substantially, a net gain of 97265%. This is considerably due to shift from open forest by 510.10 sq. km and 1865.91 sq. km from non-forest in different assessment periods. For most forest cover class, it shows a positive trend, while open forest and non-forest experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.16.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	17418			
% of GA	78.01			
Type of Protection				
Reserved Forests (RF)	1467	1926	459	31.29
Protected Forest (PF)	4171	3254	-917	-21.99
Unclassed Forests	11780	12238	458	3.89

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remained at 17418 sq. km, covering 78.01% of the state's geographical area during observed period. During this period, Reserved Forests grew by 31.29%, and Protected Forests reduced by 21.99%. The Unclassed Forest category saw a marginal increase of 458 sq. km. These trends reflect a shift in the categorization of forest areas, with increases in the reserved and unclassed forests.

5.16.3 Condition Accounts

The condition account for the forests of Manipur for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	50.288	69.4	19.11	38.01
Growing Stock in Forest per unit area	m^3/ha	-	46.69		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,43,091	1,75,925	32,834	22.95
Above Ground Biomass	'000 tonnes	27,253	47,529	20,276	74.4
Below Ground Biomass	'000 tonnes	8,821	14,175	5,354	60.7
Dead Wood	'000 tonnes	530	679	149	28.11
Litter	'000 tonnes	3,909	2,505	-1,404	-35.92
Soil Organic Carbon	'000 tonnes	1,02,578	1,11,037	8,459	8.25

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	82.49	106.08	23.59	28.6
Above Ground Biomass	Per hectare stock in tonnes	15.71	28.66	12.95	82.43
Below Ground Biomass	Per hectare stock in tonnes	5.09	8.55	3.46	67.98
Dead Wood	Per hectare stock in tonnes	0.31	0.41	0.1	32.26
Litter	Per hectare stock in tonnes	2.25	1.51	-0.74	-32.89
Soil Organic Carbon	Per hectare stock in tonnes	59.14	66.95	7.81	13.21

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	5.00		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	96.97		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	3.54	1.53	-	
> 1.0 ≤ 10	%		1.47		
> 10 ≤ 100	%	0.62	0.95	0.33	
> 100 ≤ 500	%	1.09	0.00	-1.09	
> 500 ≤ 1000	%	4.86	0.00	-4.86	
> 1000 ≤ 5000	%	0	0.00	0.00	
> 5000 ≤ 10000	%	0	0.00	0.00	
>10000	%	89.89	96.05	6.16	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	1752	1638	-114	-6.51
SNPP-VIIRS Detections	Number of fire cases	7384	5544	-1840	-24.92

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	4.48	0.22	-4.26
Very highly fire prone	%	33.13	15.87	-17.26
Highly fire prone	%	35.85	38.72	2.87
Moderately fire prone	%	15.36	28.57	13.21
Less fire prone	%	11.18	16.62	5.44

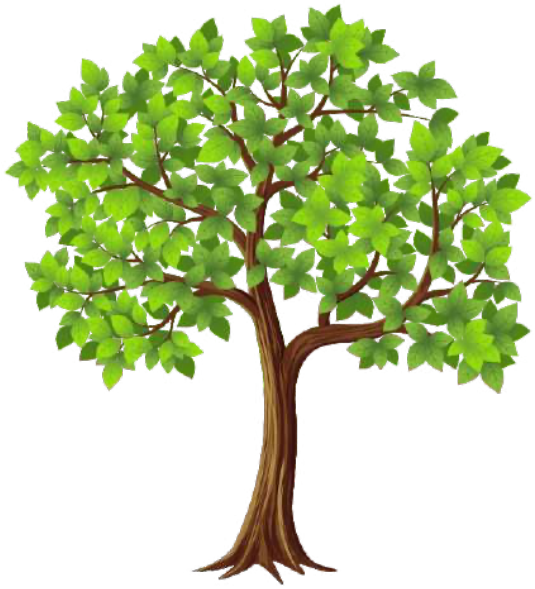
Wetlands within RFA	
Indicator	**2019**
Number	206
Area (in ha)	12424
% of RFA	0.71

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	56	89	43
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	2.02	1.56	2.49
Tropical Moist Deciduous Forests	1.15	2.47	2.25
Subtropical Broadleaved Hill Forests	2.88	3.71	2.26
Subtropical Pine Forests	1.58	2.45	1.12
Montane Wet Temperate Forests	1.75	2.67	1.48
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	7.54	4.76	12.06
Tropical Moist Deciduous Forests	3.16	11.82	9.49
Subtropical Broadleaved Hill Forests	17.81	40.85	9.58
Subtropical Pine Forests	4.85	11.59	3.06
Montane Wet Temperate Forests	5.75	14.44	4.39

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	37.91
Inadequate	40.84
Absent	8.74
NA	12.51
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	0
Moderately degraded	17.81
Mildly degraded	64.98
Not degraded	13.63
NA	3.58
Invasive Species [Distribution of RFA (%)]	
Very Dense	0
Dense	6.83
Moderate	39.67
Scanty	17.79
Absent	28.76
NA	6.95



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.16.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	78.45	0.61%	36.74	0.10%	-41.7	-53.16%
Value of non-timber forest products (NTFP)	(₹ in crore)	25.22	0.20%	14.66	0.04%	-10.56	-41.87%
Total Timber+ NTFP Services	(₹ in crore)	103.67	0.81%	51.4	0.14%	-52.26	-50.41%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP has reported a decline from 0.61% in 2011-12 to 0.10% in 2021-22, and 53.16% reduction in absolute value as well. The NTFPs has registered a significant reduction of 41.87% in their value, while in terms of % of SGDP it has a reduction from 0.20% to 0.04%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.81% to 0.14%, and their absolute value decreased by 50.41%. This trend reflects a pronounced contraction in both the absolute and relative economic contribution of forest provisioning services, underscoring their diminishing role in the state's overall economic structure.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	8263.88	42.31%	14994.73	42.81%	6730.86	81.45%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP rise from 42.31% in 2015-16 to 42.81% in 2021-22, while the absolute value registered an increase of 81.45%. This reflects an increase in the relative economic contribution of carbon retention services, with the significant growth in their absolute value during the period.

2) Ecosystem services (at constant prices)

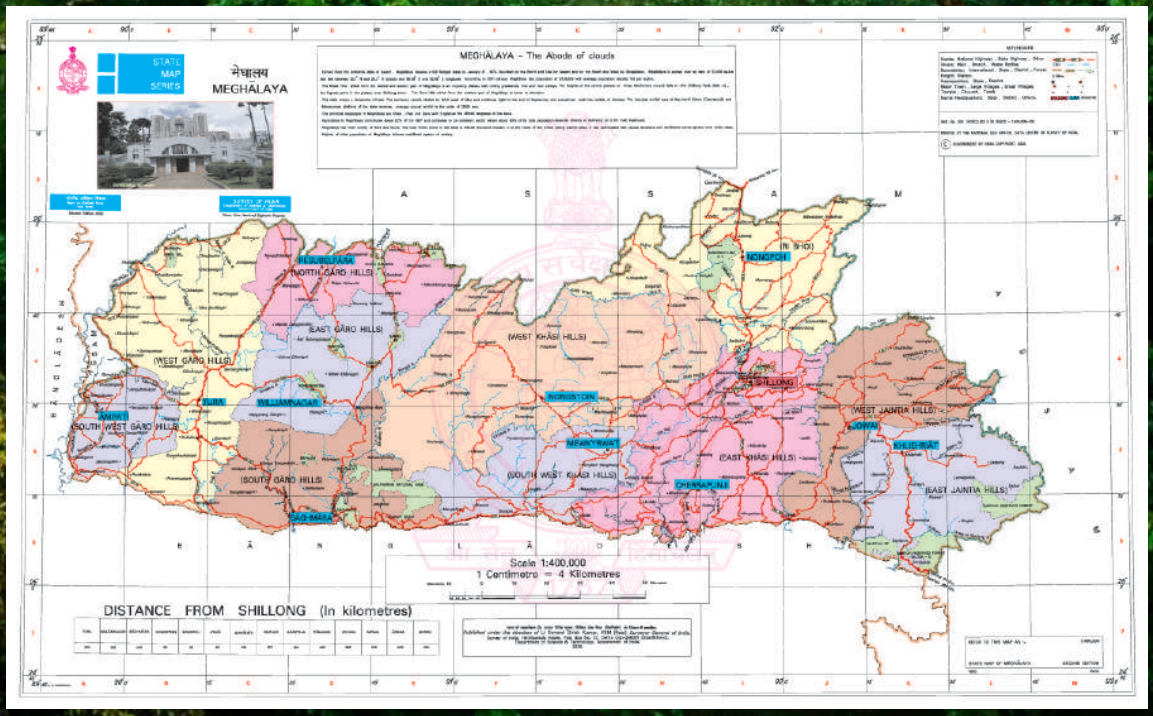
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	78.45	0.61%	38.18	0.19%	-40.27	-51.33%
Value of non-timber forest products (NTFP)	(₹ in crore)	25.22	0.20%	11.94	0.06%	-13.28	-52.65%
Total Timber+ NTFP Services	(₹ in crore)	103.67	0.81%	50.12	0.25%	-53.55	-51.65%

At constant prices, the timber provisioning services as % of SGDP has reported a significant decline from 0.61% in 2011-12 to 0.19% in 2021-22, and 51.33% reduction in absolute value as well. The NTFPs has registered a significant reduction of 52.65% in their value, while in terms of % of SGDP it has a reduction from 0.20% to 0.06%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.81% to 0.25%, and their absolute value decreased by 51.65%. This indicates a substantial contraction in both the absolute and relative economic contribution of forest provisioning services over the period.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	4993.97	30.41%	6139.9	30.73%	1145.93	22.95%

At constant prices, the carbon retention services in % of SGDP increased from 30.41% in 2015-16 to 30.73% in 2021-22, and the absolute value showed an increase of 22.95%. This highlights a marginal increase in the relative economic contribution of carbon retention services during the period, with a growth in their absolute value.

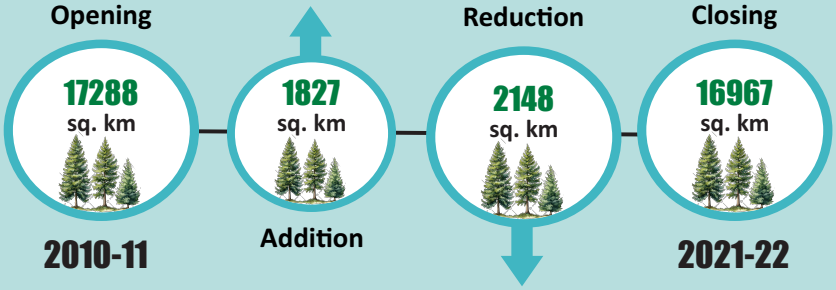
MEGHALAYA


MEGHALAYA – The Abode of clouds
STATE MAP SERIES
मेघालय
MEGHALAYA
RESUBELPARA
NORTH GARO HILLS
EAST GARO HILLS
(WEST GARO HILLS)
(WEST KHASI HILLS)
NONGPOH
SHILLONG
WILLIAMNAGAR
NONGSTOIN
MAWKYRWAT
(EAST KHASI HILLS)
(SOUTH WEST KHASI HILLS)
(WEST JAINTIA HILLS)
JOWAI
KHLIEHRIAT
(EAST JAINTIA HILLS)
CHERRAPUNJI
(SOUTH GARO HILLS)
GAD-MARA
Scale 1:400,000
1 Centimetre = 4 Kilometres
DISTANCE FROM SHILLONG (In kilometres)

FOREST EXTENT ACCOUNT

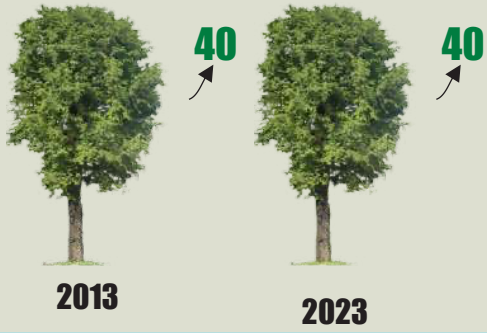
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
22429 Sq. Km	42.34%	42.39%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m³)



CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

REGULATING SERVICES
Carbon Retention Service

5.17 Meghalaya, located in the northeastern region of India, is characterized by its rugged plateau topography, deep gorges, and high rainfall, particularly in areas such as Mawsynram and Cherrapunji, which are among the wettest places on Earth. Unlike other States, forests in Meghalaya are largely under the community and private ownership. Only certain area of forests, in Reserved Forests, Protected Forests, National Parks and Sanctuaries are under the direct control of the State Forest Department. Community and private forests are under the administrative control of the three Autonomies District Councils viz Khasi Hills, Jaintia Hills and Garo Hills. The low and mid-elevation zones are dominated by tropical evergreen and semi-evergreen forests, while montane slopes support moist mixed deciduous and sub-tropical pine forests.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	22429	
Population (as per Census 2011)	**Million**	2.96	
Average Population Density	**Per sq. km**	132	
No. of Districts		7	12
No. of Hill Districts		7	12
No. of Tribal Districts		7	12

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Meghalaya is at 22429 square kilometres, with a population of 2.96 million and an average population density of 132 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 7 to 12, all classified as hill and tribal districts.

5.17.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	449	9689	7150	372	4769
Addition	200.75	347.35	1278.94	786.87	1421.68
Reduction	54.91	1012.54	1080.75	538.46	1348.93
Closing 2021-22	594.84	9023.81	7348.19	620.41	4841.75
Net change	145.84	-665.19	198.19	248.41	72.75
% Change	32.48%	-6.87%	2.77%	66.78%	1.53%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Meghalaya's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 32.48%. Scrub areas grew substantially, a net gain of 66.78%. For most forest cover class, it shows a positive trend, while MDF experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.17.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	9496	9508	12	0.13
% of GA	42.34	42.39	0.05	
Type of Protection				
Reserved Forests (RF)	1113	1125	12	1.08
Protected Forest (PF)	12			
Unclassed Forests	8371			

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 12 sq. km, marking a 0.13% rise and expanding marginally from 42.34% to 42.39% of the state's geographical area during observed period. During this period, Reserved Forests grew by 1.08%, and Protected and Unclassed Forests remained unchanged. These trends reflect consistency in the categorization of forest areas, with increases in the reserved forests.

5.17.3 Condition Accounts

The condition account for the forests of Meghalaya for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	39.882	40.04	0.158	0.4
Growing Stock in Forest per unit area	m^3/ha	-	48.74		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,55,840	1,83,230	27,390	17.58
Above Ground Biomass	'000 tonnes	25,168	55,437	30,269	120.27
Below Ground Biomass	'000 tonnes	6,835	15,853	9,018	131.94
Dead Wood	'000 tonnes	881	1,096	215	24.4
Litter	'000 tonnes	5,184	3,313	-1,871	-36.09
Soil Organic Carbon	'000 tonnes	1,17,772	1,07,531	-10,241	-8.7

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	90.89	107.99	17.1	18.81
Above Ground Biomass	Per hectare stock in tonnes	14.68	32.67	17.99	122.55
Below Ground Biomass	Per hectare stock in tonnes	3.99	9.34	5.35	134.09
Dead Wood	Per hectare stock in tonnes	0.51	0.65	0.14	27.45
Litter	Per hectare stock in tonnes	3.02	1.95	-1.07	-35.43
Soil Organic Carbon	Per hectare stock in tonnes	68.69	63.38	-5.31	-7.73

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	2.46		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.62		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	3.44	2.32	-	
> 1.0 ≤ 10	%		1.30		
> 10 ≤ 100	%	0.57	0.79	0.22	
> 100 ≤ 500	%	0	0.00	0.00	
> 500 ≤ 1000	%	0	0.00	0.00	
> 1000 ≤ 5000	%	7.45	7.09	-0.36	
> 5000 ≤ 10000	%	0	0.00	0.00	
>10000	%	88.54	88.50	-0.04	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	1545	1431	-114	-7.38
SNPP-VIIRS Detections	Number of fire cases	5797	6322	525	9.06

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	5.74	3.63	-2.11
Very highly fire prone	%	18.38	14.31	-4.07
Highly fire prone	%	20.13	22.82	2.69
Moderately fire prone	%	17.77	21.34	3.57
Less fire prone	%	37.98	37.9	-0.08

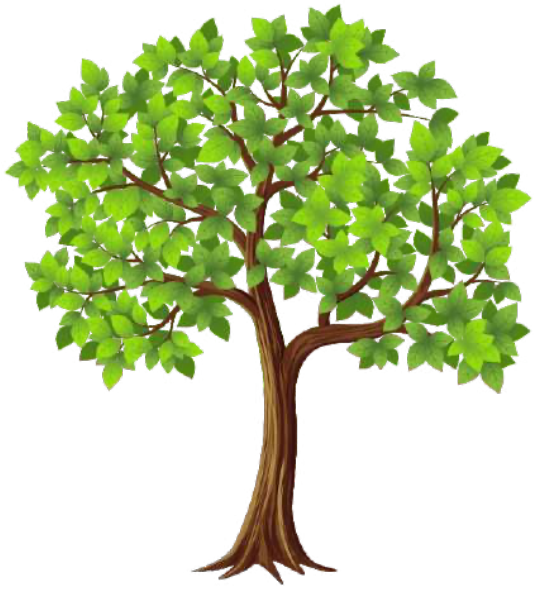
Wetlands within RFA	
Indicator	**2019**
Number	244
Area (in ha)	21470
% of RFA	1.22

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	42	176	93
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.17	3.54	2.79
Tropical Semi-Evergreen Forests	0.59	3.1	1.95
Tropical Moist Deciduous Forests	1.19	3.94	3.06
Subtropical Broadleaved Hill Forests	1.86	3.66	1.76
Subtropical Pine Forests	2.59	2.36	2.01
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	8.76	34.47	16.28
Tropical Semi-Evergreen Forests	1.8	22.2	7.03
Tropical Moist Deciduous Forests	3.29	51.42	21.33
Subtropical Broadleaved Hill Forests	6.42	38.86	5.81
Subtropical Pine Forests	13.33	10.59	7.46

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	26.3
Inadequate	41.33
Absent	7.95
NA	24.42
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	4.87
Moderately degraded	21.79
Mildly degraded	55.62
Not degraded	7.32
NA	10.4
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.96
Dense	7.02
Moderate	32.17
Scanty	22.87
Absent	19.77
NA	16.21



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.17.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	93.36	0.47%	191.08	0.48%	97.72	104.67%
Value of non-timber forest products (NTFP)	(₹ in crore)	44.5	0.22%	39.09	0.10%	-5.41	-12.17%
Total Timber+ NTFP Services	(₹ in crore)	137.86	0.69%	230.17	0.58%	92.31	66.96%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services in % of SGDP increased from 0.47% in 2011-12 to 0.48% in 2021-22, while the monetary value of the services shows a drastic increase by 104.67%. The non-timber forest provisioning service showed slight decrease in value by 12.17%, while its value as a % of SGDP decreased from 0.22% to 0.10%. Collectively, the combined timber and NTFP services as % of SGDP fall marginally from 0.69% to 0.58%, while their overall absolute value increased by nearly 66.96%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	9000.16	35.83%	15617.36	38.83%	6617.2	73.52%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP rise from 35.83% in 2015-16 to 38.83% in 2021-22, while the absolute value registered an increase of 73.52%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their absolute value during the period.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	1360
Revenue from ecotourism	(₹ in lakh)	-	3.43

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change

In 2019-20, tourist inflow for ecotourism was 1360 visitors, generating a revenue of ₹3.43 lakh. These figures indicate a potential for engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

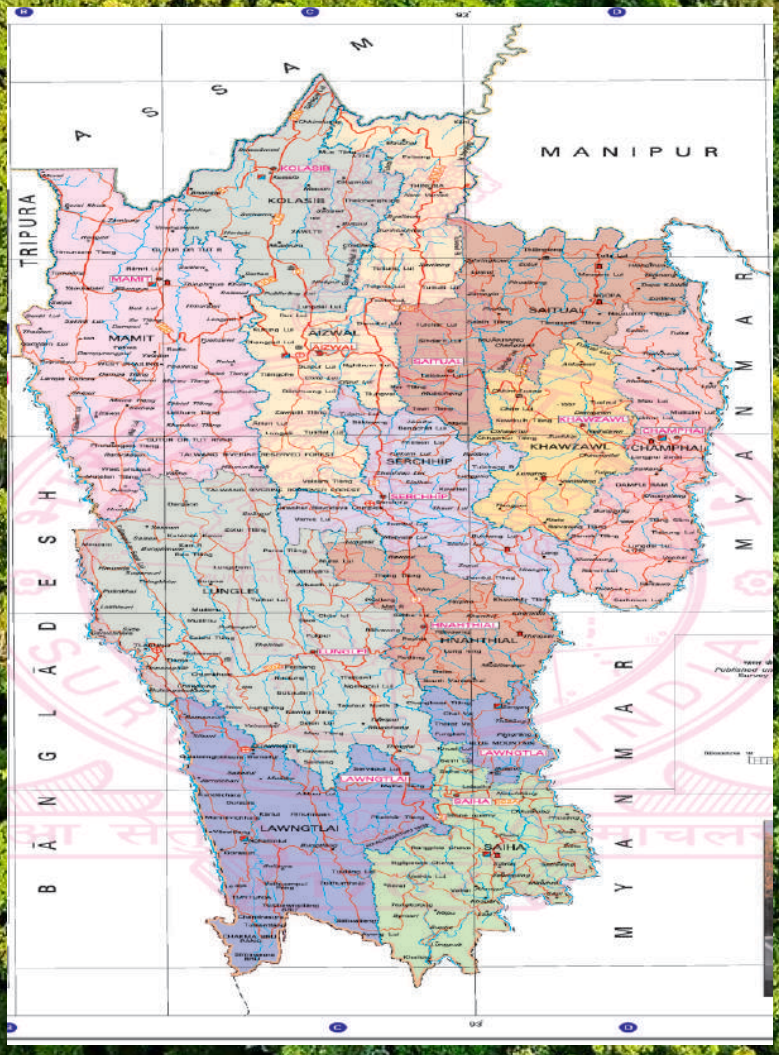
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	93.36	0.47%	92.58	0.37%	-0.78	-0.83%
Value of non-timber forest products (NTFP)	(₹ in crore)	44.5	0.22%	25.56	0.10%	-18.94	-42.56%
Total Timber+ NTFP Services	(₹ in crore)	137.86	0.69%	118.14	0.47%	-19.72	-14.30%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 0.47% in 2011-12 to 0.37% in 2021-22, and 0.83% reduction in absolute value as well. The NTFPs has registered a significant reduction of 42.56% in their absolute value, while in terms of % of SGDP it has a reduction from 0.22% to 0.10%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.69% to 0.47%, and their absolute value decreased by 14.30%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	5438.92	26.35%	6394.85	25.71%	955.93	17.58%

At constant prices, the carbon retention services in % of SGDP decreased from 26.35% in 2015-16 to 25.71% in 2021-22, while the absolute value showed an increase of 17.58%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

MIZORAM


ASSAM
MANIPUR
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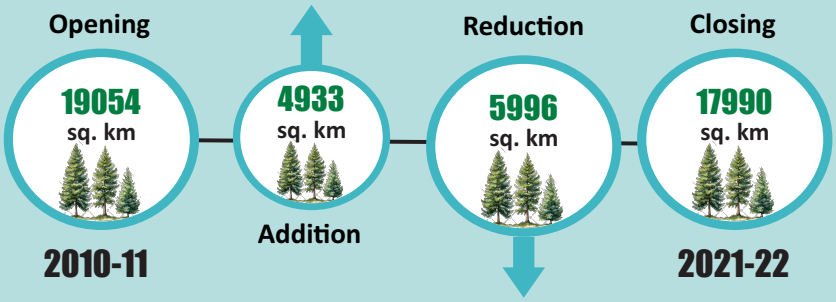
SAITUAL
KHAWZAWL
CHAMPHAI
SERCHHIP
LUNGLEI
HNAHTHIAL
LAWNGTLAI
SAIHA

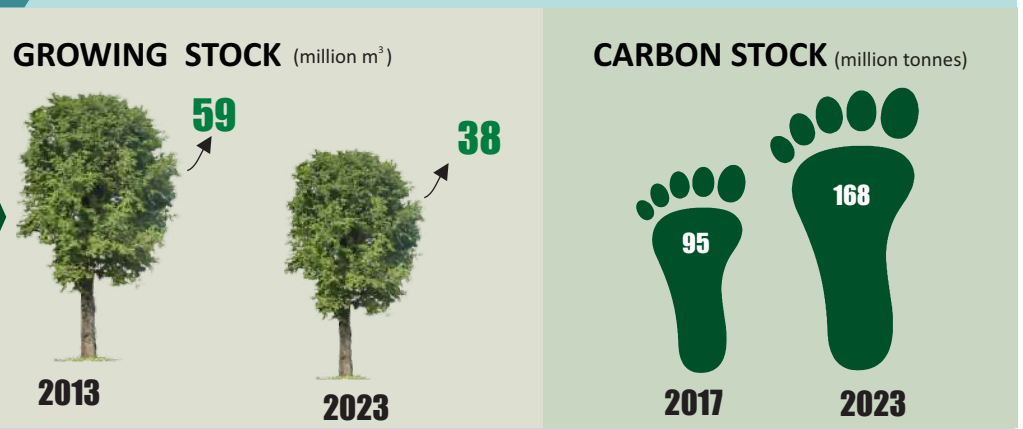
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
21081 Sq. Km	79.3%	35.48%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	1.31%	2015-16	36.26%
2021-22	1.62 %	2021-22	53.79%

5.18 Mizoram, located in the north-eastern region of India, is a predominantly hilly state. The state's rugged terrain, marked by steep hill ranges and interspersed valleys, experiences a moist tropical to subtropical climate with high annual rainfall, fostering luxuriant vegetation and exceptional biological diversity. According to the Champion & Seth Classification of Forest Types (1968), the state's forests are classified into 4 Type Groups, further subdivided into 6 distinct Forest Types. The dominant formations are tropical semi-evergreen forests, interspersed with moist mixed deciduous forests in lower altitudes, and subtropical wet hill forests and patches of subtropical pine forests occur at mid-elevations.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	21081	
Population (as per Census 2011)	**Million**	1.09	
Average Population Density	**Per sq. km**	52	
No. of Districts		8	11
No. of Hill Districts		8	11
No. of Tribal Districts		8	11

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Mizoram is at 21081 square kilometres, with a population of 1.09 million and an average population density of 52 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 8 to 11, all classified as hill and tribal districts.

5.18.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	138	5900	13016	0	2027
Addition	132.54	3444.27	1356.06	314.54	2550.97
Reduction	9.02	708.51	5278.88	0	1801.97
Closing 2021-22	261.52	8635.76	9093.18	314.54	2776
Net change	123.52	2735.76	-3922.82	314.54	749
% Change	89.51%	46.37%	-30.14%	-	36.95%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Mizoram's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 89.51%. Scrub areas grew substantially, a gain of 314.54 sq. km. For most forest cover class, it shows a positive trend, while open forest experienced some level of decrease during this period, with the most notable change in the VDF category.

5.18.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	16717	7479	-9238	-55.26
% of GA	79.3	35.48	-43.82	
Type of Protection				
Reserved Forests (RF)	7909	4499	-3410	-43.12
Protected Forest (PF)	3568	1823	-1745	-48.91
Unclassed Forests	5240	1157	-4083	-77.92

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) decreased by 9238 sq. km, marking a 55.26% reduction and falling from 79.30% to 35.48% of the state's geographical area during observed period. During this period, Reserved Forests reduced by 43.12%, and Protected Forests also reduced by 48.91%. The Unclassed Forest category saw a dramatic decrease of 4083 sq. km, reflecting a significant reclassification. These trends reflect a shift in the categorization of forest areas, with decreases in the all the three categories of forests.

5.18.3 Condition Accounts

The condition account for the forests of Mizoram for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	59.359	37.67	-21.689	-36.54
Growing Stock in Forest per unit area	m^3/ha	-	59.34		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	95,041	1,68,477	73,436	77.27
Above Ground Biomass	'000 tonnes	15,359	55,376	40,017	260.54
Below Ground Biomass	'000 tonnes	3,173	12,212	9,039	284.87
Dead Wood	'000 tonnes	633	736	103	16.27
Litter	'000 tonnes	2,652	3,430	778	29.34
Soil Organic Carbon	'000 tonnes	73,224	96,723	23,499	32.09

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	52.26	93.65	41.39	79.2
Above Ground Biomass	Per hectare stock in tonnes	8.45	30.78	22.33	264.26
Below Ground Biomass	Per hectare stock in tonnes	1.74	6.79	5.05	290.23
Dead Wood	Per hectare stock in tonnes	0.35	0.41	0.06	17.14
Litter	Per hectare stock in tonnes	1.46	1.91	0.45	30.82
Soil Organic Carbon	Per hectare stock in tonnes	40.26	53.76	13.5	33.53

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	14.64		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.63		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	0.44	0.44	-	
> 1.0 ≤ 10	%		0.15		
> 10 ≤ 100	%	0	0	0.00	
> 100 ≤ 500	%	0	0	0.00	
> 500 ≤ 1000	%	0	0	0.00	
> 1000 ≤ 5000	%	0	0	0.00	
> 5000 ≤ 10000	%	0	0	0.00	
>10000	%	99.56	99.41	-0.15	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	2795	2105	-690	-24.69
SNPP-VIIRS Detections	Number of fire cases	7597	8734	1137	14.97

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	29.91	2.59	-27.32
Very highly fire prone	%	38.46	14.19	-24.27
Highly fire prone	%	24.64	34.16	9.52
Moderately fire prone	%	5.35	28.21	22.86
Less fire prone	%	1.64	20.85	19.21

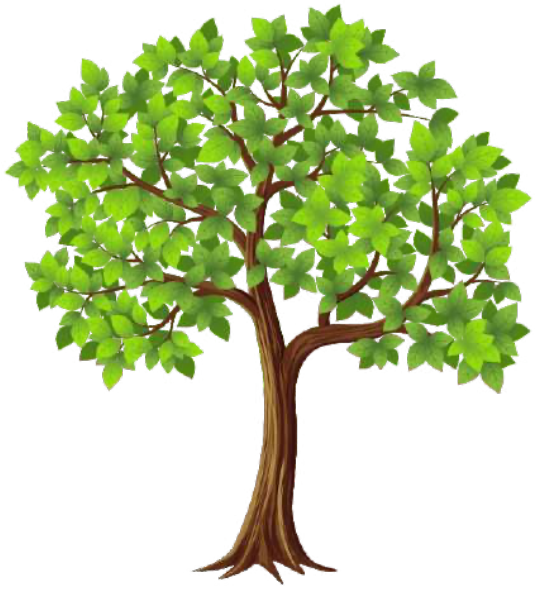
Wetlands within RFA	
Indicator	**2019**
Number	206
Area (in ha)	12456
% of RFA	0.6

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	56	96	87
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	3.15	3.37	3.08
Tropical Moist Deciduous Forests	3.26	3.38	2.78
Subtropical Pine Forests	2.19	2.45	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	23.34	29.08	21.76
Tropical Moist Deciduous Forests	26.05	29.37	16.12
Subtropical Pine Forests	8.94	11.59	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	22.49
Inadequate	33.64
Absent	6.82
NA	37.05
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	0.6
Moderately degraded	7.42
Mildly degraded	58.45
Not degraded	22.43
NA	11.1
Invasive Species [Distribution of RFA (%)]	
Very Dense	4.02
Dense	6.4
Moderate	18.49
Scanty	20.39
Absent	31.53
NA	19.17



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.18.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	69.47	0.96%	381.67	1.43%	312.2	449.41%
Value of non-timber forest products (NTFP)	(₹ in crore)	25.33	0.35%	51.88	0.19%	26.55	104.79%
Total Timber+ NTFP Services	(₹ in crore)	94.8	1.31%	433.55	1.62%	338.75	357.33%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP increased from 0.96% in 2011-12 to 1.43% in 2021-22, and the monetary value of the services drastic increase by 449.41%. The non-timber forest provisioning service showed a increase in value by 104.79%, while its value as a % of SGDP declined from 0.35% to 0.19%. Collectively, the combined timber and NTFP services in SGDP rise from 1.31% to 1.62%, as their overall value increased by nearly 357.33%. This trend indicates strong overall growth in both absolute and relative terms, a notable strengthening of the total economic value of forest provisioning services over the decade, accompanied by a gradual shift in composition toward a greater dominance of timber.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	5488.86	36.26%	14359.91	53.79%	8871.05	161.62%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP rise from 36.26% in 2015-16 to 53.79% in 2021-22, as the absolute value registered an increase of 161.62%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their absolute value during the period.

2) Ecosystem services (at constant prices)

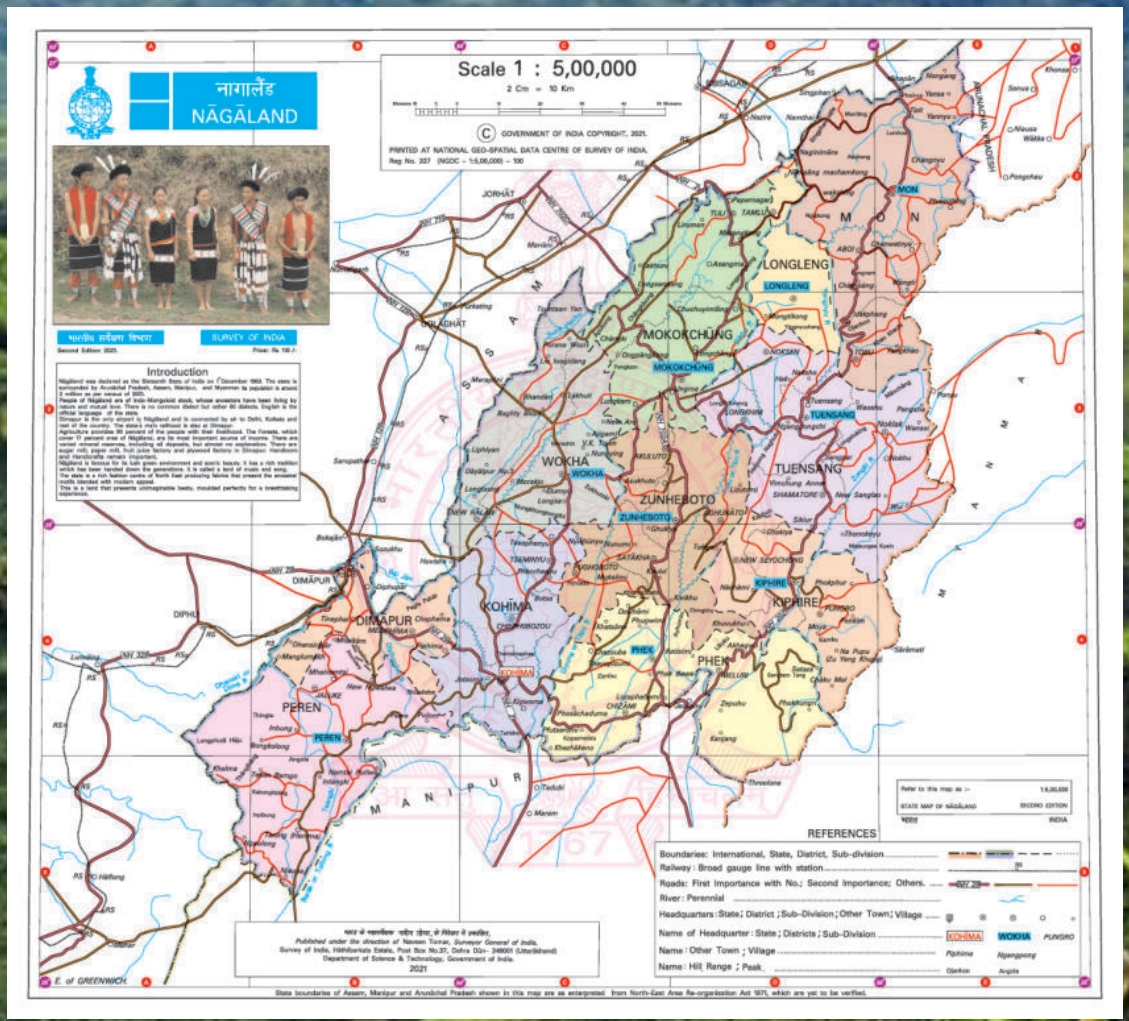
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	69.47	0.96%	194.04	1.10%	124.57	179.32%
Value of non-timber forest products (NTFP)	(₹ in crore)	25.33	0.35%	15.41	0.09%	-9.93	-39.19%
Total Timber+ NTFP Services	(₹ in crore)	94.8	1.31%	209.45	1.19%	114.64	120.93%

At constant prices, the timber provisioning services as % of SGDP increased from 0.96% in 2011-12 to 1.10% in 2021-22, and its absolute value also increased dramatically by 179.32%. The share of non-timber forest resources dropped from 0.35% to 0.09%, with a 39.19% reduction in absolute monetary value. Collectively, the combined timber and NTFP services in % of SGDP fell from 1.31% to 1.19%, while their total absolute value increased by 120.93%. This pattern reflects strong absolute growth in overall provisioning services, primarily driven by timber, alongside a marked contraction in the relative contribution of NTFPs.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	3317	26.91%	5879.96	33.29%	2562.97	77.27%

At constant prices, the carbon retention services in % of SGDP increased from 26.91% in 2015-16 to 33.29% in 2021-22, while the absolute value showed an increase of 77.27%. This highlights a substantial increase in the relative economic contribution of carbon retention services during the period, with a significant growth in their total value.

NAGALAND


नागालैंड
NĀGĀLAND
Scale 1 : 5,00,000
2 Cm = 10 Km
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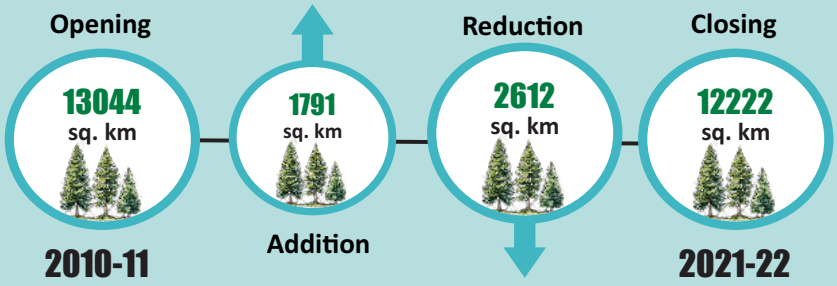
Introduction
SURVEY OF INDIA
LONGLENG
MOKOKCHUNG
WOKHA
ZUNHEBOTO
TUENSANG
KIPHIRE
KOHIMA
PHEK
DIMAPUR
PEREN
MON
REFERENCES
Boundaries: International, State, District, Sub-division
Railway : Broad gauge line with station
Roads: First Importance with No.; Second Importance; Others.
River : Perennial
Headquarters : State ; District ; Sub-Division ; Other Town ; Village
Name of Headquarter : State ; Districts ; Sub-Division
Name : Other Town ; Village
Name : Hill Range ; Peak
Published under the direction of Naveen Tomar, Surveyor General of India,
Survey of India, Hathibarkala Estate, Post Box No.37, Dehra Dün - 248001 (Uttarākhand)
Department of Science & Technology, Government of India.
2021
E. of GREENWICH
State boundaries of Assam, Manipur and Arunāchal Pradesh shown in this map are as enlarged from North-East Area Re-organisation Act 1971, which are yet to be verified.

FOREST EXTENT ACCOUNT

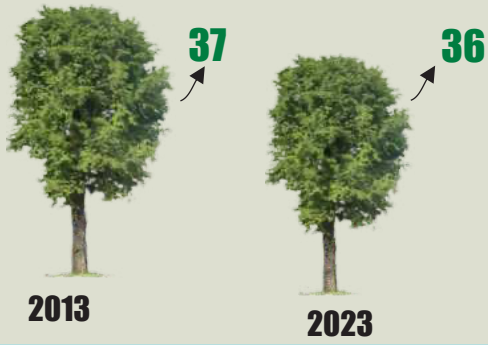
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
16579 Sq. Km	55.62%	52.07%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m^3)

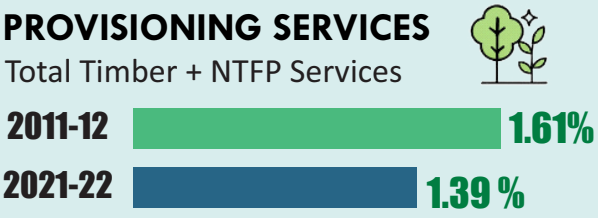


CARBON STOCK (million tonnes)

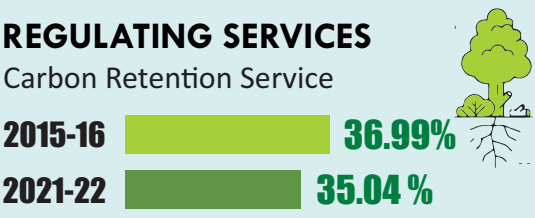
FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services



REGULATING SERVICES
Carbon Retention Service



5.19 Nagaland, located in the northeastern region of India, is a predominantly mountainous state. The terrain is characterized by steep hills, narrow valleys, and ridges, with elevations ranging from lowland river basins to high-altitude peaks. According to the Champion & Seth Classification of Forest Types (1968), Nagaland's forests are classified into seven Type Groups, further subdivided into 10 distinct Forest Types. The lower elevations are dominated by tropical wet evergreen and semi-evergreen forests. Mid-altitude regions support tropical wet hill forests and subtropical pine forests while higher elevations contain moist mixed deciduous forest.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	16579	
Population (as per Census 2011)	**Million**	1.98	
Average Population Density	**Per sq. km**	119	
No. of Districts		8	11
No. of Hill Districts		8	11
No. of Tribal Districts		8	11

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Nagaland is at 16579 square kilometres, with a population of 1.98 million and an average population density of 119 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 8 to 11, all classified as hill and tribal districts.

5.19.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	1298	4736	7010	2	3533
Addition	13.74	262.01	1514.86	1497.41	2434.41
Reduction	55.36	536.2	2020.58	832.14	2278.15
Closing 2021-22	1256.38	4461.81	6504.28	667.27	3689.26
Net change	-41.62	-274.19	-505.72	665.27	156.26
% Change	-3.21%	-5.79%	-7.21%	33263.50%	4.42%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Nagaland 's Forest cover underwent several changes across different forest types. Scrub areas grew substantially, a net gain of 33263.50%. This is largely due to shift from open forest to scrub which is almost equivalent to 1326.08 sq. km in different assessment periods. For most forest cover class, it shows a negative trend, while non-forest and Scrub experienced some level of increase during this period, with the most notable change in the Scrub category.

5.19.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	9222	8632	-590	-6.4
% of GA	55.62	52.07	-3.55	
Type of Protection				
Reserved Forests (RF)	86	234	148	172.09
Protected Forest (PF)	508	9	-499	-98.23
Unclassed Forests	8628	8389	-239	-2.77

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) decreased by 590 sq. km, marking a 6.40% reduction, resulting in nominal fall from 55.62% to 52.07% of the state's geographical area during observed period. During this period, Unclassed Forest reduced by 2.77%, and Protected Forests also fall significantly by 98.23%. While, the Reserved Forests category saw a dramatic increase of 172.09%, reflecting a significant reclassification or shift of forests towards legally most protected type. These trends reflect a shift in the categorization of forest areas, with drastic increase in the reserved forests.

5.19.3 Condition Accounts

The condition account for the forests of Nagaland for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	37.076	35.97	-1.106	-2.98
Growing Stock in Forest per unit area	m^3/ha	-	51.33		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,25,060	1,32,629	7,569	6.05
Above Ground Biomass	'000 tonnes	16,151	38,779	22,628	140.1
Below Ground Biomass	'000 tonnes	4,150	10,231	6,081	146.53
Dead Wood	'000 tonnes	666	631	-35	-5.26
Litter	'000 tonnes	2,432	1,863	-569	-23.4
Soil Organic Carbon	'000 tonnes	1,01,661	81,125	-20,536	-20.2

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	100.14	108.51	8.37	8.36
Above Ground Biomass	Per hectare stock in tonnes	12.93	31.73	18.8	145.4
Below Ground Biomass	Per hectare stock in tonnes	3.32	8.37	5.05	152.11
Dead Wood	Per hectare stock in tonnes	0.53	0.52	-0.01	-1.89
Litter	Per hectare stock in tonnes	1.95	1.52	-0.43	-22.05
Soil Organic Carbon	Per hectare stock in tonnes	81.4	66.37	-15.03	-18.46

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	2.81		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	99.15		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	2.02	1.70	-	
> 1.0 ≤ 10	%		0.74		
> 10 ≤ 100	%	0.51	0.10	-0.41	
> 100 ≤ 500	%	0	0	0.00	
> 500 ≤ 1000	%	0	0	0.00	
> 1000 ≤ 5000	%	0	0	0.00	
> 5000 ≤ 10000	%	0	0	0.00	
>10000	%	97.47	97.46	-0.01	

Forest Fires

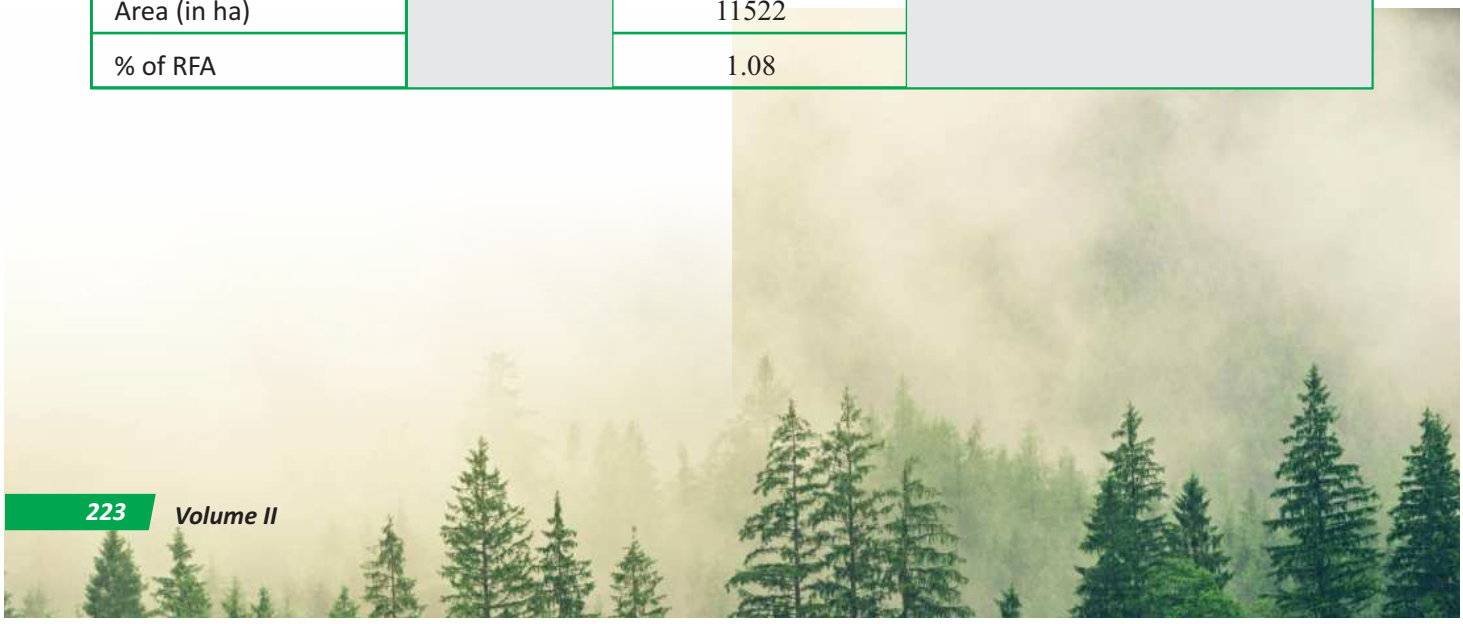
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	1057	1309	252	23.84
SNPP-VIIRS Detections	Number of fire cases	2898	3471	573	19.77

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	3.05	0	-3.05
Very highly fire prone	%	18.48	2.99	-15.49
Highly fire prone	%	38.05	22.8	-15.25
Moderately fire prone	%	25.65	34.22	8.57
Less fire prone	%	14.77	39.99	25.22

Wetlands within RFA

Indicator	2019
Number	197
Area (in ha)	11522
% of RFA	1.08

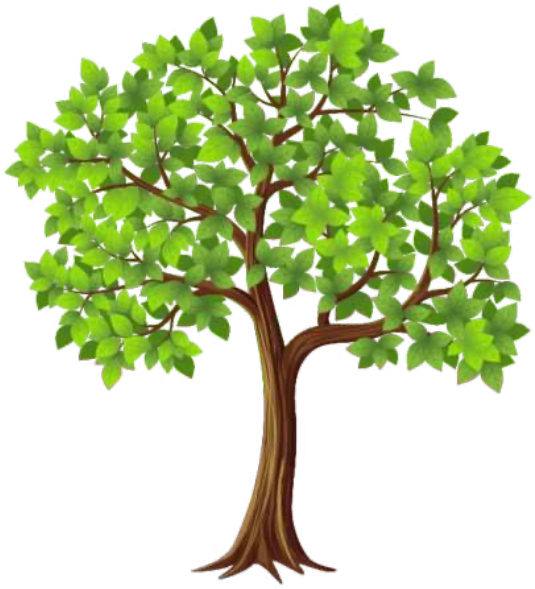


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	113	137	56
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.81	3.09	-
Tropical Semi-Evergreen Forests	2.35	2.97	2.15
Tropical Moist Deciduous Forests	3.61	3.48	2.94
Subtropical Broadleaved Hill Forests	2.92	3.4	2.62
Subtropical Pine Forests	2.19	1.55	1.31
Montane Wet Temperate Forests	1.9	1.17	1.04
Himalaya Moist Temperate Forests	-	1.16	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	16.61	21.98	-
Tropical Semi-Evergreen Forests	10.49	19.49	8.58
Tropical Moist Deciduous Forests	36.97	32.46	18.92
Subtropical Broadleaved Hill Forests	18.54	29.96	13.74
Subtropical Pine Forests	8.94	4.71	3.71
Montane Wet Temperate Forests	6.69	3.22	2.83
Himalaya Moist Temperate Forests	-	3.19	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	26.36
Inadequate	46.01
Absent	6.71
NA	20.92
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	2.16
Moderately degraded	19.82
Mildly degraded	46.52
Not degraded	18.09
NA	13.41
Invasive Species [Distribution of RFA (%)]	
Very Dense	0.52
Dense	10.31
Moderate	30.39
Scanty	15.97
Absent	26.77
NA	16.04



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.19.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	163.37	1.34%	430.67	1.33%	267.3	163.61%
Value of non-timber forest products (NTFP)	(₹ in crore)	33.1	0.27%	20.17	0.06%	-12.93	-39.07%
Total Timber+ NTFP Services	(₹ in crore)	196.47	1.61%	450.84	1.39%	254.37	129.47%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 163.61% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 1.34% to 1.33%. In case of NFTP services, it had shown fall in absolute by 39.07%, while reduction in SGDP by 0.21%. There is rise in the overall provisioning services, which improve by 129.47% in absolute terms, but reduced from 1.61% to 1.39% as % of SGDP. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	7222.54	36.99%	11304.45	35.04%	4081.92	56.52%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP show a nominal fall from 36.99% in 2015-16 to 35.04% in 2021-22, while its absolute monetary value registered an increase of 56.52%. This reflects marginal reduction in the relative economic contribution of carbon retention services, but its absolute growth during the period is encouraging.

2) Ecosystem services (at constant prices)

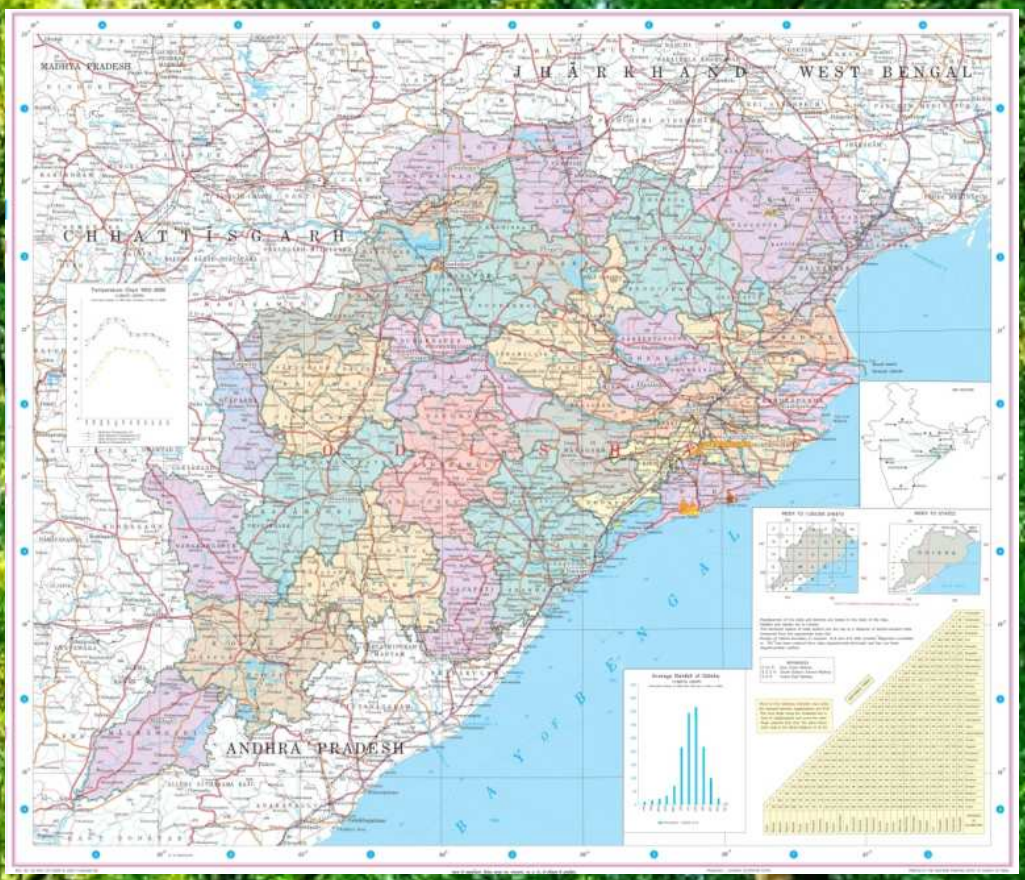
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	163.37	1.34%	188.65	1.03%	25.27	15.47%
Value of non-timber forest products (NTFP)	(₹ in crore)	33.1	0.27%	12.09	0.07%	-21.01	-63.48%
Total Timber+ NTFP Services	(₹ in crore)	196.47	1.61%	200.74	1.10%	4.26	2.17%

At constant price, the absolute monetary value of timber provisioning services has increased by 15.47% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 1.34% to 1.03%. In case of NFTP services, it had shown reduction in absolute by 63.48% and in SGDP by 0.20%. This causes fall in increment of the absolute value, which was registered at 2.17% for the overall provisioning services, and from 1.61% to 1.10% as % of SGDP. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, in relative terms to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	4364.68	29.77%	4628.84	25.31%	264.16	6.05%

At constant prices, the carbon retention services in % of SGDP decreased from 29.77% in 2015-16 to 25.11% in 2021-22, while the absolute value showed marginal increase of 6.02%. This highlights a decrease in the relative economic contribution of carbon retention services during the period.

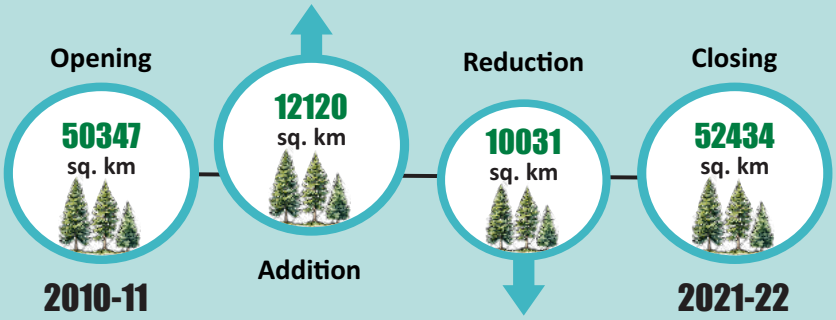
ODISHA


MADHYA PRADESH
JHARKHAND
WEST BENGAL
CHHATTISGARH
ANDHRA PRADESH
BAY OF BENGAL

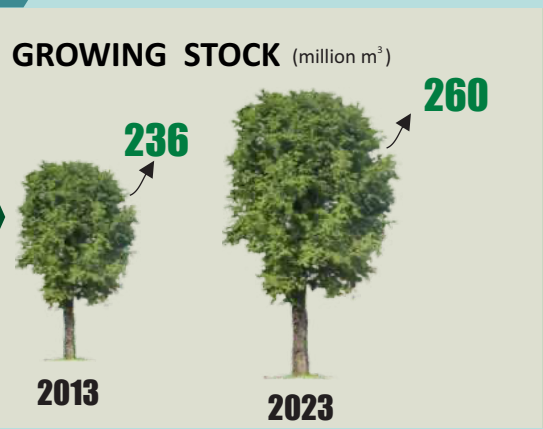
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
155707 Sq. Km	37.34 %	39.31 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.61%	2015-16	7.96%
2021-22	0.29%	2021-22	5.56%

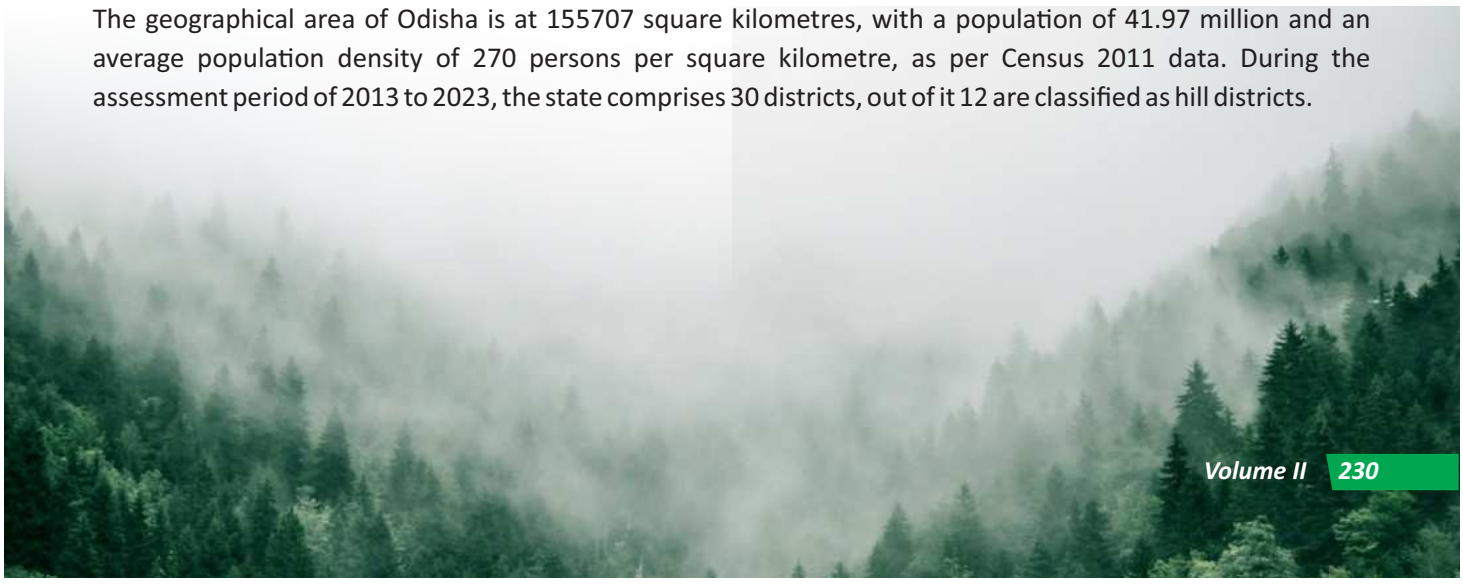
5.20 Odisha, situated along the eastern coast of India, features a varied landscape encompassing the Northern Plateau, Eastern Ghats, Central Table land and Coastal Plains. The state has a tropical climate with high monsoonal rainfall, which, combined with its diverse topography, supports a rich variety of ecosystems. As per the Champion & Seth Classification of Forest Types (1968), Odisha's forests are grouped into 4 Type Groups, further classified into 19 distinct Forest Types. Tropical moist deciduous forests, dominated by Sal, constitute the most extensive formation, interspersed with patches of tropical dry deciduous forests in the interior. Tropical semi-evergreen forests occur in high-rainfall zones of the Eastern Ghats, while littoral forests, are found along the coastal districts. Hill and upland tracts also support bamboo brakes and moist mixed deciduous forests.

State Profile

Indicator	Unit	2013-2023
Geographical Area	**Sq. km**	155707
Population (as per Census 2011)	**Million**	41.97
Average Population Density	**Per sq. km**	270
No. of Districts		30
No. of Hill Districts		0
No. of Tribal Districts		12

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Odisha is at 155707 square kilometres, with a population of 41.97 million and an average population density of 270 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the state comprises 30 districts, out of it 12 are classified as hill districts.



5.20.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	7042	21298	22007	4424	100936
Addition	1541.21	3645.03	6934.13	3893.74	3388.59
Reduction	1358.79	3877.48	4797.54	3685.06	5683.83
Closing 2021-22	7224.42	21065.55	24143.59	4632.68	98640.76
Net change	182.42	-232.45	2136.59	208.68	-2295.24
% Change	2.59%	-1.09%	9.71%	4.72%	-2.27%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010–11 and 2021–22, Odisha's Forest cover exhibited modest variations across different forest type categories in the Forest Asset Account. Very Dense Forest (VDF), Open Forest, and scrub areas recorded marginal increases, whereas Moderately Dense Forest (MDF) and non-forest areas experienced slight declines. For most forest cover class, it shows a positive trend, while MDF and Non- Forest experienced some level of decrease during this period, with the most notable change in the open forest category.

5.20.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	58136	61204	3068	5.28
% of GA	37.34	39.31	1.97	
Type of Protection				
Reserved Forests (RF)	26329	36049	9720	36.92
Protected Forest (PF)	15525	25133	9608	61.89
Unclassed Forests	16282	22	-16260	-99.86

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 3,068 sq. km, marking a 5.28% rise and expanding from 37.34% to 39.31% of the state's geographical area during observed period. During this period, Reserved Forests grew by 36.92%, and Protected Forests increased significantly by 61.89%. The Unclassed Forest category saw a dramatic decrease of 16260 sq. km, reflecting a significant reclassification or exclusion of lands. These trends reflect a shift in the categorization of forest areas, with substantial changes in the protected and unclassed forests.

5.20.3 Condition Accounts

The condition account for the forests of Odisha for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	235.768	259.75	23.98	10.17
Growing Stock in Forest per unit area	m^3/ha	-	77.4		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	4,52,903	4,53,678	775	0.17
Above Ground Biomass	'000 tonnes	1,52,525	1,34,214	-18,311	-12.01
Below Ground Biomass	'000 tonnes	50,407	41,387	-9,020	-17.89
Dead Wood	'000 tonnes	2,108	3,898	1,790	84.91
Litter	'000 tonnes	9,087	8,254	-833	-9.17
Soil Organic Carbon	'000 tonnes	2,38,776	2,65,925	27,149	11.37

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	88.21	86.52	-1.69	-1.92
Above Ground Biomass	Per hectare stock in tonnes	29.71	25.6	-4.11	-13.83
Below Ground Biomass	Per hectare stock in tonnes	9.82	7.89	-1.93	-19.65
Dead Wood	Per hectare stock in tonnes	0.41	0.74	0.33	80.49
Litter	Per hectare stock in tonnes	1.77	1.57	-0.2	-11.3
Soil Organic Carbon	Per hectare stock in tonnes	46.5	50.72	4.22	9.08

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	1.33		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	95.99		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	12.94	2.61	-	
> 1.0 ≤ 10	%		7.19		
> 10 ≤ 100	%	10.24	10.05	-0.19	
> 100 ≤ 500	%	7.1	8.79	1.69	
> 500 ≤ 1000	%	8.12	8.69	0.57	
> 1000 ≤ 5000	%	26.99	28.40	1.41	
> 5000 ≤ 10000	%	10.32	10.67	0.35	
>10000	%	24.29	23.60	-0.69	

Forest Fires

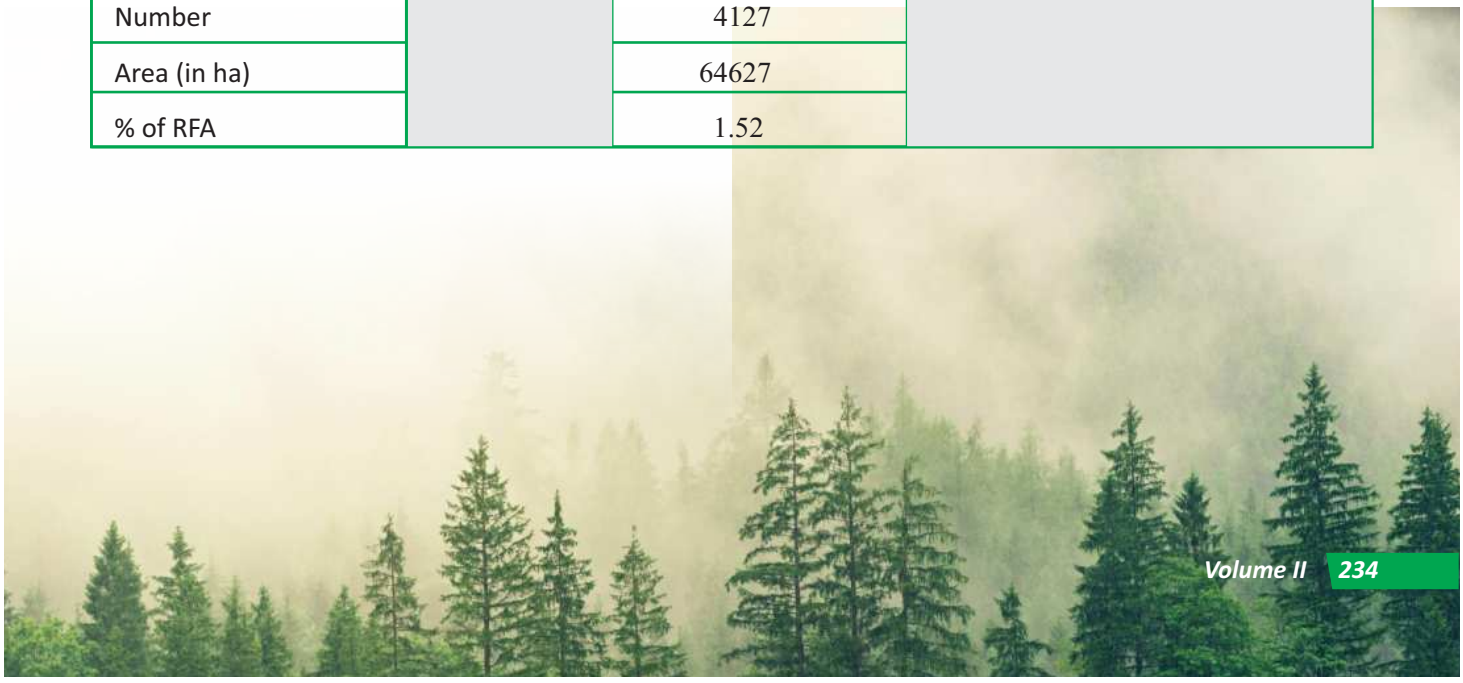
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	2123	2086	-37	-1.74
SNPP-VIIRS Detections	Number of fire cases	19159	22014	2855	14.9

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	2.82	1.01	-1.81
Very highly fire prone	%	7.73	17.98	10.25
Highly fire prone	%	13.32	32.06	18.74
Moderately fire prone	%	19.96	22.11	2.15
Less fire prone	%	56.17	26.84	-29.33

Wetlands within RFA

Indicator	2019
Number	4127
Area (in ha)	64627
% of RFA	1.52

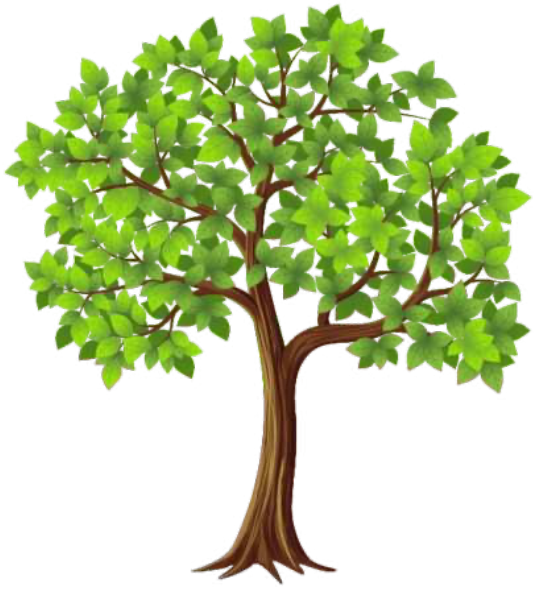


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	105	90	192
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	2.78	2.51	2.05
Tropical Moist Deciduous Forests	3.48	2.91	3.10
Littoral and Swamp Forests	2.36	2.74	-
Tropical Dry Deciduous Forests	3.61	3.26	3.33
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	16.12	12.30	7.77
Tropical Moist Deciduous Forests	32.46	18.36	22.20
Littoral and Swamp Forests	10.59	15.49	-
Tropical Dry Deciduous Forests	36.97	26.05	27.94

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	70.51
Inadequate	12.57
Absent	3.84
NA	13.08
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.46
Moderately degraded	19.67
Mildly degraded	59.16
Not degraded	16.92
NA	2.79
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.66
Dense	8.29
Moderate	23.69
Scanty	24.39
Absent	33.38
NA	8.59



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.20.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	322.47	0.14%	1018.03	0.15%	695.56	215.70%
Value of non-timber forest products (NTFP)	(₹ in crore)	1092.73	0.47%	947.64	0.14%	-145.09	-13.28%
Total Timber+ NTFP Services	(₹ in crore)	1415.2	0.61%	1965.67	0.29%	550.47	38.90%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services in % of SGDP increased from 0.14% in 2011-12 to 0.15% in 2021-22, while the monetary value of the services shows a drastic increase by 215.70%. In case of NFTP services, it had shown marginal reduction in absolute by 13.28% and in SGDP by 0.33%. Collectively, the combined absolute timber and NTFP services increased by nearly 38.90%, while its value as % of SGDP has a nominal fall from 0.61% to 0.29%. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	26156.32	7.96%	38668.64	5.56%	12512.31	47.84%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP reduce from 7.96% in 2015-16 to 5.56% in 2021-22, while the absolute value registered an increase of 47.84%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	46019
Revenue from ecotourism	(₹ in lakh)	-	685

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change

In 2019-20, tourist inflow for ecotourism reached 46019 visitors, generating a revenue of ₹6.85 crore. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

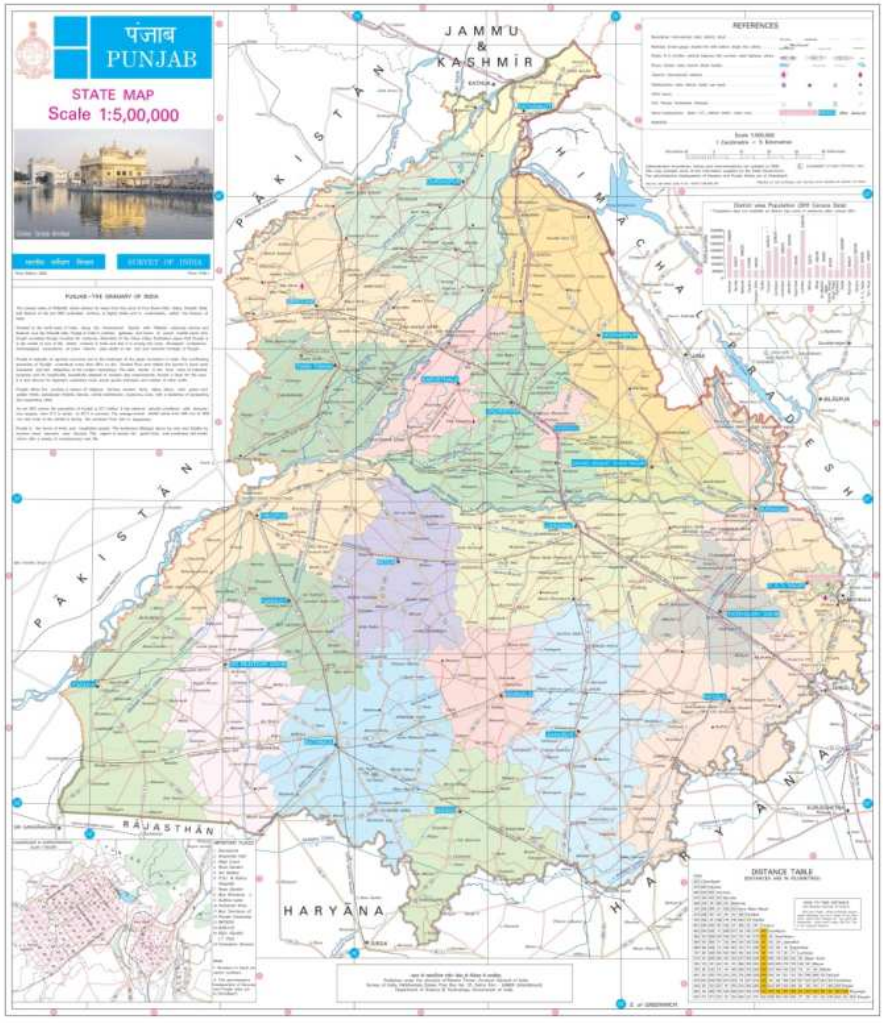
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	322.47	0.14%	604.17	0.13%	281.7	87.36%
Value of non-timber forest products (NTFP)	(₹ in crore)	1092.73	0.47%	675.45	0.15%	-417.29	-38.19%
Total Timber+ NTFP Services	(₹ in crore)	1415.2	0.61%	1279.62	0.28%	-135.59	-9.58%

At constant price, the absolute monetary value of timber provisioning services has increased by 87.36% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.14% to 0.13%. In case of NFTP services, it had shown reduction in absolute by 38.19% and in SGDP by 0.32%. This causes fall in the overall provisioning services, which reduce by 9.58% in absolute terms and from 0.61% to 0.28% as % of SGDP. This pattern indicates that, despite moderate growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	15806.63	5.41%	15833.67	3.50%	27.05	0.17%

At constant prices, the carbon retention services in % of SGDP experience nominal decrease from 5.41% in 2015-16 to 3.50% in 2021-22, while the absolute value showed a marginal increase of 0.17%. This highlights a nominal decrease in the relative economic contribution of carbon retention services during the period.

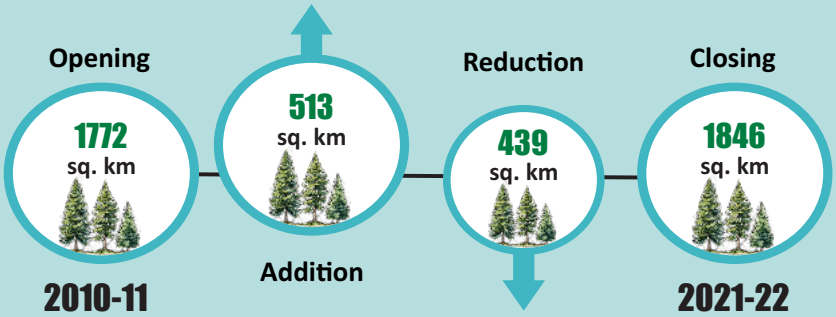
PUNJAB


पंजाब
PUNJAB
STATE MAP
Scale 1:5,00,000
JAMMU & KASHMIR
PAKISTAN
HIMACHAL PRADESH
RAJASTHAN
HARYANA
REFERENCES
DISTANCE TABLE

FOREST EXTENT ACCOUNT

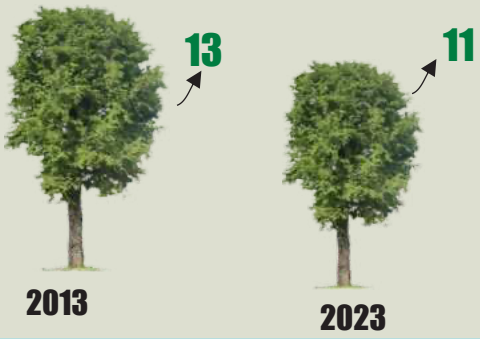
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
50362 Sq. Km	6.12 %	6.12 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m^3)



CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	6.01 %
2021-22	0.12 %

REGULATING SERVICES
Carbon Retention Service

2015-16	0.24%
2021-22	0.18%

5.21 Punjab, located in the northwestern part of India, is primarily a fertile alluvial plain, interspersed with the Shivalik foothills in the northeast. According to the Champion & Seth Classification of Forest Types (1968), Punjab's forests are grouped into 3 Forest Type Groups, further divided into 7 distinct Forest Types. Tropical dry deciduous forests, are the most common formations, primarily occurring along riverine tracts and in the Shivalik hills. Subtropical pine forests occur in the higher altitudes of the Shivalik's, while tropical thorn forests are found in degraded and semi-arid zones.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	50362	
Population (as per Census 2011)	**Million**	27.74	
Average Population Density	**Per sq. km**	551	
No. of Districts		17	22
No. of Hill Districts		0	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Punjab is at 50362 square kilometres, with a population of 27.74 million and an average population density of 551 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts increased from 17 to 22.

5.21.1- Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	0	736	1036	37	48553
Addition	11	189	313.43	38.18	181.61
Reduction	1.56	140.11	297.67	33.57	260.31
Closing 2021-22	9.44	784.89	1051.76	41.61	48474.3
Net change	9.44	48.89	15.76	4.61	-78.7
% Change	-	6.64%	1.52%	12.46%	-0.16%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010–11 and 2021–22, Punjab's Forest cover exhibited positive changes across all forest type categories. Very Dense Forest (VDF), absent in 2010–11, increased to 9.44 sq. km in 2021–22, reflecting efforts toward restoring forests to their highest ecological condition. Other forest categories also recorded improvements, contributing to a corresponding reduction in the area of non-forest category.

5.21.2- Extent Account

Indicator (area in sq. km)	2013-2023
Recorded Forest Area (RFA)	3084
% of GA	6.12
Type of Protection	
Reserved Forests (RF)	44
Protected Forest (PF)	1137
Unclassed Forests	1903

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remained at 3084 sq. km with 6.12% of the state's geographical area during observed period. During this period, all the three categories of forest based on type of protection remain unchanged. These trends reflect consistency in the categorization of forest areas.

5.21.3 Condition Accounts

The condition account for the forests of Punjab for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	13.018	11.07	-1.95	-14.96
Growing Stock in Forest per unit area	m^3/ha	-	73.14		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	16,038	13,595	-2,443	-15.23
Above Ground Biomass	'000 tonnes	5,095	3,414	-1,681	-32.99
Below Ground Biomass	'000 tonnes	1,883	1,275	-608	-32.29
Dead Wood	'000 tonnes	26	176	150	576.92
Litter	'000 tonnes	63	99	36	57.14
Soil Organic Carbon	'000 tonnes	8,971	8,631	-340	-3.79

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	87.31	73.63	-13.68	-15.7
Above Ground Biomass	Per hectare stock in tonnes	27.74	18.49	-9.25	-33.3
Below Ground Biomass	Per hectare stock in tonnes	10.25	6.91	-3.34	-32.6
Dead Wood	Per hectare stock in tonnes	0.14	0.95	0.81	578.6
Litter	Per hectare stock in tonnes	0.34	0.53	0.19	55.9
Soil Organic Carbon	Per hectare stock in tonnes	48.84	46.75	-2.09	-4.3

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.30		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.40		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	34.65	24.55	-	
> 1.0 ≤ 10	%		12.08		
> 10 ≤ 100	%	3.72	3.54	-0.18	
> 100 ≤ 500	%	30.42	29.83	-0.59	
> 500 ≤ 1000	%	31.21	30.00	-1.21	
> 1000 ≤ 5000	%	-	-	-	
> 5000 ≤ 10000	%	-	-	-	
>10000	%	-	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	77	128	51	66.23
SNPP-VIIRS Detections	Number of fire cases	214	428	214	100

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0.56	1.09	0.53
Highly fire prone	%	17.09	11.92	-5.17
Moderately fire prone	%	29.24	10.74	-18.5
Less fire prone	%	53.11	76.25	23.14

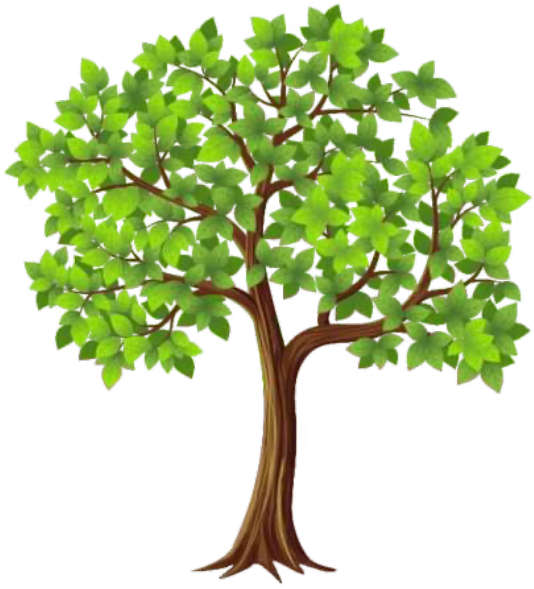
Wetlands within RFA	
Indicator	**2019**
Number	119
Area (in ha)	3068
% of RFA	3.32

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	37	31	50
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	1.65	2.07	3.06
Tropical Thorn Forests	2.28	2.38	1.78
Subtropical Pine Forests	2.36	1.94	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	5.21	7.92	21.33
Tropical Thorn Forests	9.78	10.8	5.93
Subtropical Pine Forests	10.59	6.96	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	42.55
Inadequate	39.09
Absent	13.79
NA	4.57
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.1
Moderately degraded	9.87
Mildly degraded	62.52
Not degraded	21.94
NA	4.57
Invasive Species [Distribution of RFA (%)]	
Very Dense	4.39
Dense	17.57
Moderate	28.55
Scanty	12.08
Absent	23.06
NA	14.35



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.21.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1582.51	0.59%	652.62	0.10%	-929.89	-58.76%
Value of non-timber forest products (NTFP)	(₹ in crore)	184.23	0.07%	134.56	0.02%	-49.67	-26.96%
Total Timber+ NTFP Services	(₹ in crore)	16009.38	6.01%	787.18	0.12%	-15222.2	-95.08%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP has reported a decline from 5.94% in 2011-12 to 0.10% in 2021-22, and 95.88% of significant reduction in absolute value as well. The NTFPs has registered a reduction of 26.96% in their value, while in terms of % of SGDP it has a nominal reduction from 0.07% to 0.02%. Collectively, the combined timber and NTFP services as % of SGDP fell from 6.01% to 0.12%, and their absolute value decreased by 95.08%.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	926.24	0.24%	1158.75	0.18%	232.52	25.10%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP nominal reduction from 0.24% in 2015-16 to 0.18% in 2021-22, while the absolute value registered an increase of 25.10%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1582.51	0.59%	927.06	0.21%	-655.45	-41.42%
Value of non-timber forest products (NTFP)	(₹ in crore)	184.23	0.07%	75.9	0.02%	-108.33	-58.80%
Total Timber+ NTFP Services	(₹ in crore)	1766.74	0.66%	1002.96	0.23%	-763.78	-100.22%

At constant prices, the timber provisioning services in SGDP declined from 0.59% in 2011-12 to 0.21% in 2021-22, reflecting a 41.42% decrease. The share of non-timber forest resources dropped from 0.07% to 0.02%, with a 58.80% reduction in value. Collectively, the combined timber and NTFP services in % of SGDP fell from 0.66% to 0.23%, and their total value decreased by 100.22%.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	559.74	0.17%	474.47	0.11%	-85.26	-15.23%

At constant prices, the carbon retention services in % of SGDP slight reduction from 0.17% in 2015-16 to 0.11% in 2021-22, and the absolute value also showed a decrease of 15.23%.

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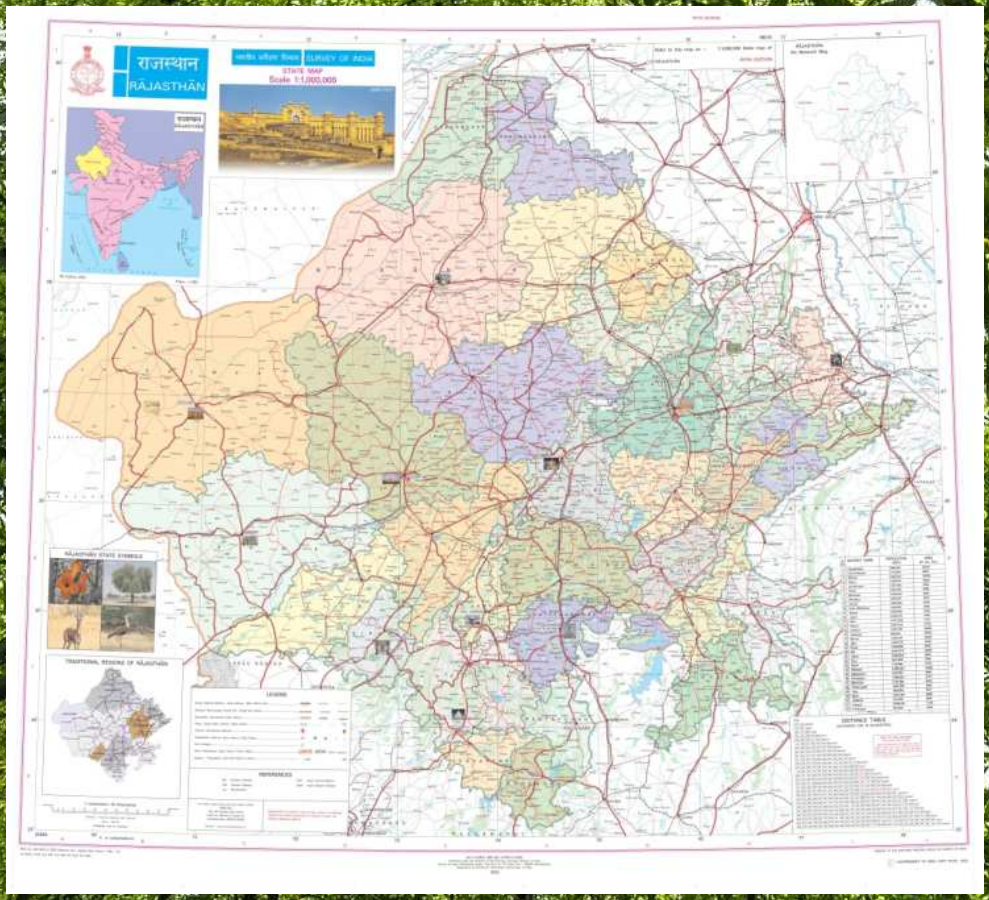
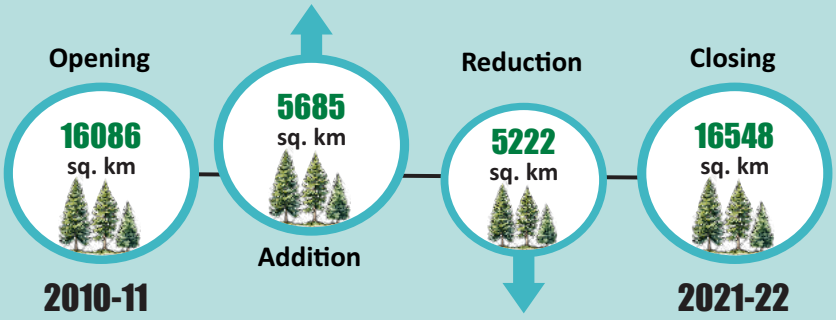


FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
342239 Sq. Km	9.57%	9.6%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.80%	2015-16	0.76 %
2021-22	0.24 %	2021-22	0.79 %

5.22 Rajasthan, situated in the north-western part of India, is the largest state in the country in terms of geographical area, the state encompasses four distinct physiographic regions, the Western Desert with barren hills, level rocky and sandy plains, the Aravalli Hills, and the south-eastern plateau. Its climate ranges from semi-arid to arid, with the western part, including the Thar Desert, being dry and infertile, while the south-western areas are relatively wetter, hilly, and more fertile. According to the Champion & Seth Classification of Forest Types (1968), the forests of Rajasthan are classified into two forest type groups, i.e., Tropical Dry Deciduous Forests and Tropical Thorn Forests, which are further divided into 20 forest types.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**sq km**	342239	
Population (as per Census 2011)	**Million**	68.55	
Average Population Density	**Per sq km**	200	
No. of Districts		29	33
No. of Hill Districts		0	0
No. of Tribal Districts		5	5

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Rajasthan remained at 342239 square kilometres, with a population of 68.55 million and an average population density of 200 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent significant changes: the number of districts increased from 29 to 33, and number of Tribal district remained at 5.

5.22.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	72	4424	11590	4211	321942
Addition	154.72	833.23	4696.57	4332.18	4893.9
Reduction	3.52	1019.82	4198.97	3066.43	6621.87
Closing 2021-22	223.2	4237.41	12087.6	5476.75	320214
Net change	151.2	-186.59	497.6	1265.75	-1727.97
% Change	210.00%	-4.22%	4.29%	30.06%	-0.54%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2, chapter 2 of Vol I.

Between 2010-11 and 2021-22, Rajasthan's forest cover exhibited considerable changes across different forest types, as reflected in the Forest Asset Account. The VDF experienced a remarkable increase of 210%, primarily driven by a notable shift of 116.06 sq km from the MDF in the 2023 assessment period. This trend indicates a positive densification of forest cover, signaling improved forest health and growing biomass density in certain areas. Scrub forest areas also expanded substantially, showing a net growth of 30.06%, while OF areas recorded a modest increase of 4.29%. Conversely, the MDF category saw a decline, which aligns with the observed conversion of some MDF areas into VDF. Additionally, a marginal reduction of 0.54% was noted in non-forest areas.

5.22.2 Extent Account

Indicator	Unit	2013	2023	Net change	% Change
Recorded Forest Area (RFA)	sq km	32737	32869	132	0.40
% of GA	-	9.57	9.6	0.03	
Type of Protection					
Reserved Forests (RF)	sq km	12475	12176	-299	-2.40
Protected Forest (PF)	sq km	18217	18588	371	2.04
Unclassed Forests	sq km	2045	2105	60	2.93

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides comprehensive information on the spatial distribution and protection status of forest areas. During the observed period, the Recorded Forest Area (RFA) registered a marginal increase of 132 sq. km, reaching 32,869 sq. km, which constitutes 9.6% of the state's geographical area. Within this period, the area under Reserved Forests declined by 2.40%, whereas Protected Forests recorded a modest increase of 2.04% and Unclassed Forests grew by 2.93%. These trends indicate that while the total forest extent has shown slight overall growth, there have been noteworthy compositional shifts among different protection categories.

5.22.3 Condition Accounts

The condition account for the forests of Rajasthan for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	34.088	25.41	-8.678	-25.46
Growing Stock in Forest per unit area	m^3/ha	-	19.66		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	89,660	1,10,171	20,511	22.88
Above Ground Biomass	'000 tonnes	32,558	26,374	-6,184	-18.99
Below Ground Biomass	'000 tonnes	12,736	10,646	-2,090	-16.41
Dead Wood	'000 tonnes	216	1,493	1,277	591.20
Litter	'000 tonnes	721	930	209	28.99
Soil Organic Carbon	'000 tonnes	43,429	70,728	27,299	62.86

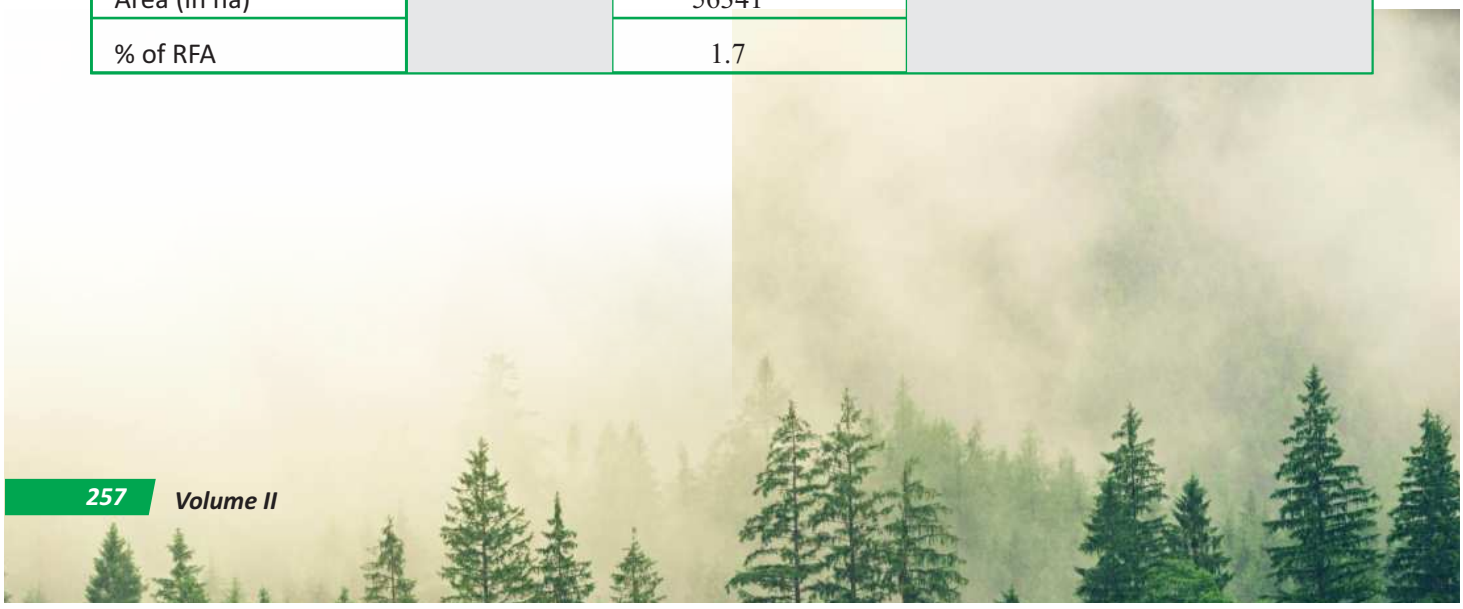
Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	54.1	66.57	12.47	23.05
Above Ground Biomass	Per hectare stock in tonnes	19.65	15.94	-3.71	-18.88
Below Ground Biomass	Per hectare stock in tonnes	7.69	6.43	-1.26	-16.38
Dead Wood	Per hectare stock in tonnes	0.13	0.9	0.77	592.31
Litter	Per hectare stock in tonnes	0.44	0.56	0.12	27.27
Soil Organic Carbon	Per hectare stock in tonnes	26.21	42.74	16.53	63.07

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.47		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	96.44		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	32.31	19.96	-	
> 1.0 ≤ 10	%		17.02		
> 10 ≤ 100	%	24.66	22.96	-1.7	
> 100 ≤ 500	%	19.29	14.28	-5.01	
> 500 ≤ 1000	%	17.37	25.78	8.41	
> 1000 ≤ 5000	%	6.37	-	-	
> 5000 ≤ 10000	%	0	-	-	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	386	238	-148	-38.34
SNPP-VIIRS Detections	Number of fire cases	3025	2703	-322	-10.64

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0.42	0.42
Very highly fire prone	%	0.32	2.83	2.51
Highly fire prone	%	2.48	4.38	1.9
Moderately fire prone	%	3.62	5.9	2.28
Less fire prone	%	93.58	86.47	-7.11

Wetlands within RFA	
Indicator	**2019**
Number	3826
Area (in ha)	56341
% of RFA	1.7

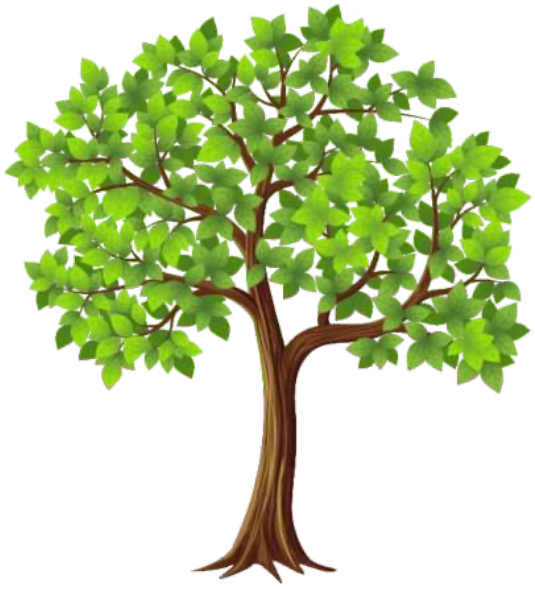


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	8	30	65
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	2.01	2.63	2.59
Tropical Thorn Forests	-	1.69	1.86
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	7.46	13.87	13.33
Tropical Thorn Forests	-	5.42	6.42

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	12.02
Inadequate	18.59
Absent	6.05
NA	63.34
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.95
Moderately degraded	10.34
Mildly degraded	52.53
Not degraded	10.41
NA	24.77
Invasive Species [Distribution of RFA (%)]	
Very Dense	0.93
Dense	5.04
Moderate	18.95
Scanty	24.25
Absent	14.18
NA	36.65



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.22.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1890.64	0.43%	1513.02	0.13%	-377.62	-19.97%
Value of non-timber forest products (NTFP)	(₹ in crore)	1607.04	0.37%	1325.97	0.11%	-281.08	-17.49%
Total Timber+ NTFP Services	(₹ in crore)	3497.68	0.80%	2838.99	0.24%	-658.7	-18.83%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services in SGDP declined from 0.43% in 2011-12 to 0.13% in 2021-22, reflecting a 19.97% decrease. The share of non-timber forest resources dropped from 0.37% to 0.11%, with a 58.80% reduction in value. Collectively, the combined timber and NTFP services in % of SGDP fell from 0.80% to 0.24%, and their total value decreased by 18.83%. This trend reflects a simultaneous decline in both timber and NTFP contributions, resulting in a reduction in the overall economic significance of forest provisioning services within the state economy.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	5178.10	0.76%	9390.28	0.79%	4212.18	81.35%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP rise from 0.76% in 2015-16 to 0.79% in 2021-22, while the absolute value registered an increase of 81.35%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their absolute value during the period.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1890.64	0.43%	1720.80	0.24%	-169.84	-8.98%
Value of non-timber forest products (NTFP)	(₹ in crore)	1607.04	0.37%	807.48	0.11%	-799.56	-49.75%
Total Timber+ NTFP Services	(₹ in crore)	3497.68	0.80%	2528.28	0.35%	-969.4	-27.72%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 0.43% in 2011-12 to 0.24% in 2021-22, and 8.98% reduction in absolute value as well. The NTFPs has registered a significant reduction of 49.75% in their value, while in terms of % of SGDP it has a nominal reduction from 0.37% to 0.11%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.80% to 0.35%, and their total value decreased by 27.72%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	3129.20	0.56%	3845.04	0.53%	715.85	22.88%

The carbon retention services in SGDP marginally declined from 0.56% in 2015-16 to 0.53% in 2021-22, while the absolute value registered an increase of 22.88%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

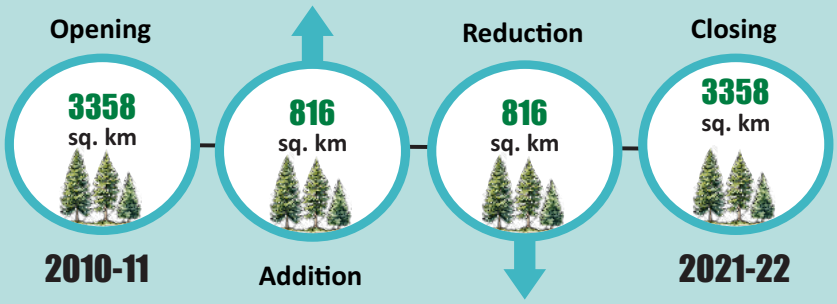
SIKKIM

China (Tibet)
Mangan District
China (Tibet)
Gyalshing District
Namchi District
Gangtok District
Pakyong District
Soreng District
Bhutan
West Bengal
Legend

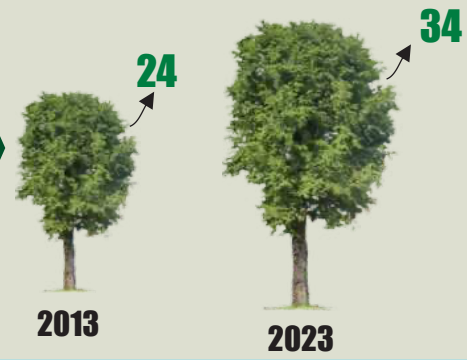
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
7096 Sq. Km	82.31%	82.31%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.08 %
2021-22	0.02 %

REGULATING SERVICES
Carbon Retention Service

2015-16	15.54 %
2021-22	12.86 %

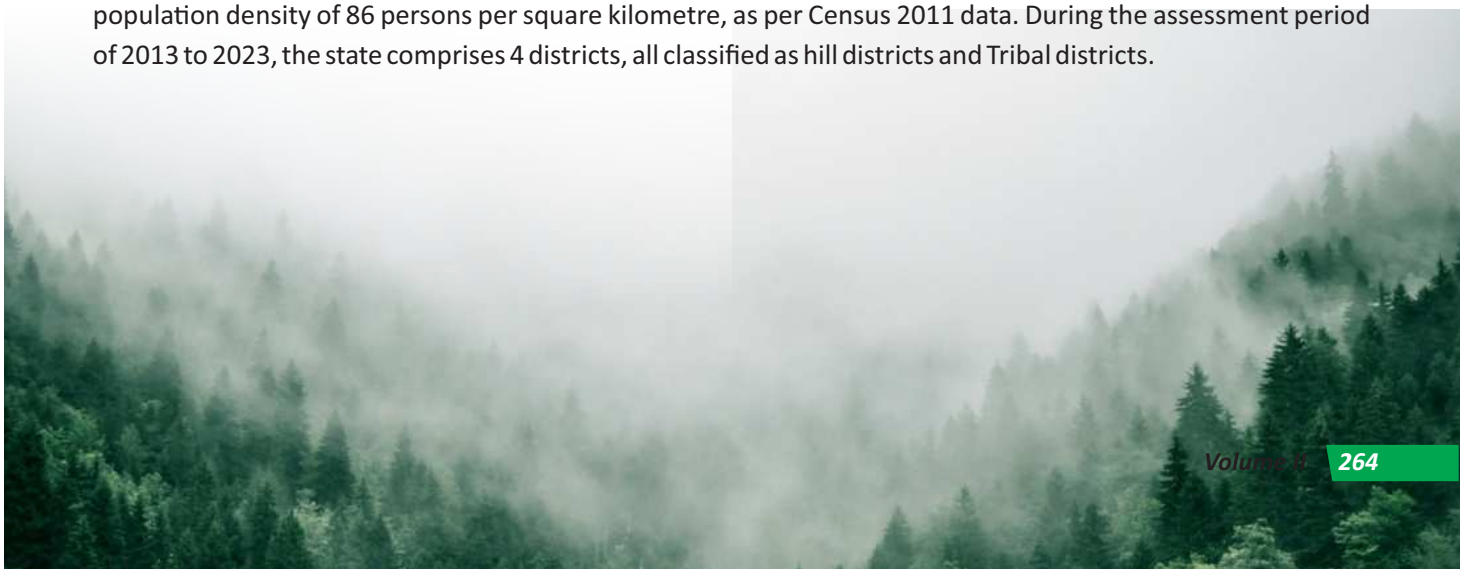
5.23 Sikkim, situated in the north-eastern part of India, is a mountainous state with altitudes ranging from 300 m to 8,586 m, including Kangchenjunga, the highest peak in India and the third highest in the world. The state experiences a wide range of climatic conditions, from subtropical in the lower regions to tundra in the high mountains, with annual rainfall between 2,700 mm and 3,200 mm and temperatures varying from sub-zero in winter to about 28°C in summer. Sikkim is richly endowed with forests, and its vegetation shows distinct altitudinal zonation. According to the Champion & Seth Classification of Forest Types (1968), the forests of Sikkim are classified into six Forest Type Groups, further divided into 11 forest types.

State Profile

Indicator	Unit	2013-2023
Geographical Area	**sq km**	7096
Population (as per Census 2011)	**Million**	0.611
Average Population Density	**Per sq km**	86
No. of Districts		4
No. of Hill Districts		4
No. of Tribal Districts		4

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Sikkim is at 7,096 square kilometres, with a population of 0.611 million and an average population density of 86 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the state comprises 4 districts, all classified as hill districts and Tribal districts.



5.23.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	500	2161	697	311	3427
Addition	608.05	98.58	109.45	69.89	77.69
Reduction	4.74	703.69	107.25	77.4	70.58
Closing 2021-22	1103.31	1555.89	699.2	303.49	3434.11
Net change	603.31	-605.11	2.2	-7.51	7.11
% Change	120.665%	-28.00%	0.32%	-2.41%	0.21%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2, chapter 2 of Vol I.

Between 2010-11 and 2021-22, Sikkim's forest cover exhibited notable changes across various forest types, as reflected in the Forest Asset Account. The VDF recorded a substantial increase of 120.66%, primarily driven by a reclassification of 582 sq. km from MDF during the 2017 assessment period. OF areas registered a modest net gain of 0.32%. In contrast, the MDF category declined significantly by 28%, while scrub areas decreased by 2.41%. Additionally, the extent of non-forest areas showed a slight increase of 0.21%. For most forest cover class, it shows a positive trend, while MDF and Scrub experienced some level of decrease during this period, with the most notable change in the VDF category.

5.23.2 Extent Account

Indicator	Unit	2013-2023
Recorded Forest Area (RFA)	sq. km	5841
% of GA		82.31
Type of Protection		
Reserved Forests (RF)	sq. km	5452
Protected Forest (PF)	sq. km	389
Unclassed Forests	sq. km	0

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remain consistent at 5841 sq. km covering 82.31% of the state's geographical area during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.23.3 Condition Accounts

The condition account for the forests of Sikkim for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	23.841	34.49	10.65	44.67
Growing Stock in Forest per unit area	m^3/ha	-	145.74		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	48,534	56,827	8,293	17.09
Above Ground Biomass	'000 tonnes	13,379	19,576	6,197	46.32
Below Ground Biomass	'000 tonnes	3,735	5,893	2,158	57.78
Dead Wood	'000 tonnes	211	242	31	14.69
Litter	'000 tonnes	585	536	-49	-8.38
Soil Organic Carbon	'000 tonnes	30,624	30,580	-44	-0.14

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	145.14	169.2	24.06	16.58
Above Ground Biomass	Per hectare stock in tonnes	40.01	58.29	18.28	45.69
Below Ground Biomass	Per hectare stock in tonnes	11.17	17.55	6.38	57.12
Dead Wood	Per hectare stock in tonnes	0.63	0.72	0.09	14.29
Litter	Per hectare stock in tonnes	1.75	1.59	-0.16	-9.14
Soil Organic Carbon	Per hectare stock in tonnes	91.58	91.05	-0.53	-0.58

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	4.83		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.40		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	1.91	1.43	-	
> 1.0 ≤ 10	%		1.11		
> 10 ≤ 100	%	3.25	3.56	0.31	
> 100 ≤ 500	%	0	0	0	
> 500 ≤ 1000	%	0	0	0	
> 1000 ≤ 5000	%	94.84	93.90	-0.94	
> 5000 ≤ 10000	%	0	0	0	
>10000	%	0	0	0	

Forest Fires

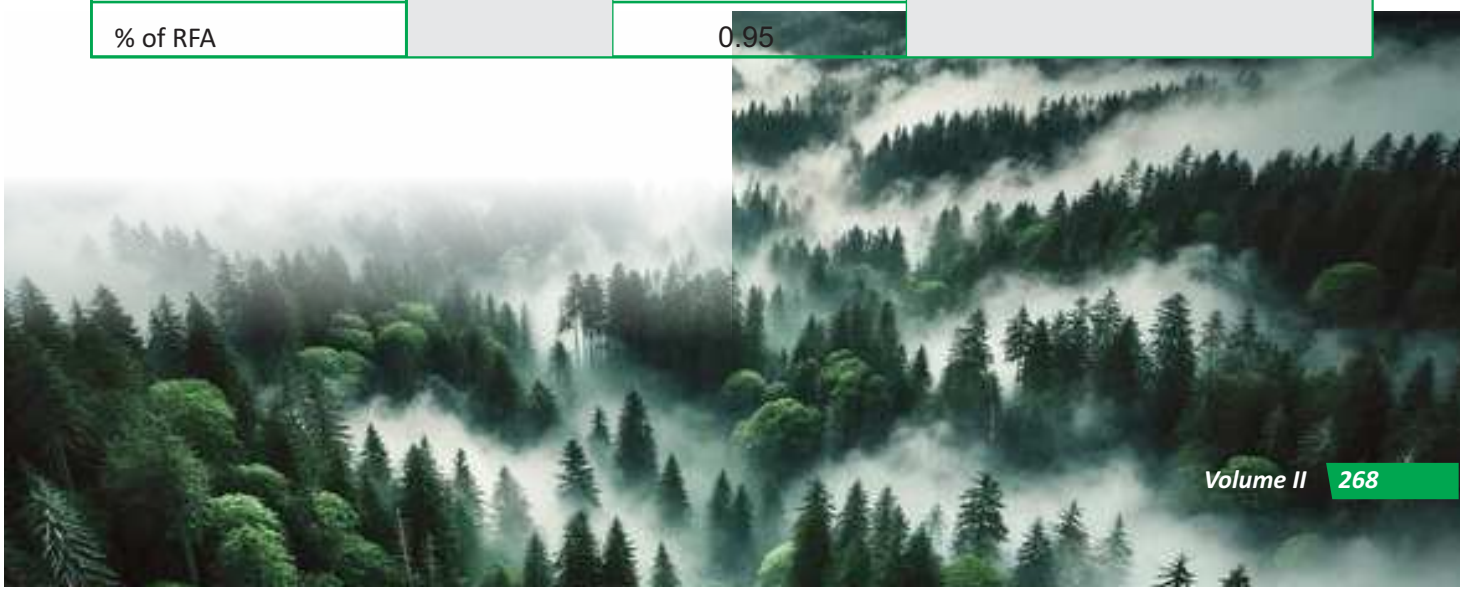
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	11			
SNPP-VIIRS Detections	Number of fire cases	64	26	-38	-59.375

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0	0	-
Highly fire prone	%	0	0	-
Moderately fire prone	%	0	0.81	0.81
Less fire prone	%	100	99.19	-0.81

Wetlands within RFA

Indicator	2019
Number	74
Area (in ha)	2609
% of RFA	0.95

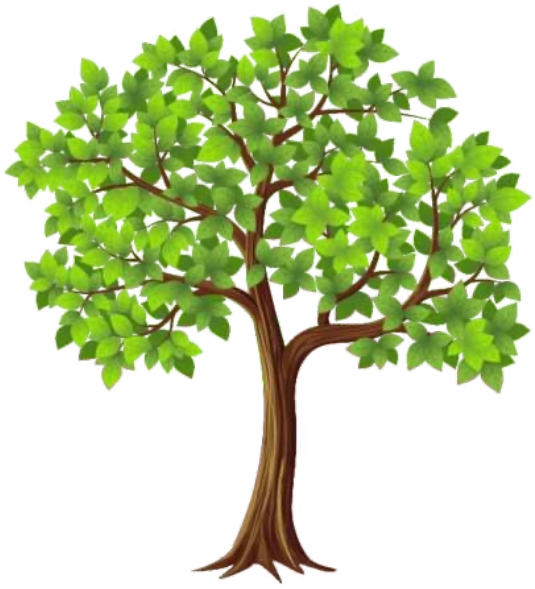


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	29	35	59
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	2.35	1.95	1.08
Subtropical Broadleaved Hill Forests	2.19	2.62	2.75
Montane Wet Temperate Forests	1.9	2.41	2.53
Himalayan Moist Temperate Forests	1.66	2.57	-
Sub-Alpine Forests	0.83	1.87	2.09
Moist Alpine Scrub	0.69	0.64	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	10.49	7.03	2.94
Subtropical Broadleaved Hill Forests	8.94	13.74	15.64
Montane Wet Temperate Forests	6.69	11.13	12.55
Himalayan Moist Temperate Forests	5.26	13.07	-
Sub-Alpine Forests	2.29	6.49	8.08
Moist Alpine Scrub	1.99	1.9	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	22.05
Inadequate	51.92
Absent	17.77
NA	8.26
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	0.58
Moderately degraded	9.25
Mildly degraded	69.91
Not degraded	14.44
NA	5.82
Invasive Species [Distribution of RFA (%)]	
Very Dense	0
Dense	4.44
Moderate	10.34
Scanty	19.18
Absent	50.17
NA	15.87



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.23.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	4.88	0.04%	4.62	0.01%	-0.26	-5.29%
Value of non-timber forest products (NTFP)	(₹ in crore)	4.85	0.04%	3.62	0.01%	-1.23	-25.35%
Total Timber+ NTFP Services	(₹ in crore)	9.73	0.08%	8.24	0.02%	-1.49	-15.31%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP has reported a marginal decline from 0.04% in 2011-12 to 0.01% in 2021-22, and 5.29% reduction in absolute value as well. The NTFPs has registered a significant reduction of 25.35% in their value, while in terms of % of SGDP it has a nominal reduction from 0.04% to 0.01%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.08% to 0.02%, and their total value decreased by 15.31%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	2802.96	15.54%	4843.57	12.86%	2040.61	72.80%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in SGDP declined from 15.54% in 2015-16 to 12.86% in 2021-22, while the absolute value registered an increase of 72.80%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	8277
Revenue from ecotourism	(₹ in lakh)	-	0.52

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2019-20, tourist inflow for ecotourism reached 8277 visitors, generating a revenue of ₹0.52 lakh. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

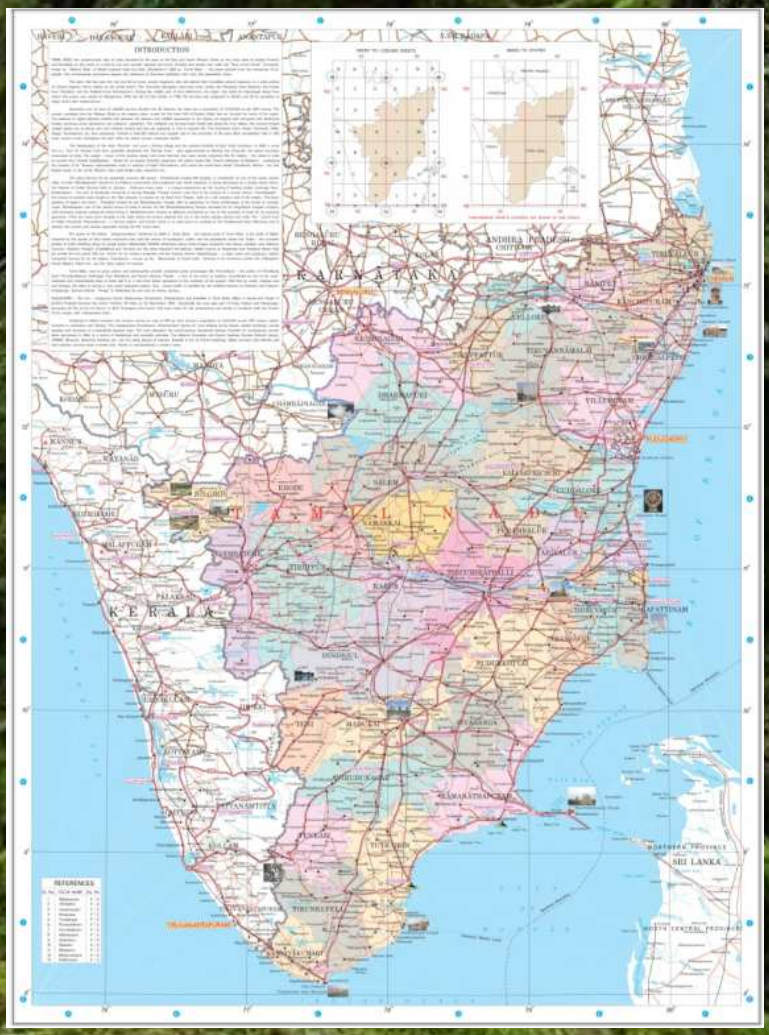
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	4.88	0.04%	8.43	0.04%	3.55	72.82%
Value of non-timber forest products (NTFP)	(₹ in crore)	4.85	0.04%	1.89	0.01%	-2.96	-61.10%
Total Timber+ NTFP Services	(₹ in crore)	9.73	0.08%	10.32	0.05%	0.59	6.06%

At constant prices, the absolute monetary value of timber provisioning services has increased by 72.82% from 2011-12 to 2021-22, while its value as % of SGDP has remained at 0.04%. In case of NFTP services, it had shown significant reduction in absolute by 61.10% and in SGDP by 0.03%. Collectively, the combined absolute timber and NTFP services increased by nearly 6.06%, while its value as % of SGDP has a nominal fall from 0.08% to 0.05%. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	1693.87	11.79%	1983.30	9.34%	289.43	17.09%

The carbon retention services as % of SGDP fall from 11.79% in 2015-16 to 9.34% in 2021-22, while the absolute value registered an increase of 17.09%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

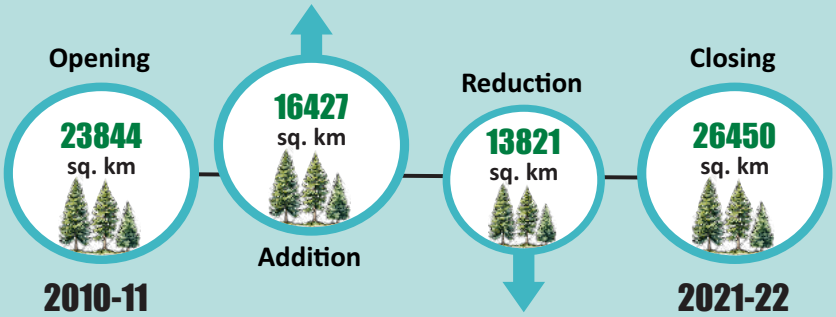
TAMILNADU



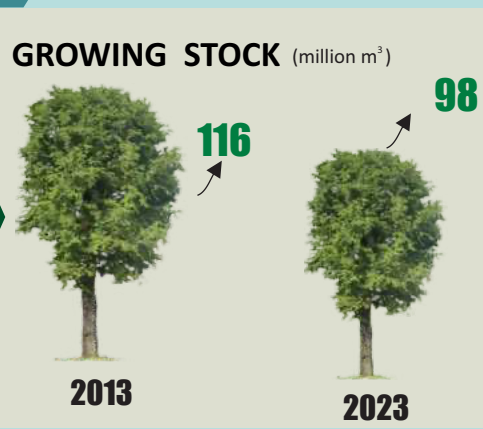
FOREST EXTENT ACCOUNT

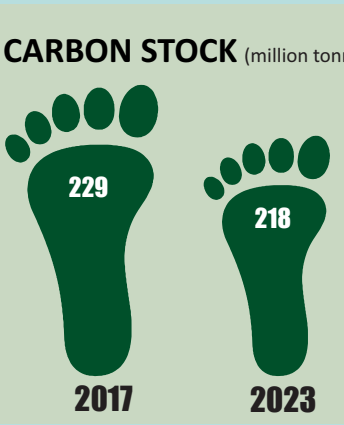
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
130060 Sq. Km	17.59%	17.83%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	0.12%	2015-16	1.13%
2021-22	0.04%	2021-22	0.89%

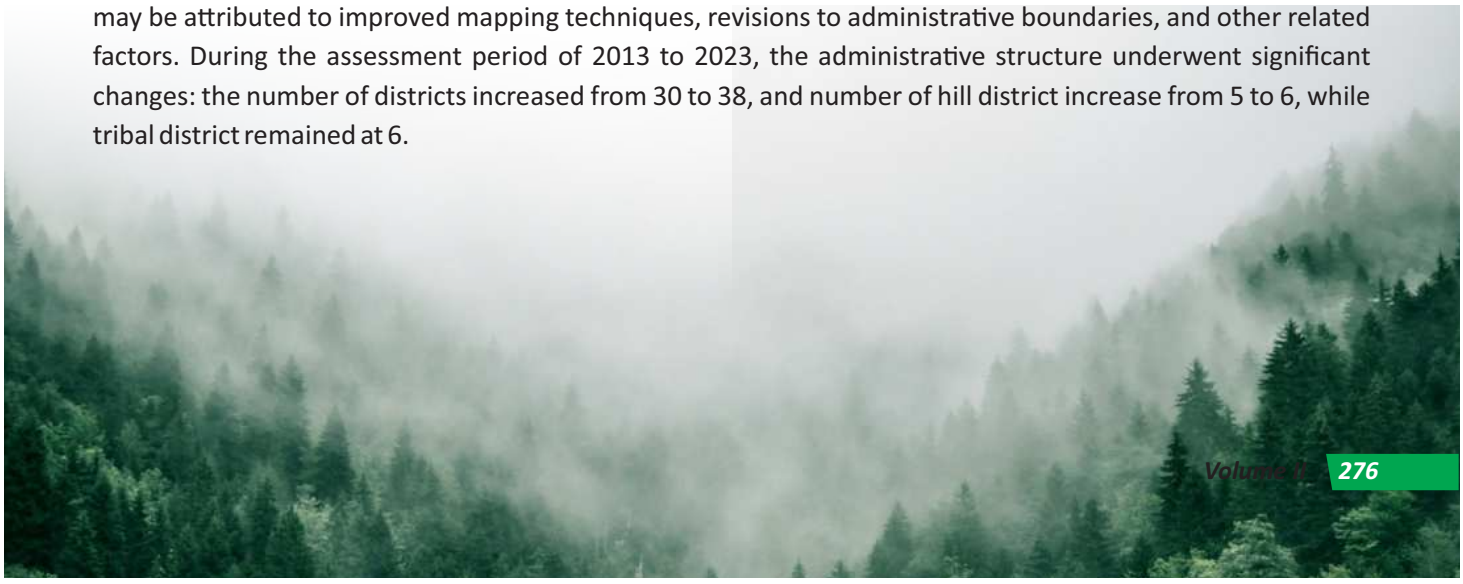
5.24 Tamil Nadu, situated in the southernmost part of India, encompasses a diverse range of ecological zones extending from the marine coastal systems along the Gulf of Mannar to the lush evergreen forests of the Western Ghats and the temperate forests of its hilly regions. physio graphically, the state can be divided into four major regions - the Coastal Plains, Eastern Ghats, Central Plateau, and Western Ghats. Tamil Nadu experiences a humid tropical climate, with annual rainfall ranging from 900 mm to 1,200 mm and temperatures varying between 19°C and 37°C. According to the Champion & Seth Classification of Forest Types (1968), the forests of Tamil Nadu are classified into nine Forest Type Groups, further divided into 39 forest types.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**sq km**	130058	130060
Population (as per Census 2011)	**Million**	72.15	
Average Population Density	**Per sq km**	555	
No. of Districts		30	38
No. of Hill Districts		5	6
No. of Tribal Districts		6	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Tamil Nadu is at 130060 square kilometres, with a population of 72.15 million and an average population density of 555 persons per square kilometre, as per Census 2011 data. The change in area may be attributed to improved mapping techniques, revisions to administrative boundaries, and other related factors. During the assessment period of 2013 to 2023, the administrative structure underwent significant changes: the number of districts increased from 30 to 38, and number of hill district increase from 5 to 6, while tribal district remained at 6.



5.24.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	2948	10199	10697	1212	105002
Addition	1936.72	5761.56	8728.91	821.44	4133.38
Reduction	1298.53	4933.53	7588.91	1155.15	6403.89
Closing 2021-22	3586.19	11027.03	11837	878.29	102731.5
Net change	638.19	828.03	1140	-333.71	-2270.51
% Change	21.6%	8.12%	10.66%	-27.53%	-2.16%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2, chapter 2 of Vol I.

Between 2010-11 and 2021-22, Tamil Nadu's forest cover underwent notable variations across different forest types, as recorded in the Forest Asset Account. The VDF, MDF, and OF categories registered increases of 21.65%, 8.12%, and 10.66%, respectively. In contrast, scrub areas declined markedly by 27.33%. For most forest cover class, it shows a positive trend, while Scrub and Non- Forest experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.24.2 Extent Account

Indicator	Unit	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	Sq km	22877	23188	311	1.36
% of GA		17.59	17.83	0.24	1.36
Type of Protection					
Reserved Forests (RF)	sq km	19388	20523	1135	5.85
Protected Forest (PF)	sq km	2183	1053	-1130	-51.76
Unclassed Forests	sq km	1306	1612	306	23.43

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) significantly increased by 311 sq. km, covering 23188 sq. km, which is 17.83 % of the state's geographical area during observed period. During this period, Reserved forests increased by 5.85%, while the area under Protected forest declined sharply by 51.76%. In Contrast Unclassed Forests recorded a notable growth of 23.43%. These trends indicate a substantial overall increase in the state's forest extent, accompanied by marked shifts in the composition and protection status of different forest categories.

5.24.3 Condition Accounts

The condition account for the forests of Tamil Nadu for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	116.042	98.38	-17.66	-15.22
Growing Stock in Forest per unit area	m^3/ha	-	51.75		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	2,29,338	2,17,560	-11,778	-5.14
Above Ground Biomass	'000 tonnes	84,067	61,872	-22,195	-26.40
Below Ground Biomass	'000 tonnes	29,252	21,053	-8,199	-28.03
Dead Wood	'000 tonnes	1,006	2,866	1,860	184.89
Litter	'000 tonnes	5,579	3,123	-2,456	-44.02
Soil Organic Carbon	'000 tonnes	1,09,434	1,28,646	19,212	17.56

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	87.26	82.25	-5.01	-5.74
Above Ground Biomass	Per hectare stock in tonnes	31.99	23.39	-8.6	-26.88
Below Ground Biomass	Per hectare stock in tonnes	11.13	7.96	-3.17	-28.48
Dead Wood	Per hectare stock in tonnes	0.38	1.08	0.7	184.21
Litter	Per hectare stock in tonnes	2.12	1.18	-0.94	-44.34
Soil Organic Carbon	Per hectare stock in tonnes	41.64	48.64	7	16.81

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.62		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.55		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	17.75	12.51	-	
> 1.0 ≤ 10	%		9.36		
> 10 ≤ 100	%	12.16	10.92	-1.24	
> 100 ≤ 500	%	8.41	11.49	3.08	
> 500 ≤ 1000	%	0	0	-	
> 1000 ≤ 5000	%	61.68	55.72	-5.96	
> 5000 ≤ 10000	%	0	0	-	
>10000	%	0	0	-	

Forest Fires

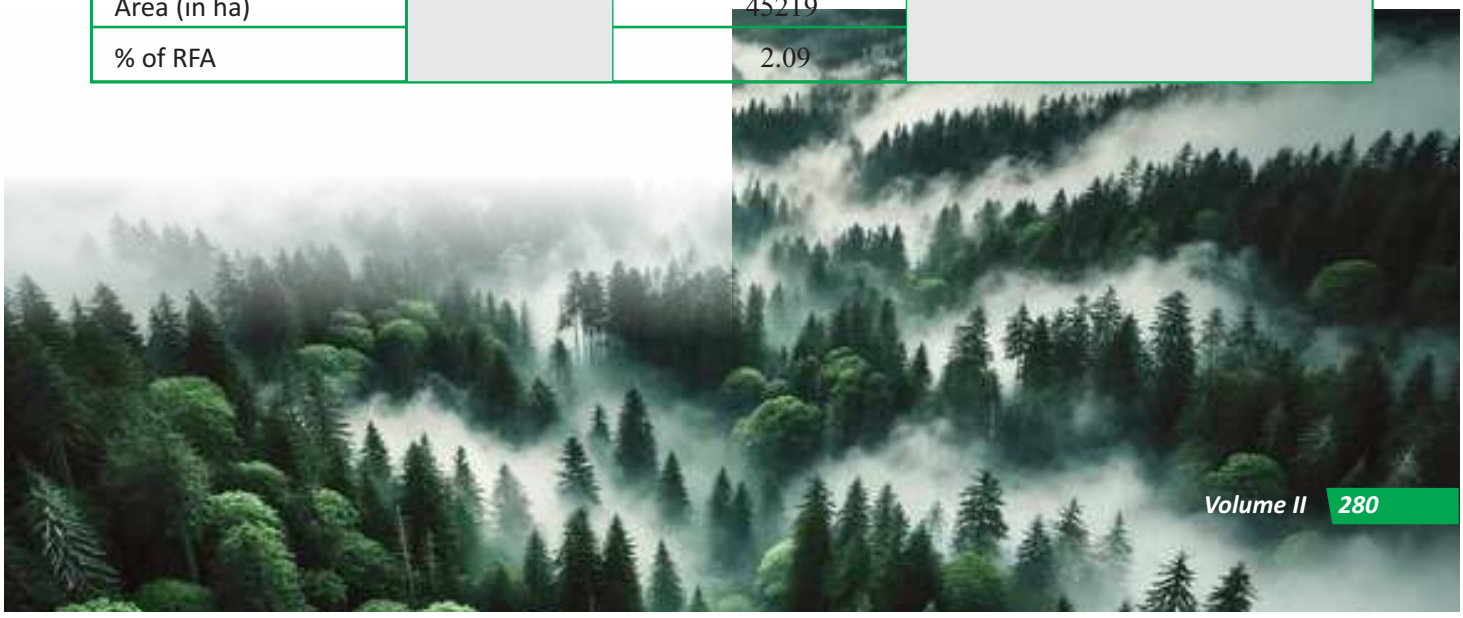
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	752	151	-601	-79.92
SNPP-VIIRS Detections	Number of fire cases	4402	1035	-3367	-76.49

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0	0.35	0.35
Highly fire prone	%	2.19	2.53	0.34
Moderately fire prone	%	7.92	6.22	-1.7
Less fire prone	%	89.89	90.9	1.01

Wetlands within RFA

Indicator	2019
Number	1523
Area (in ha)	45219
% of RFA	2.09

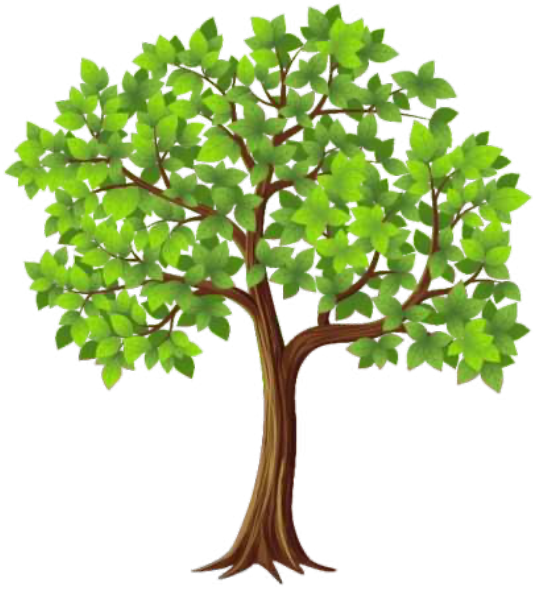


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	87	313	252
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	2.03	3.23	3.25
Tropical Semi-Evergreen Forests	2.3	2.82	2.77
Tropical Moist Deciduous Forests	2.31	3.27	3.39
Littoral & Swamp Forests	1.43	1.04	-
Tropical Dry Deciduous Forests	2.26	3.91	3.92
Tropical Thorn Forests	1.85	3.1	3.09
Tropical Dry Evergreen Forests	1.77	2.82	2.81
Subtropical Broadleaved Hill Forests	0.62	3.2	2.94
Montane Wet Temperate Forests	2.36	2.68	2.18
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	7.61	25.28	25.79
Tropical Semi-Evergreen Forests	9.97	16.78	15.96
Tropical Moist Deciduous Forests	10.07	26.31	29.67
Littoral & Swamp Forests	4.18	2.83	-
Tropical Dry Deciduous Forests	9.58	49.9	50.4
Tropical Thorn Forests	6.36	22.2	21.98
Tropical Dry Evergreen Forests	5.87	16.78	16.61
Subtropical Broadleaved Hill Forests	1.86	24.53	18.92
Montane Wet Temperate Forests	10.59	14.59	8.85

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	33.08
Inadequate	40.92
Absent	9.5
NA	16.5
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	2
Moderately degraded	24.98
Mildly degraded	55.04
Not degraded	13.22
NA	4.76
Invasive Species [Distribution of RFA (%)]	
Very Dense	3.61
Dense	15.53
Moderate	24.08
Scanty	15.37
Absent	10.82
NA	30.59



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.24.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	198.69	0.03%	412.77	0.02%	214.09	107.75%
Value of non-timber forest products (NTFP)	(₹in crore)	678.94	0.09%	403.68	0.02%	-275.26	-40.54%
Total Timber+ NTFP Services	(₹in crore)	877.63	0.12%	816.45	0.04%	-61.17	-6.97%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 107.75% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.03% to 0.02%. In case of NFTP services, it had shown a noteworthy reduction in absolute by 40.54% and in SGDP by 0.07%. Collectively, the combined absolute timber and NTFP services decreased by nearly 6.97%, and its value as % of SGDP has a fall from 0.12% to 0.04%. This indicates that, while the economic value of timber provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	13244.86	1.13%	18543.43	0.89%	5298.57	40.00%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in SGDP declined from 1.13% in 2015-16 to 0.89% in 2021-22, while the absolute value registered an increase of 40%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	5397557
Revenue from ecotourism	(₹ in lakh)	-	2180.57

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2019-20, tourist inflow for ecotourism reached 5397557 visitors, generating a revenue of ₹2180.57 lakh. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

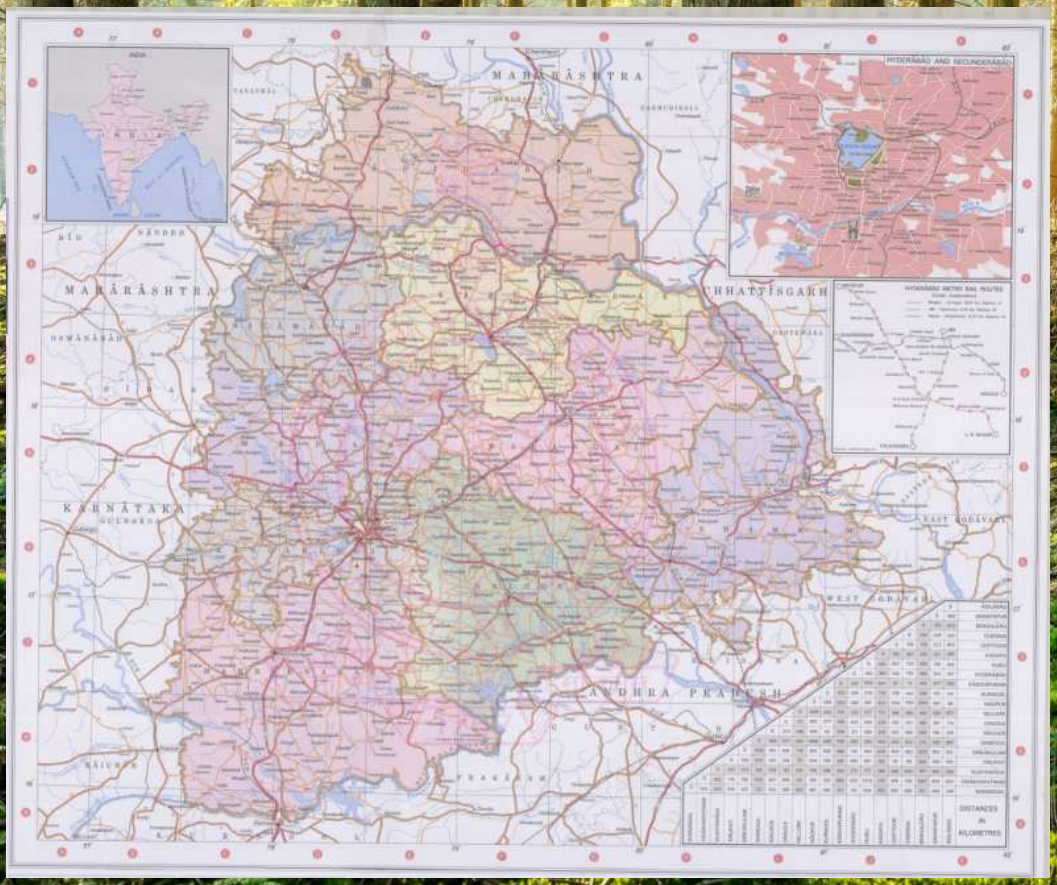
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	198.69	0.03%	457.35	0.03%	258.67	130.19%
Value of non-timber forest products (NTFP)	(₹ in crore)	678.94	0.09%	258.71	0.02%	-420.23	-61.89%
Total Timber+ NTFP Services	(₹ in crore)	877.63	0.12%	716.06	0.05%	-161.56	-18.41%

At constant price, the absolute monetary value of timber provisioning services has increased by 130.19% from 2011-12 to 2021-22, while its value as % of SGDP has remained consistent at 0.03%. In case of NFTP services, it had shown significant reduction in absolute by 61.89% and in SGDP by 0.07%. This causes fall in the overall provisioning services, which reduce by 18.41% in absolute terms and from 0.12% to 0.05% as % of SGDP. This pattern indicates that, despite growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the absolute and the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	8004.05	0.83%	7592.99	0.57%	-411.06	-5.14%

At constant prices, the carbon retention services in SGDP decreased from 0.83% in 2015-16 to 0.57% in 2021-22, and its absolute value also showed a marginal fall of 5.14%.

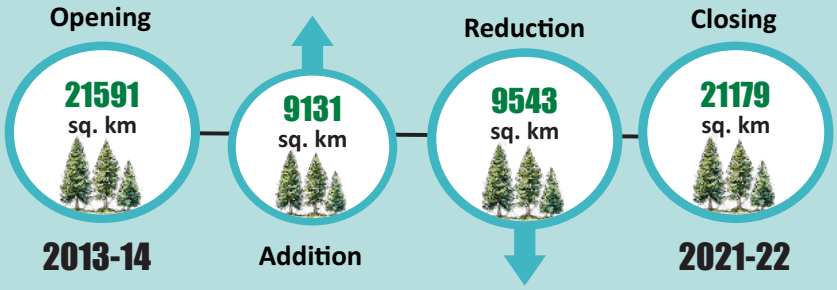
TELANGANA


MAHARĀSHTRA
KARNĀTAKA
CHHATTĪSGARH
ANDHRA PRADESH
DISTANCES IN KILOMETRES

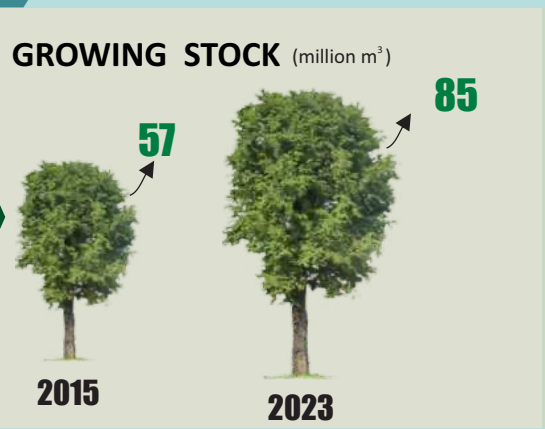
FOREST EXTENT ACCOUNT

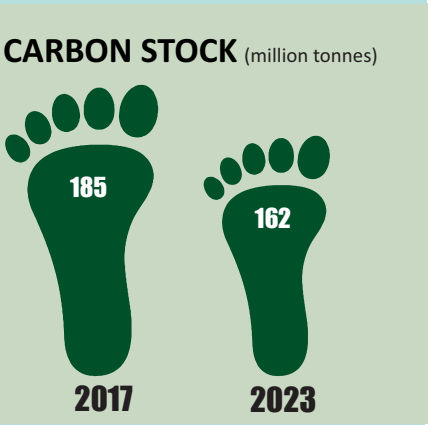
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2015	2023
112122 Sq. Km	23.42%	24.69%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.14%
2021-22	0.07%

REGULATING SERVICES
Carbon Retention Service

2015-16	1.85 %
2021-22	1.23%

5.25 Telangana, located in south-central India, is characterized by a predominantly the Deccan Plateau in the central stretch. The state experiences a sub-tropical climate. According to the Champion & Seth Classification of Forest Types (1968), the state's forests are classified into 3 Type Groups, further subdivided into 12 distinct Forest Types. Dry mixed deciduous forests dominate much of the landscape, while moist mixed deciduous forests occur in higher-rainfall tracts, particularly in the northern districts. The drier regions are marked by dry deciduous, dry savannah and thorn forests.

State Profile

Indicator	Unit	2015	2023
Geographical Area	**Sq. km**	114865	112122
Population (as per Census 2011)	**Million**	35.19	
Average Population Density	**Per sq. km**	306	
No. of Districts		10	33
No. of Hill Districts		0	
No. of Tribal Districts		3	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Telangana changed from 114865 sq. km in 2015 to 112122 sq. km with a population of 35.19 million and an average population density of 306 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques, updates in administrative boundary definitions, and corrections to earlier data,. During the assessment period of 2015 to 2023, the administrative structure underwent significant changes: the number of districts increased from 10 to 33 and number of tribal districts remained at 3.

5.25.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2013-14	513	12712	8366	1874	91400
Addition	1227	1613.51	6290.6	3545.39	3807.02
Reduction	126.68	5415.61	4000.78	2589.51	7093.5
Closing 2021-22	1613.32	8909.9	10655.82	2829.88	88113.52
Net change	1100.32	-3802.1	2289.82	955.88	-3286.48
% Change	214.49%	-29.91%	27.37%	51.01%	-3.60%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2013-14 and 2021-22, Telangana's Forest cover underwent several changes across different forest types. VDF saw a more notable increase, rising by 214.49%. This is mainly due to shift of 1139 sq. km area from MDF to VDF in 2017 assessment period. Scrub areas also grew substantially, a net gain of 51.01%. For most forest cover class, it shows a positive trend, while MDF and Non- Forest experienced some level of decrease during this period, with the most notable change in the VDF category.

5.25.2 Extent Account

Indicator (area in sq. km)	2015	2023	Net Change	% Change
Recorded Forest Area (RFA)	26904	27688	784	2.91
% of GA	23.42	24.69	1.27	
Type of Protection				
Reserved Forests (RF)	20353	25800	5447	26.76
Protected Forest (PF)	5939	1592	-4347	-73.19
Unclassed Forests	612	296	-316	-51.63

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 784 sq. km, marking a 2.91% rise and expanding marginally from 23.42% to 24.69% of the state's geographical area during observed period. During this period, Reserved Forests grew by 26.76%, and Unclassed Forest reduced by 51.63%. The Protected Forests category saw a dramatic decrease of 4347sq. km, reflecting a significant reclassification. These trends reflect a shift in the categorization of forest areas, with increases in the reserved forests.

5.25.3 Condition Accounts

The condition account for the forests of Telangana for 2015 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2015	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	57.386	85.47	28.08	48.94
Growing Stock in Forest per unit area	m^3/ha	-	45.14		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,84,975	1,61,732	-23,243	-12.57
Above Ground Biomass	'000 tonnes	72,498	43,554	-28,944	-39.92
Below Ground Biomass	'000 tonnes	28,388	18,028	-10,360	-36.49
Dead Wood	'000 tonnes	333	1,420	1,087	326.43
Litter	'000 tonnes	3,117	2,062	-1,055	-33.85
Soil Organic Carbon	'000 tonnes	80,639	96,668	16,029	19.88

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	90.59	76.35	-14.24	-15.72
Above Ground Biomass	Per hectare stock in tonnes	35.51	20.56	-14.95	-42.1
Below Ground Biomass	Per hectare stock in tonnes	13.9	8.51	-5.39	-38.78
Dead Wood	Per hectare stock in tonnes	0.16	0.67	0.51	318.75
Litter	Per hectare stock in tonnes	1.53	0.97	-0.56	-36.6
Soil Organic Carbon	Per hectare stock in tonnes	39.49	45.64	6.15	15.57

Forest Fragmentation				
Indicator	**Unit**	**2015**	**2017**	
Average Patch Size[#]	Sq. km	2.54	1.47	
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	94.84	94.86	
Patch Size Range (in sq. km)	**% of forest cover**	**2015**	**2017**	**Net Change**
≥ 0.01 ≤ 1.0	%	3.47	6.16	2.69
> 1.0 ≤ 10	%	4.53	8.32	3.79
> 10 ≤ 100	%	8.78	12.46	3.68
> 100 ≤ 500	%	18.29	15.45	-2.84
> 500 ≤ 1000	%	20.6	13.68	-6.92
> 1000 ≤ 5000	%	20.63	43.93	23.30
> 5000 ≤ 10000	%	23.7	-	-23.70
>10000	%	-	-	-

Forest Fires

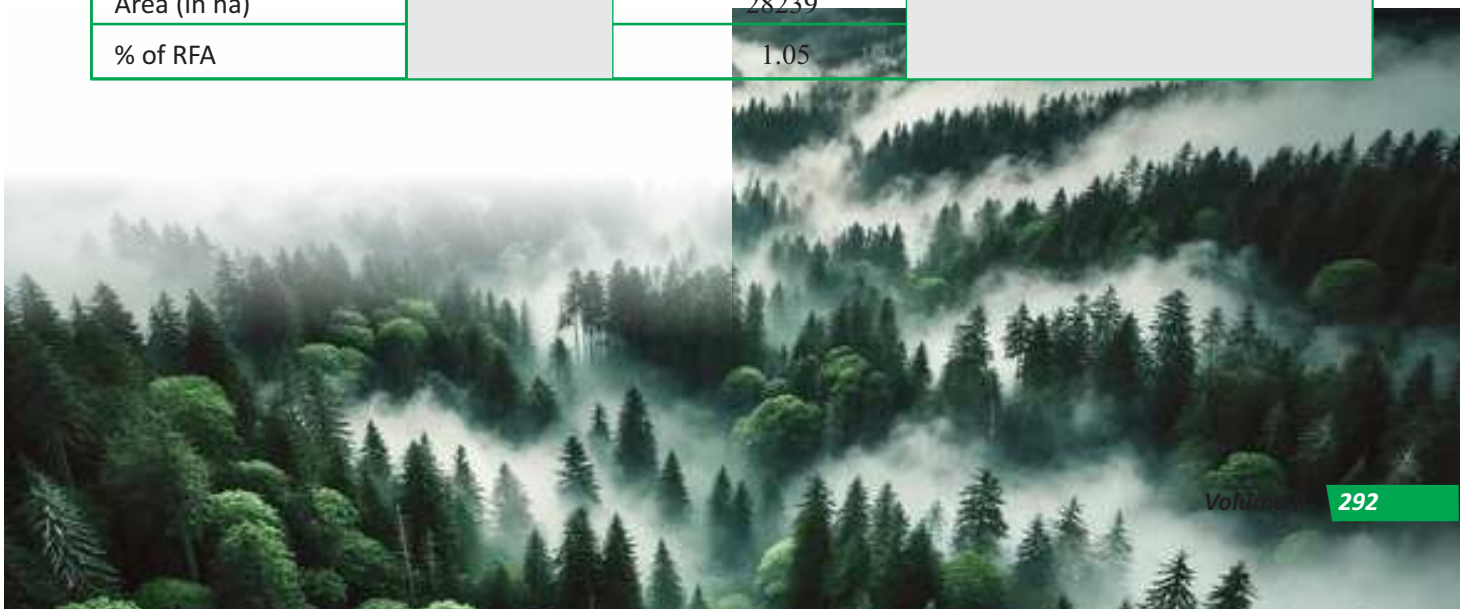
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	1246	1372	126	10.11
SNPP-VIIRS Detections	Number of fire cases	15262	13737	-1525	-9.99

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	4.21	6.32	2.11
Very highly fire prone	%	6.89	25.01	18.12
Highly fire prone	%	17.59	17.99	0.4
Moderately fire prone	%	18.6	12.67	-5.93
Less fire prone	%	52.71	38.01	-14.7

Wetlands within RFA

Indicator	2019
Number	1070
Area (in ha)	28239
% of RFA	1.05

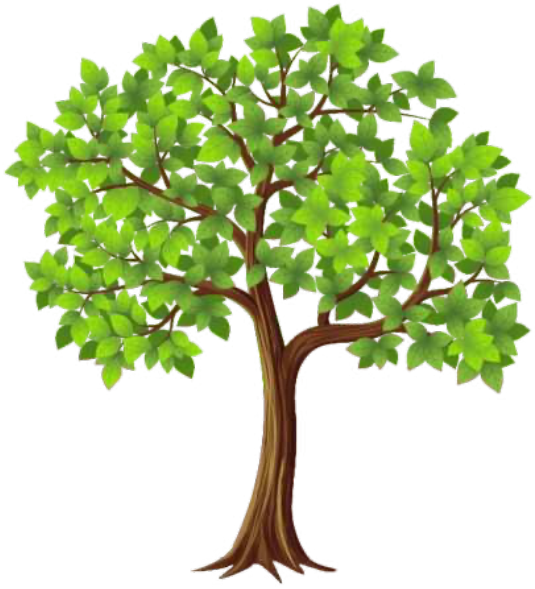


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	33	67	167
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	1.95	3.03	2.65
Tropical Dry Deciduous Forests	2.34	2.68	3.63
Tropical Thorn Forests	1.80	2.33	2.42
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	7.03	20.70	14.15
Tropical Dry Deciduous Forests	10.38	14.59	37.71
Tropical Thorn Forests	6.05	10.28	11.25

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	47.74
Inadequate	18.4
Absent	6.93
NA	26.93
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	15.76
Moderately degraded	32.85
Mildly degraded	43.06
Not degraded	5.06
NA	3.27
Invasive Species [Distribution of RFA (%)]	
Very Dense	0.82
Dense	6.14
Moderate	23.28
Scanty	15.83
Absent	42.32
NA	11.61



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.25.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	92.1	0.03%	555.01	0.05%	462.91	502.61%
Value of non-timber forest products (NTFP)	(₹in crore)	381.58	0.11%	221.66	0.02%	-159.91	-41.91%
Total Timber+ NTFP Services	(₹in crore)	473.68	0.14%	776.67	0.07%	303	63.97%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP increased from 0.03% in 2011-12 to 0.05% in 2021-22, and its absolute monetary value has also increased drastically by 502.61%. The non-timber forest product provisioning services showed a decrease in value by 41.91%, and its value as % of SGDP has also declined, from 0.11% to 0.02%. Collectively, the combined timber and NTFP services in SGDP fell from 0.14% to 0.07%, even as their overall absolute value increased by nearly 63.97%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	10682.79	1.85%	13785.01	1.23%	3102.22	29.04%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP show a marginal reduction from 1.85% in 2015-16 to 1.23% in 2021-22, while the absolute value registered an increase of 29.04%. This growth in total value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors of economy, has experienced a slight decline.

2) Ecosystem services (at constant prices)

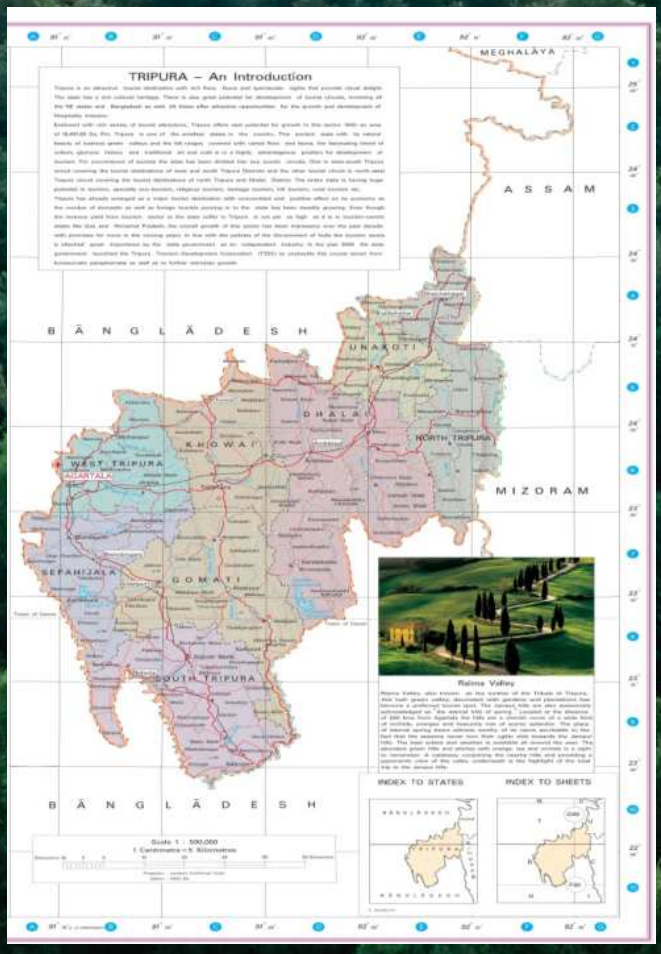
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	92.1	0.03%	109.35	0.02%	17.25	18.73%
Value of non-timber forest products (NTFP)	(₹ in crore)	381.58	0.11%	162.36	0.02%	-219.22	-57.45%
Total Timber+ NTFP Services	(₹ in crore)	473.68	0.14%	271.71	0.04%	-201.97	-42.64%

At constant price, the absolute monetary value of timber provisioning services has increased by 18.73% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.03% to 0.02%. In case of NFTP services, it had shown reduction in absolute by 57.45% and in SGDP by 0.09%. This causes fall in the overall provisioning services, which reduce by 42.64% in absolute terms and from 0.14% to 0.04% as % of SGDP. This pattern indicates that, despite moderate growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	6455.75	1.39%	5644.56	0.84%	-811.2	-12.57%

At constant prices, the carbon retention services in % of SGDP decline slightly from 1.39% in 2015-16 to 0.84% in 2021-22, and the absolute value declined as well by 12.57%. This highlights a minimal decrease in the relative economic contribution of carbon retention services during the period.

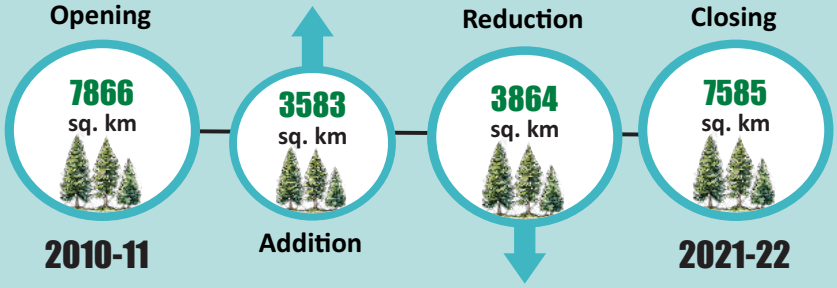
TRIPURA


TRIPURA – An Introduction
MEGHALAYA
ASSAM
BĀNGLĀDESH
UNAKOTI
DHALAI
KHOWAI
WEST TRIPURA
AGARTALA
NORTH TRIPURA
MIZORAM
SEPAHIJALA
GOMATI
SOUTH TRIPURA
Rajma Valley
INDEX TO STATES
INDEX TO SHEETS
Scale 1 : 500,000
1 Centimetre = 5 Kilometres

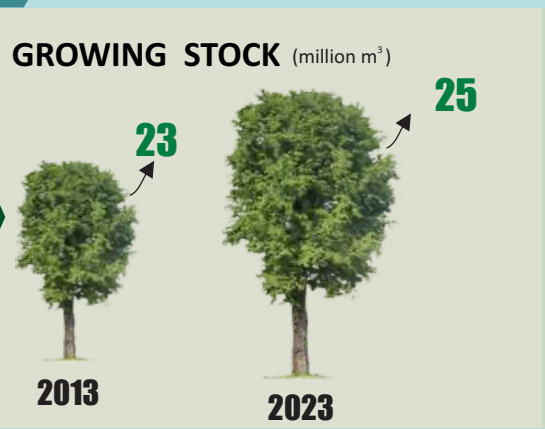
FOREST EXTENT ACCOUNT

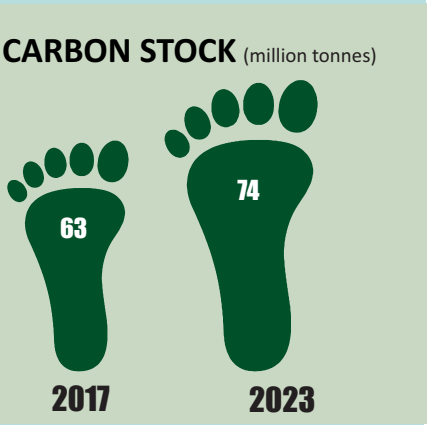
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
10486 Sq. Km	60.02 %	60.03 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	1.41 %	2015-16	10.19 %
2021-22	0.53 %	2021-22	10.16 %

5.26 Tripura, situated in the North Eastern region of India, is a small but ecologically rich state covering 10,486 sq. km, which accounts for 0.32% of the country's geographical area. Its terrain is predominantly hilly, and all four districts are classified as both hilly and tribal in nature. According to the Champion & Seth Classification of Forest Types (1968), the forests of Tripura belong to two Forest Type Groups, further divided into five forest types. The state's forests are mainly tropical evergreen, tropical semi-evergreen, and moist deciduous, reflecting its warm and humid climatic conditions and rich biodiversity.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**sq km**	10491	10486
Population (as per Census 2011)	**Million**	3.67	
Average Population Density	**Per sq km**	350	
No. of Districts		4	8
No. of Hill Districts		4	8
No. of Tribal Districts		4	8

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Tripura slightly decreased from 10,491 sq km in 2013 to 10486 sq km in 2023 with a population of 3.67 million and an average population density of 350 persons per square kilometre, as per Census 2011 data. The change in area may be attributed to improved mapping techniques, revisions to administrative boundaries, and other related factors. During this period, the administrative structure underwent some changes: the number of Districts increased from 4 to 8, no of Hill districts increased from 4 to 8 and no of Tribal districts increased from 4 to 8.

5.26.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	109	4641	3116	66	2559
Addition	585.49	1838.95	1158.5	192.83	773.89
Reduction	80.06	1549.96	2234.15	85.56	604.93
Closing 2021-22	614.43	4929.99	2040.35	173.27	2727.96
Net change	505.43	288.99	-1075.65	107.27	168.96
% Change	463.70%	6.23%	-34.52%	162.53%	6.60%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2, chapter 2 of Vol I.

Between 2010-11 and 2021-22, Tripura's forest cover underwent notable changes across different forest types, as recorded in the Forest Asset Account. The VDF registered a substantial increase of 463.7%, primarily driven by the shift of 392 sq. km area from MDF and 184 sq. km from OF during the 2017 assessment period. Scrub areas grew sharply by 162.53%, mainly due to a shift of 35.02 sq. km from MDF and 1.27 sq. km from OF in the 2023 assessment period. The extent of non-forest areas also rose by 6.60%. For most forest cover class, it shows a positive trend, while Non- Forest experienced some level of decrease during this period, with the most notable change in the VDF category.

5.26.2 Extent Account

Indicator (area in sq. km)	Unit	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	sq km	6294	6295	1	
% of GA		60.02	60.03	0.01	
Type of Protection					
Reserved Forests (RF)	sq km	4175	3588	-587	-14.06
Protected Forest (PF)	sq km	2			
Unclassed Forests	sq km	2117	2705	588	27.78

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA)marginally increased by 1 km, covering 6295 sq km which is 60.035 of state's Geographical area during observed period. Reserved Forests decrease by 14.06%. The Unclassed Forest saw a considerable increase of 27.78%, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas.

5.26.3 Condition Accounts

The condition account for the forests of Tripura for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	22.904	25.31	2.41	10.50
Growing Stock in Forest per unit area	m^3/ha	-	43.5		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	63,408	74,254	10,846	17.11
Above Ground Biomass	'000 tonnes	15,674	24,417	8,743	55.78
Below Ground Biomass	'000 tonnes	3,224	5,371	2,147	66.59
Dead Wood	'000 tonnes	556	617	61	10.97
Litter	'000 tonnes	1,613	1,630	17	1.05
Soil Organic Carbon	'000 tonnes	42,341	42,219	-122	-0.29

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	82.07	97.89	15.82	19.28
Above Ground Biomass	Per hectare stock in tonnes	20.29	32.19	11.9	58.65
Below Ground Biomass	Per hectare stock in tonnes	4.17	7.08	2.91	69.78
Dead Wood	Per hectare stock in tonnes	0.72	0.81	0.09	12.50
Litter	Per hectare stock in tonnes	2.09	2.15	0.06	2.87
Soil Organic Carbon	Per hectare stock in tonnes	54.8	55.66	0.86	1.57

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	2.27		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	97.39		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	4.83	3.27	-	
> 1.0 ≤ 10	%		2.73		
> 10 ≤ 100	%	0.75	1.81	1.06	
> 100 ≤ 500	%	0	4.70	4.70	
> 500 ≤ 1000	%	0	0	-	
> 1000 ≤ 5000	%	0	0	-	
> 5000 ≤ 10000	%	94.42	87.49	-6.93	
>10000	%	0	0	-	

Forest Fires

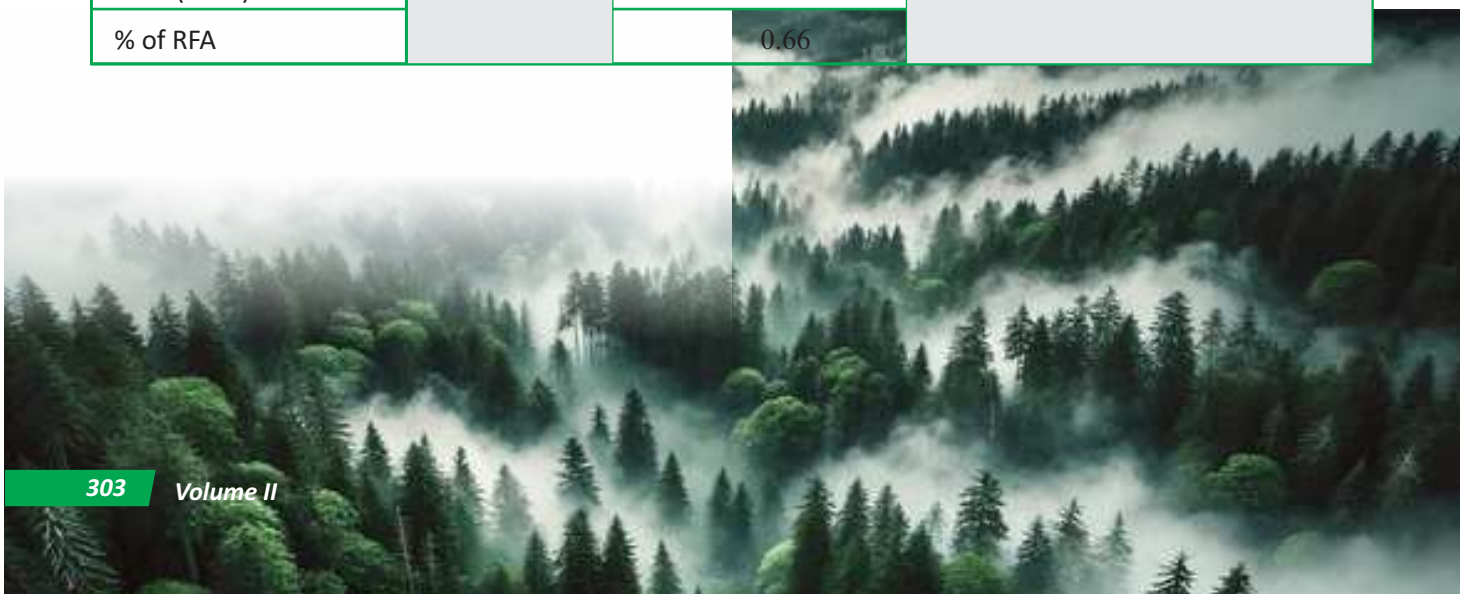
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	1195	310	-885	-74.06
SNPP-VIIRS Detections	Number of fire cases	3083	2609	-474	-15.37

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	26.95	8.88	-18.07
Very highly fire prone	%	21.9	23.09	1.19
Highly fire prone	%	12.62	14.24	1.62
Moderately fire prone	%	10.76	12.58	1.82
Less fire prone	%	27.77	41.21	13.44

Wetlands within RFA

Indicator	2019
Number	710
Area (in ha)	3879
% of RFA	0.66

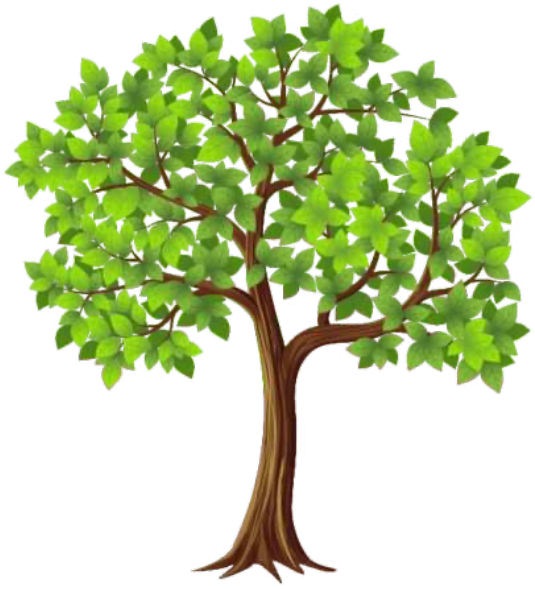


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	22	37	89
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	3.47	1.69	2.77
Tropical Moist Deciduous Forests	2.97	2.95	3.14
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	32.14	5.42	15.96
Tropical Moist Deciduous Forest	19.49	19.11	23.1

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	27.78
Inadequate	50.64
Absent	12.66
NA	8.92
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	2.16
Moderately degraded	13.26
Mildly degraded	67.72
Not degraded	14.18
NA	2.68
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.32
Dense	4.97
Moderate	26.14
Scanty	39.38
Absent	19.02
NA	9.17



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.26.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	142.70	0.74%	55.52	0.09%	-87.18	-61.09%
Value of non-timber forest products (NTFP)	(₹in crore)	128.25	0.67%	272.66	0.44%	144.41	112.60%
Total Timber+ NTFP Services	(₹in crore)	270.95	1.41%	328.18	0.53%	57.23	21.12%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of non-timber forest product provisioning services has increased by 112.60% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.67% to 0.44%. In case of timber services, it had shown reduction in absolute by 61.09%, while reduction in SGDP by 0.23%. There is rise in the overall provisioning services, which improve by 21.12% in absolute terms, but reduced from 1.41% to 0.53% as % of SGDP. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on NTFPs and a diminishing role for timber.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	3661.98	10.19%	6328.94	10.16%	2666.96	72.83%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in SGDP declined from 10.19% in 2015-16 to 10.16% in 2021-22, while the absolute value registered significant increase of 72.83%. This growth in absolute value suggests an improvement in the provision of these services over the decade; however, their relative economic contribution, when compared to other sectors, has experienced a slight decline.

Cultural Services	Unit	2011-12	2019-20	Net Change	0% Change
Tourist inflow for ecotourism	Number of tourists	173000	294000	121000	69.94%
Revenue from ecotourism	(₹ in lakh)	15.18	84.22	69.04	454.81%

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

The inflow of tourists for ecotourism shows a substantial rise of 69.94% from 2011-12 to 2019-20. Correspondingly, the revenue generated from ecotourism activities grew by 454.81%, during the same period. Ecotourism experienced a sharp rise in tourist numbers and revenue, though visitor inflow growth lagged behind the surge in revenue.

2) Ecosystem services (at constant prices)

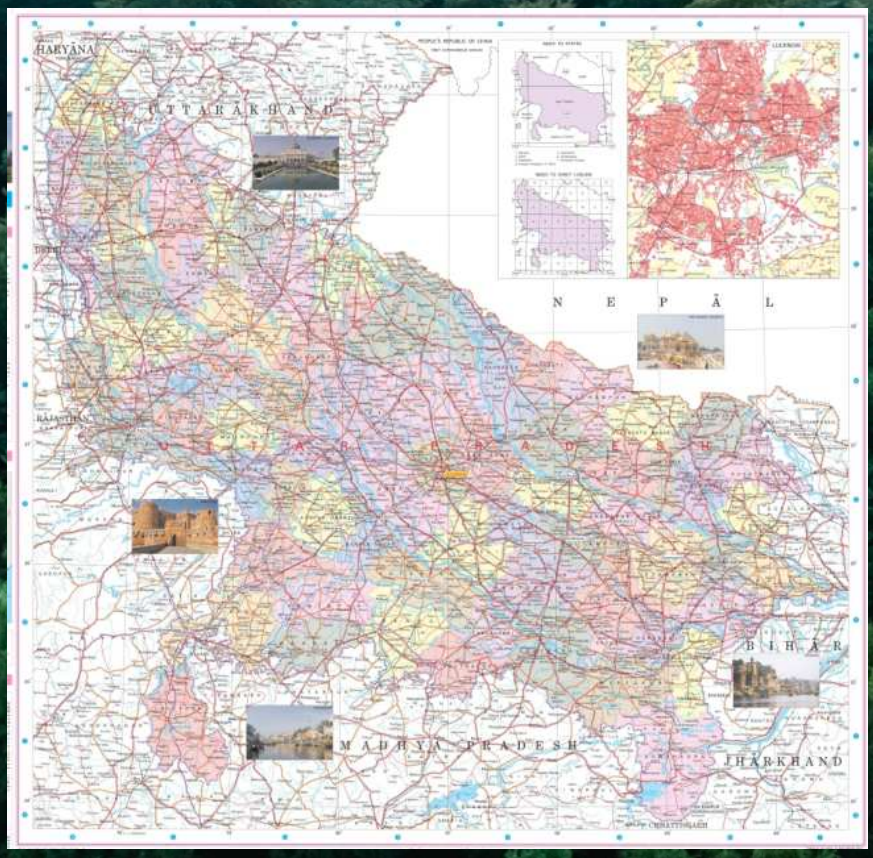
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	142.70	0.74%	105.32	0.27%	-37.38	-26.19%
Value of non-timber forest products (NTFP)	(₹ in crore)	128.25	0.67%	132.18	0.33%	3.93	3.06%
Total Timber+ NTFP Services	(₹ in crore)	270.95	1.41%	237.5	0.60%	-33.45	-12.35%

At constant price, the absolute monetary value of NTFPs provisioning services has increased by 3.06% from 2011-12 to 2021-22, while its value as % of SGDP has decline from 0.67% to 0.33%. In case of timber services, it had shown reduction in absolute by 26.19% and in SGDP by 0.47%. This causes fall in the overall provisioning services, which reduce by 12.35% in absolute terms and from 1.41% to 0.60% as % of SGDP. This pattern indicates that, despite moderate growth in NTFPs provisioning, the significant contraction in timber output has driven an overall decline in the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	2212.98	8.26%	2591.52	6.56%	378.53	17.11%

At constant prices, the carbon retention services in % of SGDP decreased from 8.26% in 2015-16 to 6.56% in 2021-22, while the absolute value showed an increase of 17.11%. This highlights a decrease in the relative economic contribution of carbon retention services during the period, even though there is a growth in their absolute value.

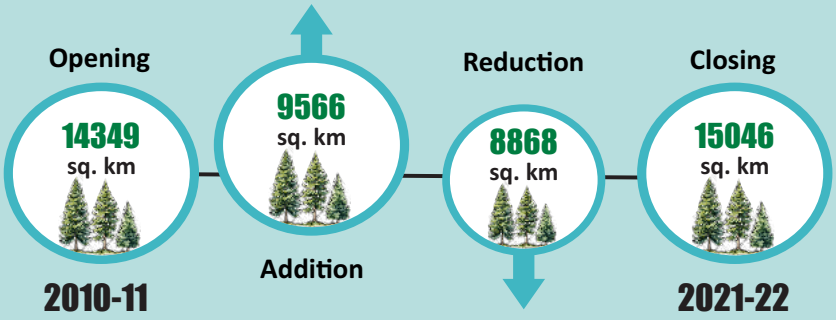
UTTAR PRADESH



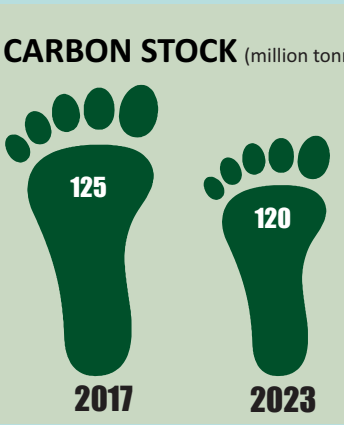
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
240928 Sq. Km	6.88%	7.24%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES		REGULATING SERVICES	
Total Timber + NTFP Services		Carbon Retention Service	
2011-12	0.42 %	2015-16	0.64 %
2021-22	0.15 %	2021-22	0.52 %

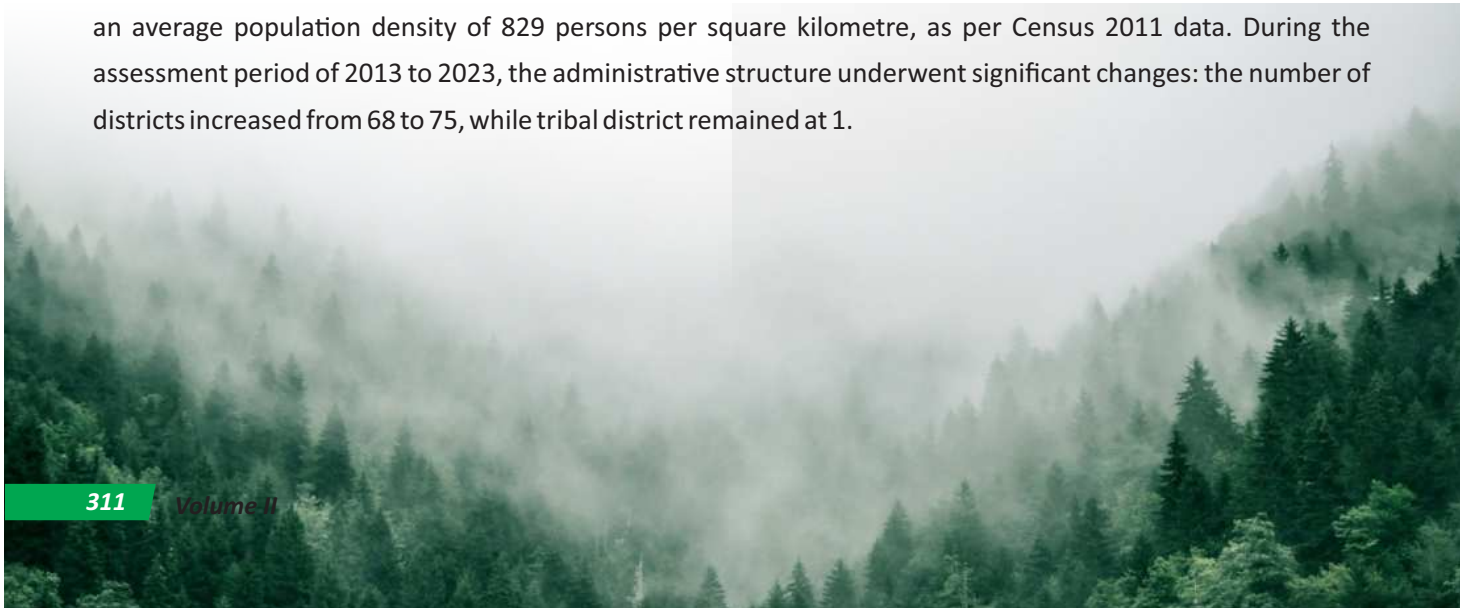
5.27 Uttar Pradesh, located in the northern part of India, spans a diverse geographical landscape ranging from the Shiwalik region in the north to the fertile Gangetic plains in the center and the Vindhyan hills in the south. Covering 2,40,928 sq km (7.33% of India's geographical area), it is the most populous state in the country, with 199.81 million people as per the 2011 Census, comprising 16.50% of India's total population. According to the Champion & Seth Classification of Forest Types (1968), the forests of Uttar Pradesh belong to five Forest Type Groups, further divided into 28 forest types, reflecting the state's varied topography and climatic conditions.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	240928	
Population (as per Census 2011)	**Million**	199.81	
Average Population Density	**Per sq. km**	829	
No. of Districts		68	75
No. of Hill Districts		0	
No. of Tribal Districts		1	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Uttar Pradesh is at 240928 square kilometres, with a population of 199.81 million and an average population density of 829 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent significant changes: the number of districts increased from 68 to 75, while tribal district remained at 1.



5.27.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	1623	4550	8176	806	225773
Addition	1430.19	2305.03	5829.72	700.93	4476.95
Reduction	364.46	2853.62	5650.06	867.42	5007.7
Closing 2021-22	2688.73	4001.41	8355.66	639.51	225242.3
Net change	1065.73	-548.59	179.66	-166.49	-530.75
% Change	65.66%	-12.06%	2.20%	-20.66%	-0.24%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2, chapter 2 of Vol I.

Between 2010-11 and 2021-22, Uttar Pradesh's forest cover recorded marked variations across different forest types, as reflected in the Forest Asset Account. The Very Dense Forest (VDF) category registered a significant increase of 65.66%, while Open Forest areas showed a substantial net gain of 179.66 sq. km. In contrast, the Moderately Dense Forest (MDF) and scrub forest categories declined by 12.06% and 20.66%, respectively.

5.27.2 Extent Account

Indicator (area in sq. km)	Unit	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	**sq km**	16583	17435	852	5.14
% of GA		6.88	7.24	0.36	5.23
Type of Protection					
Reserved Forests (RF)	sq km	11660	11571	-89	-0.76
Protected Forest (PF)	sq km	1420	330	-1090	-76.76
Unclassed Forests	sq km	3503	5534	2031	57.98

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 852 sq. km, covering 17435 sq. km, which is 7.24 % of the state's geographical area during observed period. During this period, Reserved Forests showed a slight decline of 89 sq. km (-0.76%), while Protected Forests recorded a notable reduction of 1,090 sq. km (-76.76%). In contrast, Unclassed Forests expanded considerably, gaining 2,031 sq. km (57.98%). These trends indicate that while the state's total forest extent has increased, there have been notable shifts in its composition, with substantial growth in unclassed forest areas and a marked decline in protected forest cover during the period.

5.27.3 Condition Accounts

The condition account for the forests of Uttar Pradesh for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	134.509	104.9	-29.609	-22.01
Growing Stock in Forest per unit area	m^3/ha	-	97.45		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,25,134	1,20,134	-5,000	-4.00
Above Ground Biomass	'000 tonnes	47,752	33,597	-14,155	-29.64
Below Ground Biomass	'000 tonnes	14,264	10,469	-3,795	-26.61
Dead Wood	'000 tonnes	444	1,615	1,171	263.74
Litter	'000 tonnes	1,824	1,620	-204	-11.18
Soil Organic Carbon	'000 tonnes	60,850	72,833	11,983	19.69

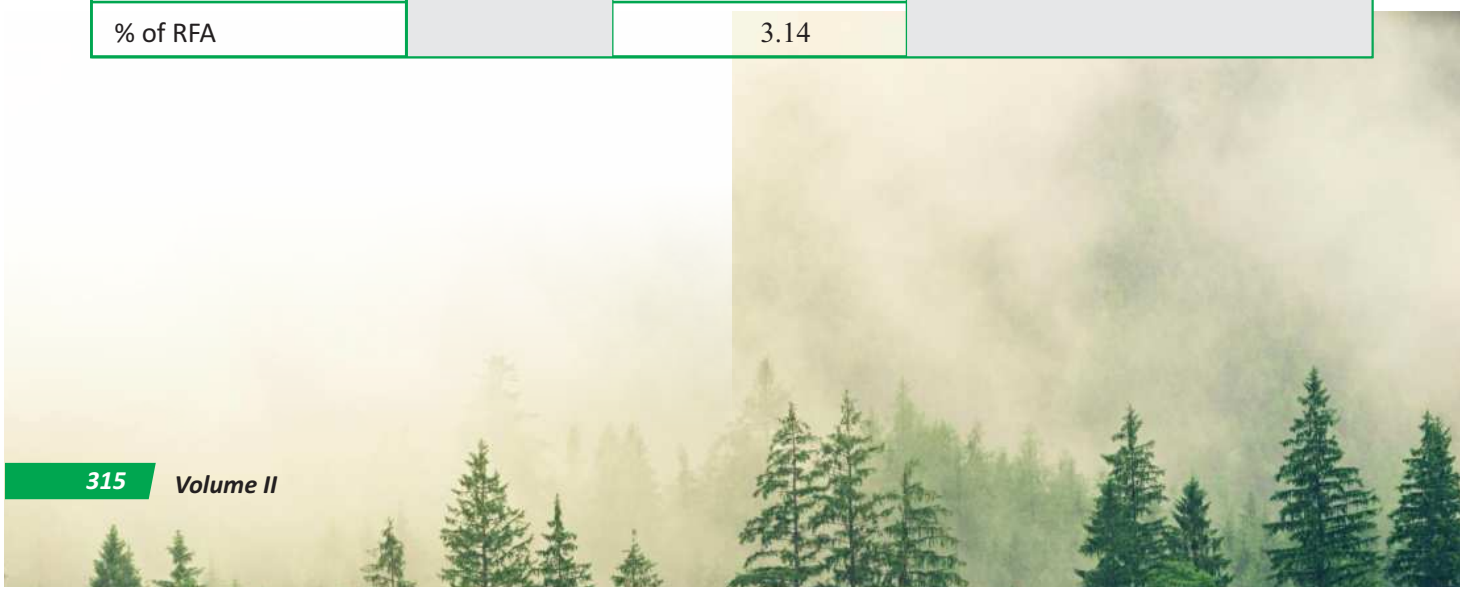
Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	85.25	79.85	-5.4	-6.33
Above Ground Biomass	Per hectare stock in tonnes	32.53	22.33	-10.2	-31.36
Below Ground Biomass	Per hectare stock in tonnes	9.72	6.96	-2.76	-28.40
Dead Wood	Per hectare stock in tonnes	0.3	1.07	0.77	256.67
Litter	Per hectare stock in tonnes	1.24	1.08	-0.16	-12.90
Soil Organic Carbon	Per hectare stock in tonnes	41.45	48.41	6.96	16.79

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.22		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.70		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	34.58	24.71	-	
> 1.0 ≤ 10	%		13.17		
> 10 ≤ 100	%	15.87	17.09	1.22	
> 100 ≤ 500	%	26.08	27.84	1.76	
> 500 ≤ 1000	%	23.47	17.19	-6.28	
> 1000 ≤ 5000	%	0	-	-	
> 5000 ≤ 10000	%	0	-	-	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	855	905	50	5.85
SNPP-VIIRS Detections	Number of fire cases	4428	5428	1000	22.58

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0.92	0.68	-0.24
Very highly fire prone	%	7.1	7.63	0.53
Highly fire prone	%	11.86	15.87	4.01
Moderately fire prone	%	17.66	13.24	-4.42
Less fire prone	%	62.46	62.58	0.12

Wetlands within RFA	
Indicator	**2019**
Number	2351
Area (in ha)	42224
% of RFA	3.14

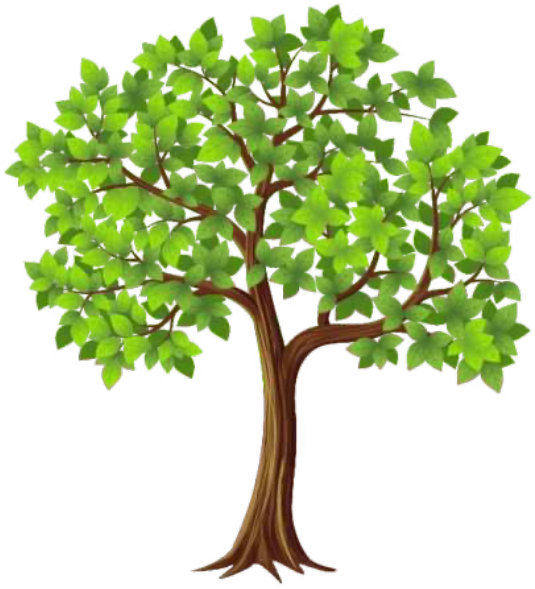


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	86	71	84
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	2.49	2.48	-
Tropical Moist Deciduous Forest	2.26	2.41	2.31
Littoral and Swamp Forests	2.63	2.29	1.98
Tropical Dry Deciduous Forests	2.97	2.15	3.44
Tropical Thorn Forests	-	2.07	1.42
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	12.06	11.94	-
Tropical Moist Deciduous Forests	9.58	11.13	10.07
Littoral and Swamp Forests	13.87	9.87	7.24
Tropical Dry Deciduous Forests	19.49	8.58	31.19
Tropical Thorn Forests	-	7.92	4.14

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	40.97
Inadequate	23.59
Absent	10.72
NA	24.72
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	3.47
Moderately degraded	25.64
Mildly degraded	50.28
Not degraded	13.55
NA	7.06
Invasive Species [Distribution of RFA (%)]	
Very Dense	2.89
Dense	15.11
Moderate	20.22
Scanty	14.11
Absent	32.89
NA	14.78



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.27.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1831.86	0.25%	2181.23	0.11%	349.36	19.07%
Value of non-timber forest products (NTFP)	(₹in crore)	1252.60	0.17%	708.78	0.04%	-543.81	-43.41%
Total Timber+ NTFP Services	(₹in crore)	3084.46	0.42%	2890.01	0.15%	-194.45	-6.30%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 19.07% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.25% to 0.11%. In case of NFTP services, it had shown a significant reduction in absolute by 43.41% and in SGDP by 0.13%. Collectively, the combined absolute timber and NTFP services decreased by nearly 6.30%, and its value as % of SGDP has a nominal fall from 0.42% to 0.15%. This indicates that, while the economic value of timber provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	7226.81	0.64%	10239.46	0.52%	3012.65	41.69%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in SGDP declined from 0.64% in 2015-16 to 0.52% in 2021-22, while the absolute value registered an increase of 41.69%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	90106	-
Revenue from ecotourism	(₹ in lakh)	70.21	-

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2011-12, tourist inflow for ecotourism reached 90106 visitors, generating a revenue of ₹70.21 lakh. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

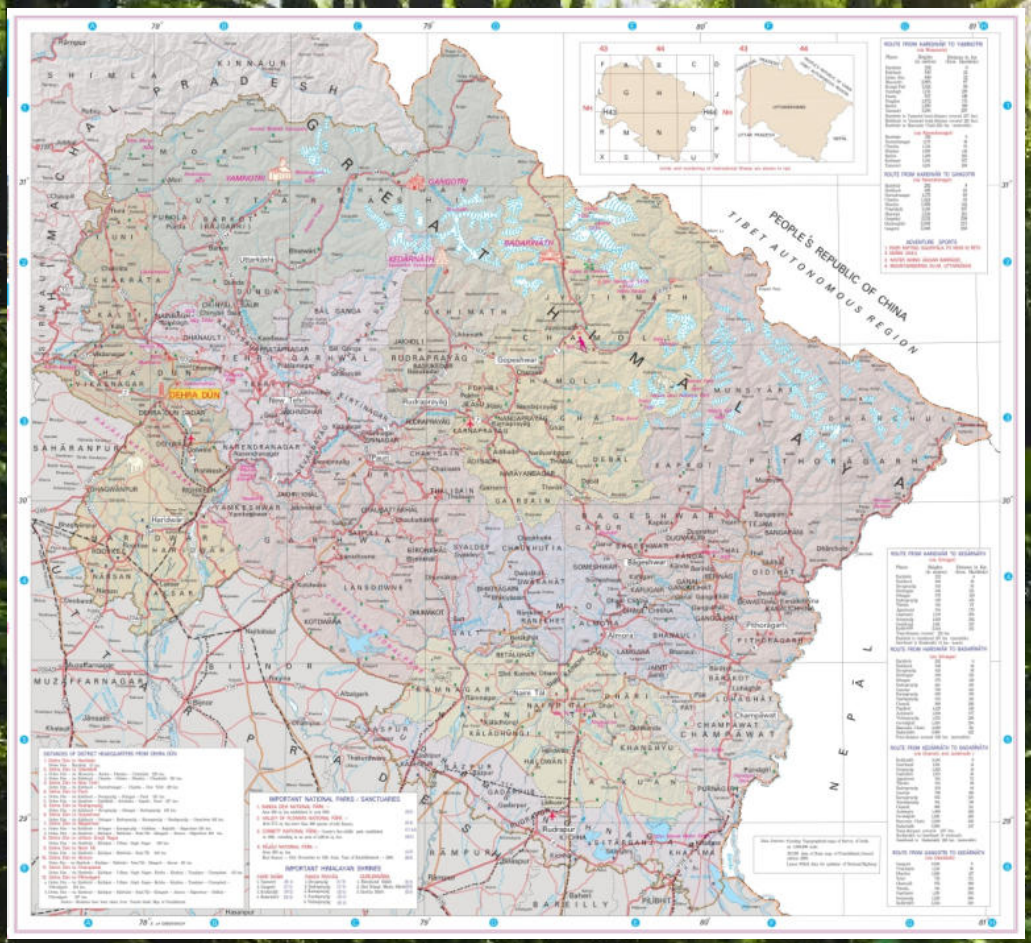
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1831.86	0.25%	1654.73	0.14%	-177.13	-9.67%
Value of non-timber forest products (NTFP)	(₹ in crore)	1252.60	0.17%	502.99	0.04%	-749.60	-59.84%
Total Timber+ NTFP Services	(₹ in crore)	3084.46	0.42%	2157.72	0.18%	-926.73	-30.05%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 0.25% in 2011-12 to 0.14% in 2021-22, and 9.67% reduction in absolute value as well. The NTFPs has registered a significant reduction of 59.84% in their value, while in terms of % of SGDP it has a nominal reduction from 0.17% to 0.04%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.42% to 0.18%, and their absolute value decreased by 30.05%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Provisioning Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	4367.26	0.48%	4192.76	0.35%	-174.50	-4.00%

At constant prices, the carbon retention services in SGDP decreased modestly from 0.48% in 2015-16 to 0.35% in 2021-22, while the absolute value showed a nominal decrease of 4%.

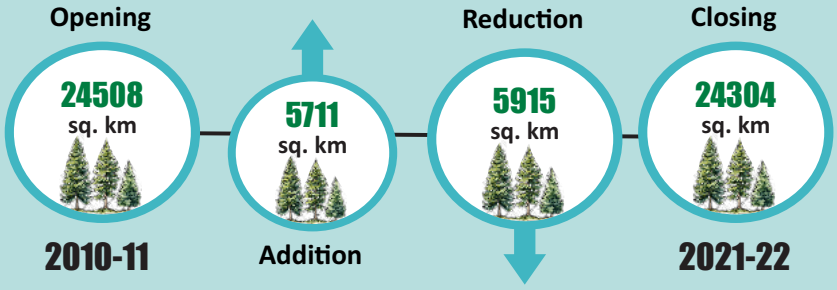
UTTARAKHAND



FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
53483 Sq. Km	64.79%	71.05%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.58%
2021-22	0.34%

REGULATING SERVICES
Carbon Retention Service

2015-16	9.28%
2021-22	12.59%

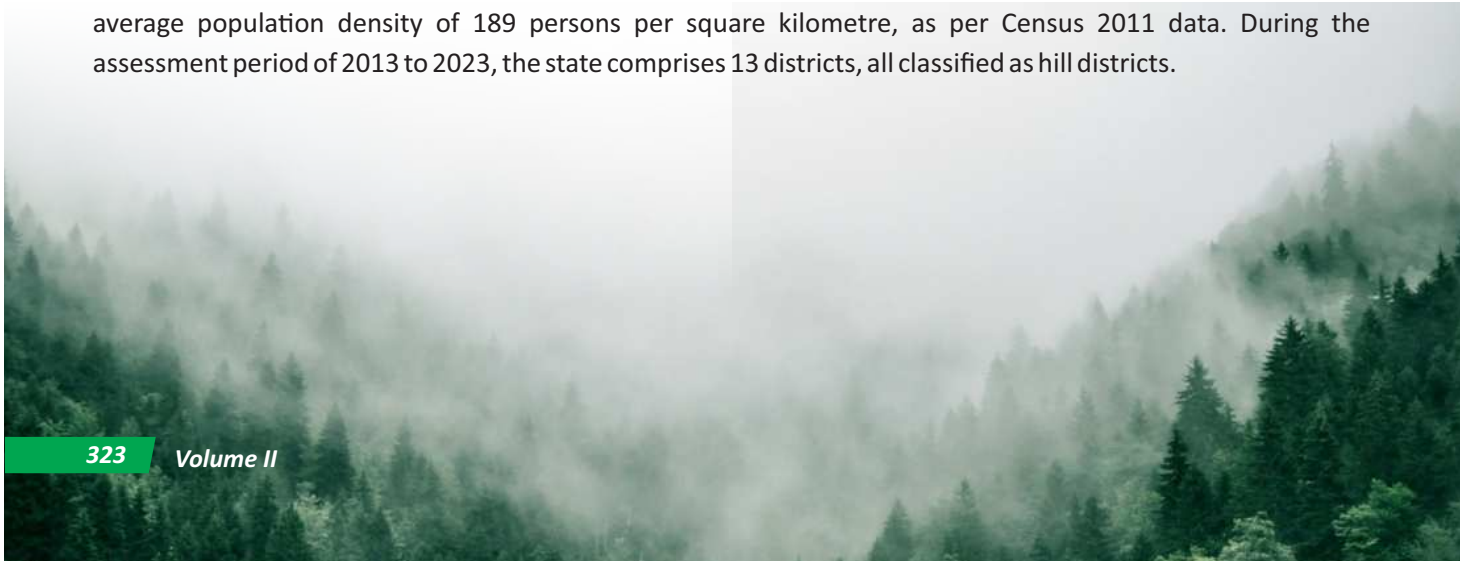
5.28 Uttarakhand, situated in the northern part of India, is a Himalayan state renowned for its complex mountainous topography and diverse climatic zones. Uttarakhand is distinguished by substantial ecological and biological diversity, supporting a wide spectrum of flora and fauna, many of which are endemic or of conservation significance. As the Champion & Seth Classification of Forest Types (1968), Uttarakhand's forests are classified into 9 Type Groups, further subdivided into 43 distinct Forest Types. The lower and mid-altitude regions are characterized by subtropical and moist temperate forests, including extensive stands of Sal, Oak, and Chir Pine. In contrast, the higher elevations are marked by temperate coniferous forests, subalpine Scrub, and sub-alpine pastures.

State Profile

Indicator	Unit	2013-2023
Geographical Area	**Sq. km**	53483
Population (as per Census 2011)	**Million**	10.09
Average Population Density	**Per sq. km**	189
No. of Districts		13
No. of Hill Districts		13
No. of Tribal Districts		0

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Uttarakhand is at 53483 square kilometres, with a population of 10.09 million and an average population density of 189 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the state comprises 13 districts, all classified as hill districts.



5.28.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	4785	14111	5612	262	28713
Addition	1234.53	1853.34	2623.27	369.32	1676.74
Reduction	752.95	3446.71	1715.65	218.44	1623.09
Closing 2021-22	5266.58	12517.63	6519.62	412.88	28766.65
Net change	481.58	-1593.37	907.62	150.88	53.65
% Change	10.06%	-11.29%	16.17%	57.59%	0.19%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Uttarakhand's Forest cover underwent several changes across different forest types. Scrub areas grew substantially, a net gain of 57.59% and open forest grew by 16.17%. MDF saw a more notable decrease, falling by 11.29%. For most forest cover class, it shows a positive trend, while MDF experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.28.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	34651	38000	3349	9.66
% of GA	64.79	71.05	6.26	
Type of Protection				
Reserved Forests (RF)	24643	26547	1904	7.73
Protected Forest (PF)	9885	9885		
Unclassed Forests	123	1568	1445	1174.80

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 3,349 sq. km, marking a 9.66% rise and expanding from 64.79% to 71.05% of the state's geographical area during observed period. During this period, Reserved Forests grew by 7.73%, and Protected Forests remained unchanged. The Unclassed Forest category saw a dramatic increase of 1,445 sq. km, reflecting a significant reclassification or inclusion of previously unrecorded lands. These trends reflect a shift in the categorization of forest areas, with increases in the reserved and unclassed forests.

5.28.3 Condition Accounts

The condition account for the forests of Uttarakhand for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	473.083	400.02	-73.063	-15.44
Growing Stock in Forest per unit area	m^3/ha	-	164.39		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	284,664	376,612	91,948	32.30
Above Ground Biomass	'000 tonnes	105,173	159,353	54,180	51.52
Below Ground Biomass	'000 tonnes	26,961	42,777	15,816	58.66
Dead Wood	'000 tonnes	1,316	1,416	100	7.60
Litter	'000 tonnes	5,665	4,749	-916	-16.17
Soil Organic Carbon	'000 tonnes	145,549	168,317	22,768	15.64

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	117.17	154.96	37.79	32.25
Above Ground Biomass	Per hectare stock in tonnes	43.29	65.57	22.28	51.47
Below Ground Biomass	Per hectare stock in tonnes	11.1	17.6	6.5	58.56
Dead Wood	Per hectare stock in tonnes	0.54	0.58	0.04	7.41
Litter	Per hectare stock in tonnes	2.33	1.95	-0.38	-16.31
Soil Organic Carbon	Per hectare stock in tonnes	59.91	69.26	9.35	15.61

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	1.96		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	96.93		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	6.11	4.00	-	
> 1.0 ≤ 10	%		3.55		
> 10 ≤ 100	%	4.57	5.65	1.08	
> 100 ≤ 500	%	4.17	4.28	0.11	
> 500 ≤ 1000	%	3.07	8.30	5.23	
> 1000 ≤ 5000	%	0	4.80	4.8	
> 5000 ≤ 10000	%	0	21.21	21.21	
>10000	%	82.08	48.21	-33.87	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	1578	1337	-241	-15.27
SNPP-VIIRS Detections	Number of fire cases	12965	12985	20	0.15

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0.17	0.1	-0.07
Very highly fire prone	%	1.6	12.92	11.32
Highly fire prone	%	9.32	27.64	18.32
Moderately fire prone	%	21.66	20.01	-1.65
Less fire prone	%	67.25	39.33	-27.92

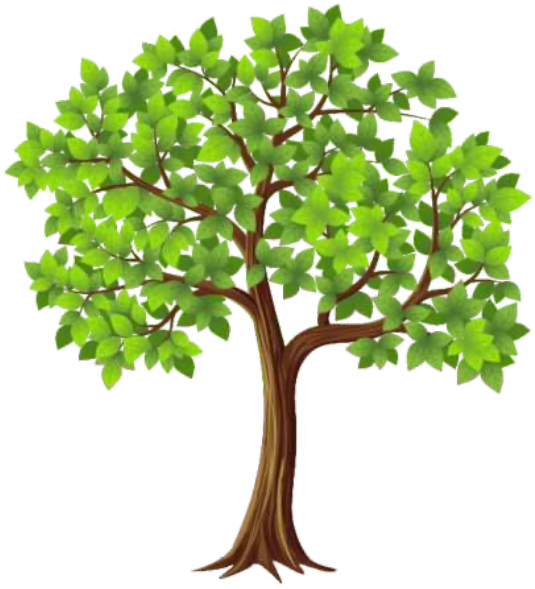
Wetlands within RFA	
Indicator	**2019**
Number	221
Area (in ha)	54129
% of RFA	2.12

Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	94	73	112
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	2.18	2.19	2.53
Subtropical Pine Forests	2.41	1.9	1.84
Himalayan Moist Temperate Forests	3.7	2.58	2.41
Himalayan Dry Temperate Forests	1.85	1.76	0.65
Sub-Alpine Forests	2.82	2.49	-
Dry Alpine Scrub	1.1	1.36	-
Tropical Moist Deciduous Forests	-	2.08	2.51
Moist Alpine Scrub	-	-	1.35
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	8.85	8.94	12.55
Subtropical Pine Forests	11.13	6.69	6.3
Himalayan Moist Temperate Forests	40.45	13.2	11.13
Himalayan Dry Temperate Forests	6.36	5.81	1.92
Sub-Alpine Forests	16.78	12.06	-
Dry Alpine Scrub	3	3.9	-
Tropical Moist Deciduous Forests	-	8	12.3
Moist Alpine Scrub	-	-	3.86

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	32.98
Inadequate	32.28
Absent	11
NA	23.74
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	0.88
Moderately degraded	6.91
Mildly degraded	59.24
Not degraded	11.41
NA	21.56
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.15
Dense	5.09
Moderate	9.66
Scanty	15.48
Absent	26.9
NA	41.72



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.28.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	360.76	0.31%	610.39	0.24%	249.63	69.19%
Value of non-timber forest products (NTFP)	(₹in crore)	316.86	0.27%	260.15	0.10%	-56.72	-17.90%
Total Timber+ NTFP Services	(₹in crore)	677.62	0.58%	870.54	0.34%	192.92	28.47%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 69.19% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.31% to 0.24%. In case of NFTP services, it had shown marginal reduction in absolute by 17.90% and in SGDP by 0.17%. Collectively, the combined absolute timber and NTFP services increased by nearly 28.47%, while its value as % of SGDP has a nominal fall from 0.58% to 0.34%. This indicates that, while the overall economic value of provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. This pattern highlights that the growth in absolute value has not translated into proportional gains in economic share, underscoring the faster expansion of other sectors relative to forest provisioning services.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	16440.08	9.28%	32100.02	12.59%	15659.93	95.25%

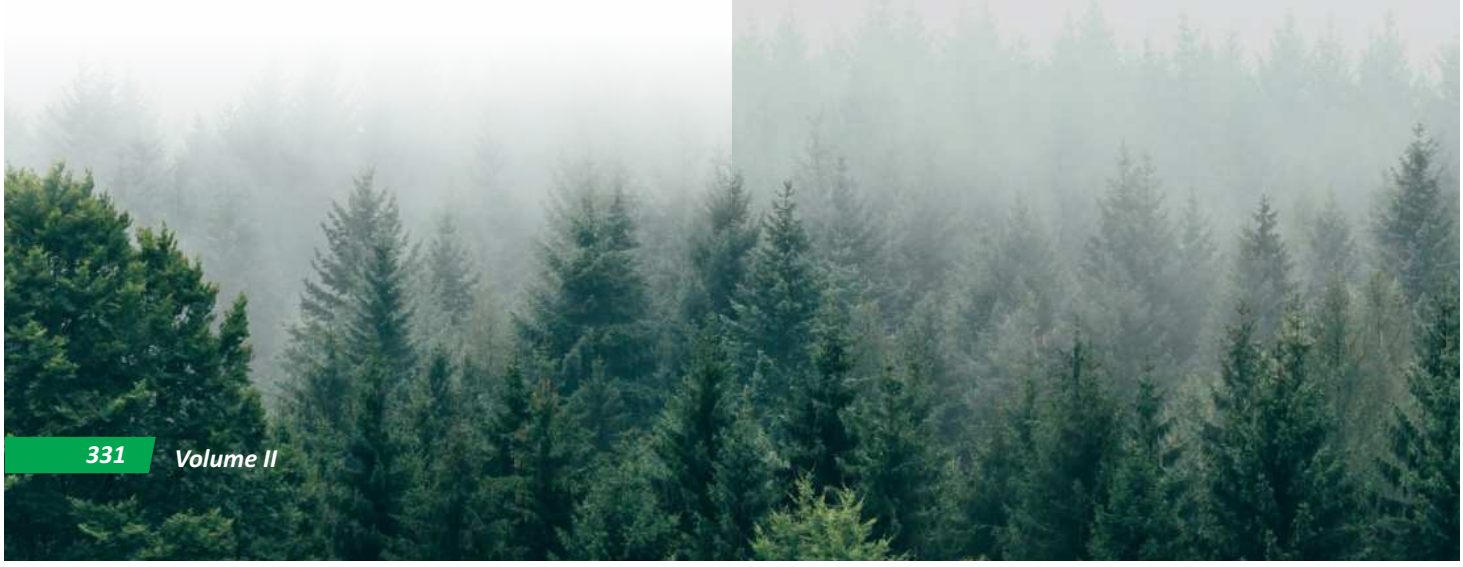
** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP rise from 9.28% in 2015-16 to 12.59% in 2021-22, while the absolute value registered an increase of 95.25%. This reflects an increase in the relative economic contribution of carbon retention services, with the growth in their absolute value during the period.

Cultural Services	Unit	2011-12	2019-20	Net Change	% Change
Tourist inflow for ecotourism	Number of tourists	284908	2312941	2028033	711.82%
Revenue from ecotourism	(₹ in lakh)	851.19	2418.04	1566.85	184.08%

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

The inflow of tourists for ecotourism shows a substantial rise of 711.82% from 2011-12 to 2019-20. Correspondingly, the revenue generated from ecotourism activities grew by 184.08%, during the same period. Ecotourism experienced a sharp rise in tourist numbers and revenue, though revenue growth lagged behind the surge in visitor inflow.



2) Ecosystem services (at constant prices)

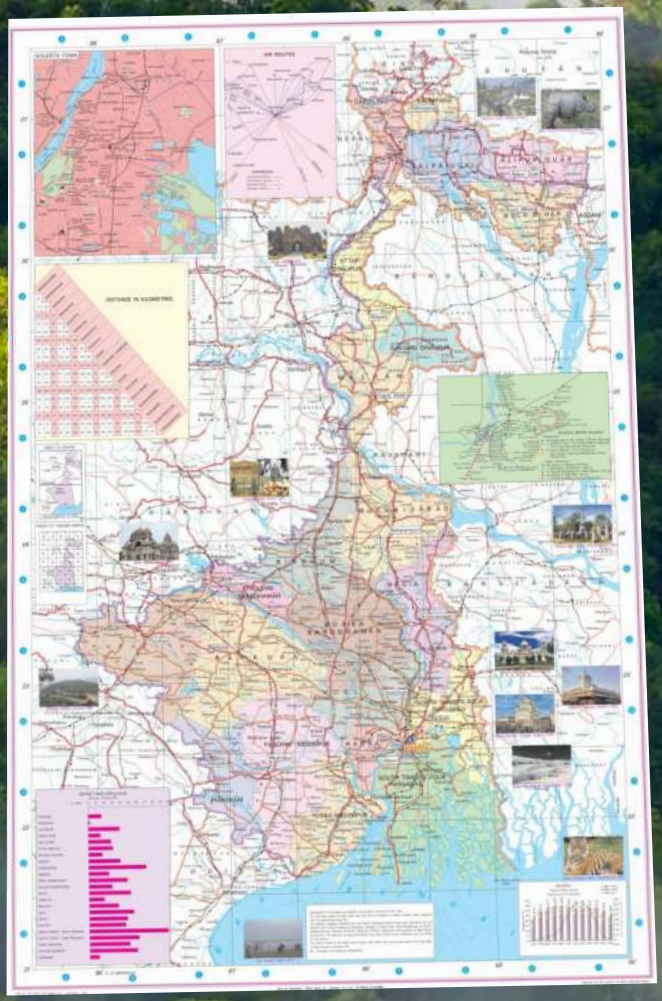
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	360.76	0.31%	293.70	0.17%	-67.06	-18.59%
Value of non-timber forest products (NTFP)	(₹ in crore)	316.86	0.27%	155.96	0.09%	-160.91	-50.78%
Total Timber+ NTFP Services	(₹ in crore)	677.62	0.58%	449.66	0.26%	-227.97	-33.64%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 0.31% in 2011-12 to 0.17% in 2021-22, and 18.59% reduction in absolute value as well. The NTFPs has registered a significant reduction of 50.78% in their value, while in terms of % of SGDP it has a nominal reduction from 0.27% to 0.09%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.58% to 0.26%, and their total value decreased by 33.64%. This trend indicates that, the decline in timber services and the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	9934.97	6.51%	13144.02	7.53%	3209.05	32.30%

At constant prices, the carbon retention services in % of SGDP increased from 6.51% in 2015-16 to 7.53% in 2021-22, while the absolute value showed an increase of 32.30%. This highlights a substantial increase in the relative economic contribution of carbon retention services during the period, with a significant growth in their absolute value.

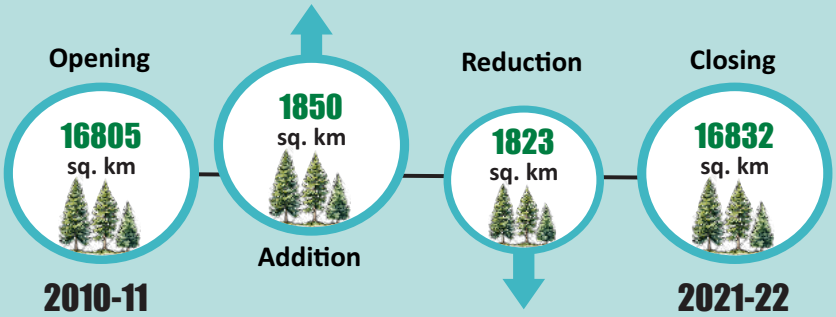
WEST BENGAL



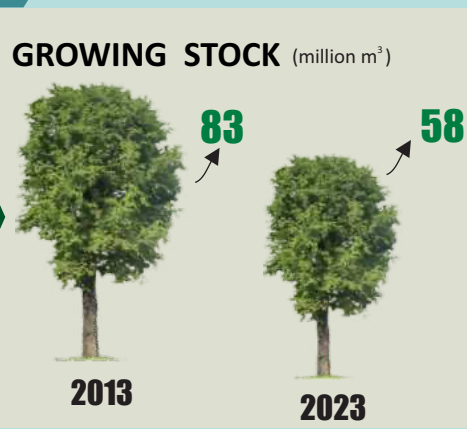
FOREST EXTENT ACCOUNT

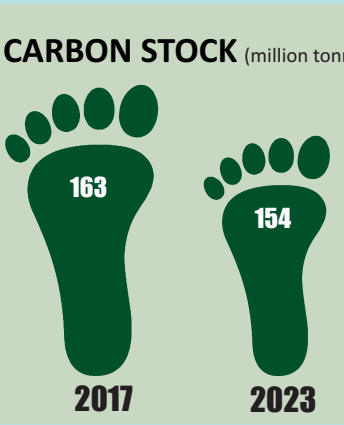
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
88752 Sq. Km	13.38 %	13.39 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	0.24%	2015-16	1.18%
2021-22	0.09%	2021-22	0.98%

5.29 West Bengal, situated in the eastern part of India, encompasses a diverse range of ecological zones extending from the Himalayas in the north to the Bay of Bengal in the south. The state is characterized by a rich variety of landscapes, including the Darjeeling Himalayan hill region, the fertile Gangetic plains, and the unique Sundarbans delta, which is renowned for its mangrove forests. According to the Champion & Seth Classification of Forest Types (1968), the forests of West Bengal are classified into 8 type groups, which are further divided into 30 forest types. The state is dominated by dry peninsular Sal forests, while the southern districts, especially the Sundarbans, are characterized by extensive mangrove formations.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	88752	
Population (as per Census 2011)	**Million**	91.27	
Average Population Density	**Per sq. km**	1028	
No. of Districts		18	23
No. of Hill Districts		1	2
No. of Tribal Districts		11	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of West Bengal is at 88,752 square kilometres, with a population of 91.27 million and an average population density of 1028 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023, the administrative structure underwent significant changes: the number of districts increased from 18 to 23, and number of hill district increase from 1 to 2, while tribal district remained at 11.

5.29.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	2971	4146	9688	111	71836
Addition	226.93	519.77	1103.49	143.74	880.52
Reduction	160.83	490.39	1171.64	116.82	934.77
Closing 2021-22	3037.1	4175.38	9619.85	137.92	71781.75
Net change	66.1	29.38	-68.15	26.92	-54.25
% Change	2.22%	0.71%	-0.70%	24.25%	-0.08%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2, chapter 2 of Vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, West Bengal's Forest cover underwent several changes across different forest types. VDF saw a marginal increase, rising by 2.22%. Scrub areas grew substantially, a net gain of 26.92 sq. km. For most forest cover class, it shows a positive trend, while open forest and non-forest categories experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.29.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	11879	11885	6	0.05
% of GA	13.38	13.39	0.01	
Type of Protection				
Reserved Forests (RF)	7054			
Protected Forest (PF)	3772	3778	6	0.16
Unclassed Forests	1053			

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) marginally increased by 6 sq. km, covering 11885 sq. km, which is 13.39 % of the state's geographical area during observed period. During this period, Reserved forests and Unclassed forests remained unchanged. In contrast, the area classified as protected forests increased slightly by 0.16%. These trends reflect that the state's forest extent remained largely stable, with only marginal changes observed in the composition and protection status of forest areas during the period.

5.29.3 Condition Accounts

The condition account for the forests of West Bengal for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	83.305	58	-25.305	-30.38
Growing Stock in Forest per unit area	m^3/ha	-	65.02		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,63,201	1,54,366	-8,835	-5.41
Above Ground Biomass	'000 tonnes	45,382	45,200	-182	-0.40
Below Ground Biomass	'000 tonnes	13,916	13,949	33	0.24
Dead Wood	'000 tonnes	434	2,142	1,708	393.55
Litter	'000 tonnes	2,585	1,663	-922	-35.67
Soil Organic Carbon	'000 tonnes	1,00,884	91,412	-9,472	-9.39

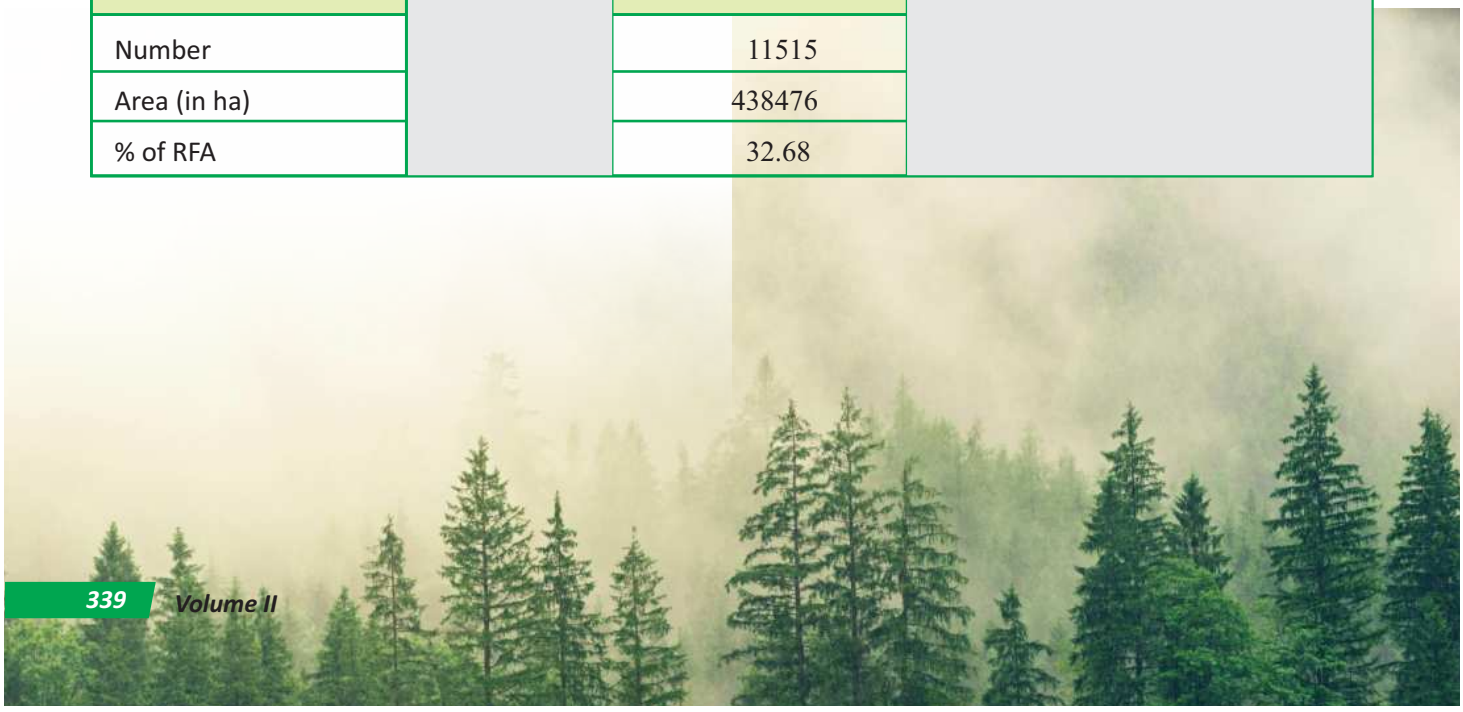
Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	96.87	91.71	-5.16	-5.33
Above Ground Biomass	Per hectare stock in tonnes	26.94	26.85	-0.09	-0.33
Below Ground Biomass	Per hectare stock in tonnes	8.26	8.29	0.03	0.36
Dead Wood	Per hectare stock in tonnes	0.26	1.27	1.01	388.46
Litter	Per hectare stock in tonnes	1.53	0.99	-0.54	-35.29
Soil Organic Carbon	Per hectare stock in tonnes	59.88	54.31	-5.57	-9.30

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.25		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	98.01		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	44.58	27.20	-	
> 1.0 ≤ 10	%		18.33		
> 10 ≤ 100	%	28.22	29.83	1.61	
> 100 ≤ 500	%	8.4	6.86	-1.54	
> 500 ≤ 1000	%	3.07	3.07	0	
> 1000 ≤ 5000	%	15.73	14.71	-1.02	
> 5000 ≤ 10000	%	0	-	-	
>10000	%	0	-	-	

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	257	233	-24	-9.34
SNPP-VIIRS Detections	Number of fire cases	1653	1520	-133	-8.05

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**	**Net Change**
Extremely fire prone	%	0	0	0
Very highly fire prone	%	0.99	1.2	0.21
Highly fire prone	%	4.33	5.56	1.23
Moderately fire prone	%	10.72	6.84	-3.88
Less fire prone	%	83.96	86.4	2.44

Wetlands within RFA	
Indicator	**2019**
Number	11515
Area (in ha)	438476
% of RFA	32.68

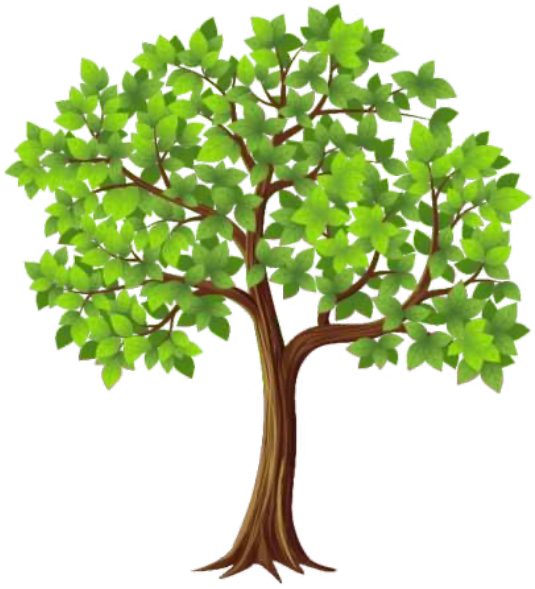


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	65	103	113
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	2.4	2.51	2.33
Tropical Moist Deciduous Forests	1.59	1.21	2.76
Littoral and Swamp Forests	1.1	1.28	-
Tropical Dry Deciduous Forests	1.95	2.49	2.32
Subtropical Broadleaved Hill Forests	2.33	2.36	1.76
Montane Wet Temperate Forests	1.76	2.66	1.51
Himalayan Moist Temperate Forests	2.32	2.72	1.96
Sub-Alpine Forests	1.24	2.03	1.19
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Semi-Evergreen Forests	11.02	12.3	10.28
Tropical Moist Deciduous Forests	4.9	3.35	15.8
Littoral and Swamp Forests	3	3.6	-
Tropical Dry Deciduous Forests	7.03	12.06	10.18
Subtropical Broadleaved Hill Forests	10.28	10.59	5.81
Montane Wet Temperate Forests	5.81	14.3	4.53
Himalayan Moist Temperate Forests	10.18	15.18	7.1
Sub-Alpine Forests	3.46	7.61	3.29

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	62.28
Inadequate	24.24
Absent	5.78
NA	7.7
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	1.61
Moderately degraded	21.53
Mildly degraded	47.01
Not degraded	20.37
NA	9.48
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.24
Dense	7.01
Moderate	16.06
Scanty	19.95
Absent	31.81
NA	23.93



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.29.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	621.60	0.12%	695.29	0.05%	73.69	11.86%
Value of non-timber forest products (NTFP)	(₹in crore)	645.19	0.12%	470.45	0.04%	-174.73	-27.08%
Total Timber+ NTFP Services	(₹in crore)	1266.78	0.24%	1165.74	0.09%	-101.04	-7.98%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 11.86% from 2011-12 to 2021-22, while its value as % of SGDP has decline marginally from 0.12% to 0.05%. In case of NFTP services, it had shown a reduction in absolute by 27.08% and in SGDP by 0.08%. Collectively, the combined absolute timber and NTFP services decreased by nearly 7.98%, and its value as % of SGDP has a nominal fall from 0.24% to 0.09%. This indicates that, while the economic value of timber provisioning services expanded over the decade, their relative share in the economy compared to other sectors registered a marginal decline. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	9425.28	1.18%	13157.18	0.98%	3731.90	39.59%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services in SGDP declined from 1.18% in 2015-16 to 0.98% in 2021-22, while the absolute value registered an increase of 39.59%. As the carbon stock as reduced during the assessment period, growth in absolute value may reflect increase due to inflation.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	-	549334
Revenue from ecotourism	(₹ in lakh)	-	575.12

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

In 2019-20, tourist inflow for ecotourism reached 549,334 visitors, generating a revenue of ₹575.12 lakh. These figures indicate a significant engagement with ecotourism activities, reflecting both the sector's economic contribution and its role in attracting visitors.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	621.60	0.12%	523.84	0.07%	-97.75	-15.73%
Value of non-timber forest products (NTFP)	(₹ in crore)	645.19	0.12%	319.13	0.04%	-326.06	-50.54%
Total Timber+ NTFP Services	(₹ in crore)	1266.78	0.24%	842.97	0.11%	-423.81	-33.46%

At constant prices, the timber provisioning services as % of SGDP has reported a marginal decline from 0.12% in 2011-12 to 0.07% in 2021-22, and 15.73% reduction in absolute value as well. The NTFPs has registered a significant reduction of 50.54% in their value, while in terms of % of SGDP it has a nominal reduction from 0.12% to 0.04%. Collectively, the combined timber and NTFP services as % of SGDP fell from 0.24% to 0.11%, and their total value decreased by 33.46%. This trend indicates that, despite the relatively smaller decline in timber services, the pronounced reduction in NTFPs has driven an overall contraction in the economic contribution of forest provisioning services, both in absolute terms and relative to the other sector contribution to economy.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	5695.83	0.93%	5387.48	0.69%	-308.35	-5.41%

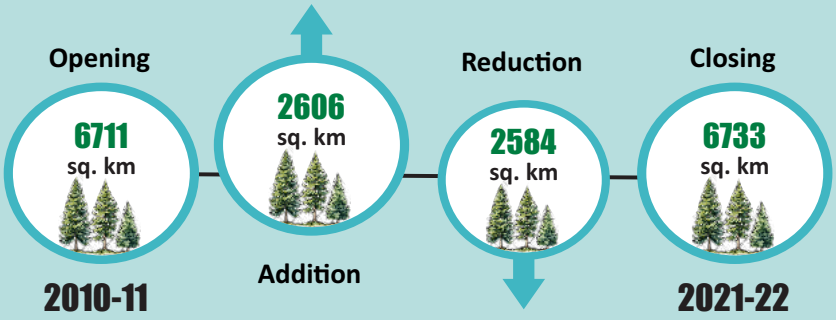
At constant prices, the carbon retention services in SGDP decreased from 0.93% in 2015-16 to 0.69% in 2021-22, and the absolute value also showed a marginal decrease of 5.41%.

Andaman & Nicobar Island

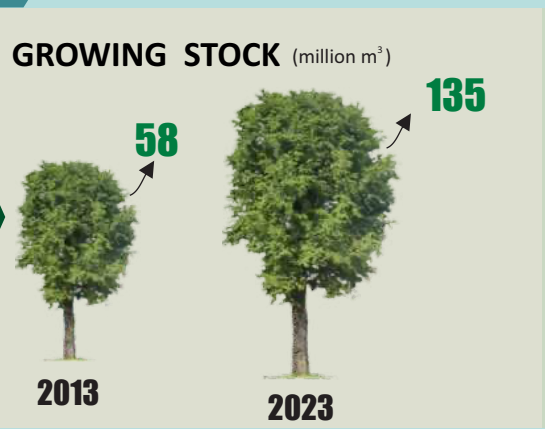
FOREST EXTENT ACCOUNT

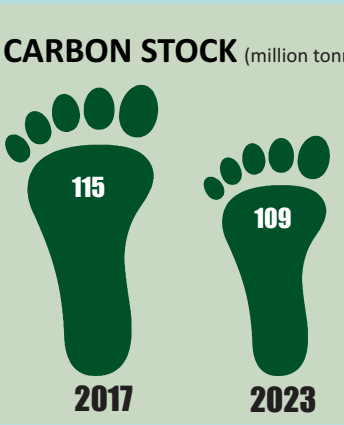
GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
8249 Sq. Km	86.93%	86.93%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT





FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2011-12	0.25%	2015-16	110.18%
2021-22	0.21%	2021-22	89.25%

5.30 Andaman and Nicobar Islands, in the Bay of Bengal, comprises a chain of islands with varied topography, including coastal plains, hilly terrain, mangrove swamps, and coral reefs. As per the Champion & Seth Classification of Forest Types (1968), the forests of these islands are grouped into 4 Type Groups, further divided into 13 distinct Forest Types. Tropical wet evergreen and semi-evergreen forests dominate large tracts, while tropical moist deciduous forests and littoral and swamp forests occur along drier and coastal zones.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	8249	
Population (as per Census 2011)	**Million**	0.38	
Average Population Density	**Per sq. km**	46	
No. of Districts		2	3
No. of Hill Districts		0	0
No. of Tribal Districts		2	3

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Andaman and Nicobar Islands is at 8249 square kilometres, with a population of 0.38 million and an average population density of 46 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 and 2023, the administrative structure underwent marginal changes: the number of districts increased from 2 to 3, and all districts are classified as tribal districts.

5.30.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	3754	2413	544	57	1481
Addition	2160.87	247.58	197.14	3.25	206.68
Reduction	212	2007.38	364.29	56.09	175.76
Closing 2021-22	5702.87	653.2	376.85	4.16	1511.92
Net change	1948.87	-1759.8	-167.15	-52.84	30.92
% Change	51.91%	-72.93%	-30.73%	-92.70%	2.09%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Andaman and Nicobar Islands' forest cover underwent several changes across different forest types. VDF saw significant increase, rising by 51.91% while MDF show a reduction of 72.93%. Scrub areas reduce substantially, a net loss of 52 sq. km. For most forest cover class, it shows a negative trend, while VDF and non-forest categories experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.30.2 Extent Account

Indicator (area in sq. km)	2013-2023
Recorded Forest Area (RFA)	7171
% of GA	86.93
Type of Protection	
Reserved Forests (RF)	5613
Protected Forest (PF)	1558
Unclassed Forests	0

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remain consistent at 7171 sq. km covering 86.93% of the state's geographical area during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.30.3 Condition Accounts

The condition account for the forests of Andaman and Nicobar Islands for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	57.953	134.74	76.787	132.5
Growing Stock in Forest per unit area	m^3/ha	-	246.61		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1,15,073	1,08,817	-6256	-5.44
Above Ground Biomass	'000 tonnes	39,426	47,115	7689	19.5
Below Ground Biomass	'000 tonnes	11,901	15,240	3339	28.06
Dead Wood	'000 tonnes	2,048	1,569	-479	-23.39
Litter	'000 tonnes	3,702	2,215	-1487	-40.17
Soil Organic Carbon	'000 tonnes	57,996	42,678	-15318	-26.41

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	170.68	161.62	-9.06	-5.31
Above Ground Biomass	Per hectare stock in tonnes	58.48	69.98	11.5	19.66
Below Ground Biomass	Per hectare stock in tonnes	17.65	22.63	4.98	28.22
Dead Wood	Per hectare stock in tonnes	3.04	2.33	-0.71	-23.36
Litter	Per hectare stock in tonnes	5.49	3.29	-2.2	-40.07
Soil Organic Carbon	Per hectare stock in tonnes	86.02	63.39	-22.63	-26.31

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size[#]	Sq. km	-	7.68		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)[#]	%	-	90.89		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	3.23	1.04	-	
> 1.0 ≤ 10	%		2.30		
> 10 ≤ 100	%	9.28	9.31	0.03	
> 100 ≤ 500	%	10.61	10.52	-0.09	
> 500 ≤ 1000	%	21.87	22.14	0.27	
> 1000 ≤ 5000	%	55.01	54.69	-0.32	
> 5000 ≤ 10000	%	-	-	-	
>10000	%	-	-	-	

Forest Fires

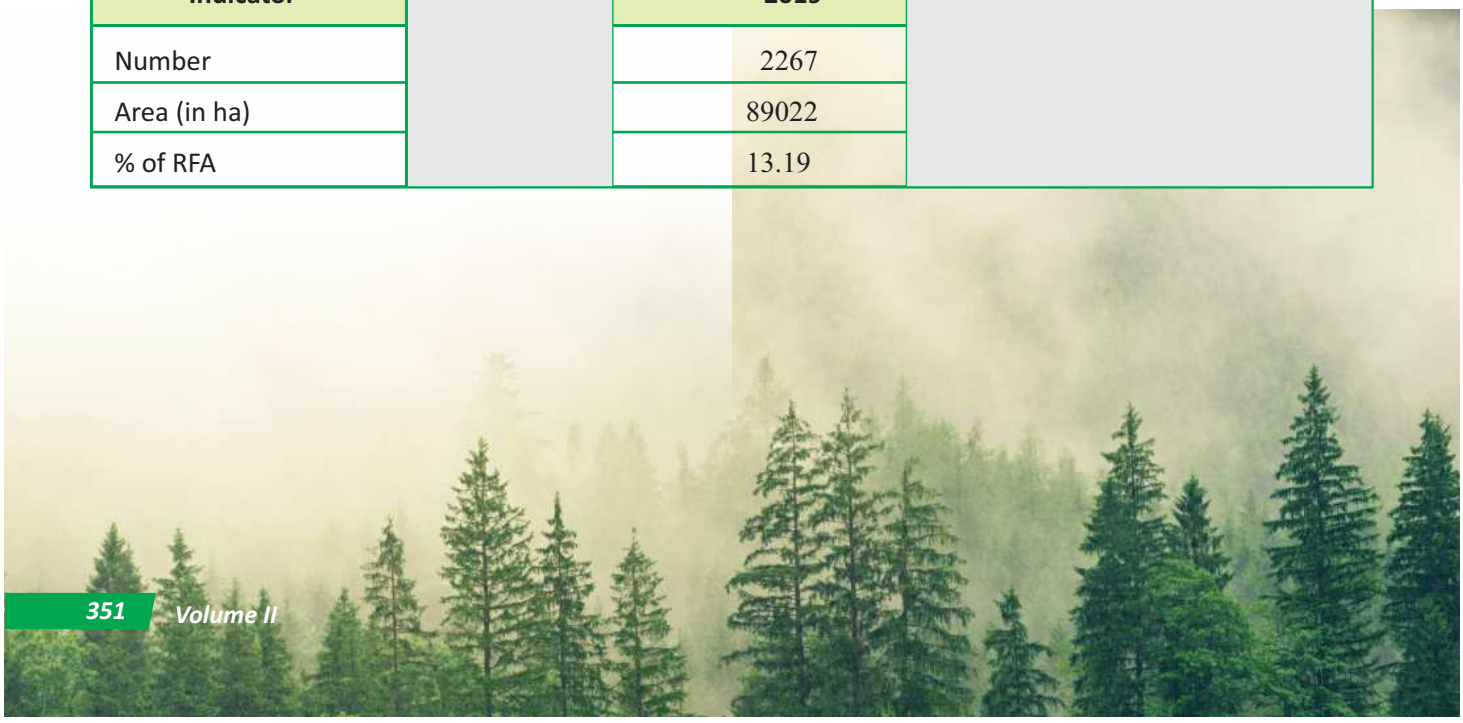
Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022	Net Change	% Change
MODIS Detections	Number of fire cases	6	3	-3	-50
SNPP-VIIRS Detections	Number of fire cases	37	33	-4	-10.81

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2019	2023	Net Change
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0.52	0	-0.52
Highly fire prone	%	0.42	0	-0.42
Moderately fire prone	%	0.38	0.03	-0.35
Less fire prone	%	98.68	99.97	1.29

Wetlands within RFA

Indicator	2019
Number	2267
Area (in ha)	89022
% of RFA	13.19

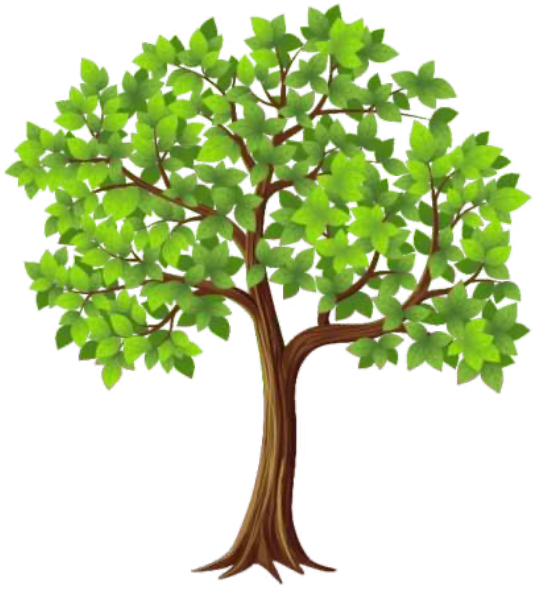


Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	79	102	89
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	3.28	3.34	3.01
Tropical Semi-Evergreen Forests	3.21	3.31	3.19
Tropical Moist Deciduous Forests	2.85	3.10	2.67
Littoral and Swamp Forests	2.11	2.29	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Wet Evergreen Forests	26.58	28.22	20.29
Tropical Semi-Evergreen Forests	24.78	27.39	24.29
Tropical Moist Deciduous Forests	17.29	22.20	14.44
Littoral and Swamp Forests	8.25	9.87	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	68.54
Inadequate	18.1
Absent	3.89
NA	9.47
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	0
Moderately degraded	3.32
Mildly degraded	33.92
Not degraded	57.86
NA	4.9
Invasive Species [Distribution of RFA (%)]	
Very Dense	0
Dense	1.99
Moderate	2.96
Scanty	6.93
Absent	57.47
NA	30.65



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.30.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	5.49	0.14%	17.8	0.17%	12.31	224.22%
Value of non-timber forest products (NTFP)	(₹in crore)	4.5	0.11%	3.81	0.04%	-0.69	-15.36%
Total Timber+ NTFP Services	(₹in crore)	9.99	0.25%	21.61	0.21%	11.62	116.32%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP increased from 0.14% in 2011-12 to 0.17% in 2021-22, and its absolute monetary value has also increased drastically by 224.22%. The non-timber forest product provisioning services showed a decrease in value by 15.36%, and its value as % of SGDP has also declined, from 0.11% to 0.04%. Collectively, the combined timber and NTFP services in SGDP fell from 0.25% to 0.21%, even as their overall absolute value increased by nearly 116.32%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	6645.76	110.18%	9274.87	89.25%	2629.11	39.56%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP has declined from 110.18% in 2015-16 to 89.25% in 2021-22, while the absolute value registered an increase of 39.56%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20	Net Change	0% Change
Tourist inflow for ecotourism	Number of tourists	2092794	495217	-1597577	-76.34%
Revenue from ecotourism	(₹ in lakh)	35.35	49.55	14.2	40.17%

Source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change.

The inflow of tourists for ecotourism shows a fall of 76.34% from 2011-12 to 2019-20. While, the revenue generated from ecotourism activities grew by 40.17%, during the same period. Overall, the period reflects a contrasting trend in ecotourism, with a substantial decline in tourist inflow alongside a notable increase in revenue generation. This suggests a shift toward higher-value tourism, where fewer visitors are contributing more significantly to the economic returns from ecotourism activities.

2) Ecosystem services (at constant prices)

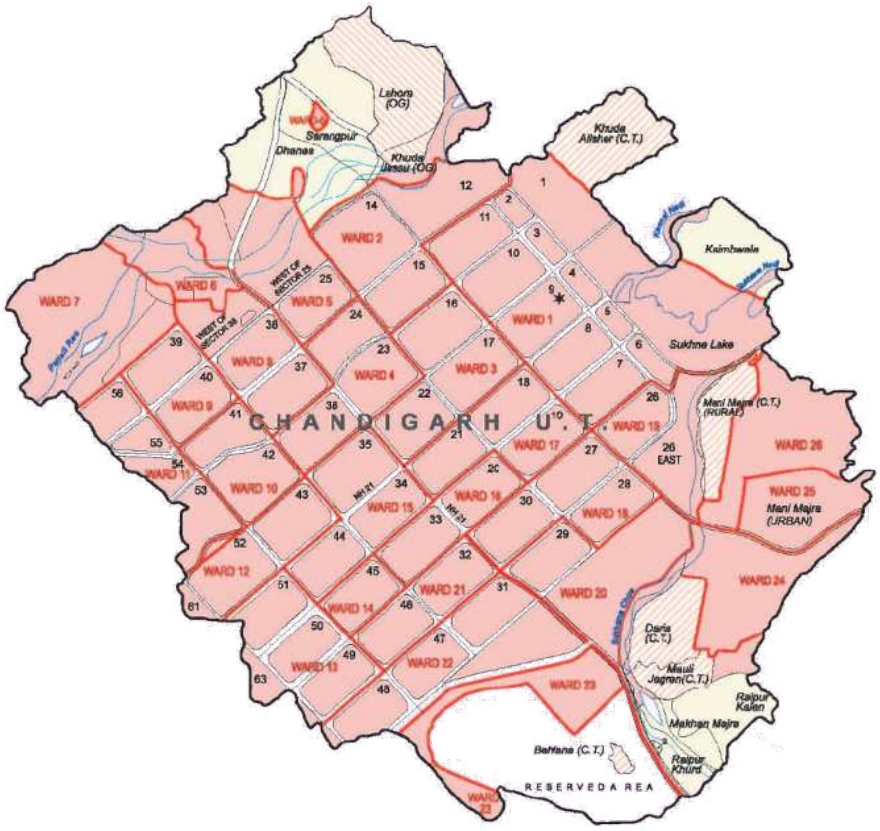
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	5.49	0.14%	16.29	0.23%	10.8	196.70%
Value of non-timber forest products (NTFP)	(₹ in crore)	4.5	0.11%	2.45	0.03%	-2.05	-45.52%
Total Timber+ NTFP Services	(₹ in crore)	9.99	0.25%	18.74	0.26%	8.75	87.59%

At constant prices, the timber provisioning services in SGDP rise from 0.14% in 2011-12 to 0.23% in 2021-22, reflecting an increase in absolute value by 196.70%. The non-timber forest resources dropped from 0.11% to 0.03%, with a 45.52% reduction in value. Collectively, the combined timber and NTFP services in % of SGDP increased from 0.25% to 0.26%, and their absolute value increased by 87.59%, indicating a significant improvement in their relative economic contribution over the period.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	4016.13	78.87%	3797.79	53.63%	-218.34	-5.44%

At constant prices, the carbon retention services as % of SGDP has decreased from 78.87% in 2015-16 to 53.63% in 2021-22, and the absolute value showed a marginal decrease of 5.44%.

CHANDIGARH


Lahora (OG)
Sarangpur
Dhanas
Khuda Jassu (OG)
Khuda Alisher (C.T.)
Kaimbwala
Sukhna Lake
Mani Majra (C.T.) (RURAL)
CHANDIGARH U.T.
WARD 1
WARD 2
WARD 3
WARD 4
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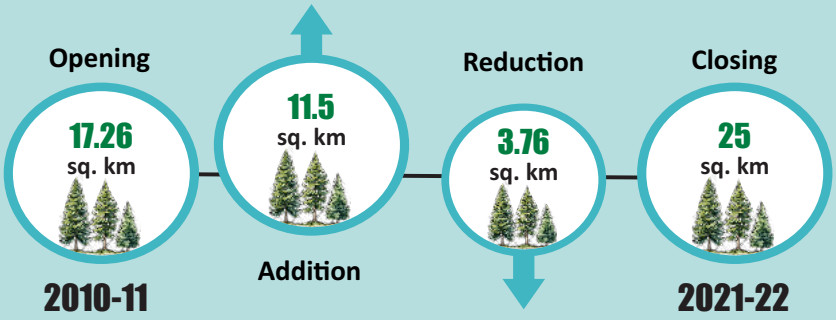
WARD 22
WARD 23
WARD 24
WARD 25
WARD 26
WEST OF SECTOR 25
WEST OF SECTOR 26
26 EAST
Mani Majra (URBAN)
Daria (C.T.)
Maulli Jagran (C.T.)
Raipur Kalan
Makhan Majra
Raipur Khurd
Behlana (C.T.)
RESERVED AREA

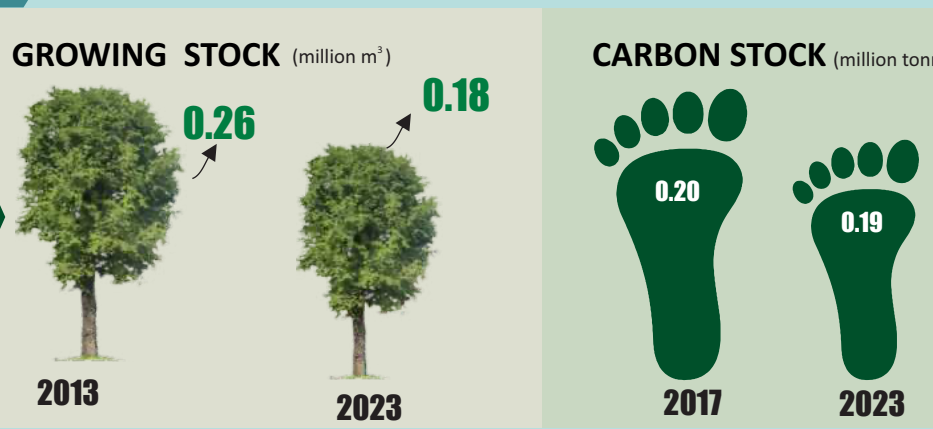
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
114 Sq. Km	30.7%	30.7%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.004%	(only NTFP)
2021-22	0.005 %	

REGULATING SERVICES
Carbon Retention Service

2015-16	0.04 %
2021-22	0.04 %

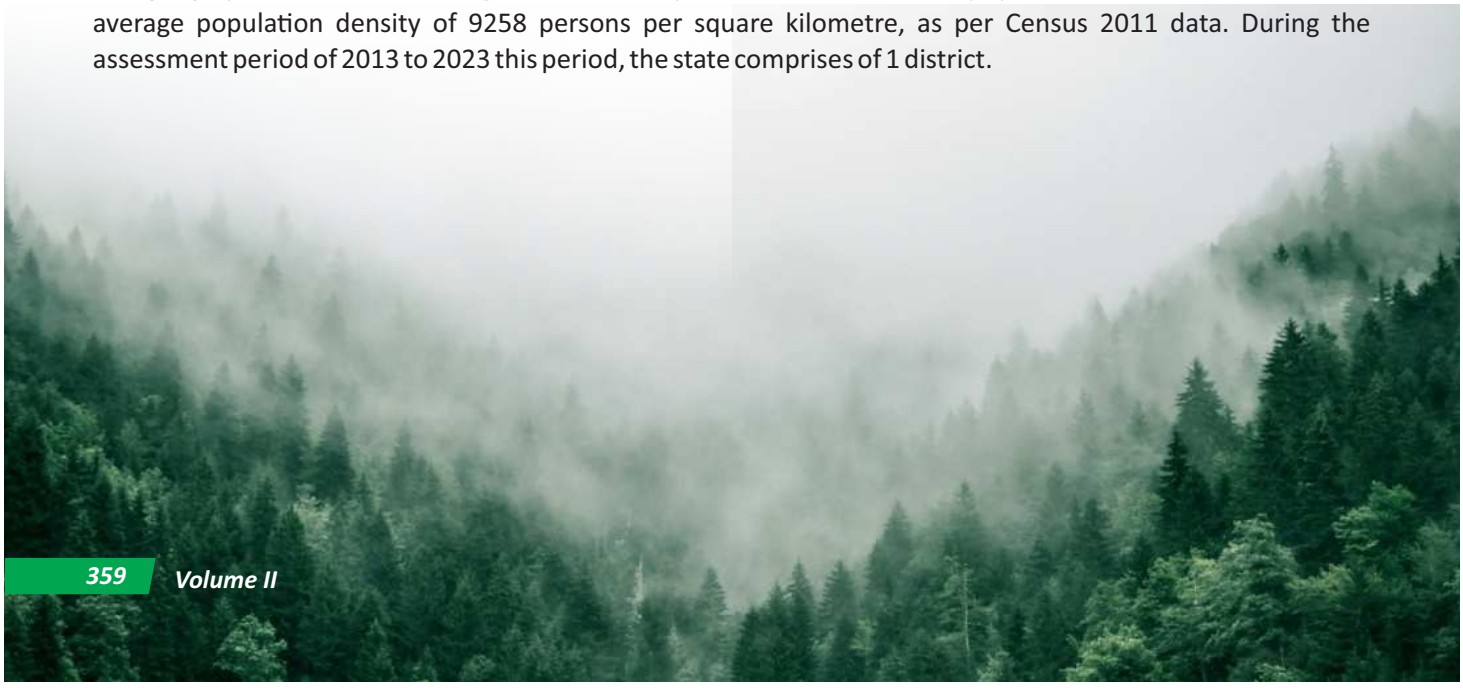
5.31 Chandigarh, the joint capital of Punjab and Haryana and a Union Territory of India, is a planned city situated in the foothills of the Shivalik range. As per the Champion & Seth Classification of Forest Types (1968), Chandigarh's forests belong to one forest type groups, further subdivided into 2 distinct Forest Types. Tropical dry deciduous forests, are the most common, with smaller patches of dry deciduous scrub occurring in its hilly areas.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	114	
Population (as per Census 2011)	**Million**	1.06	
Average Population Density	**Per sq. km**	9258	9298
No. of Districts		1	
No. of Hill Districts		0	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The geographical area of Chandigarh is at 114 square kilometres, with a population of 1.06 million and an average population density of 9258 persons per square kilometre, as per Census 2011 data. During the assessment period of 2013 to 2023 this period, the state comprises of 1 district.



5.31.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	1.36	9.66	6.24	0.56	96.18
Addition	0.08	6.29	5.13	0.85	1.69
Reduction	0	2.43	1.33	0.63	9.65
Closing 2021-22	1.44	13.52	10.04	0.78	88.22
Net change	0.08	3.86	3.8	0.22	-7.96
% Change	5.88%	39.96%	60.90%	39.29%	-8.28%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Chandigarh's Forest cover underwent several changes across different forest types. MDF saw significant increase, rising by 39.96%. Open forest areas reduce, a net loss of 3.80 sq. km. For most forest cover class, it shows a positive trend, while non-forest categories experienced some level of decrease during this period, with the most notable change in the open forest category.

5.31.2 Extent Account

Indicator (area in sq. km)	2013-2023
Recorded Forest Area (RFA)	35
% of GA	30.7
Type of Protection	
Reserved Forests (RF)	32
Protected Forest (PF)	0
Unclassed Forests	3

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remain consistent at 35 sq. km covering 30.70% of the state's geographical area during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.31.3 Condition Accounts

The condition account for the forests of Chandigarh for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	0.262	0.18	-0.082	-31.30
Growing Stock in Forest per unit area	m^3/ha	-	78.64		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	204	199	-5	-2.45
Above Ground Biomass	'000 tonnes	61	51	-10	-16.39
Below Ground Biomass	'000 tonnes	19	16	-3	-15.79
Dead Wood	'000 tonnes	0	3	-	-
Litter	'000 tonnes	2	2	-	-
Soil Organic Carbon	'000 tonnes	122	127	5	4.10

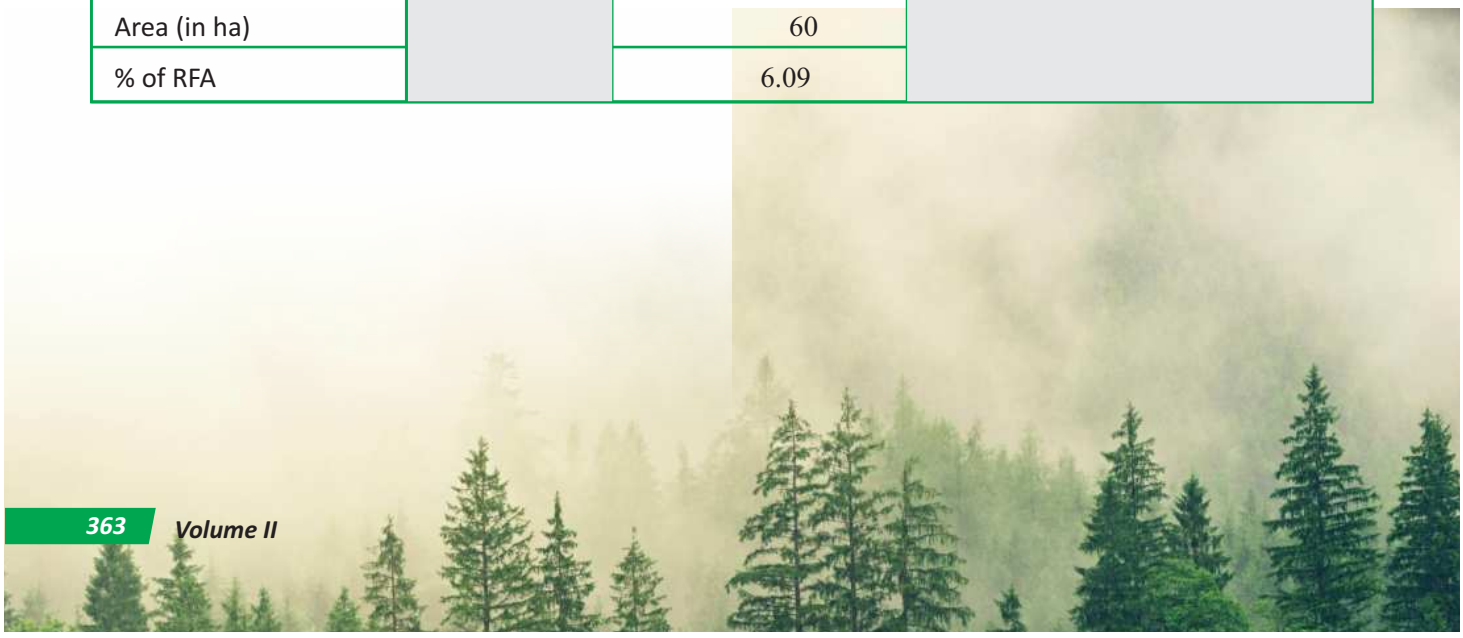
Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	92.73	80.13	-12.6	-13.59
Above Ground Biomass	Per hectare stock in tonnes	27.73	20.58	-7.15	-25.78
Below Ground Biomass	Per hectare stock in tonnes	8.64	6.56	-2.08	-24.07
Dead Wood	Per hectare stock in tonnes	0	1.15	-	-
Litter	Per hectare stock in tonnes	0.91	0.88	-0.03	-3.30
Soil Organic Carbon	Per hectare stock in tonnes	55.45	50.96	-4.49	-8.10

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.13		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	97.58		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	100	54.87	-	
> 1.0 ≤ 10	%		45.13		
> 10 ≤ 100	%	0	-	-	
> 100 ≤ 500	%	0	-	-	
> 500 ≤ 1000	%	0	-	-	
> 1000 ≤ 5000	%	0	-	-	
> 5000 ≤ 10000	%	0	-	-	
>10000	%	0	-	-	

Forest Fires			
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**
MODIS Detections	Number of fire cases	0	0
SNPP-VIIRS Detections	Number of fire cases	0	0

Forest Fire Prone Classes			
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**
Extremely fire prone	%	0	0
Very highly fire prone	%	0	0
Highly fire prone	%	0	0
Moderately fire prone	%	0	0
Less fire prone	%	100	100

Wetlands within RFA	
Indicator	**2019**
Number	4
Area (in ha)	60
% of RFA	6.09



Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	7	4	21
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	1.56	1.23	1.6
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Dry Deciduous Forests	4.76	3.42	4.95

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I

5.31.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	NA	-	2.06	0.004%		
Value of non-timber forest products (NTFP)	(₹in crore)	0.72	0.004%	0.67	0.001%	-0.04	-5.94%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services in % of SGDP is 0.004% in 2021-22. The non-timber forest provisioning service showed a marginal decrease in value by 0.04% reflecting declined from 0.004% to 0.001% as a % of SGDP. Overall, forest provisioning services in 2021–22 contributed a small yet measurable share to the state's economic output.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	11.78	0.04%	16.96	0.04%	5.18	43.97%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP has remained at 0.04% between 2015-16 and 2021-22, while the absolute value registered an increase of 43.97%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

2) Ecosystem services (at constant prices)

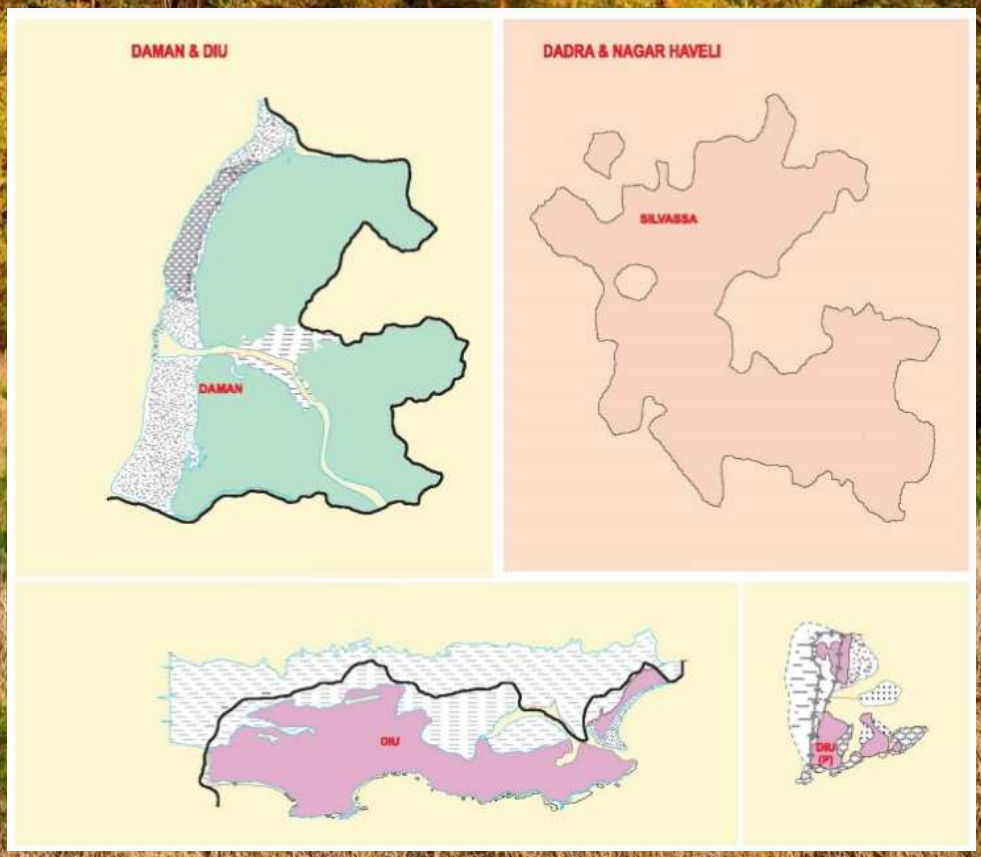
Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	NA	-	2	0.007%		
Value of non-timber forest products (NTFP)	(₹ in crore)	0.72	0.004%	0.56	0.002%	-0.15	-21.48%

At constant prices, the timber provisioning services in % of SGDP is 0.007% in 2021-22. The non-timber forest provisioning service showed a marginal decrease in value by 21.48% reflecting declined from 0.004% to 0.002% as a % of SGDP. Overall, forest provisioning services continued to contribute a modest share to the state's economy during the period.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	7.12	0.03%	6.95	0.02%	-0.17	-2.45%

At constant prices, the carbon retention services as % of SGDP has decreased from 0.03% in 2015-16 to 0.02% in 2021-22, and the absolute value showed a marginal decrease of 2.45%.

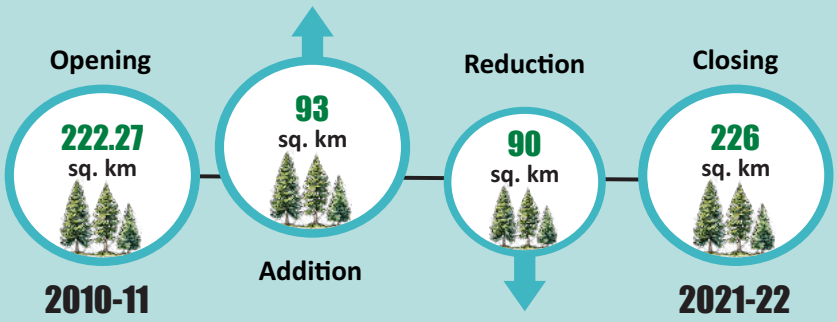
DADRA & NAGAR HAVELI & DAMAN & DIU



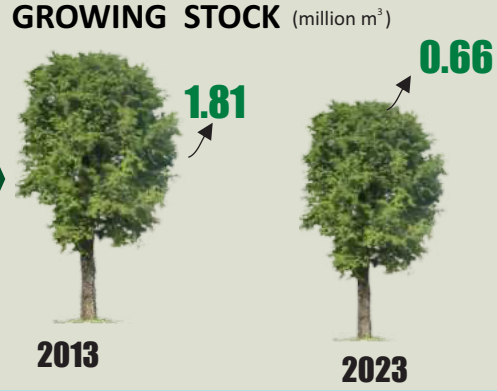
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA
2023	2023
602 Sq. Km	36.05 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	₹ 7.31 Crore
2021-22	₹ 13.94 Crore

REGULATING SERVICES
Carbon Retention Service

2015-16	₹ 87.55 Crore
2021-22	₹ 167.23 Crore

5.32 Dadra & Nagar Haveli and Daman & Diu, a Union Territory located along India's western coast, experiences a tropical climate, with high humidity and pronounced monsoonal rainfall, influencing its vegetation and biodiversity. As per the Champion & Seth Classification of Forest Types (1968), the forests in Dadra & Nagar Haveli and Daman & Diu belong to three Type Groups i.e. Tropical Moist Deciduous Forests, Tropical Dry Deciduous Forests and Littoral & Swamp Forests, out of which two forests (Tropical Moist Deciduous Forests, Tropical Dry Deciduous Forests) are further divided into four Forest Types.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	603	602
Population (as per Census 2011)	**Million**	0.58	
Average Population Density	**Per sq. km**	-	963
No. of Districts		3	
No. of Hill Districts		0	
No. of Tribal Districts		2	2

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Dadra & Nagar Haveli and Daman & Diu changed from 603 sq. km in 2013 to 602sq. km with a population of 0.58 million and an average population density of 963 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2013 to 2023, the administrative structure underwent marginal changes: the number of districts remained at 3, but the number of tribal districts increased from 1 to 2.

5.32.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	0	115.87	106.4	1.96	378.77
Addition	1.4	11.17	80.43	5.69	45.23
Reduction	0.04	48.45	41.16	2.99	52.28
Closing 2021-22	1.36	78.59	145.67	4.66	371.72
Net change (sq. km)	1.36	-37.28	39.27	2.7	-7.05

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Dadra & Nagar Haveli and Daman & Diu's Forest cover underwent several changes across different forest types. Open forest saw significant increase, rising by 39.27 sq. km while MDF show a reduction of 37.28 sq. km. For most forest cover class, it shows a positive trend, while MDF and non-forest categories experienced some level of decrease during this period, with the most notable change in the open forest category.

5.32.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	% Change
Recorded Forest Area (RFA)	212	217	5	2.36
% of GA	-	36.05		
Type of Protection				
Reserved Forests (RF)	199.24	206	6.76	3.39
Protected Forest (PF)	5			
Unclassed Forests	8.03	6	-2.03	-25.28

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 5 sq. km, marking a 2.36% rise, remaining at 36.05% of the state's geographical area during observed period. During this period, Reserved Forests grew by 3.39%, and Protected Forests remained unchanged. The Unclassed Forest category saw a decrease of 2.03 sq. km. These trends reflect a slight shift in the categorization of forest areas.

5.31.3 Condition Accounts

The condition account for the forests of Dadra & Nagar Haveli and Daman & Diu for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	1.808	0.66	-1.148	-63.5
Growing Stock in Forest per unit area	m^3/ha	-	39.33		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	1516	1,962	446	29.42
Above Ground Biomass	'000 tonnes	458	547	89	19.43
Below Ground Biomass	'000 tonnes	108	127	19	17.59
Dead Wood	'000 tonnes	10	18	8	80
Litter	'000 tonnes	37	32	-5	-13.51
Soil Organic Carbon	'000 tonnes	903	1,238	335	37.1

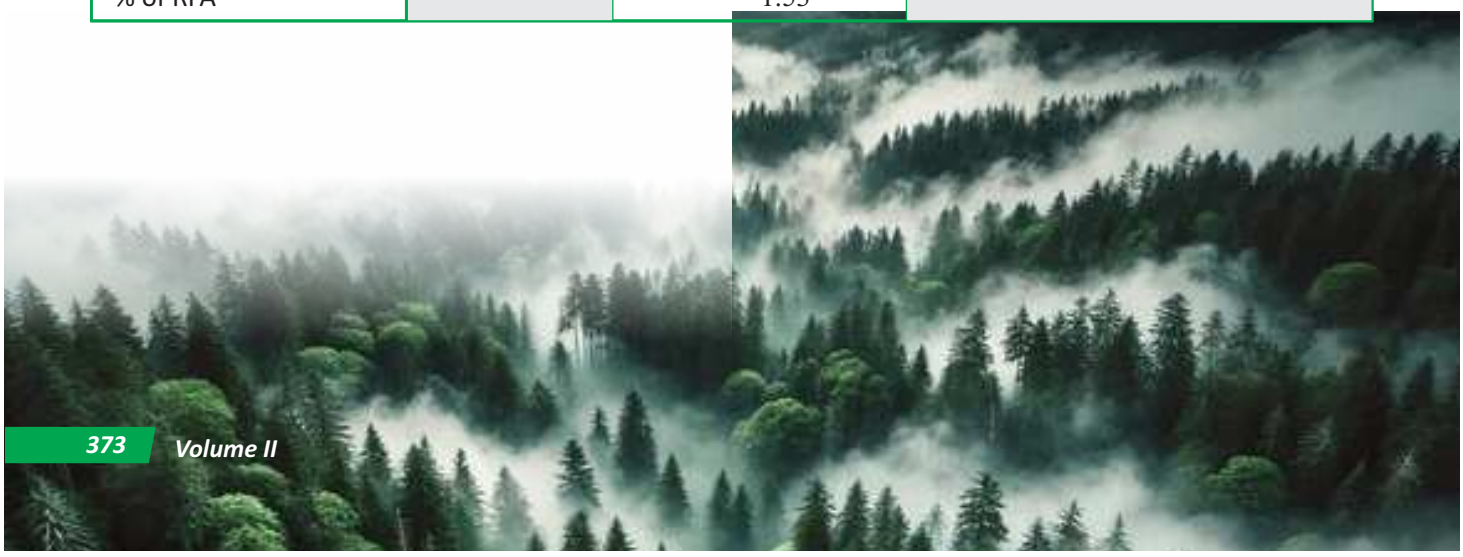
Carbon Stock per hectare			
Indicator	**Unit**	**2017**	**2023**
Total	Per hectare stock in tonnes	-	86.99
Above Ground Biomass	Per hectare stock in tonnes	-	24.24
Below Ground Biomass	Per hectare stock in tonnes	-	5.63
Dead Wood	Per hectare stock in tonnes	-	0.81
Litter	Per hectare stock in tonnes	-	1.42
Soil Organic Carbon	Per hectare stock in tonnes	-	54.89

Forest Fragmentation			
Indicator	**Unit**	**2013**	**2017**
Average Patch Size#	Sq. km	-	0.68
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	94.66
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**
≥ 0.01 ≤ 1.0	%	-	14.08
> 1.0 ≤ 10	%	-	12.95
> 10 ≤ 100	%	-	72.97
> 100 ≤ 500	%	-	-
> 500 ≤ 1000	%	-	-
> 1000 ≤ 5000	%	-	-
> 5000 ≤ 10000	%	-	-
>10000	%	-	-

Forest Fires					
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**	**Net Change**	**% Change**
MODIS Detections	Number of fire cases	1			
SNPP-VIIRS Detections	Number of fire cases	21	18	-3	-14.29

Forest Fire Prone Classes			
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**
Extremely fire prone	%	0	0
Very highly fire prone	%	0	0
Highly fire prone	%	0	0
Moderately fire prone	%	0	0
Less fire prone	%	100	100

Wetlands within RFA	
Indicator	**2019**
Number	5
Area (in ha)	322*
% of RFA	1.53*



Biodiversity Assessment			
Indicator	**2019**		
	Herbs	**Shrubs**	**Trees**
Total Number of species	11	8	25
Shannon Weiner Index	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	1.33	0.97	2.48
Tropical Dry Deciduous Forests	0.69	-	-
Effective number of species (ENC)	**Herbs**	**Shrubs**	**Trees**
Tropical Moist Deciduous Forests	3.78	2.64	11.94
Tropical Dry Deciduous Forests	1.99	-	-

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

*Note: *Figures include Dadra & Nagar Haveli only.; Note: # The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.*

5.32.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	2.79	8.21	5.42	194.01%
Value of non-timber forest products (NTFP)	(₹in crore)	4.52	5.73	1.21	26.75%
Total Timber+ NTFP Services	(₹in crore)	7.31	13.94	6.63	90.70%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services has increased by 194.01% from 2011-12 to 2021-22. In case of NFTP services, it had shown growth in absolute terms by 26.75%. This causes rise in the overall provisioning services, which improve by 90.70% in absolute terms. This indicates that, the overall economic value of provisioning services expanded over the decade. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber.

Regulating Services*	Unit	2015-16	2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	87.55	167.23	79.68	91.00%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The absolute value of carbon retention services registered an increase of 91.00%. This growth in absolute value suggests an improvement in the provision of these services over the decade.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	2.79	3.28	0.49	17.4%
Value of non-timber forest products (NTFP)	(₹in crore)	4.52	4.4	-0.13	-2.83%
Total Timber+ NTFP Services	(₹in crore)	7.31	7.68	0.36	4.92%

At constant prices, the timber provisioning services registered an increase in absolute value by 17.40%. The non-timber forest resources dropped by 2.83%. Collectively, the combined absolute value of timber and NTFP services increased by 4.29%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to the reduction in the incremental growth of overall forest provisioning services.

Regulating Services	Unit	2015-16	2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	52.91	68.48	15.57	29.42%

At constant prices, the absolute value of carbon retention services has the showed a marginal decrease of 29.42%.

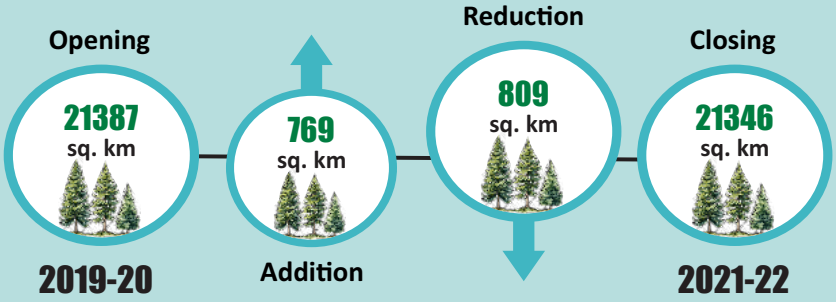
Note: Through its notification dated 09 December 2019, the Government of India merged the erstwhile Union Territories of Dadra & Nagar Haveli and Daman & Diu under a single administration. Accordingly, combined data for the two territories has been reported for the 2023 assessment period. For the 2013 assessment period, the figures were manually consolidated by aggregating the individual datasets of the two erstwhile UTs in order to generate a unified series. This approach was adopted to ensure consistency, comparability, and continuity in the presentation of data across the assessment years.

JAMMU & KASHMIR

FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2021	2023
54634 Sq. Km	9.09 %	9.09 %

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

FOREST ECOSYSTEM SERVICE ACCOUNT
(% of SGDP)

PROVISIONING SERVICES Total Timber + NTFP Services		REGULATING SERVICES Carbon Retention Service	
2019-20	0.17%	2019-20	16.14%
2021-22	0.22 %	2021-22	16.80%

5.33 Jammu and Kashmir, located in the northernmost part of India, is characterized by diverse physiography ranging from fertile plains and river valleys to the lofty Himalayas, with altitudes varying dramatically from subtropical lowlands to alpine zones. According to the Champion & Seth Classification of Forest Types (1968), the forests of Jammu and Kashmir are grouped into 8 Type Groups, further subdivided into 42 distinct Forest Types. The lower elevations are dominated by dry mixed deciduous and pine forests. Mid-altitude regions are characterized by mixed coniferous forests, along with temperate broad-leaved species such as Oak. Higher reaches transition into temperate pastures, which are critical summer grazing grounds and harbour unique flora.

State Profile

Indicator	Unit	2021	2023
Geographical Area	**Sq. km**	54624*	54634#
Population (as per Census 2011)	**Million**	12.54 (Including Ladakh)	
No. of Districts		22	
No. of Hill Districts		22	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change.

*Area of shape file provided by Survey of India (August, 2021);

#Area of Digitized boundary provided by Survey of India (November,2023)

Reported geographical area of Jammu & Kashmir changed from 54624 sq. km in 2021 to 54634 sq. km with a population of 12.54 million and an average population density of 125 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2021 to 2023, the number of districts remained at 22.

5.33.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2019-20	4155	8117	9115	284	32953
Addition	88.77	162.88	516.96	82.92	697.95
Reduction	34.98	273.32	500.92	104.65	625.49
Closing 2021-22	4208.79	8006.56	9131.04	262.27	33025.46
Net change	53.79	-110.44	16.04	-21.73	72.46
% Change	1.29%	-1.36%	0.18%	-7.65%	0.22%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2019-20 and 2021-22, Jammu & Kashmir's Forest cover underwent several changes across different forest types. VDF saw significant increase, rising by 1.29% while MDF show a reduction of 1.36%. Scrub areas reduce substantially, a net loss of 21.73 sq. km. For most forest cover class, it shows a positive trend, while MDF and Scrub experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.33.2 Extent Account

Indicator (area in sq. km)	2021-2023
Recorded Forest Area (RFA)	20199
% of GA	9.09
Type of Protection	
Reserved Forests (RF)	17648
Protected Forest (PF)	2551
Unclassed Forests	0

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remain consistent at 20199 sq. km covering 9.09% of the state's geographical area during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.33.3 Condition Accounts

The condition account for the forests of Jammu and Kashmir for 2021 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2021	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	348.35	376.51	28.16	8.08
Growing Stock in Forest per unit area	m^3/ha	172.46	296.22	123.76	71.76
Carbon Stock					
Indicator	**Unit**	**2021**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	3,70,870	3,71,629	759	0.20
Above Ground Biomass	'000 tonnes	1,63,897	1,66,654	2757	1.68
Below Ground Biomass	'000 tonnes	45,864	46,631	767	1.67
Dead Wood	'000 tonnes	3,386	1,386	-2000	-59.07
Litter	'000 tonnes	4,951	3,416	-1535	-31.00
Soil Organic Carbon	'000 tonnes	1,52,772	1,53,542	770	0.50

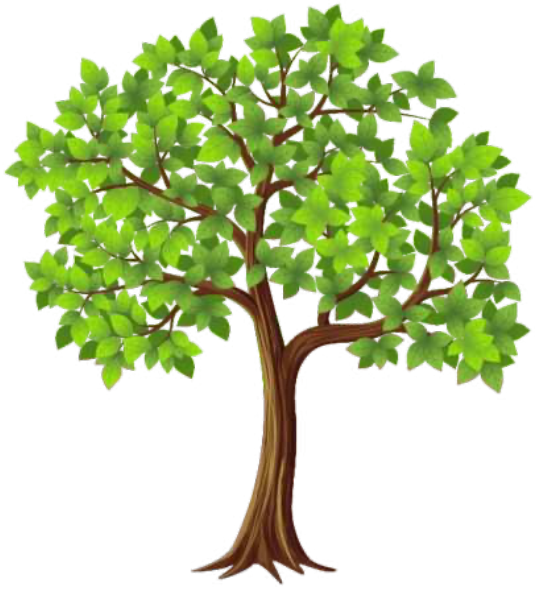
Carbon Stock per hectare					
Indicator	**Unit**	**2021**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	173.41	174.1	0.69	0.40
Above Ground Biomass	Per hectare stock in tonnes	76.63	78.07	1.44	1.88
Below Ground Biomass	Per hectare stock in tonnes	21.45	21.85	0.4	1.86
Dead Wood	Per hectare stock in tonnes	1.58	0.65	-0.93	-58.86
Litter	Per hectare stock in tonnes	2.32	1.6	-0.72	-31.03
Soil Organic Carbon	Per hectare stock in tonnes	71.43	71.93	0.5	0.70

Forest Fire Prone Classes

Indicator	% of Total Forest Cover & Scrub	2021	2023	Net Change
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0.08	1.25	1.17
Highly fire prone	%	1.51	4.12	2.61
Moderately fire prone	%	4.01	5.76	1.75
Less fire prone	%	94.4	88.87	-5.53

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

Indicator	2023
Status of Regeneration [Distribution of RFA (%)]	
Adequate	14.45
Inadequate	34.71
Absent	43.75
NA	7.09
Biotic Influence [Distribution of RFA (%)]	
Heavily degraded	3.31
Moderately degraded	17.46
Mildly degraded	51.75
Not degraded	18.61
NA	8.87
Invasive Species [Distribution of RFA (%)]	
Very Dense	1.47
Dense	2.95
Moderate	3.44
Scanty	1.97
Absent	32.95
NA	57.22



Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

5.33.4 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2019-20	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	150.33	0.09%	261.52	0.14%	111.19	73.96%
Value of non-timber forest products (NTFP)	(₹in crore)	125.78	0.08%	149.73	0.08%	23.95	19.04%
Total Timber+ NTFP Services	(₹in crore)	276.11	0.17%	411.25	0.22%	135.14	48.94%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP increased from 0.09% in 2019-20 to 0.14% in 2021-22, and its absolute monetary value has also increased by 73.96%. The non-timber forest product provisioning services showed a increase in value by 19.04%, and its value as % of SGDP has remained stagnant at 0.08%. Collectively, the combined timber and NTFP services in SGDP rise from 0.17% to 0.22%, and their overall absolute value increased by nearly 48.94%. This trend reflects a steady improvement in the overall contribution of forest provisioning services, with notable growth in both timber and non-timber values leading to a rise in their combined share of SGDP and strengthening their economic significance over the period.

Regulating Services*	Unit	2019-20	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	26485.63	16.14%	31675.3	16.80%	5189.67	19.59%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP has raised from 16.14% in 2015-16 to 16.80% in 2021-22, while the absolute value registered an increase of 19.59%. This growth in absolute and relative value suggests an improvement in the provision of these services over the period.

2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2019-20	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	168.48	0.15%	193.47	0.17%	24.99	14.83%
Value of non-timber forest products (NTFP)	(₹ in crore)	126.76	0.11%	133.39	0.12%	6.63	5.23%
Total Timber+ NTFP Services	(₹ in crore)	295.23	0.26%	326.86	0.29%	31.63	10.71%

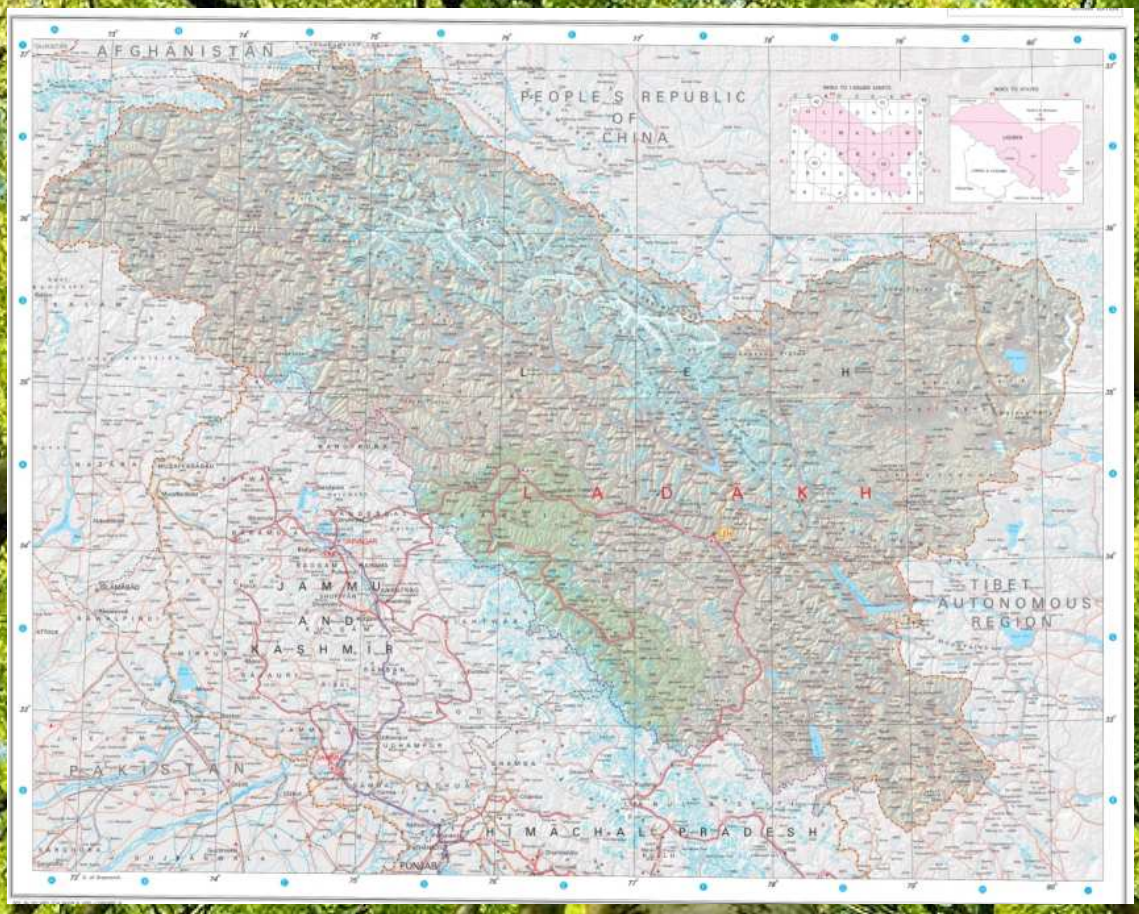
At constant prices, the timber provisioning services in SGDP rise from 0.15% in 2011-12 to 0.17% in 2021-22, reflecting an increase in absolute value by 14.83%. The non-timber forest resources also rise from 0.11% to 0.12%, with a 5.23% growth in value. Collectively, the combined timber and NTFP services in % of SGDP increased from 0.26% to 0.29%, and their absolute value increased by 10.71%, indicating a significant improvement in their relative economic contribution over the period.

Regulating Services	Unit	2019-20	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	12943.62	11.36%	12970.11	11.24%	26.49	0.20%

At constant prices, the carbon retention services as % of SGDP has nominal decrease from 11.36% in 2019-20 to 11.24% in 2021-22, and the absolute value showed a marginal increase of 0.20%.

Note: Through its notification dated 31 October 2019, the Government of India bifurcated the erstwhile State of Jammu & Kashmir into two separate Union Territories: Jammu & Kashmir and Ladakh. For these UTs, data has been reported independently beginning with the India State of Forest Report (ISFR) 2021 assessment cycle, and accordingly this period has been considered for analysis. However, certain indicators have not been presented for Jammu & Kashmir, either due to unavailability of data for the reference period or because the information continues to be compiled at the combined level for both UTs.

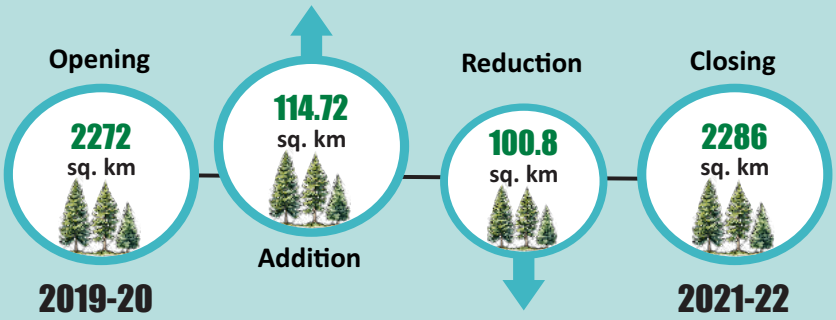
LADAKH


AFGHANISTAN
PEOPLE'S REPUBLIC OF CHINA
L A D A K H
JAMMU AND KASHMIR
TIBET AUTONOMOUS REGION
PAKISTAN
HIMACHAL PRADESH
PUNJAB

FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA
2023	2023
168327 Sq. Km	7 Sq. Km

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

GROWING STOCK (million m^3)

CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES	REGULATING SERVICES
Total Timber + NTFP Services	Carbon Retention Service

5.34 Ladakh, situated in the northernmost part of India, is a high-altitude cold desert region bounded by the Karakoram Range in the north and the Himalayas in the south. The union territory is characterized by extreme aridity, sparse precipitation, and harsh climatic conditions, with elevations ranging from 2,700 to over 7,000 meters above sea level. Ladakh's vegetation is limited, with forests primarily categorized under alpine and temperate types, further represented by subalpine scrub and dry alpine pastures.

State Profile

Indicator	Unit	2021	2023
Geographical Area	**Sq. km**	168055*	168327#
No. of Districts		2	
No. of Hill Districts		2	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change.

*Area of shape file provided by Survey of India (August, 2021);

#Area of Digitized boundary provided by Survey of India (November,2023)

Reported geographical area of Ladakh changed from 168055 sq. km in 2021 to 168327 sq. km with a population of 12.54 million and an average population density of 125 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2021 to 2023, the number of districts remained at 2.

5.34.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2019-20	2	512	1758	279	165504
Addition	0.27	16.8	97.65	52.06	319.59
Reduction	0	19.73	81.07	5.57	108
Closing 2021-22	2.27	509.07	1774.58	325.49	165715.6
Net change	0.27	-2.93	16.58	46.49	211.59
% Change	13.50%	-0.57%	0.94%	16.66%	0.13%

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2019-20 and 2021-22, Ladakh's Forest cover underwent several changes across different forest types. VDF saw significant increase, rising by 13.50% while MDF show a reduction of 0.57%. Scrub areas grow substantially, a net gain of 46.49 sq. km. For most forest cover class, it shows a positive trend, while MDF experienced some level of decrease during this period, with the most notable change in the Scrub category.

5.34.2 Extent Account

Indicator (area in sq. km)	2021-2023
Recorded Forest Area (RFA)	7
% of GA	-
Type of Protection	
Reserved Forests (RF)	7
Protected Forest (PF)	0
Unclassed Forests	0

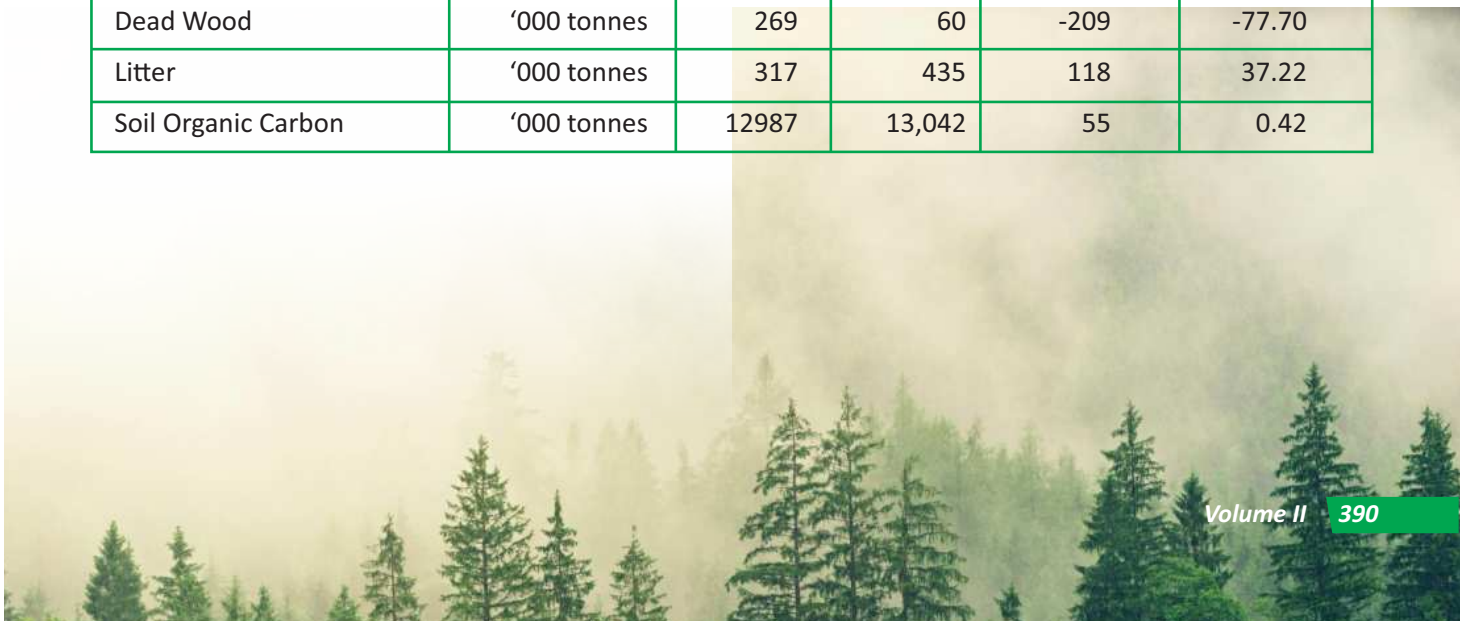
Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) remain consistent at 7 sq. km during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.34.3 Condition Accounts

The condition account for the forests of Ladakh for 2021 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2021	2023		
Growing Stock					
Volume of Growing Stock	Million m^3	0.18	-		
Growing Stock in Forest per unit area	m^3/ha	257.14	-		
Carbon Stock					
Indicator	**Unit**	**2021**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	30702	30,651	-51	-0.17
Above Ground Biomass	'000 tonnes	13293	13,275	-18	-0.14
Below Ground Biomass	'000 tonnes	3836	3,839	3	0.08
Dead Wood	'000 tonnes	269	60	-209	-77.70
Litter	'000 tonnes	317	435	118	37.22
Soil Organic Carbon	'000 tonnes	12987	13,042	55	0.42



Carbon Stock per hectare					
Indicator	**Unit**	**2021**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	135.11	134.08	-1.03	-0.76
Above Ground Biomass	Per hectare stock in tonnes	58.5	58.07	0	-0.74
Below Ground Biomass	Per hectare stock in tonnes	16.88	16.8	0	-0.47
Dead Wood	Per hectare stock in tonnes	1.18	0.26	-1	-77.97
Litter	Per hectare stock in tonnes	1.39	1.9	1	36.69
Soil Organic Carbon	Per hectare stock in tonnes	57.16	57.05	0	-0.19

Forest Fires			
Number of Forest Fire Detected by FSI using	**% of forest cover & Scrub**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**
MODIS Detections	Number of fire cases	-	1
SNPP-VIIRS Detections	Number of fire cases	-	27

Forest Fire Prone Classes				
Indicator	**% of Total Forest Cover & Scrub**	**2021**	**2023**	**Net Change**
Extremely fire prone	%	0	0	-
Very highly fire prone	%	0	0	-
Highly fire prone	%	0	0	-
Moderately fire prone	%	0.81	0	-0.81
Less fire prone	%	99.19	100	0.81

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation.

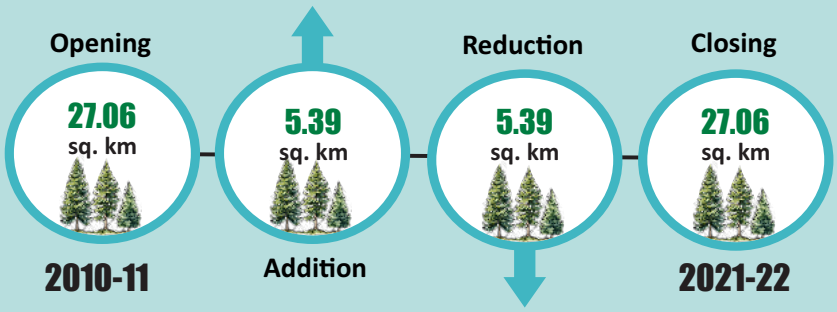
Note: Through its notification dated 31 October 2019, the Government of India bifurcated the erstwhile State of Jammu & Kashmir into two separate Union Territories: Jammu & Kashmir and Ladakh. For these UTs, data has been reported independently beginning with the India State of Forest Report (ISFR) 2021 assessment cycle, and accordingly this period has been considered for analysis. However, certain indicators have not been presented for Ladakh, either due to unavailability of data for the reference period or because the information continues to be compiled at the combined level for both UTs. For Ladakh, Ecosystem Services Account also could not be prepared due to non-availability of data.

LAKSHADWEEP

FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA
2023	2023
30 Sq. Km	

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT

CARBON STOCK (million tonnes)

FOREST ECOSYSTEM SERVICE ACCOUNT

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12 — 0.63 Crore (only NTFP)

2021-22 — 0.54 Crore

REGULATING SERVICES
Carbon Retention Service

2015-16 — ₹ 9.3 Crore

2021-22 — ₹ 18.5 Crore

5.35 Lakshadweep, India's smallest Union Territory, is group of 36 islands scattered across the Arabian Sea, comprising 12 atolls, three reefs, and 10 inhabited islands. ***The Union Territory of Lakshadweep does not have any notified forests***. About 82% of the land mass is covered by privately owned coconut plantations. Lakshadweep has a vast lagoon of 4,200 sq. km with sandy beaches and abundance of marine fauna.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	32	30
Population (as per Census 2011)	**Million**	0.064	
Average Population Density	**Per sq. km**	2149	2015
No. of Districts		1	
No. of Hill Districts		0	
No. of Tribal Districts		1	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Lakshadweep changed from 32 sq. km in 2013 to 30 sq. km with a population of 0.064 million and an average population density of 2149 persons per square kilometre which shifted to 2015, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2013 to 2023, the number of districts remained at 1.

5.35.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	0	17.18	9.88	0	4.94
Addition	0	2.29	3.1	0	2.31
Reduction	0	2.5	2.89	0	4.68
Closing 2021-22	0	16.97	10.09	0	2.57
Net change (sq. km)	0	-0.21	0.21	0	-2.37

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Lakshadweep's Forest cover underwent several changes across different forest types. Open forest saw significant increase, rising by 0.21 sq. km while MDF show a reduction of 0.21 sq. km. For most forest cover class, it shows a negative trend, while except for open forest experience some level of an increase, with the most notable change in the non-forest category.

5.35.3 Condition Accounts

The condition account for the forests of Lakshadweep for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net Change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	0	-		
Growing Stock in Forest	m^3/ha	-	-		

Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net Change**	**% Change**
Total	'000 tonnes	161	217	56	34.78
Above Ground Biomass	'000 tonnes	55	52	-3	-5.45
Below Ground Biomass	'000 tonnes	0	11		
Dead Wood	'000 tonnes	1	4	3	300
Litter	'000 tonnes	5	2	-3	-60
Soil Organic Carbon	'000 tonnes	100	148	48	48

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	59.63	80.41	20.78	34.85
Above Ground Biomass	Per hectare stock in tonnes	20.37	19.2	-1.17	-5.74
Below Ground Biomass	Per hectare stock in tonnes	0	4.21		
Dead Wood	Per hectare stock in tonnes	0.37	1.62	1.25	337.84
Litter	Per hectare stock in tonnes	1.85	0.56	-1.29	-69.73
Soil Organic Carbon	Per hectare stock in tonnes	37.04	54.82	17.78	48

Forest Fragmentation			
Indicator	**Unit**	**2013**	**2017**
Average Patch Size#	Sq. km	-	1.29
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	61.90

Patch Size Range (in sq. km)	% of forest cover	2015	2017
≥ 0.01 ≤ 1.0	%	100	13.14
> 1.0 ≤ 10	%		86.86
> 10 ≤ 100	%	0	-
> 100 ≤ 500	%	0	-
> 500 ≤ 1000	%	0	-
> 1000 ≤ 5000	%	0	-
> 5000 ≤ 10000	%	0	-
>10000	%	0	-

Forest Fires

Number of Forest Fire Detected by FSI using	Unit	Nov 2018 to June 2019	Nov 2021 to June 2022
MODIS Detections	Number of fire cases	0	0
SNPP-VIIRS Detections	Number of fire cases	0	0

Forest Fire Prone Classes

Patch Size Range (in sq. km)	% of forest cover & Scrub	2019	2023
Extremely fire prone	%	0	0
Very highly fire prone	%	0	0
Highly fire prone	%	0	0
Moderately fire prone	%	0	0
Less fire prone	%	100	100

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

5.35.3 Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	0	0.33		
Value of non-timber forest products (NTFP)	(₹in crore)	0.63	0.58	-0.05	-7.31%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The absolute monetary value of timber provisioning services is at 0.33 crore in 2021-22. In case of NFTP services, it had shown reduction in absolute terms by 7.31%. Overall, forest provisioning services in 2021–22 contributed a small yet measurable share to the union territory's economic output.

Regulating Services*	Unit	2015-16	2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	9.3	18.5	9.2	98.92%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The absolute value of carbon retention services registered an increase of 98.92%. This growth in absolute value suggests an improvement in the provision of these services over the decade.

2) Ecosystem services (at constant prices)

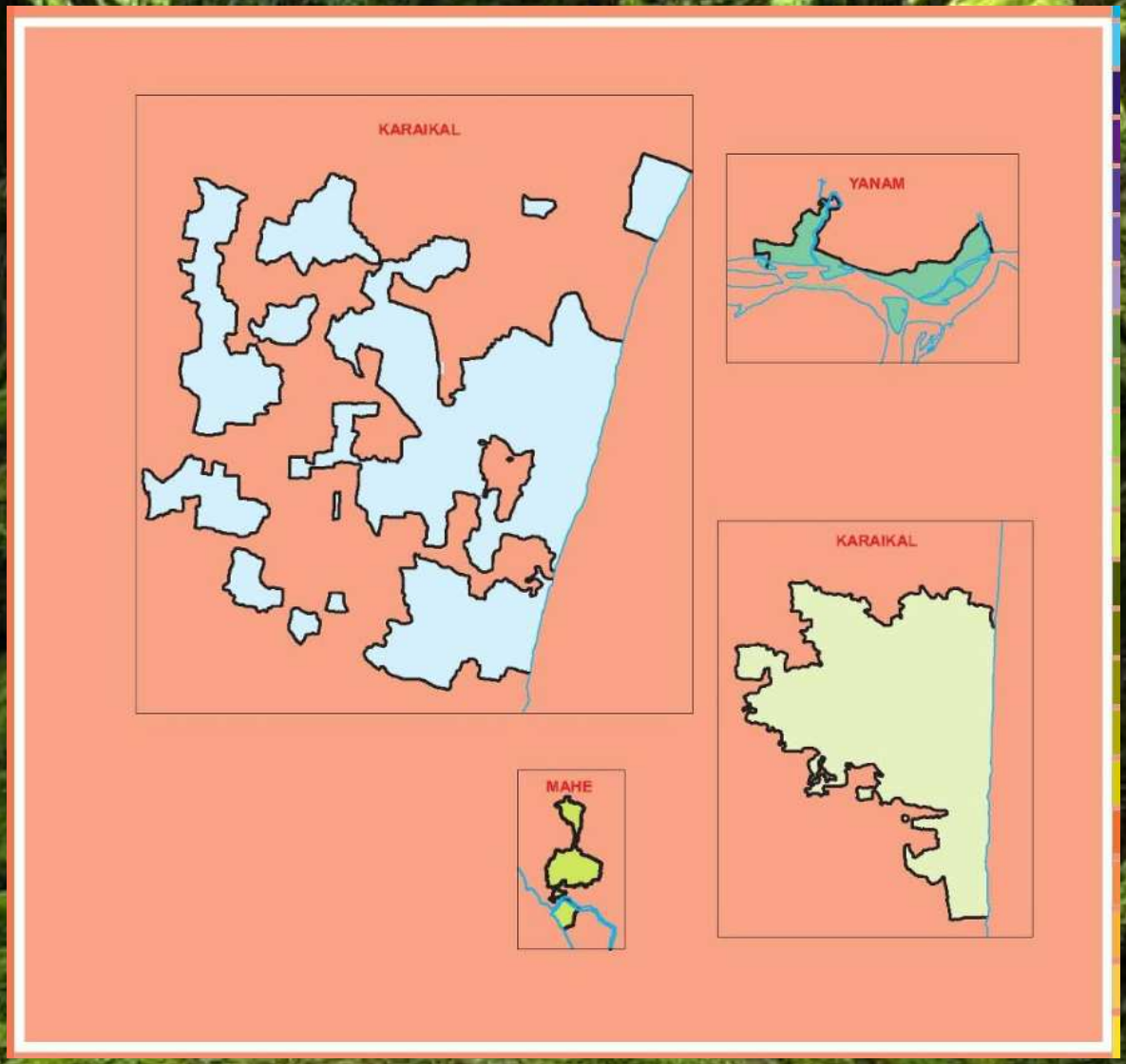
Provisioning Services	Unit	2011-12	2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	0	0.13		
Value of non-timber forest products (NTFP)	(₹in crore)	0.63	0.41	-0.22	-34.87%

At constant prices, the timber provisioning services registered at 0.13 crore in 2021-22. The non-timber forest resources dropped by 34.87%. Overall, forest provisioning services continued to contribute a modest share to the total economy during the period.

Regulating Services	Unit	2015-16	2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	5.62	7.57	1.95	34.78%

At constant prices, the absolute value of carbon retention services has the showed a marginal decrease of 34.78%.

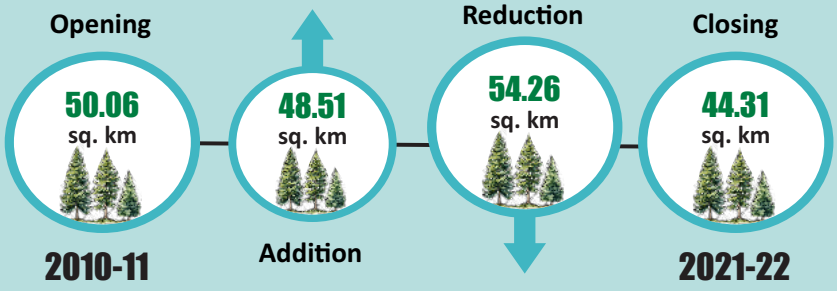
PUDUCHERRY



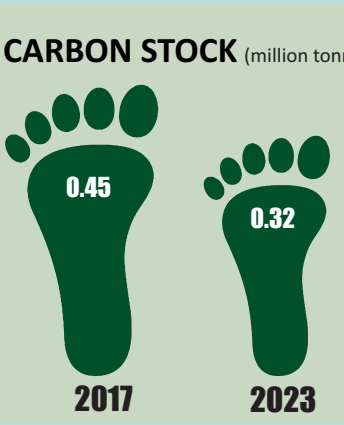
FOREST EXTENT ACCOUNT

GEOGRAPHICAL AREA	RECORDED FOREST AREA	
2023	2013	2023
490 Sq. Km	2.71%	2.65%

FOREST PHYSICAL ASSET ACCOUNT
(Total Forest Cover)



FOREST CONDITION ACCOUNT



FOREST ECOSYSTEM SERVICE ACCOUNT

(% of SGDP)

PROVISIONING SERVICES
Total Timber + NTFP Services

2011-12	0.05%
2021-22	0.02%

REGULATING SERVICES
Carbon Retention Service

2015-16	0.10%
2021-22	0.07%

5.36 Puducherry, a Union Territory on the southeastern coast of India, comprises four geographically separated districts, Puducherry, Karaikal, Mahe, and Yanam, situated along the coasts of Tamil Nadu, Kerala, and Andhra Pradesh. As per the Champion & Seth Classification of Forest Types (1968), the forests in Puducherry belong to Type Group 'Littoral & Swamp Forests'.

State Profile

Indicator	Unit	2013	2023
Geographical Area	**Sq. km**	480	490
Population (as per Census 2011)	**Million**	1.25	
Average Population Density	**Per sq. km**	2547	
No. of Districts		4	
No. of Hill Districts		0	
No. of Tribal Districts		0	

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

Reported geographical area of Puducherry changed from 480 sq. km in 2013 to 490 sq. km with a population of 1.25 million and an average population density of 2547 persons per square kilometre, as per Census 2011 data. Change in area is possibly due to improved mapping techniques or updates in administrative boundary definitions. During the assessment period of 2013 to 2023, the number of districts remained at 4.

5.36.1 Forest Physical asset account

Type of Forest cover Class (area in sq. km)	Very Dense Forest (VDF)	Moderately Dense Forest (MDF)	Open Forest (OF)	Scrub	Non-Forest
Opening 2010-11	0	35.23	14.83	0	429.94
Addition	0	6.58	41.93	0.07	54.04
Reduction	0	31.48	22.78	0	38.36
Closing 2021-22	0	10.33	33.98	0.07	445.62
Net change (sq. km)	0	-24.90	19.15	0.07	15.68

Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.2 in chapter 2, vol I.

In the Forest Asset Account, between 2010-11 and 2021-22, Puducherry's Forest cover underwent several changes across different forest types. Open forest saw significant increase, rising by 19.15 sq. km while MDF show a reduction of 24.90 sq. km. For most forest cover class, it shows a positive trend, while except for MDF experience some level of a decrease, with the most notable change in the MDF category.

5.36.2 Extent Account

Indicator (area in sq. km)	2013	2023	Net Change	Change
Recorded Forest Area (RFA)	13	13	1	8.33
% of GA	2.71	2.65	-0.06	
Type of Protection				
Reserved Forests (RF)	0			
Protected Forest (PF)	2			
Unclassed Forests	11			

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change

The Forest Extent Account provides detailed information on the spatial distribution and protection status of forest areas. The Recorded Forest Area (RFA) increased by 1 sq. km, marking an 8.33% rise, while decreasing from 2.71% to 2.65% of the state's geographical area during observed period. During this period, Reserved Forests, Protected Forests and Unclassed Forest categories remained unchanged. These trends reflect consistency in the categorization of forest areas.

5.36.3 Condition Accounts

The condition account for the forests of Puducherry for 2013 and 2023 assessment of ISFR are given in table below. However, in some cases where data for these years were unavailable, the closest subsequent year with available data is considered.

Indicator	Unit	2013	2023	Net change	% Change
Growing Stock					
Volume of Growing Stock	Million m^3	0.083	0.03	-0.053	-63.86
Growing Stock in Forest per unit area	m^3/ha	-	62.7		
Carbon Stock					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	'000 tonnes	451	315	-136	-30.16
Above Ground Biomass	'000 tonnes	108	61	-47	-43.52
Below Ground Biomass	'000 tonnes	23	14	-9	-39.13
Dead Wood	'000 tonnes	1	8	7	700
Litter	'000 tonnes	8	2	-6	-75
Soil Organic Carbon	'000 tonnes	311	230	-81	-26.05

Carbon Stock per hectare					
Indicator	**Unit**	**2017**	**2023**	**Net change**	**% Change**
Total	Per hectare stock in tonnes	83.52	71.11	-12.41	-14.86
Above Ground Biomass	Per hectare stock in tonnes	20	13.84	-6.16	-30.8
Below Ground Biomass	Per hectare stock in tonnes	4.26	3.15	-1.11	-26.06
Dead Wood	Per hectare stock in tonnes	0.19	1.84	1.65	868.42
Litter	Per hectare stock in tonnes	1.48	0.44	-1.04	-70.27
Soil Organic Carbon	Per hectare stock in tonnes	57.59	51.84	-5.75	-9.98

Forest Fragmentation					
Indicator	**Unit**	**2013**	**2017**		
Average Patch Size#	Sq. km	-	0.06		
Proportion of small patches (≥ 0.01 sq. km to 1 sq. km)#	%	-	99.65		
Patch Size Range (in sq. km)	**% of forest cover**	**2013**	**2017**	**Net Change**	
≥ 0.01 ≤ 1.0	%	100	90.42	-	
> 1.0 ≤ 10	%		9.58		
> 10 ≤ 100	%	-	-	-	
> 100 ≤ 500	%	-	-	-	
> 500 ≤ 1000	%	-	-	-	
> 1000 ≤ 5000	%	-	-	-	
> 5000 ≤ 10000	%	-	-	-	
>10000	%	-	-	-	

Forest Fires			
Number of Forest Fire Detected by FSI using	**Unit**	**Nov 2018 to June 2019**	**Nov 2021 to June 2022**
MODIS Detections	Number of fire cases	0	0
SNPP-VIIRS Detections	Number of fire cases	4	0

Forest Fire Prone Classes			
Indicator	**% of Total Forest Cover & Scrub**	**2019**	**2023**
Extremely fire prone	%	0	0
Very highly fire prone	%	0	0
Highly fire prone	%	0	0
Moderately fire prone	%	0	0
Less fire prone	%	100	100

Wetlands within RFA	
Indicator	**2019**
Number	8
Area (in ha)	127
% of RFA	41.64

Source: India State of Forest Report (ISFR), Forest Survey of India (FSI), Ministry of Environment, Forest and Climate Change; Ecosystem Accounts for India, Report of the NCAVES Project, Ministry of Statistics and Programme Implementation

 # Note: The calculation has been done by MoSPI using data from India State of Forest Report (ISFR). For the methodology, please refer section 2.9 in chapter 2, vol I.

5.36.4- Ecosystem Services Accounts

1) Ecosystem services (at current prices)

Provisioning Services*	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1.99	0.01%	5.49	0.01%	3.49	175.16%
Value of non-timber forest products (NTFP)	(₹in crore)	6.2	0.04%	3.5	0.01%	-2.7	-43.49%
Total Timber+ NTFP Services	(₹in crore)	8.19	0.05%	8.99	0.02%	0.79	9.65%

**For methodology refer table 2.2, in chapter 2, Vol I.*

The timber provisioning services as % of SGDP remained at 0.01% during the observed period, and its absolute monetary value has also increased drastically by 175.16%. The non-timber forest product provisioning services showed a decrease in value by 43.49%, and its value as % of SGDP has also declined, from 0.04% to 0.01%. Collectively, the combined timber and NTFP services in SGDP fell from 0.05% to 0.02%, even as their overall absolute value increased by nearly 9.65%. This trend suggests that while the economic significance of timber provisioning has expanded, the contraction in NTFP contributions has led to an overall reduction in the share of forest provisioning services relative to other sectors of the economy. Overall, this shift underscores a structural change in forest-based economic contributions, with increasing dependence on timber and a diminishing role for NTFPs.

Regulating Services*	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	26.05	0.10%	26.85	0.07%	0.80	3.08%

** For methodology refer table 2.3, in chapter 2, Vol I.*

The carbon retention services as % of SGDP has declined from 0.10% in 2015-16 to 0.07% in 2021-22, while the absolute value registered an increase of 3.08%. Since the carbon stock decreased during the assessment period, any increase in absolute value might be attributable to inflation.

Cultural Services	Unit	2011-12	2019-20
Tourist inflow for ecotourism	Number of tourists	NA	104000

source: Forestry Statistics 2021, Indian Council of Forestry Research & Education (ICFRE), Ministry of Environment, Forest and Climate Change

Note: Revenue from Ecotourism is not available for respective period in Forestry Statistics 2021

In 2019-20, tourist inflow for ecotourism reached 104000 visitors. These figures indicate a significant engagement with ecotourism activities, reflecting its role in attracting visitors.

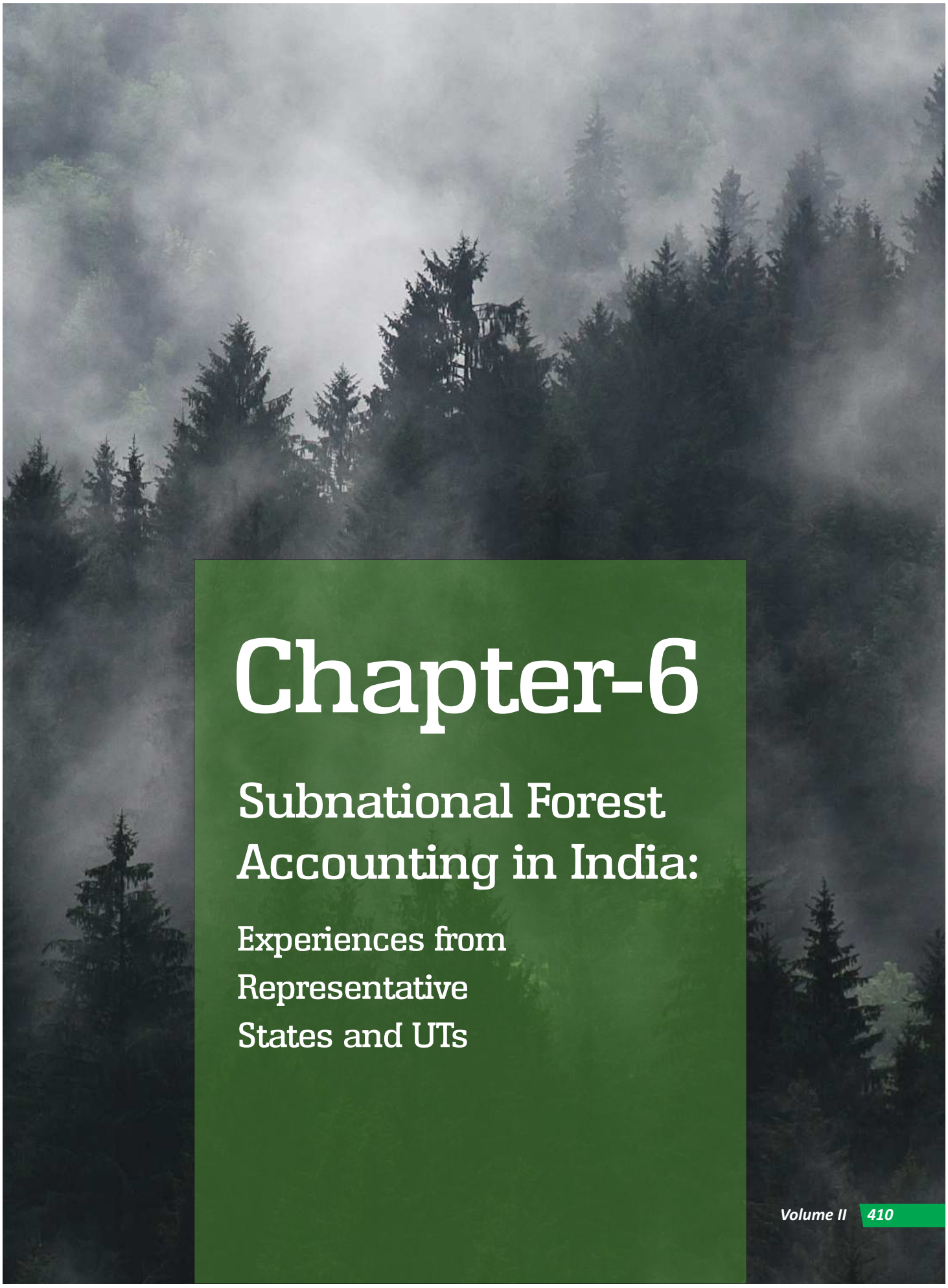
2) Ecosystem services (at constant prices)

Provisioning Services	Unit	2011-12	Imputed value (% of SGDP) 2011-12	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Timber	(₹ in crore)	1.99	0.01%	2.19	0.01%	0.20	9.87%
Value of non-timber forest products (NTFP)	(₹ in crore)	6.2	0.04%	2.06	0.01%	-4.14	-66.83%
Total Timber+ NTFP Services	(₹ in crore)	8.19	0.05%	4.25	0.02%	-3.94	-48.11%

At constant prices, the timber provisioning services in SGDP remained at 0.01%, while an increase in absolute value by 9.87% is registered. The non-timber forest resources dropped from 0.04% to 0.01%, with a 66.83% reduction in value. Collectively, the combined timber and NTFP services in % of SGDP decreased from 0.05% to 0.02%, and their absolute value decreased by 48.11%. This pattern indicates that, despite moderate growth in timber provisioning, the significant contraction in NTFP output has driven an overall decline in the relative economic importance of forest provisioning services.

Regulating Services	Unit	2015-16	Imputed value (% of SGDP) 2015-16	2021-22	Imputed value (% of SGDP) 2021-22	Net Change	% Change
Value of Carbon Retention Service	(₹ in crore)	15.74	0.08%	10.99	0.04%	-4.75	-30.16%

At constant prices, the carbon retention services as % of SGDP has decreased from 0.08% in 2015-16 to 0.04% in 2021-22, and the absolute value showed a decrease of 30.16%.



Chapter-6

Subnational Forest Accounting in India:

Experiences from Representative States and UTs

Introduction

6.1 India is blessed with a remarkable wealth of forest resources, ranging from the alpine woodlands of the Himalayas to the dense tropical forests along the country's vast coastline. These forests harbour an exceptional diversity of plant and animal life, making India one of the richest countries in the world in terms of forest biodiversity. Far beyond their ecological significance, India's forests play a pivotal role in supporting millions of people by providing livelihoods, regulating water systems, maintaining soil fertility, and offering spiritual and cultural inspiration across generations. As the world increasingly acknowledges the economic and social importance of healthy ecosystems, there is a growing recognition in India of the need to look beyond the traditional focus on timber extraction. It has become essential to measure and value the full range of goods and services provided by forests including carbon sequestration, water regulation, biodiversity conservation, recreation, and cultural heritage in a way that truly reflects their contribution to the nation's well-being. In line with this evolving perspective, India has taken significant steps to bring forest resources into the mainstream of economic decision-making by adopting the United Nations' System of Environmental-Economic Accounting (SEEA). This internationally recognized framework allows for a systematic assessment of the area, condition, and multiple ecosystem services of forests, both in physical and monetary terms. Such a commitment to comprehensive forest accounting is rooted in the understanding that forests are not just an environmental asset but a foundation for economic growth, food and water security, and social progress. To ensure the continued health and sustainability of these invaluable resources, it is vital that policies and investments are guided by accurate, holistic, and inclusive information reflecting the true value of forests to India's people and future.

With this objective in mind and reference material available, Himachal Pradesh, Uttarakhand, Karnataka, Madhya Pradesh, Rajasthan, and Assam were reviewed for a comprehensive and in-depth analysis. It involves thorough review of available literature, an assessment of each state's prior engagement with the SEEA framework or experience in ecosystem service valuation, and the application of a systematic ranking matrix[3] to ensure fairness and scientific rigor. India's forests are diverse; they include everything from the icy alpine and temperate forests of the Himalayas, through the rich tropical and moist deciduous forests of the Western Ghats and the Northeast, to the dry deciduous and thorn forests of the country's central and western landscapes. Additionally, significant mangrove and wetland forests play a vital role in coastal and floodplain ecology. To further ensure that the regional variety of India's forests was captured, these states represent each of the country's major geographic regions. Madhya Pradesh in the Central and Eastern region, reflecting the vast dry and moist deciduous forests at the heart of India. Assam capture the unique tropical and wetland forests of the North-Eastern region, which are also rich in riverine and floodplain ecosystems. Himachal Pradesh and Uttarakhand represent the Northern region, with their diverse alpine and temperate forest types. Karnataka in the Southern region, home to parts of the Western Ghat. Lastly, Rajasthan in the Western region has the dry and thorn forest ecosystems typical of arid and semi-arid landscapes.

[3] https://seea.un.org/sites/seea.un.org/files/india_assessment_2019.pdf

Himachal Pradesh

6.2 Himachal Pradesh, situated in the western Himalayas, has immense wealth of natural resources and rich biodiversity and is one of the most ecologically sensitive regions of the Himalayas. Forests, representing nearly 66% of the state's total geographical area by legal classification, constitute its most critical natural asset. Himachal Pradesh is marked by its mountainous terrain, pleasant climate, and diverse flora and fauna. Himachal Pradesh is renowned for its adventure tourism, offering activities such as trekking, skiing, and river rafting amidst its breathtaking landscapes.

Himachal Pradesh serves as a valuable case study for the application of the SEEA framework to subnational forest management. Over the past decade, the state has developed a comprehensive forest accounting system, systematically monitoring forest extent by legal designation and canopy density through both field surveys and advanced remote sensing techniques. Annual shifts in forest cover attributable to afforestation, regeneration, or losses from logging and fire are methodically documented. The forest accounts of Himachal Pradesh go beyond traditional area and volume measurements. The state has introduced a comprehensive set of condition indicators, including canopy density, growing stock, biodiversity indices, prevalence of threatened species, and carbon storage in both biomass and soils. Apart from this, Himachal Pradesh has also constructed detailed physical and monetary accounts for ecosystem services, quantifying not only the harvest of timber, bamboo, fuelwood, and medicinal plants but also capturing the non-market values of services such as carbon sequestration, water recharge, nutrient cycling, pollination, and recreation. By assigning monetary values to these flows—employing market prices, avoided cost techniques, and benefit-transfer methods—the state has established an integrated supply-use accounting framework. These accounts demonstrate how SEEA-based environmental-economic accounting can bridge ecological knowledge with development priorities, thus embodying the principles of sustainable and inclusive growth.

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Uttarrakhand

6.3 Uttarakhand, a state renowned for its striking natural landscapes, is characterized by its predominantly mountainous terrain covering 93 percent of its area and an extensive forest cover that spans 71 percent of its land. The region's topography is defined by dramatic slopes and deep valleys, while its forests play a central role in sustaining local livelihoods and regulating hydrological cycles at the regional level.

Positioned at the heart of the central Himalayas, literature has adopted the "satellite" accounts that blend conventional administrative forest boundaries with modern GIS-based mapping and high-resolution forest canopy classifications produced by the Forest Survey of India. Within this framework, Uttarakhand has developed a comprehensive physical asset account for recorded forest areas, as well as a Forest Ecosystem Extent Account that distinguishes between legally designated forest areas and actual forest cover observed on the ground. Alongside these efforts, the state has assembled a broad monetary account of ecosystem services, capturing the annual provision of goods such as timber, fuelwood, fodder, resin, bamboo, and medicinal plants. Regulatory services—including carbon sequestration, water recharge and flood mitigation—are also incorporated. The accounts explicitly recognize the value of supporting functions like pollination and seed dispersal, in addition to cultural and spiritual services associated with eco-tourism and sacred groves. However, it is important to note that within the physical account, detailed assessment has thus far been limited to growing timber stock, highlighting both the achievements and ongoing opportunities for expanding Uttarakhand's SEEA-based forest accounts.

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Madhya Pradesh

6.4 Madhya Pradesh situated at the centre of the Indian subcontinent, holds the distinction of having the largest forest area among all Indian states, with its territory accounting for 9.38 percent of the country's total geographical area. The forests of Madhya Pradesh, largely characterized by dry deciduous species, are monitored and managed using a combination of remote sensing technologies and systematic, stratified field inventories. This approach ensures detailed documentation of both the spatial extent and the structural characteristics of the forest landscape. The state maintains comprehensive records, categorizing forests by legal class and canopy density, which together provide a dynamic and evolving picture of forest resources over time.

Within the framework of condition accounts, literature mentioned a suite of indicators such as growing stock, carbon stocks, regeneration and survival rates, and disturbances including fire and pest outbreaks. These physical measurements are complemented by biodiversity assessments, which record species richness, endemism, and the presence of threatened species. The state's ecosystem services accounts encompass the physical and monetary flows associated with timber, fuelwood, fodder, resin, bamboo, medicinal plants, and grazing. In addition, these accounts explicitly recognize the importance of non-market regulatory and supporting services, including carbon sequestration, watershed protection, and pollination. Valuation of these services employs a range of techniques, from direct market pricing to avoided cost and benefit-transfer methodologies. This enables the state to estimate both the annual economic value derived from forest ecosystem services and the changes in its natural capital over time. The integrated accounting system developed by Madhya Pradesh is not only instrumental in updating State Domestic Product figures but also plays a vital role in guiding the sustainable management of forest assets for the benefit of both present and future generations.

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Karnataka

6.5 Karnataka is situated at the intersection of the Western Ghats, the Deccan Plateau, and the eastern coastal plains, encompasses a remarkable range of ecological zones and stands out for supporting some of the highest levels of biodiversity in India. Karnataka is progressively advancing towards a full implementation of the SEEA framework for forest. The literature methodology integrates satellite-based forest mapping with statutory records, allowing for the classification of forest area by type, legal designation, and canopy density. This systematic approach enables the consistent monitoring of changes arising from deforestation, afforestation, or degradation.

Within the SEEA structure, literature related to Karnataka places considerable emphasis on developing detailed condition accounts. These accounts are informed by an array of data sources, including comprehensive soil analyses, and species inventories, which collectively provide insights into regeneration rates and the overall health of forest ecosystems. By quantifying both the physical stocks such as timber volume and total biomass and evaluating ecological indicators, Karnataka achieves a nuanced and holistic understanding of forest condition. The state's ecosystem services accounts are equally extensive, tracking the flows of timber, fuelwood, fodder, non-timber forest products, and grazing. Additionally, Karnataka captures regulatory services such as carbon sequestration, water purification, and sediment retention, as well as cultural and spiritual services, including the value derived from sacred groves and recreation. A variety of valuation methods are employed, encompassing market prices, replacement cost, benefit-transfer, contingent-valuation, and travel-cost techniques, which together facilitate the construction of integrated physical and monetary accounts. In doing so, the state strengthens the role of forest conservation within a broader vision of sustainable and inclusive development.

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Rajasthan

6.6 Rajasthan is the largest state in India, encompasses a geographical area of 342,239 square kilometres, accounting for 10.41 percent of the nation's total land area. The state's landscape is diverse, comprising four major physiographic regions: the expansive western desert with its barren hills, the ancient Aravalli hill range, level rocky and sandy plains, and the southeastern plateau. The Aravalli range notably divides Rajasthan into two unequal parts, shaping both its climate and ecology. Although Rajasthan is relatively limited in terms of natural forest resources, these forests remain critically important for maintaining ecological stability, supporting rural livelihoods, and enhancing climate resilience across this arid landscape.

The state employs GIS technology and Forest Survey of India (FSI) data to rigorously track forest extent, with particular attention given to area by legal classification and canopy density. Condition accounts for Rajasthan's forests incorporate a wide range of information, including soil carbon, regeneration rates, and detailed biodiversity assessments that capture species richness and the identification of key habitats. The monitoring of hydrological functions and soil quality is also prioritized, given their crucial significance in Rajasthan's dry and variable climate. Ecosystem services in Rajasthan are systematically accounted for across several categories. Provisioning services include timber, bamboo, fuelwood, non-timber forest products (NTFPs), and fodder. Regulating services such as carbon sequestration, water supply and purification, sediment retention, and nutrient cycling are also measured, along with supporting services like pollination, biological control, and habitat provision. Cultural values—including recreation, sacred groves, and medicinal plants—are recognized as integral parts of the forest's contribution. The state adopts a range of valuation techniques, including market prices, replacement and avoided costs, benefit-transfer, and contingent-valuation methods. These values are then integrated into monetary asset and flow accounts, reflecting Rajasthan's commitment to a holistic and informed approach to forest resource management within the SEEA framework.

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Assam

6.7 Assam is in the north-eastern part of India, is renowned for its distinctive landscape of hills, fertile valleys, and the great Brahmaputra River. With a geographical area of 78,438 square kilometres comprising approximately 2.4 percent of India's total area, Assam is the largest state in the region when considering both population and size relative to other north-eastern states, which include Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and West Bengal. Assam has diverse mix of tropical forests, extensive wetlands, and riverine ecosystems underpins exceptional biodiversity while also sustaining millions of people through direct and indirect livelihoods.

The state has taken a comprehensive approach to environmental-economic accounting by mapping the extent of its forests and wetlands by legal category and canopy density. Condition accounts in Assam include a wide array of indicators, such as, growing stock, biomass and soil carbon content, and detailed biodiversity assessments that encompass both species richness and the status of threatened species. Additionally, the state actively monitors hydrological regimes and disturbance events to better understand ecosystem dynamics. Assam's ecosystem services accounts are distinguished by their breadth and detail, covering annual flows of timber, fuelwood, bamboo, non-timber forest products, drinking water, and fishery yields. Regulatory services—such as carbon sequestration, water retention, nutrient and sediment cycling, and temperature regulation—are systematically recorded, along with supporting functions like air filtration. The accounts also recognize cultural services, including recreation, traditional uses by tribal communities, and the value visitors place on access to natural areas. A variety of valuation methods are employed in Assam's Forest accounting, including household and visitor surveys, market and replacement cost approaches, avoided cost, benefit-transfer, and contingent-valuation techniques.

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Table 6.1: Comparative State-Level Assessment of Forest Accounting Indicators in Literature

SEEA Indicator	*Himachal Pradesh*	*Uttarakhand*	*Karnataka*	*Madhya Pradesh*	*Rajasthan*	*Assam*
Extent Account						
Recorded Forest Area by canopy density	✔	✔	✔	✔	✔	✔
Forest area by legal class	✔	✔	✔	✔	✔	✔
Actual Forest Cover	✔	✔	✔	✔	✔	✔
Forest cover change matrix			✔		✔	
Condition Account						
Growing stock (timber volume and area account)	✔	✔		✔	✔	
Regeneration/survival rates				✔		✔
Soil health (organic carbon, erosion)		✔	✔	✔		✔
Disturbance events (fire, pests)	✔	✔				✔
Biodiversity indicators (species, threat)	✔	✔		✔	✔	✔
Biomass carbon stock	Framework (carbon account)	✔	✔	✔	✔	✔
Hydrological status (water balance)			✔	✔		✔

SEEA Indicator	Himachal Pradesh	Uttarakhand	Karnataka	Madhya Pradesh	Rajasthan	Assam
Ecosystem Services (Physical Flows)						
Timber extraction (annual)	✔	✔	✔	✔	✔	✔
NTFP flows (bamboo, resin, etc.)	✔	✔	✔	✔	✔	✔
Fuelwood/fodder extraction	✔	✔	✔	✔	✔	
Grazing/animal-unit days	✔		✔	✔	✔	
Gene pool protection			✔		✔	
Water supply/regulation	✔		✔	✔	✔	✔
Sediment/nutrient retention	✔		✔	✔	✔	✔
Pollination services	✔		✔		✔	
Habitat provision/supporting services	✔		✔		✔	
Air filtration services			✔			✔
Local (micro and meso) climate regulation services	✔		✔			
Recreation/tourism visits	✔	✔	✔	✔	✔	✔
Cultural/spiritual services	✔	✔	✔	✔	✔	
Ecosystem Services (Monetary Flows)						
Timber/NTFPs (market valuation)	✔	✔	✔	✔	✔	✔
Fuelwood/fodder (market/replacement)	✔	✔	✔	✔	✔	✔

SEEA Indicator	Himachal Pradesh	Uttarakhand	Karnataka	Madhya Pradesh	Rajasthan	Assam
Grazing (market/replacement value)	✔	✔	✔	✔	✔	✔
Water (replacement/avoided cost)	✔	✔	✔	✔	✔	✔
Carbon sequestration (social cost)	✔	✔	✔	✔	✔	✔
Gene pool protection			✔		✔	
Air filtration services			✔			✔
Local (micro and meso) climate regulation services			✔			
Recreation/tourism (travel cost/WTP)	✔	✔	✔	✔	✔	✔
Biodiversity (benefit transfer/proxy)	✔	✔		✔	✔	
Cultural/spiritual (contingent value)	✔	✔	✔	✔	✔	
Net asset values (comprehensive)	✔	✔	✔	✔	✔	✔

✔ = *Indicator assessed and reported in the literature.*
Blank = Not applicable or not yet assessed/reported in available state studies

GLOSSARY

Term	Definition
A	
Above-Ground Biomass (AGB)	Component of the carbon pool consisting of all living Vegetation above the soil, inclusive of stems, stumps, branches, bark, seeds and foliage.
Adaptation	Adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.
Afforestation	Establishment of forest through planting and/or deliberate seeding on land that, until then, was under a different land use, implies a transformation of land use form non-forest to forest.
Agricultural Land	Land primarily used for farming and for production of food, fibres and other commercial and horticultural crops.
Assets	Assets are stores of value representing a benefit or series of benefits accruing to an economic owner by holding or using the entity over a period of time. It is a means of carrying forward value from one accounting period to another.
Atmosphere	The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen (78.1% volume mixing ratio) and oxygen (20.9% volume mixing ratio), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium, radiatively active greenhouse gases such as carbon dioxide (0.035% volume mixing ratio) and ozone. In addition, the atmosphere contains water vapour, whose amount is highly variable but typically 1% volume mixing ratio. The atmosphere also contains clouds and aerosols.

B

Base Year	A base year in estimation of GDP is the reference year whose prices are used to calculate real growth. Methodology & data sources are also fixed during the base year for maintaining comparability throughout the series.
Below-Ground Biomass (BGB)	Component of carbon pool consisting of the biomass contained within live roots.
Biodiversity	Variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, including diversity within species, between species and of Ecosystems. It is a measure of ecosystem health.
Biological Resources	Renewable resources that are capable of regeneration through natural (non – managed or managed) processes. Include timber and aquatic resources and a range of other animal and plant resources (such as livestock, orchards, crops and wild animals), fungi and bacteria.
Biome	A distinct community of plants, animals or fungi that occupy a distinct region. It is often referred to as an ecosystem.
Biosphere	Part of the Earth system comprising all ecosystems and living organisms, in the atmosphere, on land (terrestrial biosphere) or in the oceans (marine biosphere), including derived dead organic matter, such as litter, soil organic matter and oceanic detritus.

C

Canopy	The cover of branches and foliage formed by the crowns of trees.
Canopy Cover	Percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of plants.
Canopy Density	Percent area of land covered by the canopy of trees. It is expressed as a decimal coefficient, taking closed canopy as unity.

Carbon Cycle	All parts (reservoirs) and fluxes of carbon. The cycle is usually thought of as four main reservoirs of carbon interconnected by pathways of exchange. The reservoirs are the atmosphere, terrestrial biosphere (usually includes freshwater systems), oceans and sediments (includes fossil fuels). The annual movements of carbon, the carbon exchanges between reservoirs, occur because of various chemical, physical, geological and biological processes. The ocean contains the largest pool of carbon near the surface of the Earth, but most of that pool is not involved with rapid exchange with the atmosphere.
Carbon Dioxide	A naturally occurring gas and also a by – product of burning fossil fuels and biomass, as well as land – use changes and other industrial processes. It is the principal human caused greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured.
Carbon Pool	Components of an ecosystem that can either accumulate or release carbon.
Carbon Sequestration	It is a natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form.
Carbon Sinks	Natural systems, such as oceans and forests, that absorb more carbon dioxide than they release, helping to reduce greenhouse gases in the atmosphere.
Carbon Storage	The capacity of ecosystems to retain carbon over time, providing climate regulation benefits.

Climate	Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is 3 decades, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation and wind.
Climate Change	Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (Source – UNFCCC).
Climate Change Adaptation	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
Climate Change Mitigation	Efforts to reduce or prevent greenhouse gas emissions and may involve using new technologies, incorporating and increasing renewable energies, making older equipment more energy efficient and changing management practices or consumer behavior. Protecting natural carbon sinks like forests and oceans, or creating new sinks through silviculture or green agriculture, are also elements of mitigation.
Climate Change – related Statistics	According to UNECE, environmental, social and economic data that measure the human causes of climate change, the impacts of climate change on human and natural systems and the efforts by humans to avoid and adapt to these consequences.
Closing Stock	Closing Stock refers to the quantity available at the end of the accounting period after incorporating any additions and deductions in the stock.
Constant Price	Constant Price measures the value of goods at the price of a fixed year known as the base year.

Cultural Services	The non-material benefits people obtain from ecosystems are called cultural services. They include aesthetic inspiration, cultural identity, sense of home, and spiritual experience related to the natural environment. Typically, opportunities for tourism and for recreation are also considered within the group.
Current Price	Current price measures the value of goods at the actual prevailing price in the country

D

Dead Organic Matter (DOM)	Component of carbon pool that contains all non-living woody biomass and can be divided into wood (fallen trees, roots and stumps with diameter over 10cm) and litter (greater than 2mm and less than 10cm diameter) components.
Deciduous	These are the forest types that are predominantly composed of species, which shed their leaves once a year, especially during summer. It also includes tree clad area with tree cover lying outside the notified forest boundary areas that are herbaceous with a woody appearance.
Deforestation	The conversion of forest to other land use independently whether human-induced or not. It includes areas of forest converted to agriculture, pasture, water reservoirs, mining, and urban areas. (Source – GFRA, 2020).
Desertification	Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities. (Source - https: //catalogue.unccd. int/1195_Desertification.pdf, 26.07.2024)
Disasters	Unforeseen and often sudden events that cause great damage, destruction and human suffering. They often exceed local response capacities and require external assistance at the national or international level. Depending on their cause, disasters can be both natural and technological.

E

Ecosystem	A dynamic complex of plant, animal and microorganism communities and their non – living environment Interacting as a functional unit.
Ecosystem Accounting	Ecosystem accounting is a coherent framework for integrating measures of ecosystems and the flows of services from them with measures of economic and other human activity. Ecosystem accounting complements, and builds on, the accounting for environmental assets as described in the System of Environmental-Economic Accounting (SEEA) Central Framework (e.g. water resources, soil resources). In ecosystem accounting as described in the SEEA Ecosystem Accounting (SEEA EA), the accounting approach recognizes that these individual resources function in combination within a broader system and within a given spatial area.
Ecosystem Assets	Spatial areas comprising a combination of biotic and abiotic components and other elements which function together. Some examples are forests and wetlands.
Ecosystem Condition	Overall quality of an ecosystem asset in terms of its characteristics. Measures of ecosystem condition are generally combined with measures of ecosystem extent to provide an overall measure of the state of an ecosystem asset.
Ecosystem Condition Account	This account organizes biophysical information on the condition of different ecosystem types. The ecosystem condition account organizes data on selected ecosystem characteristics and the distance to a reference condition to provide insight into the ecological integrity of ecosystems.
Ecosystem Extent	Size of an ecosystem asset, commonly in terms of spatial area.
Ecosystem Extent Account	This account serves as a common starting point for ecosystem accounting. It organizes information on the extent of different ecosystem types (e.g. forests, wetlands, agricultural areas, marine areas) within a country in terms of area.
Ecosystem Services	Benefits supplied by the functions of ecosystems and received by humanity.

Ecosystem Services Flow Account (physical and monetary terms)	This set of ecosystem accounts measures the supply of ecosystem services and the use of those services by economic units, including households, enterprises and Government.
Environmental-Economic Accounting	Environmental-economic accounts are 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. Environmental-economic accounts can 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. Environmental economic accounts present this information in physical and monetary terms, as appropriate.
Evergreen/Semi-Evergreen	This category comprises of tall trees, which predominantly remain green throughout the year. It includes both coniferous and tropical broad-leaved evergreen species. Semi- evergreen is a forest type that includes a combination of evergreen and deciduous species with the former dominating the canopy cover.
Extraction	Extractions are reductions in stock due to the physical removal or harvest of an environmental asset through a Process of production.

F

Forest Inventory	The measurement of certain parameters of forests to assess the growing stand and stock and other characteristics of forests.

G

Gross Value Added (GVA)	In India's national accounts, Gross Value Added (GVA) is the total value of goods and services produced in the economy after deducting the value of intermediate consumption (the value of goods and services used up in the process of production). GVA = Output – Intermediate Consumption

Growing Stock	The sum (by number or volume) of all the trees Growing/living in the forest or a specified part of it.

H

Habitat	Site or environment where a plant or animal lives, such as forest.

I

Intergovernmental Panel on Climate Change (IPCC)	The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for conducting national greenhouse gas emission inventories.

L

Land	Space provided for natural ecosystems, human habitats and human activities. As this space is finite, the expansion of human activities can reduce the space occupied by natural ecosystems, thus reducing ecosystems' capacity to yield ecosystem goods and services for all living beings. From the resource perspective, land is a unique environmental resource that delineates the space in which economic activities and environmental processes take place and within which environmental resources and economic assets are located.

Land Cover	Land cover refers to the observed physical and biological cover oft h e Earth's surface and includes natural vegetation and abiotic (non-living) surfaces.
Land Use	Reflects both the activities undertaken and the institutional arrangements put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions. Land being "used" means the existence of some kind of human activity or management. Consequently, there are areas of land that are "not in use" by human activities.
Land with Dense Scrub	Areas with scrubs dominating the landscape and having shallow and skeletal soils, at times chemically degraded, extremes of slopes, severely eroded and are subjected to excessive aridity. They have a tendency for intermixing with croplands.
Land with Open Scrub	Similar to land with dense scrub, except that it has sparse Vegetative cover or is devoid of scrub and has a thin soil cover.
Litter	Woody material of trees having diameter < 5 cm which is not decomposed.
Littoral/Swamp/Mangrove Forest	Areas on coastal tidal flats, estuaries salt marshes etc where the canopy cover/density is above 10% and tropical and subtropical vegetation species are densely colonized.

M

Managed Expansion/ Regression	Managed expansion / regression represents an increase /decrease in the area of a land cover type due to human activity. Generally, the managed expansion /regression of one land cover type will also lead to the recording of a matching entry for managed regression /expansion of another land cover type. A matching entry is not recorded if there is a managed expansion in the total area of land within scope of the account (e.g., in the case of land reclamation).

Mitigation	A human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.

N

Natural Expansion/ Regression	Natural expansion / regression is an increase /decrease in area resulting from natural processes including seeding, sprouting, suckering, layering or erosion by sea. As in the case of managed expansion /regression, generally, the natural expansion of one land cover type will also lead to the recording of a matching entry for natural regression of another land cover type. A matching entry is not recorded if there is a natural expansion /regression in the total area of land (e.g., in the case where land is created through volcanic activity or landslide or eroded by sea).

O

Open Forest	Lands with forest cover having a canopy density between >10 and<40 %.
Opening Stock	Opening Stock refers to the quantity available at the beginning of the accounting period.
Other Wooded Land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 metres and a canopy cover of 5 – 10 percent, or trees able to reach these thresholds in situ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.

P

Protected Areas	Protected area means a National Park, a Sanctuary, a Conservation Reserve or a Community Reserve notified under sections 18, 35, 36A and 36C of the Wildlife Protection Act.

R

Recorded Forest Area (RFA)	Area recorded as forest in Government records.
Reforestation	Planting of forests on lands that have previously contained forests but that have been converted to some other use.
Remote Sensing	Science of obtaining information about objects or areas from a distance, typically from aircraft or satellites.
Reserved Forests (RF)	An area so constituted under the provisions of the Indian Forest Act or other State Forest Acts, having full degree of protection. In reserved forests all activities are prohibited unless permitted.
Runoff	Water which is not absorbed by the soil and flows to lower ground, eventually draining into a stream, river, or other body of water. It is that part of precipitation that flows toward the streams on the surface of the ground or within the ground. Runoff is composed of base flow and surface runoff.

S

Scrub	Forest lands having canopy density less than 10 percent, generally with Shrubs interspersed with trees.

Sink	Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere.
Social Cost of Carbon	The social cost of carbon (SCC) is an estimate, in dollars, of the economic damages that would result from emitting one additional ton of carbon dioxide into the atmosphere.
Soil Erosion	The displacement of the soil by the action of water or wind. Soil erosion is a major process of land degradation.
Soil Resources	Comprise the top layers (horizons) of soil that form a Biological system.
Species	Group of individual specimens having close resemblance but differing from others and belonging to the same genus.
Stream Flow	Volume of water that moves over a designated point over a fixed period of time. It is often expressed as cubic feet per second.
Sustainable Development Goals	It is known as global goals, and are adopted as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace as well as prosperity by 2030. All United Nations Member States adopted these goals in 2015.
System of Environmental-Economic Accounting (SEEA)	The System of Environmental Economic Accounting (SEEA) is the accepted international standard for environmental-economic accounting, providing a framework for organizing and presenting statistics on the environment and its relationship with the economy. It brings together economic and environmental information in an internationally agreed set of standard concepts, definitions, classifications, accounting rules and tables to produce internationally comparable statistics. The SEEA is produced and released under the auspices of the United Nations, the European Commission, the Food and Agriculture Organization of the United Nations, the Organization for Economic Co-operation and Development, International Monetary Fund and the World Bank Group.

T

Tree Cover	Tree cover comprises all tree patches outside the forest area, which are less than one hectare in extent including all the scattered trees found in the rural and urban settings, and not captured under the forest cover assessment.

W

Watershed	The geographic area through which water flows across the land and drains into a common body of water, whether a stream, river, lake, or ocean.
Weather	Atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness and precipitation. In most places, weather can change from hour – to – hour, day – to – day and season – to – season. Climate in a narrow sense is usually defined as the "Average weather".
Wetlands	Areas of land that are either temporarily or permanently covered by water. These are neither truly aquatic nor terrestrial; it is possible that wetlands can be both at the same time depending on seasonal variability. These could be natural or man – made and found both in the inland and coastal areas.

Government of India
Ministry of Statistics and Programme Implementation
National Statistics Office
Social Statistics Division