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*MANGROVE COVER*

03





# MANGROVE COVER

## 3.1

### Introduction

Intertidal tropical and subtropical regions between latitudes 24°N - 38°S bear halophytic vegetation called 'Mangroves'. These diverse group of plants, exhibit varied morphological and physiological adaptations in order to survive the harsh physical environment in spite of these regions receiving 1000-3000 mm of annual rainfall and a temperature regime between 26-35°C. The limiting factors include lack of oxygen, high salinity and diurnal tidal inundation. The adaptations include succulent leaves, sunken stomata, aerial breathing roots called 'pneumatophores', higher cellular salt concentration, vivipary, support structures like stilt roots and buttresses etc.

*The complex root system facilitates accumulation of organic detritus and inorganic nutrients, thus acting as a breeding and nursing ground for various marine and pelagic species. They act as an important source of livelihood for the coastal communities dependant on collection of honey, tannins, wax and fishing.*

*Mangroves also act as zone of land accretion due to trapping of fine sediment and thereby arresting coastal erosion. They protect coastal areas from storm surges and tsunamis. Their protective role has been widely recognized especially after the deadly Tsunami of 2004.*

Mangroves are therefore considered as most productive wetlands, but they are increasingly threatened by biotic pressure, changing land use patterns and natural calamities. It is therefore imperative to regularly assess and monitor the mangroves for designing appropriate conservation strategies.

Remote sensing using multi-temporal satellite imagery in tandem with Geographical Information System has provided an efficient technological means of regular monitoring of mangrove ecosystems.



3.2

### Conservation of Mangroves

In many countries mangrove ecosystem is facing constant pressure due to increased human population in coastal areas and their rising demand for timber, fodder, fuelwood and other non-wood forest products. An appropriate management of mangrove ecosystem is required for their conservation for environment benefits as well as supplying forest products on a sustainable basis to meet day today requirement of local people.

Sundarbans mangroves located in Bay of Bengal (partly in India and Bangladesh), were the first mangroves in the world, which were considered under scientific management since 1892. Observing the importance of mangroves, Indian Govt. set up a National Mangrove Committee in 1976, which advises the Govt. about conservation and development of mangroves. Different states are carrying out practices for conservation of mangrove cover with the active involvement of local communities.

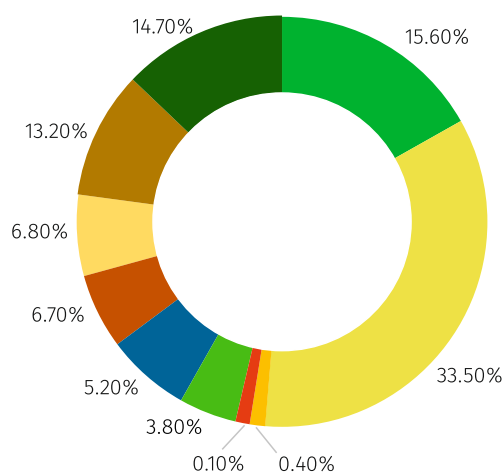
3.3

### Status of Mangrove Cover Worldwide

Mangroves are mostly distributed over 123 countries and territories in the tropical and sub-tropical region of the world. Asia has the largest amount of the world's mangrove. The total Mangrove cover in the world is 150,000 sq.km (Source: World Atlas of Mangroves, 2010). The most extensive area of mangrove is found in South East Asia followed by South America, North Central America and West and Central Africa. South Asia comprises 10,344 sq km which is 6.8 % of the world's mangrove cover. India's contribution is 45.8% of the total Mangrove cover in South Asia.

Figure: 3.1  
**World Mangrove Distribution**  
 Total 150,000 sq. km.

- North and central America
- West and Central Africa
- South Asia
- Australia/New Zealand
- East and South Africa
- Pacific Ocean
- East Asia
- Middle East
- South East Asia
- South America



## Status of Mangrove Cover in India

Mangroves are spread over an area of 4921 sq km in India which is nearly 3.3% of the world's mangrove vegetation. Sundarbans in West Bengal accounts for almost half of the total area under mangrove in India. Forest Survey of India has been assessing the mangrove cover using remote sensing data since 1987. In the first assessment, the estimated extent of the mangrove cover was 4,046 sq km which was carried out at 1:1 million scale. Subsequently, from 1989 to 1999 the mangrove cover was assessed regularly on a two-year cycle at 1:250,000 scale. Assessment from 2001 onwards has been carried out at 1:50,000 scale. States/UTs wise mangrove cover as assessed by FSI in different assessments is given in Table 3.1. This assessment pertains only to the mangrove cover and does not include the tidal creeks and water bodies within the mangrove forests.

Table 3.1 Mangrove Cover Assessment in States/ UTs since 1987

State/UT	State of Forest Report			
	1987	1989	1991	1993
Andhra Pradesh	495	405	399	378
Goa	0	3	3	3
Gujarat	427	412	397	419
Karnataka	0	0	0	0
Kerala	0	0	0	0
Maharashtra	140	114	113	155
Odisha	199	192	195	195
Tamil Nadu	23	47	47	21
West Bengal	2,076	2,109	2,119	2,119
A&N Islands	686	973	971	966
Daman & Diu	0	0	0	0
Puducherry	0	0	0	0
<b>Total</b>	<b>4,046</b>	<b>4,255</b>	<b>4,244</b>	<b>4,256</b>



(area in sq km)

1995	1997	1999	2001	2003	2005	2009	2011	2013	2015
383	383	397	333	329	354	353	352	352	367
3	5	5	5	16	16	17	22	22	26
689	901	1,031	911	916	991	1,046	1,058	1,103	1,107
2	3	3	2	3	3	3	3	3	3
0	0	0	0	8	5	5	6	6	9
155	124	108	118	158	186	186	186	186	222
195	211	215	219	203	217	221	222	213	231
21	21	21	23	35	36	39	39	39	47
2,119	2,123	2,125	2,081	2,120	2,136	2,152	2,155	2,097	2,106
966	966	966	789	658	635	615	617	604	617
0	0	0	0	1	1	1	2	1.63	3
0	0	0	1	1	1	1	1	1	2
4,533	4,737	4,871	4,482	4,448	4,581	4,639	4,663	4,628	4,740

### 3.5

## Mangrove Cover (2017 Assessment)

Mangroves show conspicuous tone and texture on the satellite images, which has been used in the mapping of mangrove cover of the country. The mangrove cover in this assessment has been categorized into Very Dense, Moderately Dense and Open categories. The density as mentioned pertains to the same density classes as for the forest cover classes in Chapter 2. Table 3.2 presents status of mangrove cover in 2017 assessment and also the change with respect to previous assessment.

*"The current assessment shows that mangrove cover in the country is 4921 sq km, which is 0.15 per cent of the country's total geographical area (32,87,469 sq km, Source: Census of India, 2011). The Very Dense mangrove comprises 1481 sq km (30.10%) of the mangrove cover, Moderately Dense mangrove is 1480 sq km (30.07%) while Open mangroves constitute an area of 1960 sq km (39.83%). There has been a net increase of 181 sq km in the mangrove cover of the country as compared to 2015 assessment".*



Table 3.2 Mangrove Cover Assessment 2017 (Area in sq km)

S. No.	State/UT	Very Dense Mangrove Mangrove	Moderately Dense	Open Mangrove	Total	Change with respect to ISFR 2015
1.	Andhra Pradesh	0	213	191	404	37
2.	Goa	0	20	6	26	0
3.	Gujarat	0	172	968	1,140	33
4.	Karnataka	0	2	8	10	7
5.	Kerala	0	5	4	9	0
6.	Maharashtra	0	88	216	304	82
7.	Odisha	82	94	67	243	12
8.	Tamil Nadu	1	25	23	49	2
9.	West Bengal	999	692	423	2,114	8
10.	A&N Islands	399	169	49	617	0
11.	Daman & Diu	0	0	3	3	0
12.	Puducherry	0	0	2	2	0
	<b>Total</b>	<b>1,481</b>	<b>1,480</b>	<b>1,960</b>	<b>4,921</b>	<b>181</b>

### 3.6

## District wise Mangrove Cover

The district wise mangrove cover in coastal States/UTs is given in Table 3.3

Table 3.3: District wise Mangrove Cover (Area in sq km)

S. No.	State/UT	Very Dense Mangrove Mangrove	Moderately Dense	Open Mangrove	Total	Change with w.r.t. 2015 Assessment
<b>1</b>	<b>Andhra Pradesh</b>					
	East Godavari	0	126	62	188	4
	Guntur	0	35	33	68	18
	Krishna	0	50	87	137	11
	Sri Potti Sriramalu Nellore	0	2	8	10	5
	Prakasam	0	0	1	1	0
	West Godavari	0	0	0	0	-1
	<b>Total</b>	<b>0</b>	<b>213</b>	<b>191</b>	<b>404</b>	<b>37</b>
<b>2</b>	<b>Goa</b>					
	North Goa	0	17	3	20	0
	South Goa	0	3	3	6	0
	<b>Total</b>	<b>0</b>	<b>20</b>	<b>6</b>	<b>26</b>	<b>0</b>
<b>3</b>	<b>Gujarat</b>					
	Ahmadabad	0	1	31	32	-1
	Amreli	0	0	2	2	0
	Anand	0	0	8	8	0
	Bharuch	0	14	31	45	3

S. No.	State/UT	Very Dense Mangrove Mangrove	Moderately Dense	Open Mangrove	Total	Change with w.r.t. 2015 Assessment
	Bhavnagar	0	6	16	22	5
	Jamnagar	0	28	156	184	11
	Junagarh	0	0	3	3	2
	Kachchh	0	118	680	798	12
	Navsari	0	0	14	14	1
	Porbandar	0	0	1	1	0
	Rajkot	0	1	3	4	0
	Surat	0	4	17	21	0
	Vadodara	0	0	3	3	0
	Valsad	0	0	3	3	0
	<b>Total</b>	<b>0</b>	<b>172</b>	<b>968</b>	<b>1,140</b>	<b>33</b>
<b>4</b>	<b>Karnataka</b>					
	Uttar Kannada	0	0	8	8	7
	Udupi	0	2	0	2	0
	<b>Total</b>	<b>0</b>	<b>2</b>	<b>8</b>	<b>10</b>	<b>7</b>
<b>5</b>	<b>Kerala</b>					
	Ernakulam	0	1	1	2	0
	Kannur	0	4	2	6	0
	Kasaragod	0	0	1	1	0
	<b>Total</b>	<b>0</b>	<b>5</b>	<b>4</b>	<b>9</b>	<b>0</b>
<b>6</b>	<b>Maharashtra</b>					
	Mumbai city	0	0	2	2	0
	Mumbai suburban	0	27	37	64	16
	Raigarh	0	12	94	106	29
	Ratnagiri	0	15	15	30	1
	Sindhudurg	0	5	7	12	5
	Thane	0	29	61	90	31
	<b>Total</b>	<b>0</b>	<b>88</b>	<b>216</b>	<b>304</b>	<b>82</b>
<b>7</b>	<b>Odisha</b>					
	Baleswar	0	1	4	5	3
	Bhadrak	0	9	23	32	2
	Jagatsinghapur	0	1	7	8	0
	Kendrapara	82	83	32	197	7
	Puri	0	0	1	1	0
	<b>Total</b>	<b>82</b>	<b>94</b>	<b>67</b>	<b>243</b>	<b>12</b>
<b>8</b>	<b>Tamil Nadu</b>					
	Cuddalore	0	7	1	8	1
	Nagapattinam*	0	1	3	4	-16
	Pudukkottai	1	0	1	2	1
	Ramanathapuram	0	1	1	2	-1
	Thanjavur	0	8	4	12	0



S. No.	State/UT	Very Dense Mangrove	Moderately Dense	Open Mangrove	Total	Change with w.r.t. 2015 Assessment
	Thiruvallur	0	0	1	1	0
	Thiruvarur*	0	7	9	16	16
	Thoothukkudi	0	1	3	4	1
	<b>Total</b>	<b>1</b>	<b>25</b>	<b>23</b>	<b>49</b>	<b>2</b>
<b>9</b>	<b>West Bengal</b>					
	Purba Medinipur*	0	1	3	4	1
	North 24 Parganas	13	11	2	26	0
	South 24 Parganas	986	680	418	2084	7
	<b>Total</b>	<b>999</b>	<b>692</b>	<b>423</b>	<b>2114</b>	<b>8</b>
<b>10</b>	<b>A&amp;N Islands</b>					
	North Andaman*	285	112	28	425	-1
	South Andaman*	114	55	21	190	0
	Nicobar	0	2	0	2	1
	<b>Total</b>	<b>399</b>	<b>169</b>	<b>49</b>	<b>617</b>	<b>0</b>
<b>11</b>	<b>Daman &amp; Diu</b>					
	Daman	0	0	1	1	0
	Diu	0	0	2	2	0
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>0</b>
<b>12</b>	<b>Puducherry</b>					
	Karaikal	0	0	0	0	0
	Mahe	0	0	0	0	0
	Puducherry	0	0	0	0	-1
	Yanam	0	0	2	2	1
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>
	<b>Grand Total</b>	<b>1481</b>	<b>1480</b>	<b>1960</b>	<b>4921</b>	<b>181</b>

\* New District according to Census, 2011

### 3.7

## Reasons for increase in Mangrove Cover

- Andhra Pradesh: The positive change of 37 sq km in Andhra Pradesh is mainly due to plantation and regeneration.
- Gujarat: The positive change of 33 sq km in the mangrove is mainly due to conservational effort such as plantation and regeneration particularly in Bhavnagar, Jamnagar, Kuchch and Junagarh.
- Maharashtra: The positive change of 82 sq km in Maharashtra is mainly due to plantation and regeneration of mangroves.
- Odisha: The positive change of total 12 sq Km is reflected in the Mangroves in Balasore, Bhadrak & Kendrapara districts. The change is mainly due to mangrove plantation, natural regeneration and growing of mangroves in some newly formed island.
- West Bengal: The positive change of 8 sq km is reflected in the mangroves of Purba Medinipur and South 24 Pargana districts. The change is mainly due to mangrove plantation in some islands and along the river creeks and natural regeneration at few places.

