Chapter

3. Mangroves Cover

3.1 Introduction

Mangroves are Salt tolerant plant community found in tropical and sub-tropical intertidal region of the word receiving rainfall between 1,000 to 3,000 mm and temperature ranging between 26-35^{0}C. They exhibits a variety adaptation in morphology, anatomy and physiology to survive in a hostile environment which is marked with water logged soils and high salinity regime frequented by storm and tidal surge. Prominent among these adaptations are presence of pneumatophores, buttress, stilt roots, vivipary etc.

Biotic pressures and natural calamities are the enemies of mangrove ecosystems. Growing industrial areas along the coastlines and discharge of domestic and industrial sewage are polluting these areas. Many studies have highlighted these problems and intensive conservation efforts are needed to conserve the sensitive ecosystem of mangroves.

3.2 Status of Mangrove Cover

Mangroves occupy an area of 4,628 sq km in India accounting for nearly three per cent of the world's mangrove vegetation. Sundarbans in West Bengal accounts for almost half of the total area under mangroves in India. The 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 covers were 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. State/UT 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.

3.3 Mangrove Cover: 2013 Assessment

Mangroves show conspicuous tone and texture on the satellite images, which have been used in the mapping of mangrove cover of the country. The mangrove cover in this assessment has been categorized into very dense (canopy density of 70% and above), moderately dense (canopy density of 40% and more but less than 70%) and open categories (canopy density of 10% and more but less than 40%). Table 3.2 presents status of mangrove cover in 2013 assessment and also the change with respect to previous assessments.

The current assessment shows that mangrove cover in the country is 4,628 sq km, which is 0.14 per cent of the country's total geographical area. The very dense mangrove

Table 3.1 Mangrove Cover Assessment in States/UTs (Area in km^2)

States/UTs	Assessment Year											
	1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2009	2011
Andhra Pradesh	495	405	399	378	383	383	397	333	329	354	353	352
Goa	0	3	3	3	3	5	5	5	16	16	17	22
Gujarat	427	412	397	419	689	901	1,031	911	916	991	1,046	1,058
Karnataka	0	0	0	0	2	3	3	2	3	3	3	3
Kerala	0	0	0	0	0	0	0	0	8	5	5	6
Maharashtra	140	114	113	155	155	124	108	118	158	186	186	186
Odisha	199	192	195	195	195	211	215	219	203	217	221	222
Tamil Nadu	23	47	47	21	21	21	21	23	35	36	39	39
West Bengal	2,076	2,109	2,119	2,119	2,119	2,123	2,125	2,081	2,120	2,136	2,152	2,155
A&N Islands	686	973	971	966	966	966	966	789	658	635	615	617
Daman & Diu	0	0	0	0	0	0	0	1	1	1	1	1.56
Puducherry	0	0	0	0	0	0	0	0	1	1	1	1
Total	**4,046**	**4,255**	**4,244**	**4,256**	**4,533**	**4,737**	**4,871**	**4,482**	**4,448**	**4,581**	**4,639**	**4,663**

comprises 1,351 sq km (29.20 per cent of the mangrove cover), moderately dense mangrove is 1,457 sq km (31.49 per cent) while open mangroves constitute an area of 1,819 sq km (39.31 per cent). Compared with 2011 assessment, there has been a net decrease of 34 sq km in the mangrove cover of the country. It is pertinent to mention here that in West Bengal the decrease of mangrove cover is mainly due to exclusion of creeks area within the mangroves on account of better radiometric resoluation of satellite data. In case of Gujarat, signatures of forest cover and mangrove cover could not be discerned in some areas due to mixing of the signatures of these two classes in the previous assessment.

Table 3.2: Mangrove Cover Assessment 2013 (Area in km^2)

States/UTs	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change with respect to ISFR 2011
Andhra Pradesh	0	126	226	352	0
Goa	0	20	2	22	0
Gujarat	0	175	928	1,103	45
Karnataka	0	3	0	3	0
Kerala	0	3	3	6	0
Maharashtra	0	69	117	186	0
Odisha	82	88	43	213	-9
Tamil Nadu	0	16	23	39	0
West Bengal	993	699	405	2,097	-57
A&N Islands	276	258	70	604	-13
Daman & Diu	0	0	1	1	0
Puducherry	0	0.14	1.49	1.63	0.07
Total	**1,351**	**1,457**	**1,819**	**4,628**	**-34**

However, the same has been resolved in the present assessment based on the better radiometric resolution of satellite data along with intensive field visits, Google Earth data and other ancilliary data.

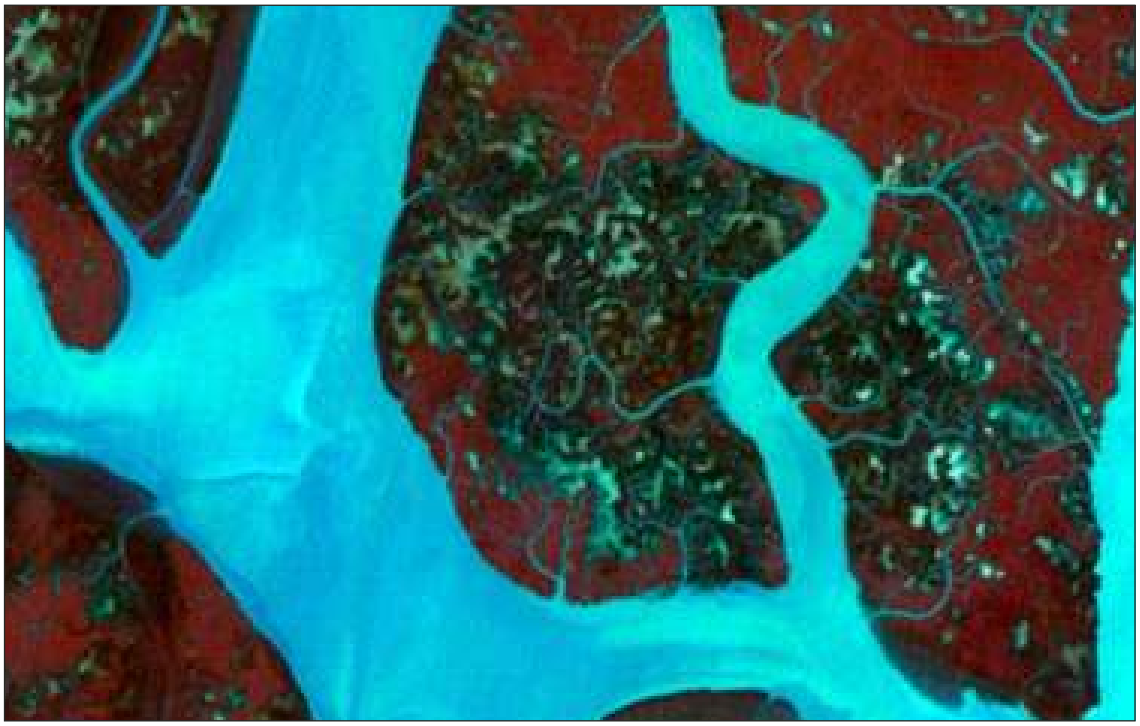
3.4 District wise Mangrove Cover

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

Table 3.3: District-wise Mangrove Cover (Area in km^2)

States/UTs and Districts	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change w.r.t. ISFR 2011
Andhra Pradesh					
East Godavari	0	63	125	188	0
Guntur	0	28	21	49	0
Krishna	0	35	74	109	0
Nellore	0	0	5	5	0
Prakasam	0	0	1	1	0
Total	**0**	**126**	**226**	**352**	**0**
Goa					
North Goa	0	16	1	17	0
South Goa	0	4	1	5	0
Total	**0**	**20**	**2**	**22**	**0**
Gujarat					
Ahmedabad	0	1	35	36	6
Amreli	0	0	2	2	1
Anand	0	0	8	8	8
Bharuch	0	16	28	44	1
Bhavnagar	0	6	5	11	-8
Jamnagar	0	28	139	167	8
Junagarh	0	0	1	1	0
Kuchchh	0	118	671	789	11
Navsari	0	0	13	13	12
Porbandar	0	0	1	1	1
Rajkot	0	1	3	4	2
Surat	0	5	16	21	1
Vadodara	0	0	3	3	1
Valsad	0	0	3	3	1
Total	**0**	**175**	**928**	**1,103**	**45**
Karnataka					
Uttar Kannada	0	1	0	1	0
Udipi	0	2	0	2	0
Total	**0**	**3**	**0**	**3**	**0**
Kerala					
Kannur	0	3	2	5	0
Kasaragod	0	0	1	1	0
Total	**0**	**3**	**3**	**6**	**0**

States/UTs and Districts	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total	Change with respect to ISFR 2011
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**
Odisha					
Baleshwar	0	0	2	2	-2
Bhadrak	0	7	14	21	-2
Jagatsinghpur	0	2	5	7	0
Kendrapara	82	79	22	183	-4
Puri	0	0	0	0	-1
Total	**82**	**88**	**43**	**213**	**-9**
Tamil Nadu					
Cuddalore	0	0	7	7	0
Nagapattinam	0	9	10	19	0
Ramanathapuram	0	2	1	3	0
Thanjavur	0	5	3	8	0
Toothukudi	0	0	2	2	0
Total	**0**	**16**	**23**	**39**	**0**
West Bengal					
Medinipur	0	0	3	3	-8
North 24 Pargana	13	11	1	25	-1
South 24 Pargana	980	688	401	2,069	-48
Total	**993**	**699**	**405**	**2,097**	**-57**
A&N Islands					
Andaman	276	256	69	601	-13
Nicobar	0	2	1	3	0
Total	**276**	**258**	**70**	**604**	**-13**
Daman & Diu					
Daman & Diu	0	0.14	1.49	1.63	0.07
Total	**0**	**0.14**	**1.49**	**1.63**	**0.07**
Puducherry					
Yanam	0	0	1	1	0
Total	**0**	**0**	**1**	**1**	**0**
Grand Total	**1,351**	**1,457**	**1,819**	**4,628**	**-34**



Satellite Imagery showing Mangrove Forest using band 4,2,1 as RGB

Mangrove Forest of Sundarban, West Bengal