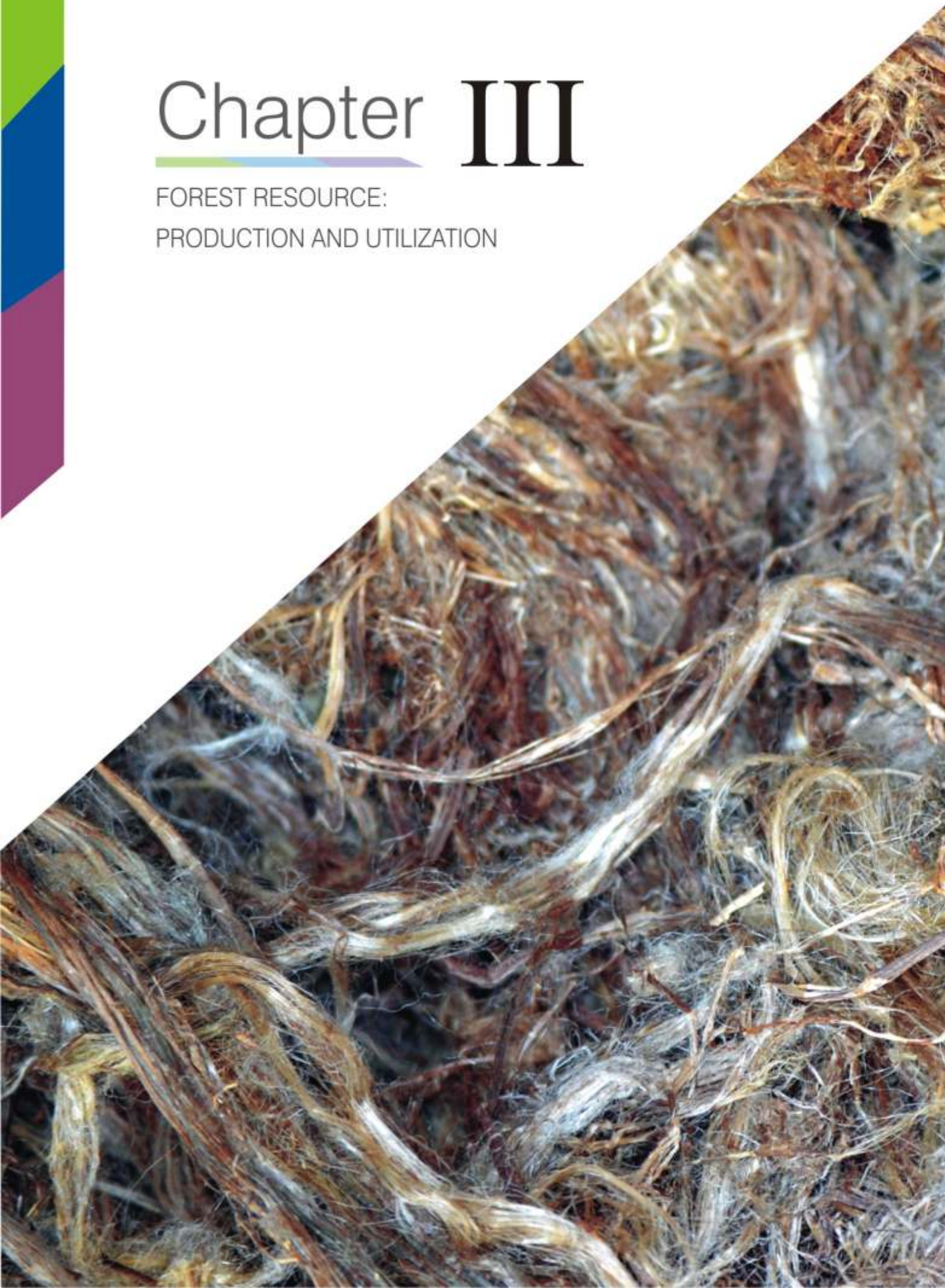


# Chapter III

FOREST RESOURCE:  
PRODUCTION AND UTILIZATION





# FOREST RESOURCE: PRODUCTION AND UTILIZATION

The forest, despite being a resource for conservation, produces important material, like bamboo, cane, fibre, seed, gum, resin, essential oils, drugs, spices, etc. Forest also contributes to the economy of India by way of providing several products like timber, fuel-wood, etc. Most of this contribution goes unaccounted as they contribute to subsistence of the forest dependent communities and hence are not generally measured directly. Timber has been the most important and valuable product obtained from the forests through ages. After the implementation of the Indian Forest Policy of 1988, NTFPs have gained significance as they could be sustainably harvested and, unlike timber, did not take a long to replenish. They also did not resort to large scale plunder of forests leading to their degradation. Owing to such forestry produce, the contribution of forests to the economy also increased besides adding to the gross value.

## 3.1 SHARE OF FORESTRY IN ECONOMY

Forestry is an important sector of 'Agricultural, Forestry and Fishing' contributing in India's Gross Domestic Product (GDP). It also meets the requirements of forest dependent communities for food, fuel, fodder, timber and other forest produce. In GDP estimation, the economic activities of 'forestry and logging' sub sector include (i) forestry (e.g. planting and conservation of forests, gathering of forest products, charcoal burning carried out in forests), (ii) logging (e.g. felling and rough cutting of trees, hewing or rough shaping of poles, blocks, etc.) and transportation of forest products to the sale depots/assembly centers, and (iii) farmyard wood (industrial wood and fuel wood collected by the primary producers from tress outside regular forests). The forest products are classified into two broad groups, viz., (a) major products comprising industrial wood (timber, round wood, match and pulpwood) and fuel-wood (firewood and charcoal wood) and (b) minor products comprising a large number of wild growing forest material such as bamboo, fodder, lac, sandalwood, honey, resin, gum, tendu leaves, cork, balsams, vegetable fiber, acorns, horse chestnuts, mosses, lichens, etc.

MoSPI, GoI prepares the National Accounts Statistics regularly for the country of which GDP is one aggregate. First official estimate of national income was prepared in 1953 with the base year 1948-49 for estimates of constant and current prices. The reason for periodically changing the base year of the national accounts is to take into accounts the structural changes which have taken place in the economy and to depict the true picture of economy through macro aggregates like GDP, consumption expenditure, capital formation, etc. In forestry sector, there are still many products specially the NTFPs which are undervalued or not accounted for inclusion into the sector's contribution to GDP. Gross Value Added (GVA) of sector is an economic productivity metric that measures the contribution of the sector to an economy or region. GVA provides a money value for the amount of goods and services that have been produced in a country minus the cost of all inputs and raw materials that are directly attributable to that production. It is simply the sum of GDP and subsidies on products minus the taxes on products.



The GDP and GVA at basic constant (2011-12) prices for the year 2018-19 is estimated at INR140.78 lakh Cr and INR 129.07 lakh Cr respectively, while for the current price it is estimated at INR190.10 lakh Cr and INR 172 lakh Cr, respectively (MoSPI, 2019). The growth in the 'Agriculture, Forestry and Fishing' is estimated to be 2.9% at constant price (2011-12). GVA of the 'Agriculture, Forestry and Fishing' sector is estimated to be INR18.56 lakh Cr at constant price (2011-12) and INR27.76 lakh Cr at the current price.

The bifurcation data of the contribution of the forestry sector to the national economy of India for the forestry sector was available with MoSPI and is summarized in Table 3.1.1 and Table 3.1.2. There was an increasing trend of GVA of Forestry, at both the constant and current price, over the years from 2011-12 to 2016-17 (Table 3.1.1. and 3.1.2.). The rate of increase at current price is higher than the same at constant price.

Table 3.1.1. GVA and growth rate of forestry sector at constant price (year 2011-12)

Indicator	Year					
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
GVA of forestry (INR Cr)	1,24,436	1,24,743	1,32,093	1,34,609	1,37,072	1,38,779
Growth rate	-	0.25	5.89	1.90	1.83	1.25

Source: MoSPI, Gol.

Table 3.1.2. GVA and growth rate of forestry sector at current price

Indicator	Year					
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
GVA of forestry (INR Cr)	1,24,436	1,37,558	1,56,674	1,73,760	1,82,747	1,80,465
Share of forestry (%)	1.53	1.49	1.51	1.51	1.45	1.30

Source: MoSPI, Gol.

### 3.2 FOREST AREA, FOREST COVER AND MANGROVES OF COASTAL FORESTS

The area recorded as a forest in the government record is referred as a recorded forest area. However, all lands, more than one ha in area, with a tree canopy density of more than 10%, irrespective of ownership and legal status, is known as the forest cover. Such lands may not necessarily be a recorded forest area. It also includes orchards, bamboo and palm. Important steps involved in the forest cover assessment methodology are data preparation, interpretation to identify change areas, ground-truthing, post classification correction and delivering the outputs.

FSI conducts a biennial exercise to determine the forest cover in India. The exercise is carried out by obtaining satellite imageries for the forest areas along with adequate ground-truthing. Generally, multistage random sampling is being used for the purpose.

Table 3.2.1. reveals maximum recorded forest area in Madhya Pradesh (about 30.70% of its geographical area) during all the four-assessment periods. It is followed by Andhra Pradesh until Telangana was a part of it and, thereafter, Maharashtra was at second position (about 20% of its geographical area). Among all the states/UTs, Daman and Diu has the minimum recorded forest area (about 7.20% of its geographical area). The UTs did not have any recorded forest area and hence excluded from the table.

Table 3.2.1. Forest area (km<sup>2</sup>) of the country from 2011 to 2017

S. no.	State/UT	Year			
		2011	2013	2015	2017
1.	Andhra Pradesh	63,814	63,814	37,258	37,258
2.	Arunachal Pradesh	51,540	51,541	51,407	51,407
3.	Assam	26,832	26,832	26,832	26,832
4.	Bihar	6,473	6,473	6,493	6,877
5.	Chhattisgarh	59,772	59,772	59,772	59,772
6.	Delhi	85	85	102	102
7.	Goa	1,224	1,225	1,225	1,225
8.	Gujarat	18,927	21,647	21,647	21,647
9.	Haryana	1,559	1,559	1,559	1,559
10.	Himachal Pradesh	37,033	37,033	37,033	37,033
11.	Jammu and Kashmir #	20,230	20,230	20,230	20,230
12.	Jharkhand	23,605	23,605	23,605	23,605
13.	Karnataka	38,284	38,284	38,284	38,284
14.	Kerala	11,265	11,309	11,309	11,309
15.	Madhya Pradesh	94,689	94,689	94,689	94,689
16.	Maharashtra	61,939	61,357	61,579	61,579
17.	Manipur	17,418	17,418	17,418	17,418
18.	Meghalaya	9,496	9,496	9,496	9,496
19.	Mizoram	16,717	16,717	5,641	5,641
20.	Nagaland	9,222	9,222	9,222	8,623
21.	Odisha \$	58,136	58,136	58,136	61,204

S. no.	State/UT	Year			
		2011	2013	2015	2017
22.	Punjab	3,084	3,084	3,084	3,084
23.	Rajasthan	32,639	32,737	32,737	32,737
24.	Sikkim	5,841	5,841	5,841	5,841
25.	Tamil Nadu	22,877	22,877	22,877	22,877
26.	Telangana	-	-	26,904	26,904
27.	Tripura	6,294	6,294	6,294	6,294
28.	Uttar Pradesh	16,583	16,583	16,582	16,582
29.	Utt arakhand	34,651	34,651	38,000	38,000
30.	West Bengal	11,879	11,879	11,879	11,879
31.	Andaman and Nicobar Islands	7,171	7,171	7,171	7,171
32.	Chandigarh	34	35	35	35
33.	Dadra and Nagar Haveli	204	204	204	204
34.	Daman and Diu	8	8	8	8
35.	Puducherry	13	13	13	13
	<b>Total</b>	<b>7,69,538</b>	<b>7,71,821</b>	<b>7,64,566</b>	<b>7,67,419</b>

Source: State of Forest Report 2011 - 2017, FSI.

\$: Reserved Forest (RF) in Odisha includes 9,175 km<sup>2</sup> of proposed RF, Protected Forest (PF) includes 15,117 km<sup>2</sup> revenue forest/deemed forest and 191 km<sup>2</sup> private forest.

#: Includes Jammu and Kashmir area outside LOC that is under illegal occupation of Pakistan and China.

The recorded forest area showed a vacillating trend over time (Fig 3.2.1). An initial increase till 2013, then, a dip for subsequent two years till 2015 and again a rise thereafter. However, this jump (2015-17) still falls below the area of initial rise of 2011-13.

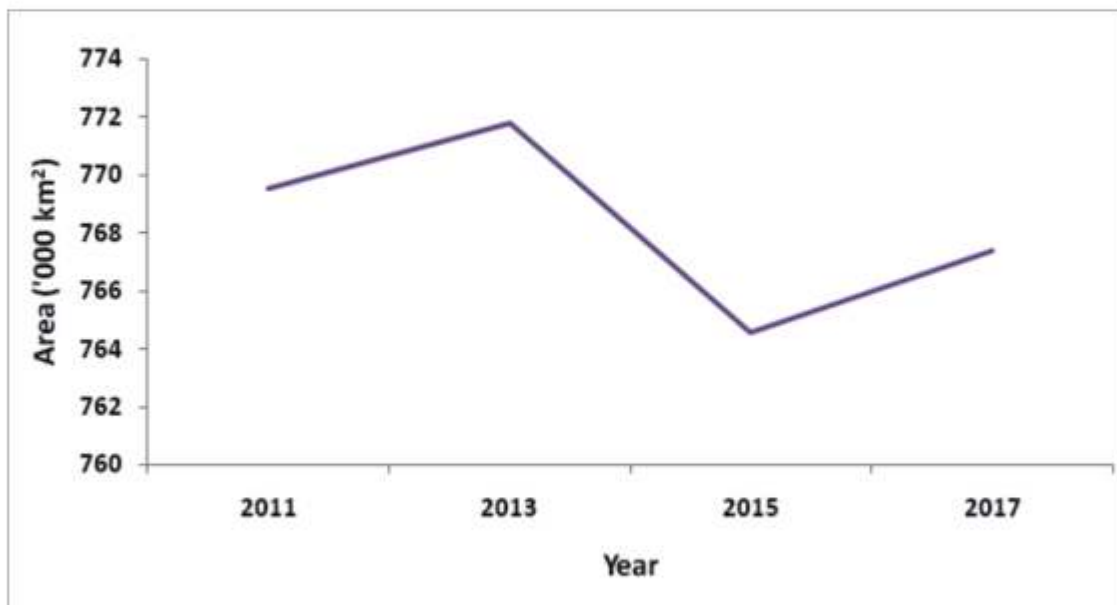


Fig. 3.2.1. Trend of recorded forest area ('000 km<sup>2</sup>) from 2011 to 2017.

Table 3.2.2. provides the forest cover of India for the four years (2011-17). Madhya Pradesh (77,414 km<sup>2</sup> in 2017) has the maximum forest cover followed by the Arunachal Pradesh (66,964 km<sup>2</sup> in 2017) while Daman and Diu has the minimum forest cover (20 km<sup>2</sup> in 2017).

**Table 3.2.2. Forest cover (km<sup>2</sup>) of the country from 2011 to 2017**

S. no.	State/UT	Year			
		2011	2013	2015	2017
1.	Andhra Pradesh	46,389	46,116	26,006	28,147
2.	Arunachal Pradesh	67,410	67,321	67,154	66,964
3.	Assam	27,673	27,671	27,538	28,105
4.	Bihar	6,845	7,291	7,254	7,299
5.	Chhattisgarh	55,674	55,621	55,559	55,547
6.	Delhi	176	180	189	192
7.	Goa	2,219	2,219	2,210	2,229
8.	Gujarat	14,619	14,653	14,710	14,757
9.	Haryana	1,608	1,586	1,580	1,588
10.	Himachal Pradesh	14,679	14,683	14,707	15,100
11.	Jammu and Kashmir	22,539	22,538	22,988	23,241
12.	Jharkhand	22,977	23,473	23,524	23,553
13.	Karnataka	36,194	36,132	36,449	37,550
14.	Kerala	17,300	17,922	19,278	20,321
15.	Madhya Pradesh	77,700	77,522	77,426	77,414
16.	Maharashtra	50,646	50,632	50,699	50,682
17.	Manipur	17,090	16,990	17,083	17,346
18.	Meghalaya	17,275	17,288	17,262	17,146
19.	Mizoram	19,117	19,054	18,717	18,186
20.	Nagaland	13,318	13,044	12,939	12,489
21.	Odisha	48,903	50,347	50,460	51,345
22.	Punjab	1,764	1,772	1,771	1,837
23.	Rajasthan	16,087	16,086	16,106	16,572
24.	Sikkim	3,359	3,358	3,353	3,344
25.	Tamil Nadu	23,625	23,844	26,208	26,281
26.	Telangana	-	-	19,854	20,419
27.	Tripura	7,977	7,866	7,890	7,726
28.	Uttar Pradesh	14,338	14,349	14,401	14,679
29.	Uttarakhand	24,496	24,508	24,272	24,295
30.	West Bengal	12,995	16,805	16,826	16,847
31.	Andaman and Nicobar Islands	6,724	6,711	6,751	6,742
32.	Chandigarh	17	17	22	22

S. no.	State/UT	Year			
		2011	2013	2015	2017
33.	Dadra and Nagar Haveli	211	213	206	207
34.	Daman and Diu	6	9	20	20
35.	Lakshadweep	27	27	27	27
36.	Puducherry	50	50	57	54
<b>Total</b>		<b>6,92,027</b>	<b>6,97,898</b>	<b>7,01,495</b>	<b>7,08,273</b>
<b>% of Geographical Area</b>		<b>21.05</b>	<b>21.23</b>	<b>21.34</b>	<b>21.54</b>

Source: India State of Forest Reports - 2011-2017, FSI.

The National Forest Policy 1988 sets a national objective of expanding the forest and tree cover of India to 33% of the total area of the country. This expansion of forest envisaged through afforestation of wasteland (barren, un-utilized) both 'outside forest' and within recorded 'forest lands'. As per the 2017 assessment of FSI, the states that have more than 33% forest cover of the state's geographical area, are mentioned in Table 3.2.3. There are a total of 15 states/UTs (about 50%) having more than 33% forest cover. In the states, Mizoram has the highest per cent forest cover (about 86%) followed by Arunachal Pradesh (about 80%). In the UTs, Lakshadweep has maximum forest cover (about 85%) followed by Andaman and Nicobar Islands (about 82%).

Table 3.2.3. States/UTs having more than 33% forest cover (as on 2017)

S. no.	State/UT	Geographical area (km <sup>2</sup> )	Forest cover (km <sup>2</sup> )	Forest cover (%)
1.	Arunachal Pradesh	83,743	66,964	79.96
2.	Assam	78,438	28,105	35.83
3.	Chhattisgarh	1,35,191	55,547	41.09
4.	Goa	3,702	2,229	60.21
5.	Kerala	38,863	20,321	52.30
6.	Manipur	22,327	17,346	77.69
7.	Meghalaya	22,429	17,146	76.45
8.	Mizoram	21,081	18,186	86.27
9.	Nagaland	16,579	12,489	75.33
10.	Sikkim	7,096	3,344	47.13
11.	Tripura	10,486	7,726	73.68
12.	Uttarakhand	53,483	24,295	45.43
13.	Andaman and Nicobar Islands	8,249	6,742	81.73
14.	Dadra and Nagar Haveli	491	207	42.16
15.	Lakshadweep	32	27.10	84.69



Twelve states in India are known to have mangroves. As per the ISFR-2017, there is an estimated 4,921 km<sup>2</sup> of mangroves in India (Table 3.2.4.), maximum being in West Bengal (2,114 km<sup>2</sup>) and minimum in Puducherry (2 km<sup>2</sup>).

Table 3.2.4. Mangrove cover (km<sup>2</sup>) of the coastal states

S. no.	State/UT	Year			
		2011	2013	2015	2017
1	Andhra Pradesh	352	352	367	404
2	Goa	22	22	26	26
3	Gujarat	1,058	1,103	1,107	1,140
4	Karnataka	3	3	3	10
5	Kerala	6	6	9	9
6	Maharashtra	186	186	222	304
7	Odisha	222	213	231	243
8	Tamil Nadu	39	39	47	49
9	West Bengal	2,155	2,097	2,106	2,114
10	Andaman and Nicobar Islands	617	604	617	617
11	Daman and Diu	1.56	1.63	3	3
12	Puducherry	1	1	2	2
<b>Total</b>		<b>4,662.56</b>	<b>4,627.63</b>	<b>4,740</b>	<b>4,921</b>

Source: India State of Forest Reports-2011-2017, FSI.



### 3.3 PRODUCTION OF TIMBER

Increased emphasis on forest conservation has led to a decline in timber production from forests and, now, wood-based industries are having their own plantations for raw material. Improved planting stock under various programmes like Planting Stock Improvement Program (PSIP) by ICFRE and the R&D divisions of industries gave new high yielding clones, sometimes, with shortened rotation. Till 1970s, there was a shortfall of around  $5 \text{ Mm}^3 \text{ year}^{-1}$  in the timber requirement (supply being  $10 \text{ Mm}^3$  and demand around  $15 \text{ Mm}^3$ ). A part of this shortfall was made up by harvesting trees from private lands and part through imports. In order to make up for the shortfall along with conservation of natural forests, many state governments established FDCs which were given the mandate to work on the commercial aspects of forestry, like raising plantations and providing timber from them. In some states like Punjab and Haryana, these corporations supported farmers to raise and market timber. The functions and work plan of the forest development corporations varied from state to state.

With more and more forest area being brought under the Protected Area Network, felling of trees in forests was restricted and timber production from forests declined considerably. Dependency is now more on areas outside of forests for timber. Table 3.3.1 gives the production of timber of different states from 2010-11 to 2016-17. On an average, maximum timber production is found in Uttar Pradesh (about  $3 \text{ lakh m}^3 \text{ year}^{-1}$ ) followed by Jammu and Kashmir (about  $2.94 \text{ lakh m}^3 \text{ year}^{-1}$ ).

Table 3.3.1. Production of timber ( $\text{m}^3$ ) in SFDs

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1.	Andhra Pradesh	12,302.55	12,142.16	10,696.45	8,733.00	NA	NA	NA
2.	Arunachal Pradesh	23,859.88	30,542.53	21,669.10	17,570.32	21,148.01	NA	27,750.76
3.	Assam	34,140.00	NA	NA	NA	NA	NA	NA
4.	Bihar	6,920.00	NA	NA	NA	NA	NA	NA
5.	Chhattisgarh	1,43,075.00	96,550.00	1,56,812.00	1,51,631.00	1,47,923.00	1,20,271.00	NA
6.	Goa	11,468.50	9,462.30	11,358.30	NA	NA	NA	NA
7.	Gujarat	18,662.00	24,308.00	31,318.00	30,616.00	18,881.00	22,719.00	91,818.16
8.	Haryana	NA	50,577.00	52,243.00	50,248.00	61,919.00	99,581.00	NA
9.	Himachal Pradesh	2,45,404.00	1,46,057.00	2,00,852.00	2,45,083.00	NA	NA	NA
10.	Jammu and Kashmir	2,45,200.83	2,47,048.00	3,40,424.57	3,44,700.41	NA	NA	NA
11.	Jharkhand	5,422.58	7,404.24	5,869.34	4,292.72	5,176.32	NA	NA
12.	Karnataka	21,491.05	44,651.93	39,574.36	45,346.60	23,144.02	35,262.42	54,555.47
13.	Kerala	22,867.71	24,799.91	80,950.22	1,79,758.60	44,371.27	49,951.10	NA
14.	Madhya Pradesh	2,78,083.00	2,43,357.00	2,52,808.00	2,35,456.00	2,40,409.00	NA	NA

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
15.	Maharashtra	89,718.00	77,399.00	40,580.00	66,062.00	56,135.00	92,269.00	39,170.00
16.	Manipur	57,502.32	28,329.22	2,975.35	5,216.80	NA	NA	NA
17.	Mizoram	369.00	1,460.00	554.00	922.00	NA	NA	NA
18.	Nagaland	NA	NA	52,699.63	7,669.62	NA	NA	NA
19.	Punjab	34,855.00	32,748.03	84,607.19	78,316.93	74,289.00	NA	NA
20.	Rajasthan	49,466.67	0.00	21,333.33	51,466.67	65,066.67	34,266.67	54,000.00
21.	Sikkim	179.00	3,345.69	240.41	NA	NA	2,847.78	NA
22.	Tamil Nadu	6,752.99	NA	NA	NA	NA	NA	NA
23.	Telangana	-	-	-	5,228.05	4,630.24	2,410.59	NA
24.	Tripura	1,639.03	1,540.34	27,922.74	1,396.89	NA	NA	NA
25.	Uttar Pradesh	2,75,956.00	2,74,414.00	3,09,082.00	3,85,441.00	3,50,068.00	2,69,728.00	NA
26.	Uttarakhand	2,01,900.00	2,35,236.00	1,16,532.43	2,18,739.14	2,39,521.00	3,08,885.00	1,84,149.21
27.	West Bengal	58,086.00	95,612.00	1,49,150.00	1,32,733.02	NA	39,018.44	NA
28.	Andaman and Nicobar Islands	12,321.93	11,928.31	12,139.19	13,790.82	15,296.16	11,881.32	18,052.26

Source: SFDs; NA: data not available.



### 3.4 PRODUCTION OF IMPORTANT NTFPs

The goods which have biological origin other than major forest produce i.e. timber, small wood and fuel-wood in all its forms are termed as Non-Timber Forest Products (NTFPs). It is the modification of old term *Minor Forest Products*. NTFPs play an important role in the rural economy of our country. They include a host of medicinal plants that are used by the industry in formulations of medicines and other health formulations or nutraceuticals. Most of such products are collected by the tribal and villagers residing in and around the forests. Apart from retaining a part for their own use, a significant quantum of the produce collected is sold in the local market mostly for a pittance to the middlemen who sell them at a premium to the industry.

In India, NTFPs are classified as nationalised and non-nationalised according to the importance and marketing of the products. Nationalised NTFPs are those products, which have high economic importance and vast contribution in revenue generation and their marketing is controlled directly by the state government, while non-nationalised NTFPs are the ones on which the state does not have any monopolistic control and marketing of these products is controlled by the communities. The control of communities over the collection and trading of these NTFPs not only supports their sustenance but also helps in uplifting their livelihood. After the recognition of FRA 2006, state government has almost no stake in the trade of non-nationalised NTFPs. Minor Forest Product Federation promotes *in-situ* conservation, *ex-situ* cultivation and propagation, value addition, processing and marketing of NTFPs to provide maximum benefits to the local communities. Tendu leaves, sal seeds, bamboo, etc. are major nationalised NTFPs while mahua, aonla, neem, mahul patta, chironji, tamarind and honey are some major non-nationalised NTFPs.



### 3.4.1 Tendu Leaves

Tendu (*Diospyrus melanoxylon*) leaves is one of the most important nationalised NTFP which has significant commercial value. It is best suited for *Bidi* Industry as they are most suitable wrapper with fine texture, flavour and workability. The enormous production, flexibility, resistance to decay and capacity to retain fires has encouraged its wide scale use in '*Bidi*' industry. It is also known as Kendu leaves in some of the states, like Odisha. In Odisha, Kendu leaves are sold by standard weight which constitutes one lot equal to 100 bags and each bag contains 12 bundles each of 5 kg. Thus, one lot of processed Kendu leaves generally constitutes 60 q leaves. In some of the states, the unit standard bag issued, and it varies from state to state with 40 to 75 kg standard bags<sup>1</sup>. The price of tendu leaf depends upon the grade of leaves.

Table 3.4.1.1 provides the tendu leaves production. Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Telangana, Uttar Pradesh and West Bengal are actively engaged in tendu leaves collection and its marketing (Table 3.4.1.1). Among all the states, Madhya Pradesh is considered as first followed by Chhattisgarh and Odisha.

**Table 3.4.1.1. Production of tendu leaves**

S. no.	State	Unit	Year						
			2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Andhra Pradesh	LSB	3.00	3.49	3.97	NA	NA	NA	NA
2	Chhattisgarh	LSB	15.45	13.57	17.15	14.71	14.27	13.01	16.64
3	Gujarat	LSB	1.23	1.26	1.77	1.16	0.77	0.21	1.39
4	Jharkhand	LSB	5.68	4.19	7.69	4.33	2.94	NA	NA
5	Karnataka	t	132.23	0.50	57.87	66.18	NA	8.00	14.74
6	Madhya Pradesh	LSB	20.75	17.05	26.05	19.93	16.99	16.05	NA
7	Maharashtra	LSB	6.39	6.30	6.46	4.54	4.81	4.58	2.86
8	Odisha	t	43,970	37,800	42,630	44,000	39,200	37,500	32,700
9	Rajasthan	LSB	2.99	2.56	4.57	2.63	1.77	0.93	2.65
10	Telangana	LSB	NA	NA	NA	2.93	1.97	1.96	NA
11	Uttar Pradesh	LSB	2.68	1.67	NA	2.00	1.86	1.75	NA
12	West Bengal	t	11,255	21,151	44,399	NA	48,300	56,165	NA

Source: SFDs; NA: data not available; LSB: lakh standard bag.

Table 3.4.2 gives the value of tendu leaves produced. Based upon the available data, Odisha have the maximum annual average value (about INR 45,880 lakh year<sup>-1</sup>) of tendu leaves produced.

Table 3.4.1.2. Value of tendu leaves produced (INR lakh)

S. no.	State	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Andhra Pradesh	2,056.00	7,346.41	12,662.20	NA	NA	NA	NA
2	Chhattisgarh	33,529.88	35,531.03	73,039.23	34,530.67	32,348.19	33,960.40	63,872.00
3	Gujarat	543.00	604.26	1,412.06	928.29	613.94	185.45	1,332.35
4	Jharkhand	2,106.18	2,912.60	4,124.40	2,404.40	1,629.17	NA	NA
5	Madhya Pradesh	327.28	309.96	634.12	400.58	305.56	329.27	NA
6	Maharashtra	8,952.17	10,262.92	13,681.04	6,291.99	4,576.94	6,457.36	5,473.20
7	Odisha	36,424	41,341	42,235	41,800	38,483.00	54,045	66,837
8	Rajasthan	1,171.00	1,056.79	1,933.80	968.73	598.15	700.00	2,122.11
9	Telangana	NA	NA	NA	6,701.00	4,139.00	4,579.00	NA
10	Uttar Pradesh	3,832.69	4,101.16	NA	2,552.23	2,849.92	3,937.13	NA

Source: SFDs; NA: data not available.

### 3.4.2 Resin

Most of the conifer species exude resin, if wounded, while other exude it spontaneously from branches and cones. Resins are broadly classified into three categories, viz., hard, oleo and gum resin. Hard resins are the best source of varnishes which includes Copals, Dammer, Amber, Lacquer, Shellac, Sandrac and Mastic. Oleoresins contain the essential oils along with resinous matter. These are the main source of turpentine oil and rosin. Turpentine obtained in crude form through tapping of pine trees which, on distillation, yield essential oil or spirits of turpentine and rosin. Resin is mainly used as solvent specially for thinning paints/varnishes, pharmaceutical preparations, perfumery, disinfectants, insecticides and denaturants besides its wide utility in making soap, paint, varnish, inks, lacquers, adhesives and synthetic plastic, etc.

In India, the highest amount of resin is collected through tapping from pine trees. Major states growing pine trees are Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir and Uttarakhand. It is observed that the total annual production of resin in India has generally declined because of the policy to reduce the number of trees being tapped which resulted rise in price. It is observed that major portion (more than 70%) of the total resin consumed in India is being imported, mostly from China. The production of resins with major resin producing states and its value is given in Table 3.4.2.1 and Table 3.4.2.2 respectively.

**Table 3.4.2.1. Production of resins with major resin producing states**

S. no.	State	Unit	Year						
			2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Arunachal Pradesh	Blaze	2,800	950	34,910	20,785	NA	NA	NA
2	Himachal Pradesh	t	7,000	6,900	6,894	5,389	5,258	5,360	5,841
3	Jammu and Kashmir	t	1,422	940	850	1,237	1,805*	NA	NA
4	Uttarakhand	t	17,641	16,142	14,673	14,861	14,415	15,624	17,189

Source: (i) SFDs (ii) Indian Institute of Natural Resin and Gums, Ranchi; NA: data not available; \*: upto January 2015.

**Table 3.4.2.2. Value of resins produced (INR lakh)**

S. no.	State	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Arunachal Pradesh	0.06	0.44	6.28	5.20	NA	NA	NA
2	Himachal Pradesh	1,032.58	1,024.57	762.78	854.51	832.62	942.49	844.34
3	Jammu and Kashmir	1,025.65	799.77	302.73	770.19	139.21*	NA	NA
4	Uttarakhand	6,493.06	5,974.51	3,697.25	6,653.18	7,271.57	4,938.74	3,976.01

Source: (i) SFDs (ii) Indian Institute of Natural Resin and Gums, Ranchi; NA: data not available; \*: upto January 2015.

### 3.4.3 Gums

Gums are one of the most valuable NTFPs in India. They are produced by members of a large number of families, but commercial exploitation is restricted to a few species of *Leguminosae*, *Sterculiaceae* and *Combretaceae*. Gums are basically plant exudations that result partly from natural phenomena and partly from injury to the bark or stem in response to injuries to seal the wound. They are also extracted from seeds, seaweeds, micro-organisms, and *Aloe barbadensis* (*aloe gum*), wood chips of *Larix occidentalis* (*stractan*), seed coats or barns of corn, wheat, oats, barley, rice and soybean (*hemicellulose*). Mainly karaya (*S. urens*), dhawada (*A. latifolia*), prosopis (*P. juliflora*), khair (*Acacia catechu*), babool/babul (*A. nilotica*), jhingan (*Lannea coromandelica*), palas (*B. monosperma*), char (*B. lanzan*) and guggul gum (*C. wightii*) are produced in India.

Andhra Pradesh, Chhattisgarh, Gujarat, Madhya Pradesh, Maharashtra and Uttar Pradesh are major gum producing states of the country (Table 3.4.3.1.). Maximum gum production in the country is contributed by Maharashtra (about 30%) followed by Madhya Pradesh (about 21%), Jharkhand (about 16%) and Telangana (about 10%). Rest comes from Andhra Pradesh, Chhattisgarh, Gujarat, and other minor gum producing states.

Table 3.4.3.1. Gum production with major gum producing states of India (t)

S. no.	State	Year					
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
1.	Andhra Pradesh	23.97	34.49	29.87	42.53	26.17	19.84
2.	Telangana	99.67	159.55	102.19	65.02	42.26	33.64
3.	Chhattisgarh	41.64	20.30	23.61	2.54	4.03	139.00
4.	Gujarat	27.85	33.57	42.62	54.72	51.50	16.05
5.	Jharkhand	240.60	270.40	207.30	90.00	56.00	56.30
6.	Madhya Pradesh	286.48	292.28	232.39	207.50	120.00	113.00
7.	Maharashtra	200.00	203.40	350.77	539.11	323.79	221.00
8.	Others	103.00	134.60	155.20	143.00	87.00	85.00
<b>Total</b>		<b>1,023.21</b>	<b>1,148.59</b>	<b>1,143.95</b>	<b>1,144.43</b>	<b>710.75</b>	<b>683.83</b>

Source: Indian Institute of Natural Resin and Gums, Ranchi.

#### 3.4.4 Lac

India is the largest lac producing country (about 65% of the world's total lac output) which has an annual production of more than 16,000 t (Table 3.4.4.1.). In India, major lac producing states are Chhattisgarh, Jharkhand, Madhya Pradesh, West Bengal, Maharashtra, Odisha, Uttar Pradesh, Gujarat and some north eastern states, whereas Chhattisgarh and Jharkhand account for about 40% of India's total lac production. It is widely used in food, pharmaceuticals, cosmetics, perfumes, varnishes, paints, polishes, adhesives, jewellery and textile industries.

Table 3.4.4.1. Lac production (t) in India during 2010-11 to 2017-18

Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
<b>Production (t)</b>	9,035	17,900	19,577	21,008	16,978	18,746	16,352	14,222

Source: Indian Institute of Natural Resin and Gums, Ranchi.

#### 3.4.5 Canes

Cane/Rattans are very important source of livelihood for the economically and socially weaker sections of the community of hilly regions like North-East. Most of the canes have a spine which acts as a hook to climb over other plants. They can grow up to hundreds of meters long. Rattans are used mainly for making ropes, furniture frames, walking sticks, polo sticks, umbrella handles, baskets, sports goods, mat making, wicker work, for stuffing and packing, etc. Apart from conventional uses, these have beneficial medicinal uses as well. The juice obtained from the stem of *Calamus manan* and *C. ornatus* is very effective in treating stomach-ache and diarrhea. Young shoots of *Calamus exilis* are eaten raw for treating influenza, coughs and throat irritation (Lim, 1992).



Andaman and Nicobar Island, Arunachal Pradesh, Manipur, Meghalaya, Nagaland, Punjab and Uttar Pradesh are the major states where canes are found naturally. There are about 60 species of canes found in India, out of which 25 species are present in north-east region only. In north-east region, Arunachal Pradesh alone has 18 species of canes. *Calamus flagellum*, *C. acanthospathus*, *C. latifolius*, *C. gracilis*, *C. leptospathix*, *C. tenuis* and *Daemonorops jenkinsiana* are some of the commercially important species of canes.

### 3.4.6 Sal Seeds

Sal seeds, one of the major nationalised NTFPs, possess high commercial value. It forms the primary ingredient for number of products such as oil, soap, animal/ poultry feed and forms a substitute for cocoa-butter used in manufacturing of chocolates, rocket fuel, tanning purposes, etc. Sal seeds are ground into coarse flour used to make bread, and the plant is used as a famine food. Sal butter, used in cooking, is also derived from the seeds. A de-fatted kernel powder, popularly known as sal seed cake, contains about 50% starch, in addition to proteins, tannins and minerals. The physico-chemical property of the starch can be exploited for preparing canned food products. Sal seed cake can also constitute up to 10% of poultry and pig rations without affecting the performance of these animals. *S. robusta* seed oil fat is a significant foreign exchange earner for India.

Chhattisgarh, West Bengal and Madhya Pradesh are considered the major producer of sal seeds and it has a significant contribution in the economy of these states. Sal seeds are major means of survival of large number of forest dwellers of these states. Sal seed selling is an important source of earning both amount and time-wise as seeds are sold in agricultural lean season of May and June. The collection process of sal seed is quite burdensome; hence, a person can harvest only 8-10 kg of seeds in a day, worth about INR 50 which is far less than the minimum wage. Present scenario shows that the number of people collecting sal seeds is reducing due to the National Rural Employment Guarantee Scheme of Government under which higher wages are paid. The production data of sal seeds is available only for four states of the country, namely, Chhattisgarh, Madhya Pradesh, Uttar Pradesh and West Bengal. Chhattisgarh had the maximum yearly average production (about 14,000 t year<sup>-1</sup>) of sal seeds (Table 3.4.6.1).

**Table 3.4.6.1. Production of sal seed (t) in selected states**

State	Year							
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Chhattisgarh	3,920	71,300	130	12,570	11,200	280	12,320	120
Madhya Pradesh	171.37	3,774.18	18.60	316.47	1,165.48	NA	NA	NA
Uttar Pradesh	NA	NA	NA	NA	NA	1.00	NA	NA
West Bengal	2,046.01	2,360.68	4139.4	NA	NA	37.85	NA	NA

Source: SFDs; NA: data not available.

### 3.5 PRODUCTION OF FUEL-WOOD

One of the most sought after forest products by the rural and forest dependent population is fuel wood. Fuel wood is mainly collected as head load from forest areas by gathering fallen twigs and branches, and occasional cut also. Estimating the total outturn of fuel-wood from the forests is a very difficult task as the porous boundaries and sporadic movement of villagers and tribal people for fuel-wood collection is next to impossible to track. The amount of fuel-wood produced by the forest departments is, however, recordable and statistics are available for some states. These are given in Table 3.5.1. Based on annual average production, maximum fuel-wood production is reported in Karnataka (about 0.15 Mt year<sup>-1</sup>), followed by Gujarat (about 0.10 Mt year<sup>-1</sup>) and Maharashtra (0.09 Mt year<sup>-1</sup>). To work out the uniform figure in tonne (t), except pile, the conversion factor 1 m<sup>3</sup> = 725 kg is used for the purpose.

**Table 3.5.1. Fuel-wood production (t) in selected states**

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1.	Andhra Pradesh	11,211.43	16,383.85	10,908.52	NA	NA	NA	NA
2.	Andaman and Nicobar Islands	NA	685.85	555.35	569.13	366.85	416.15	735.88
3.	Arunachal Pradesh	17,687.54	6,714.13	3,065.60	3,719.9	NA	NA	NA
4.	Chhattisgarh	49,661.78	14,681.80	9,448.00	8,049.71	8,309.99	8,581.63	1,019.11*
5.	Goa	14,227.74	7,045.70	15,241.02	NA	NA	NA	NA
6.	Gujarat	79,079	59,135	95,088	1,10,221	68,943	1,79,777	1,28,510.8
7.	Haryana	11,315.80	10,371.85	10,157.98	8,871.10	13,521.98	21,462.18	NA
8.	Himachal Pradesh	13,324.70	15,790.00	12,738.90	14,726.80	NA	NA	NA
9.	Jammu and Kashmir	15,186.00	17,740.00	17,397.30	17,366.00	NA	NA	NA
10.	Jharkhand	7,348.57	11,233.65	16,319.84	6,701.54	4,836.41	NA	NA
11.	Karnataka	87,147.90	1,19,279.26	1,46,243.55	1,30,635.72	1,05,487.50	1,91,984.44	2,83,145.10
12.	Kerala	11,362.31	4,114	11,440	22,066	14,818	5,831	NA
13.	Madhya Pradesh	44,906.27	43,065.45	36,712	30,150.72	22,736.59	10,610.43**	NA
14.	Maharashtra	1,33,360.85	1,55,155.08	74,838.85	70,988.38	51,760.65	88,958.95	53,541.25
15.	Manipur	65.30	126.70	40.10	40.00	80.20	NA	NA

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
16.	Mizoram	NA	55.50	64.10	123.50	41.30	2.00	NA
17.	Nagaland	NA	NA	962.76	899.33	NA	NA	NA
18.	Odisha	28,619.92	24,547.17	24,505.14	29,386.00	34,073.00	32,247	30,404
19.	Rajasthan	24,900	28,700	28,900	40,000	44,200	57,200	38,500
20.	Sikkim#	248.50	271.00	276.00	294.50	NA	212	NA
21.	Tamil Nadu	20,091.74	NA	1,240.00	NA	NA	NA	NA
22.	Tripura	8,162.09	62,845.12	3,148.05	23,937.64	NA	NA	NA
23.	Uttar Pradesh	NA	13,590.13	15,491.8	22,536.63	26,263.85	21,480.30	19,862.83
24.	Uttarakhand	17,640.76	16,141.74	14,673.39	14,860.74	14,415.32	15,623.75	NA
25.	West Bengal	1,12,994.20	74,856.25	NA	1,08,489.00	54,280.49	74,791.07	33,079.98

Source: SFDs; NA: data not available; \*: upto Nov. 2016; \*\*: upto December 2015; #: unit in pile.

### 3.6 PRODUCTION OF BAMBOO

Bamboo is considered as a versatile natural resource which is extensively used in cottage industry for making lots of household products, besides house construction. It has been an important source of raw material and income for millions of rural Indians for sustaining their livelihoods. The major quantity of bamboos is utilized as raw material by paper and pulp industries, for housing, rural and agricultural applications, packing industry, etc. These are mostly used in building works, in making ladders, mats, baskets, fencing, garden support, fodder, fishing rods, walking sticks, tool- handles, pipes, handicrafts, etc. Young shoots of bamboo are used as vegetable and pickles are also made from it.

The SFDs have been providing bamboo to the poor and communities dependent on forests. It is done under various welfare schemes, also known as *Nistar* in some states, and provided either free of cost or at highly subsidized rates. The states of Chhattisgarh and Madhya Pradesh are the highest providers of bamboo under this scheme.

Bamboos are mainly found in Andaman and Nicobar Island, Arunachal Pradesh, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. The quantity of bamboo produced in some of the states is given in Table 3.6.1. To work out the national figure, all the reporting units of production have been converted to a uniform unit of tonne (t). Following conversion factors are used for the purpose:

1 bamboo = 6kg (*Malocanna* spp of Tripura, Mizoram, etc) = 12kg (*Dendrocalamus* spp found in many states)

1 notional tonne = 2,400 running metres = 0.75t.

1 score = 20 numbers

Table 3.6.1. Quantity of bamboo produced (t) in major bamboo growing states/UTs

State/UT	Year						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Andhra Pradesh	99,251.87	1,25,517.5	1,51,877.78	NA	NA	NA	NA
Andaman and Nicobar Islands	5,223.61	5,680.84	5,142.54	5,000.74	4,957.26	3,246.56	3,083.47
Arunachal Pradesh	252.4	554.44	587.61	385.53	NA	NA	NA
Chhattisgarh	23,509.40	2,82,984.00	1,61,733.00	3,56,619.00	1,70,243.25	3,42,470.25	73,890.75
Goa	1,215	513.372	378.48	808.308	NA	NA	NA
Gujarat	NA	9,225.07	1,353.40	1,600.62	7,351.55	NA	2,681.29
Karnataka	406.88	283.03	35.14	247.19	169.92	2,718.22	1,756.12
Kerala	4,754.10	5,590.33	19,006.39	5,939.00	8,751.93	NA	4,125.31
Madhya Pradesh	49,658.78	53,637.92	54,034.43	59,376	31,393.50	27,064.50	12,600
Maharashtra	62,011	1,41,445	3,99,189	10,872	9,110	NA	NA
Manipur	10,064.08	7,901.22	13,136.40	16,891.36	16,094.54	11,609.41	NA
Mizoram	2,128.80	2,836.80	555.00	5,580.00	47,509.08	6,355.57*	NA
Nagaland	265.19	NA	5,550.7	11,829	NA	NA	NA
Odisha	69,079.89	70,924.44	3,736.69	10,957.21	3,037.83	25,774.50	NA
Rajasthan	15,648.00	16,812.00	18,948.00	18,660.00	15,648.00	NA	7,200.00
Tamil Nadu	3,625.73	NA	NA	NA	NA	NA	NA
Tripura	44,858.32	50,375.17	23,203.47	52,906.66	NA	NA	NA
Uttar Pradesh	23,941.68	15,207.84	NA	7,247.28	6,107.04	6,907.20	NA
Uttarakhand	NA	NA	NA	1,731.44	148.44	NA	NA
West Bengal	NA	NA	NA	4,239.60	NA	NA	5,607.70

Source: SFDs; NA: data not available; \*: upto January 2016.



### 3.7 TARGET AND ACHIEVEMENT UNDER 20-POINT PROGRAMME

The 20-Point Programme was launched by the Government of India in 1975 and was restructured in 1982, 1986 and 2006. The programme is meant to give a thrust to schemes relating to poverty alleviation, employment generation in rural areas, housing, education, health and family welfare, protection of environment and many other schemes having a bearing on the quality of life, especially in the rural areas. MoEF&CC has been designated as nodal agency in the Centre for monitoring the progress of afforestation under Item No. 51 A (area covered under public and forest lands) and item 51B (number of seedlings planted on public and forest lands) of the programme. Target of 20-Point Programme, is fixed by MoEF&CC and intimated annually to states/UTs. The average annual target of afforestation of the country, based upon the data from 2014-15 to 2019-20, under the 20-Point Programme is about 1.6Mha year<sup>-1</sup> (Table 3.7.1). Maximum annual average target is given to the Andhra Pradesh (about 0.24 Mha year<sup>-1</sup>) followed by Telangana (about 0.20 Mha year<sup>-1</sup>).

**Table 3.7.1. Targeted area (ha) for plantations (public and forest lands) under 20-Points Programme**

S. no.	State/UT	Year					
		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1.	Andhra Pradesh	3,99,600	1,48,730	2,08,591	2,38,390	2,26,180	2,33,800
2.	Arunachal Pradesh	5,780	210	210	210	30	35
3.	Assam	4,060	40	40	40	45	50
4.	Bihar	22,800	22,790	30,330	67,860	40,000	23,600
5.	Chhattisgarh	60,000	50,410	60,581	93,440	1,16,760	94,700
6.	Goa	305	150	154	175	50	30
7.	Gujarat	1,45,400	1,39,280	1,39,283	1,60,405	1,87,250	1,82,100
8.	Haryana	40,000	57,200	35,798	41,210	33,700	26,800
9.	Himachal Pradesh	20,000	18,000	20,728	15,000	13,000	11,250
10.	Jammu and Kashmir	13,300	8,700	8,454	9,340	9,760	10,830
11.	Jharkhand	22,300	3,450	3,450	5,370	15,570	24,050
12.	Karnataka	47,000	66,090	41,000	58,000	40,600	70,720
13.	Kerala	7,530	3,890	3,700	2,900	18,890	18,240
14.	Madhya Pradesh	1,33,000	1,10,700	7,499	50,230	1,23,077	59,000
15.	Maharashtra	1,63,450	1,22,880	91,413	1,20,315	69,410	49,600
16.	Manipur	14,380	14,600	11,547	10,770	9,770	7,900
17.	Meghalaya	4,110	4,850	1,991	7,170	2,850	3,260
18.	Mizoram	5,840	4,070	4,070	4,070	4,455	4,440
19.	Nagaland	3,840	1,050	1,050	1,050	1,155	1,270
20.	Odisha	1,82,270	1,07,290	1,07,287	1,62,410	2,82,755	3,50,000
21.	Punjab	10,090	6,970	2,769	6,505	4,100	5,590
22.	Rajasthan	53,155	57,100	57,103	42,000	33,194	66,580
23.	Sikkim	6,160	4,810	4,095	3,410	3,225	1,860
24.	Tamil Nadu	55,071	70,240	70,235	61,865	56,890	43,290
25.	Telangana	-	59,970	80,446	1,58,520	2,76,870	4,26,900
26.	Tripura	20,900	16,280	16,280	11,675	8,360	4,130
27.	Uttarakhand	16,000	16,000	17,268	12,000	19,570	21,080
28.	Uttar Pradesh	68,180	47,731	57,907	1,00,705	1,15,830	1,13,490
29.	West Bengal	8,130	750	3,910	7,490	7,805	9,370
30.	Andaman and Nicobar Islands	1,100	1,120	1,116	1,205	1,320	1,150
31.	Chandigarh	155	180	126	155	170	190
32.	Dadar and Nagar Haveli	220	200	200	215	240	240
33.	Daman and Diu	10	10	10	5	10	10
34.	Delhi	692	850	848	1,270	1,560	1,540
35.	Lakshadweep	25	20	25	10	10	10
36.	Puducherry	70	40	41	65	150	140
	<b>Total</b>	<b>15,34,923</b>	<b>11,66,651</b>	<b>10,89,555</b>	<b>14,55,450</b>	<b>17,24,611</b>	<b>18,67,245</b>

Source: NAEB, MoEF&CC, Gol and MoSPI, Gol.

The average annual achievement of afforestation in the country, based upon the data from 2012-13 to 2017-18, under the 20-Point Programme is about 1.6 Mha year<sup>-1</sup> (Table 3.7.2). Maximum annual average achievement is observed for the state Telangana (about 0.31 Mha year<sup>-1</sup>) followed by Andhra Pradesh (about 0.27 Mha year<sup>-1</sup>).

**Table 3.7.2. Achievement for area covered under plantations (public and forest lands) under 20-Point Programme (ha)**

S. no.	State/UT	Year					
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1.	Andhra Pradesh	4,07,252	3,72,962	2,08,591	1,33,618	2,74,635	2,29,409
2.	Arunachal Pradesh	378	213#	42	8	0	0
3.	Assam	8,642	0	0	0	0	0
4.	Bihar	30,330	69,224	92,956	41,419	43,279	35,114
5.	Chhattisgarh	83,789	6,0581#	86,211	1,33,531	98,697	26,037
6.	Goa	471	154	346	21	38	15
7.	Gujarat	1,68,470	1,39,283	1,91,118	1,50,822	1,68,733	1,77,148
8.	Haryana	68,026	57,197	35,798	30,643	25,474	17,000
9.	Himachal Pradesh	28,902	25,595	20,728	11,449	10,052	9,200
10.	Jammu and Kashmir	13,988	8,704	8,454	10,863	7,307	11,371
11.	Jharkhand	10,746	3,450#	7,296	NR	21,005	22,729
12.	Karnataka	80,385	84,279	53,927	71,608	64,376	62,108
13.	Kerala	10,154	3,891	3,700	1,117	46,695	1,923
14.	Madhya Pradesh	1,19,580	1,35,199#	7,499	7,994	99,197	0
15.	Maharashtra	1,88,968	2,13,750	91,413	55,793	42,100	37,393
16.	Manipur	14,595	17,916	11,547	2,855	12,247	6,442
17.	Meghalaya	4,852	16,330	1,991	3,186	0	2,743
18.	Mizoram	4,071	5,253#	0	NR	4,050	4,020
19.	Nagaland	5,681#	10,140#	0	NR	0	0
20.	Odisha	1,07,287	1,17,535	1,98,891	1,70,808	4,01,452	3,82,364
21.	Punjab	9,569	13,816	2,769	2,934	5,469	6,845
22.	Rajasthan	57,103	67,722	70,423	70,893	66,815	43,873
23.	Sikkim	9,0190	4,805	4,095	1,325	3,376	365
24.	Tamil Nadu	74,844	70,235	70,235	45,129	39,790	33,147
25.	Telangana	-	-	80,446	2,36,598	4,38,059	4,89,673
26.	Tripura	20,451	16,280	16,403	2,339	4,070	4,858
27.	Uttarakhand	22,024	21,242	17,268	17,846	18,251	21,397
28.	Uttar Pradesh	67,057	78,339	57,907	1,65,867	92,128	51,513

S. no.	State/UT	Year					
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
29.	West Bengal	9,362	3,910	6,396	12,169	2,722	10,653
30.	Andaman and Nicobar Islands	1,116	1,128	1,184	1,300	1,125	713
31.	Chandigarh	219	175	126	167	178	176
32.	Dadar and Nagar Haveli	200	200	220	225	220	200
33.	Daman and Diu	8	0\$	11	0	10	15
34.	Delhi	1,409	848	1,468	1,498	1,299	0
35.	Lakshadweep	22	28	0	0	0	0
36.	Puducherry	96	41	75	86	250	63
<b>Total</b>		<b>16,29,066</b>	<b>16,19,071</b>	<b>13,49,534</b>	<b>13,84,111</b>	<b>19,93,099</b>	<b>16,88,507</b>

Source: NAEB, MoEF&CC, Gol and MoSPI, Gol.

#: Figures reported earlier have been repeated; \$: State has downward revised the figure; NR: Not reported.

Table 3.7.3 provides the targets of seedlings planted under 20-Point Programme. The average annual target of seedlings planted in the country, based upon the data from 2012-13 to 2019-20, is about 971 M year<sup>-1</sup>. Maximum annual average target is given to the Andhra Pradesh (about 181 M year<sup>-1</sup>) followed by Telangana (about 130 M year<sup>-1</sup>).

**Table 3.7.3. Targets of seedlings (in lakh) planted under 20-Point Programme**

S. no.	State/UT	Year							
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
1.	Andhra Pradesh	2,505.10	2,520.44	2,597.40	966.75	1,355.84	1,549.54	1,470.17	1,519.70
2.	Arunachal Pradesh	70.20	37.44	37.57	1.37	1.37	1.37	0.20	0.23
3.	Assam	36.73	7.67	26.39	0.26	0.26	0.26	0.29	0.33
4.	Bihar	147.55	142.09	148.20	148.14	197.15	441.09	260.00	153.40
5.	Chhattisgarh	327.60	417.43	417.30	327.67	393.78	607.36	758.94	615.55
6.	Goa	2.93	1.46	4.77	0.98	1.00	1.14	0.33	0.20
7.	Gujarat	913.25	809.38	945.10	905.32	905.34	1,042.63	1,217.13	1,183.65
8.	Haryana	370.50	421.79	300.00	371.80	232.69	267.87	219.05	174.20
9.	Himachal Pradesh	187.85	165.49	130.00	117.00	134.73	97.50	84.50	73.13
10.	Jammu and Kashmir	47.13	58.83	86.45	56.55	54.95	60.71	63.44	70.40
11.	Jharkhand	300.30	144.30	144.95	22.43	22.43	34.91	101.21	156.33
12.	Karnataka	632.05	773.76	443.00	429.59	266.50	377.00	263.90	459.68
13.	Kerala	25.68	48.95	48.95	25.29	24.05	18.85	122.79	118.56
14.	Madhya Pradesh	719.55	834.41	864.50	719.55	48.74	326.50	800.00	383.50
15.	Maharashtra	798.85	1,025.57	1,062.43	798.72	594.18	782.05	451.17	322.40
16.	Manipur	117.00	74.75	93.47	94.90	75.06	70.01	63.51	51.35
17.	Meghalaya	44.53	25.61	26.72	31.53	12.94	46.61	18.53	21.19
18.	Mizoram	40.63	35.23	37.96	26.46	26.46	26.46	28.96	28.86
19.	Nagaland	68.90	12.68	24.96	6.83	6.83	6.83	7.51	8.26



S. no.	State/UT	Year							
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
20.	Odisha	1,126.45	650.00	1,184.76	697.39	697.37	1,055.67	1,837.91	2,275.00
21.	Punjab	45.18	63.05	65.59	45.31	18.00	42.28	26.65	36.34
22.	Rajasthan	240.00	370.00	345.50	371.15	371.17	273.00	188.00	432.77
23.	Sikkim	48.43	40.04	40.04	31.27	26.62	22.17	20.96	12.09
24.	Tamil Nadu	329.55	382.01	357.96	456.56	456.53	402.12	369.79	281.39
25.	Telangana	-	-	-	389.81	522.90	1,030.38	1,799.66	2,774.85
26.	Tripura	176.80	132.93	135.85	105.82	105.82	75.89	54.34	26.85
27.	Uttarakhand	149.50	129.48	104.00	104.00	112.24	78.00	127.21	137.02
28.	Uttar Pradesh	531.05	495.50	443.17	310.25	376.40	654.58	752.90	737.69
29.	West Bengal	104.00	51.61	52.85	4.88	25.42	48.69	50.73	60.91
30.	Andaman and Nicobar Islands	7.00	7.93	7.00	7.28	7.25	7.83	8.58	7.48
31.	Chandigarh	1.95	0.65	1.01	1.17	0.82	1.01	1.11	1.24
32.	Dadar and Nagar Haveli	1.63	1.43	1.43	1.30	1.30	1.40	1.56	1.56
33.	Daman and Diu	0.10	0.70	0.07	0.07	0.07	0.03	0.07	0.07
34.	Delhi	7.48	7.93	4.50	5.53	5.51	8.26	10.14	10.01
35.	Lakshadweep	0.13	0.13	0.16	0.13	0.16	0.07	0.07	0.07
36.	Puducherry	0.23	0.26	0.46	0.26	0.27	0.42	0.98	0.91
<b>Total</b>		<b>10,125.81</b>	<b>9,890.93</b>	<b>10,184.43</b>	<b>7,583.32</b>	<b>7,082.15</b>	<b>9,460.49</b>	<b>11,182.21</b>	<b>12,137.09</b>

Source: NAEB, MoEF&CC, Gol and MoSPI, Gol.

The average annual achievement of planting bamboo seedlings, based on the data from 2012-13 to 2017-18, under the 20-Point Programme is about 1,196 M year<sup>-1</sup> (Table 3.7.4). Maximum annual average achievement is found for the state Andhra Pradesh (about 242 M year<sup>-1</sup>) followed by Gujarat (about 159 M year<sup>-1</sup>).



Table 3.7.4. Achievement of seedlings planted (in lakh) under 20-Point Programme

S. no.	State/UT	Year					
		2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1.	Andhra Pradesh	3,450.09	3,050.71	2,212.73	1,839.48	1,820.43	2,115.50
2.	Arunachal Pradesh	1.98	1.36	0.27	0.06	0.00	0.00
3.	Assam	28.93	0.00	0.00	0.00	0.00	0.00
4.	Bihar	197.14	449.95	604.21	269.22	281.32	228.24
5.	Chhattisgarh	643.54	577.79	696.00	98.70	787.00	598.74
6.	Goa	7.07	2.60	4.50	0.33	0.32	0.12
7.	Gujarat	2,011.53	995.82	1,820.39	1,689.92	1,841.46	1,177.56
8.	Haryana	501.00	111.72	279.27	238.50	191.64	165.83
9.	Himachal Pradesh	187.87	166.37	135.00	121.68	106.99	91.82
10.	Jammu and Kashmir	56.44	58.77	59.61	76.60	41.34	59.63
11.	Jharkhand	184.37	54.72	74.26	NR	192.10	159.95
12.	Karnataka	691.18	777.17	519.29	435.38	547.00	465.08
13.	Kerala	162.64	28.61	10.53	17.30	29.48	34.41
14.	Madhya Pradesh	777.27	878.79	866.87	63.94	855.37	0.00
15.	Maharashtra	1,575.16	1,770.58	863.12	557.50	566.62	0.00
16.	Manipur	145.76	116.55	92.02	62.06	78.09	64.61
17.	Meghalaya	39.48	1.04	45.04	33.65	0.00	13.08
18.	Mizoram	15.13	32.84	0.00	NR	26.46	24.81
19.	Nagaland	64.17#	65.63	0.00	NR	0.00	0.00
20.	Odisha	533.58	771.81	1,242.17	960.03	874.32	312.00
21.	Punjab	99.24	110.53	18.00	19.07	35.35	44.50
22.	Rajasthan	275.85	473.13	451.96	461.14	443.57	300.67
23.	Sikkim	60.27	31.93	23.07	16.31	22.99	2.37
24.	Tamil Nadu	296.90	456.53	456.53	293.34	258.63	215.46
25.	Telangana	-	-	445.79	1,378.31	3,680.62	3,407.94
26.	Tripura	129.88	105.83	106.19	15.38	433.31	31.58
27.	Uttarakhand	187.96	212.17	175.09	157.76	166.58	189.07
28.	Uttar Pradesh	524.76	599.41	919.73	587.03	711.93	589.92
29.	West Bengal	162.66	50.75	100.18	324.19	27.51	429.69
30.	Andaman and Nicobar Islands	7.06	7.23	6.73	7.13	7.25	1.62
31.	Chandigarh	0.87	0.70	0.82	1.33	1.38	1.23
32.	Dadar and Nagar Haveli	3.28	3.33	3.52	3.03	3.83	4.55
33.	Daman and Diu	0.25	0.39	0.16	0.00	0.19	0.62
34.	Delhi	9.16	5.51	4.50	9.74	8.72	0.00
35.	Lakshadweep	0.24	0.21	0.00	0.00	0.00	0.00
36.	Puducherry	2.04	0.45	1.46	0.33	0.87	0.41
	<b>Total</b>	<b>13,034.76</b>	<b>11,970.93</b>	<b>12,244.07</b>	<b>9,738.43</b>	<b>14,042.88</b>	<b>10,731.01</b>

Source: NAEB, MoEF&CC, Gol and MoSPI, Gol.

#: Figures reported earlier have been repeated; \*: Achievements for 2018-19 onwards are yet to be published by MoSPI; NR: Not reported.

### 3.8 ECO-TOURISM

Eco-tourism activities have been taken up by almost all the states in its forest areas. Apart from generating revenue, eco-tourism also helps in creating awareness about the need to preserve the forest ecosystems. Guided tours are also conducted and mostly, local communities are involved as it gives them a chance to earn their livelihoods. States have earmarked specific sites for eco-tourism. Although the data are not yet available comprehensively, the number of footfalls in some states about the tourists and revenue generated are given in the Table 3.8.1 and Table 3.8.2, respectively.

Table 3.8.1. Number of tourists in eco-tourism areas in selected states/UTs

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1.	Goa	1,84,699	2,25,157	2,93,089	3,63,937	NA	NA	NA
2.	Gujarat	1,69,430	4,76,519	2,53,993	2,57,708	3,81,520	2,02,077	1,61,156
3.	Karnataka	6,42,720	6,49,544	6,05,294	6,64,813	6,62,592	11,43,768	26,93,918
4.	Kerala	NA	NA	49,90,366	44,95,129	NA	NA	NA
5.	Madhya Pradesh	11,98,551	10,96,288	10,28,697	10,90,731	9,32,000	NA	NA
6.	Sikkim	NA	NA	NA	NA	2,094	2,150	NA
7.	Tripura	1,89,000	1,73,000	1,60,000	1,57,000	NA	NA	NA
8.	Uttar Pradesh	90,106	1,02,464	1,41,240	1,63,902	NA	NA	NA
9.	Uttarakhand	2,30,827	2,84,908	2,92,501	2,84,061	3,22,936	3,40,175	3,86,260
10.	Andaman and Nicobar Islands	NA	NA	1,55,779	2,29,894	2,79,085	2,15,794	2,54,250
11.	Dadra and Nagar Haveli	31,840	57,494	1,12,866	82,304	NA	NA	NA

Source: SFDs; NA: Data not available.

Table 3.8.2. Revenue realised (INR lakh) from eco-tourism

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1.	Goa	68.990	67.165	108.334	156.613	NA	NA	NA
2.	Himachal Pradesh	NA	5.541	3.690	20.250	NA	NA	NA
3.	Kerala	590.604	NA	1,580.580	1,076.880	2,602.000	NA	NA
4.	Madhya Pradesh	1,518.310	1,844.800	1,482.840	2,068.290	2,161.320	NA	NA
5.	Sikkim	NA	NA	NA	NA	15.458	18.678	NA
6.	Tripura	12.300	15.180	12.410	22.440	NA	NA	NA
7.	Uttar Pradesh	24.720	27.770	30.740	41.780	42.180	40.040	24.720
8.	Uttarakhand	729.330	851.190	790.160	869.840	993.910	1,060.730	1,168.060
9.	West Bengal	NA	NA	NA	NA	384.50	NA	NA

S. no.	State/UT	Year						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
10.	Andaman and Nicobar Islands	NA	35.350	40.550	33.840	39.150	31.560	46.260
11.	Dadra and Nagar Haveli	5.510	8.210	8.710	8.680	NA	NA	NA

Source: SFDs; NA: Data not available.

## REFERENCES

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