Chapter

3

MANGROVE COVER

3.1 Introduction

Mangroves comprise salt tolerant plant species that occur along inter-tidal zones of rivers and seas in the form of narrow strips or as extensive patches in estuarine habitats and river deltas of tropical and sub-tropical regions. Sheltered environment with brackish influx, estuarine and deltaic muddy soils, good rainfall (1000 mm- 3000 mm) and temperature between 26°C – 35°C are considered as ideal habitats for luxuriant and rich mangrove growth.

Mangroves are significantly different from other vegetation as they survive in a hostile environment, an interface between land and sea marked with fluctuations in salinity, storms and tidal surges. They exhibit a variety of adaptations in terms of morphology, anatomy, physiology, seed and seedlings development, physiognomy and succession mechanisms. Prop roots, knee roots, plank buttresses and pneumatophores, sclerophyllous leaves with sunken stomata and vivipary are some of the common adaptations.

Mangrove forests are considered the most productive and biodiverse wetlands on earth. These provide critical habitat for a diverse marine and terrestrial flora and fauna. Healthy mangrove forests are key to a healthy marine ecology. These unique coastal tropical forests are among the most threatened habitats in the world.

Mangroves perform a number of vital ecological functions in nutrient recycling, maintenance of hydrological regime, coastal protection and fish production. Mangroves are important from socio-economic point of view also as they provide firewood, timber, fodder, fruits, medicines, honey, etc. Protective role of mangroves has been highlighted in every disaster of cyclones, tsunami, etc.

3.2 Status of Mangrove Cover in India

Mangrove cover in India accounts for about 3% of the world's mangrove vegetation and is spread over an area of 4,639 km² in the coastal States/UTs of the country. Sundarbans in West Bengal accounts for a little less than half of the total area under mangroves in India. The Forest Survey of India is assessing the mangroves using remote sensing technology since 1987. In the first assessment, the estimate of mangrove cover was 4,046 km². Thereafter, mangrove cover was assessed regularly on a two-year cycle from 1989 to 1999 wherein scale of assessment was 1:250,000. Assessment from 2001 onwards is being done on a scale of 1:50,000. State/UT wise mangrove cover as assessed by FSI in different assessments is given in Table 3.2.1. West Bengal (46.39%) has the maximum mangrove cover in the country, followed by Gujarat (22.55%) and Andaman & Nicobar Islands (13.26%) of the country's total mangrove cover.

Table 3.2.1: State/UT wise mangrove cover assessment (area in km²)

S. No.	State/UT	Assessment Year									
		1987	1989	1991	1993	1995	1997	1999	2001	2003	2005
1.	Andhra Pradesh	495	405	399	378	383	383	397	333	329	354
2.	Goa	0	3	3	3	3	5	5	5	16	16
3.	Gujarat	427	412	397	419	689	901	1,031	911	916	991
4.	Karnataka	0	0	0	0	2	3	3	2	3	3
5.	Maharashtra	140	114	113	155	155	124	108	118	158	186
6.	Orissa	199	192	195	195	195	211	215	219	203	217
7.	Tamil Nadu	23	47	47	21	21	21	21	23	35	36
8.	West Bengal*	2,076	2,109	2,119	2,119	2,119	2,123	2,125	2,081	2,120	2,136
9.	A & N Islands	686	973	971	966	966	966	966	789	658	635
10	Puducherry	0	0	0	0	0	0	0	1	1	1
11	Kerala	0	0	0	0	0	0	0	0	8	5
12	Daman & Diu	0	0	0	0	0	0	0	0	1	1
	Total	**4,046**	**4,255**	**4,244**	**4,256**	**4,533**	**4,737**	**4,871**	**4,482**	**4,448**	**4,581**

* As per the West Bengal Forest Department, mangrove area in Sundarbans is 4,200 km² (approximately) which is almost double the area estimated by FSI. This is mainly due to the difference in assessment methods. West Bengal Forest Department includes the intervening water in the mangrove cover, whrereas, assessment of FSI takes into account the mangrove cover only, as discerned on the satellite image.

3.3 Mangrove Cover Assessment

Mangroves show conspicuous tone and texture on the satellite image, which has been used in the mapping of mangrove cover of the country. Mangrove cover has been categorized into very dense (canopy density of more than 70%), moderately dense (canopy density between 40-70%) and open (canopy density between 10-40%). Table 3.3.1 presents State/UT wise status of mangrove cover as assessed in 2007 and also the change with respect to previous assessment.

The current assessment shows that mangrove cover in the country is 4,639 km², which is 0.14 % of the country's total geographical area. The very dense mangrove comprises 1,405 km² (30.29 % of mangrove cover), moderately dense mangrove is 1,659 km² (35.76 %), while open mangrove covers an area of 1,575 km² (33.95 %).

Compared with 2005 assessment, there has been an increase of 58 km² in mangrove cover mainly because of the plantations and protection measures in the state of Gujarat, Orissa, Tamil Nadu and West

Table 3.3.1: State/UT wise mangrove cover in 2007 (data of Oct - Dec 2006) (area in km²)

S. No.	State/UT	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change* w.r.t. 2005 assessment (Oct - Dec 2004)
1.	Andhra Pradesh	0	126	227	353	-1
2.	Goa	0	14	3	17	1
3.	Gujarat	0	188	858	1,046	55
4.	Karnataka	0	3	0	3	0
5.	Kerala	0	3	2	5	0
6.	Maharashtra	0	69	117	186	0
7.	Orissa	82	97	42	221	4
8.	Tamil Nadu	0	16	23	39	3
9.	West Bengal	1,038	881	233	2,152	16
10.	A & N Islands	285	262	68	615	-20
11.	Daman & Diu	0	0	1	1	0
12.	Puducherry	0	0	1	1	0
	Total	**1,405**	**1,659**	**1,575**	**4,639**	**58**

* The change in the above table refers to change in the area w.r.t. revised assessment of 2005.

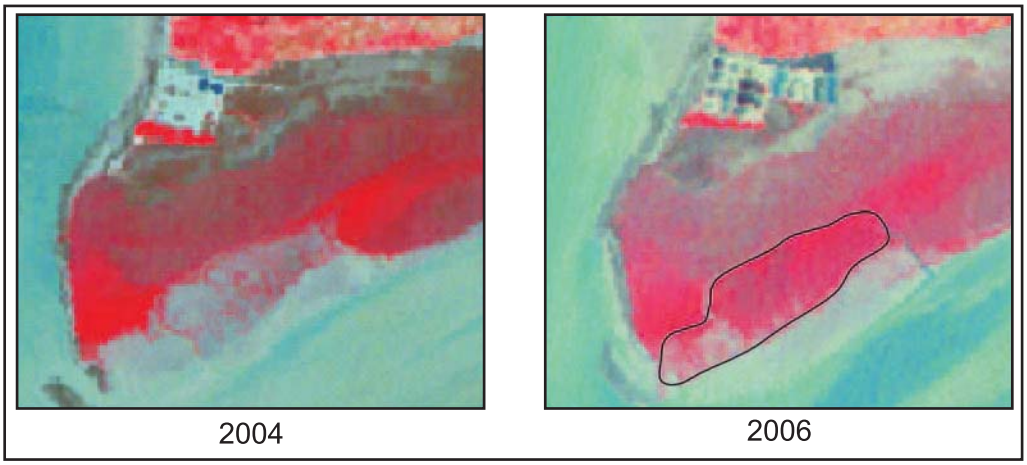

Fig. 3.1: Regeneration of mangroves, Bharuch (Gujarat)

Bengal. Decrease in mangrove cover in Andaman & Nicobar Islands is attributed to after effects of tsunami.

3.4 District wise Mangrove cover

The district wise mangrove cover in each State/UT is given in Table 3.4.1.

Table 3.4.1: District wise mangrove cover

(area in km^2)

S. No.	State/UT and District	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change* w.r.t. 2005 assessment
1.	**Andhra Pradesh**					
	East Godavari	0	63	126	189	-1
	Guntur	0	28	21	49	0
	Krishna	0	35	74	109	0
	Nellore	0	0	5	5	0
	Prakasham	0	0	1	1	0
	Total	**0**	**126**	**227**	**353**	**-1**
2.	**Goa**					
	North Goa	0	10	2	12	1
	South Goa	0	4	1	5	0
	Total	**0**	**14**	**3**	**17**	**1**
3.	**Gujarat**					
	Ahmedabad	0	2	25	27	18
	Anand	0	0	3	3	3
	Bharuch	0	23	19	42	5
	Bhavnagar	0	6	7	13	0
	Jamnagar	0	28	129	157	7
	Kuchchh	0	121	654	775	18
	Navsari	0	0	1	1	0
	Rajkot	0	1	1	2	0
	Surat	0	7	10	17	0
	Vadodara	0	0	4	4	4

continued

S. No.	State/UT and District	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change* w.r.t. 2005 assessment
	Valsad	0	0	5	5	0
	TOTAL	**0**	**188**	**858**	**1,046**	**55**
4.	**Karnataka**					
	Uttar Kannada	0	1	0	1	0
	Udupi	0	2	0	2	0
	Total	**0**	**3**	**0**	**3**	**0**
5.	**Kerala**					
	Kannur	0	3	2	5	0
	Total	**0**	**3**	**2**	**5**	**0**
6.	**Maharashtra**					
	Mumbai City	0	0	2	2	0
	Mumbai Suburb	0	23	20	43	0
	Raigarh	0	10	52	62	0
	Ratnagiri	0	12	11	23	0
	Sindhudurg	0	2	1	3	0
	Thane	0	22	31	53	0
	Total	**0**	**69**	**117**	**186**	**0**
7.	**Orissa**					
	Baleshwar	0	2	1	3	1
	Bhadrak	1	9	13	23	2
	Jagatsinghpur	0	2	5	7	1
	Kendrapara	81	83	23	187	0
	Puri	0	1	0	1	0
	Total	**82**	**97**	**42**	**221**	**4**
8.	**Tamil Nadu**					
	Cuddalore	0	0	7	7	0
	Nagapattinam	0	9	10	19	3
	Ramanathapuram	0	2	1	3	0
	Thanjavur	0	5	3	8	0
	Toothukudi	0	0	2	2	0
	Total	**0**	**16**	**23**	**39**	**3**
9.	**West Bengal**					
	Medinipur	4	2	4	10	4
	24 Parganas North	20	6	0	26	0
	24 Parganas South	1,014	873	229	2,116	12
	Total	**1,038**	**881**	**233**	**2,152**	**16**
10.	**Andaman & Nicobar Islands**					
	Andaman	285	260	67	612	-11
	Nicobar	0	2	1	3	-9
	Total	**285**	**262**	**68**	**615**	**-20**

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S. No.	State/UT and District	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change* w.r.t. 2005 assessment
11.	**Daman & Diu**					
	Diu	0	0	1	1	0
	Total	**0**	**0**	**1**	**1**	**0**
12.	**Puducherry**					
	Yanam	0	0	1	1	0
	Total	**0**	**0**	**1**	**1**	**0**
	Grand Total	**1,405**	**1,659**	**1,575**	**4,639**	**58**

* The change in the above table refers to change in the area w.r.t. revised assessment of 2005.