

11.33

DADRA & NAGAR HAVELI

11.33.1 Introduction

The Union Territory of Dadra & Nagar Haveli is situated between Gujarat and Maharashtra on the foothills of Western Ghats and has an area of 491 sq km. The Union Territory lies between 20°0'N to 20° 25'N latitude and 72°50' E to 73°15'E longitude. The average annual rainfall ranges between 2,000 mm to 2,500 mm and the average annual temperature ranges between 25°C to 27.5°C. The terrain is intersected by the river Damanganga and its three tributaries. As per census 2011, the population of the UT is 0.34 million which is 0.03% of the country's population. The urban and rural population of the UT is 46.72% and 53.28% respectively. About 32% of the population of the UT is Tribal. The population density is 700 per sq km. The 19th Livestock census 2012 reported the livestock population as 0.05 million.

TABLE 11.33.1 Land Use Pattern

Land Use Types	Area (in 000' ha)	Percentage
Geographical Area	49	
Reporting area for land utilization	49	100.00
Forests	20	41.63
Not available for land cultivation	3.76	7.69
Permanent pastures and other grazing lands	0.92	1.89
Land under misc. tree crops and groves	-	-
Culturable wasteland	0.46	0.94
Fallow land other than current fallows	2.14	4.38
Current fallows	2.31	4.72
Net area sown	18.94	38.75

Source: Land Use Statistics, Ministry of Agriculture, GOI, (2014-15)



11.33.1.1 A Brief Overview of Forestry Scenario

As per the Champion & Seth Classification of Forest Types (1968), the forests in Dadra & Nagar Haveli belong to two Type Groups i.e Tropical Moist Deciduous Forests and Tropical Dry Deciduous Forests, which are further divided into four Forest Types. The tribal population of the union territory mainly depends on forests for their requirements of fuel wood, fodder, small timber and livelihood. The main tribes are Dhodia, Kokna and Varli with small groups of Koli, Kathodi, Naika and Dubla scattered over the territory.

Recorded Forest Area (RFA) in the Union Territory is 204 sq km of which 199 sq km is Reserved Forest and 5 sq km is Protected Forest. In Dadra & Nagar Haveli, during the period 1st January 2015 to 5th February 2019, a total of 5.40 hectares of forest land was diverted for various non-forestry purposes under the Forest Conservation Act, 1980 (MoEF&CC, 2019).

The Protected Area network in the UT has one Wildlife Sanctuary which covers 18.77% of geographical area of the Union Territory.

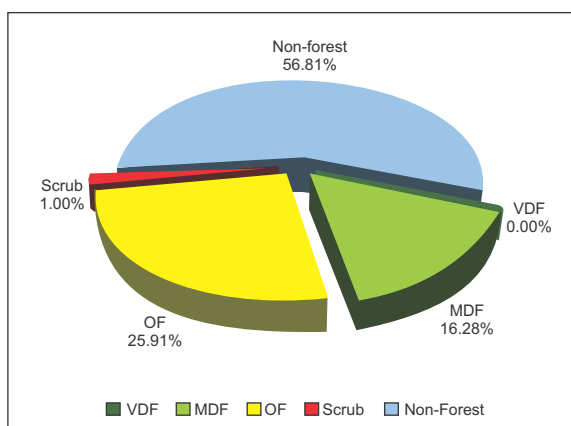
11.33.2 Forest Cover

Based on the interpretation of IRS Resourcesat-2 LISS III satellite data of the period Oct 2017, the Forest Cover in the UT is 207.16 sq km which is 42.19% of the UT's geographical area. In terms of forest canopy density classes, the UT has 79.93 sq km under Moderately Dense Forest (MDF) and 127.23 sq km under Open Forest (OF). Forest Cover in the UT has increased by 0.16 sq km as compared to the previous assessment reported in ISFR 2017.

Table 11.33.2 Forest Cover of Dadra & Nagar Haveli

(in sq km)		
Class	Area	% of GA
VDF	0.00	0.00
MDF	79.93	16.28
OF	127.23	25.91
Total	207.16	42.19
Scrub	4.93	1.00

FIGURE 11.33.1 Forest Cover of Dadra & Nagar Haveli



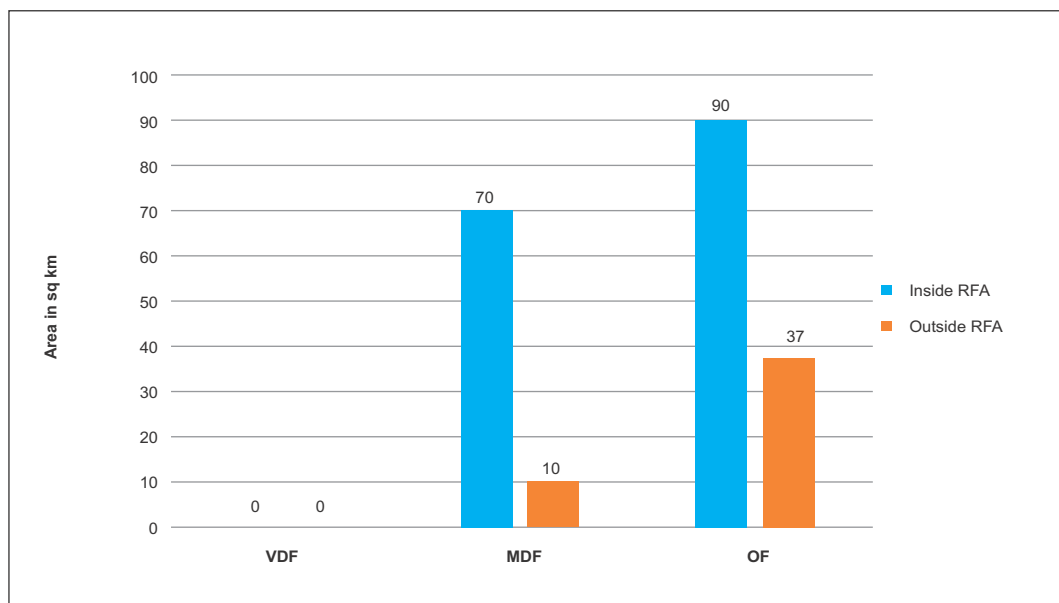
11.33.2.1 Forest Cover inside and outside Recorded Forest Area (or Green Wash)

The UT has reported extent of recorded forest area (RFA) 204.00 sq km which is 41.55% of its geographical area. The reserved and protected forests are 97.55% and 2.45% respectively of the recorded forest area in the UT. However, as the digitized boundary of recorded forest area from the UT covers only 210.53 sq km, the analysis of forest cover inside and outside this area is given below.

TABLE 11.33.3 Forest Cover inside and outside Recorded Forest Area or (Green Wash) in Dadra & Nagar Haveli (in sq km)

Forest Cover inside the Recorded Forest Area (or Green Wash)				Forest Cover outside the Recorded Forest Area (or Green Wash)			
VDF	MDF	OF	Total	VDF	MDF	OF	Total
0	70	90	160	0	10	37	47
0.00%	43.55%	56.45%		0.00%	21.80%	78.20%	

(*in case of Dadra & Nagar Haveli RFA boundaries have been used.)

FIGURE 11.33.2 Forest Cover inside and outside RFA in Dadra & Nagar Haveli**TABLE 11.33.4** District-wise Forest Cover in Dadra & Nagar Haveli

(in sq km)

District	Geographical Area (GA)	2019 Assessment				% of GA	Change wrt 2017 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Dadra & Nagar Haveli ^T	491	0.00	79.93	127.23	207.16	42.19	0.16	4.93
Grand Total	491	0.00	79.93	127.23	207.16	42.19	0.16	4.93

TABLE 11.33.5 Forest Cover Change Matrix for Dadra & Nagar Haveli

(in sq km)

Class	2019 Assessment					Total ISFR 2017
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	0	0	0	0	0	0
Moderately Dense Forest	0	80	0	0	0	80
Open Forest	0	0	126	0	1	127
Scrub	0	0	0	5	0	5
Non Forest	0	0	1	0	278	279
Total ISFR 2019	0	80	127	5	279	491
Net Change	0	0	0	0	0	

Main reasons for the increase in forest cover in the UT are plantation and conservation activities.

TABLE 11.33.6 Altitude-wise Forest Cover in Dadra & Nagar Haveli

(in sq km)

Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-500	491	0	80	127	207 (100%)	5
Total	491	0	80	127	207	5

(based on SRTM, Digital Elevation Model, 30 m, 2016)

TABLE 11.33.7 Forest Cover in different slope classes in Dadra & Nagar Haveli

(in sq km)

Slope (in degrees)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-5	326	0	23	61	84 (40.58%)	3
5-10	91	0	24	35	59 (28.50%)	1
10-15	44	0	18	19	37 (17.87%)	1
15-20	19	0	9	8	17 (8.21%)	0
20-25	7	0	4	3	7 (3.38%)	0
25-30	3	0	2	1	3 (1.45%)	0
>30	1	0	0	0	0 (0.00%)	0
Total	491	0	80	127	207	5

(based on SRTM, Digital Elevation Model, 30 m, 2016)

FIGURE 11.33.3 Forest Cover Map of Dadra & Nagar Haveli

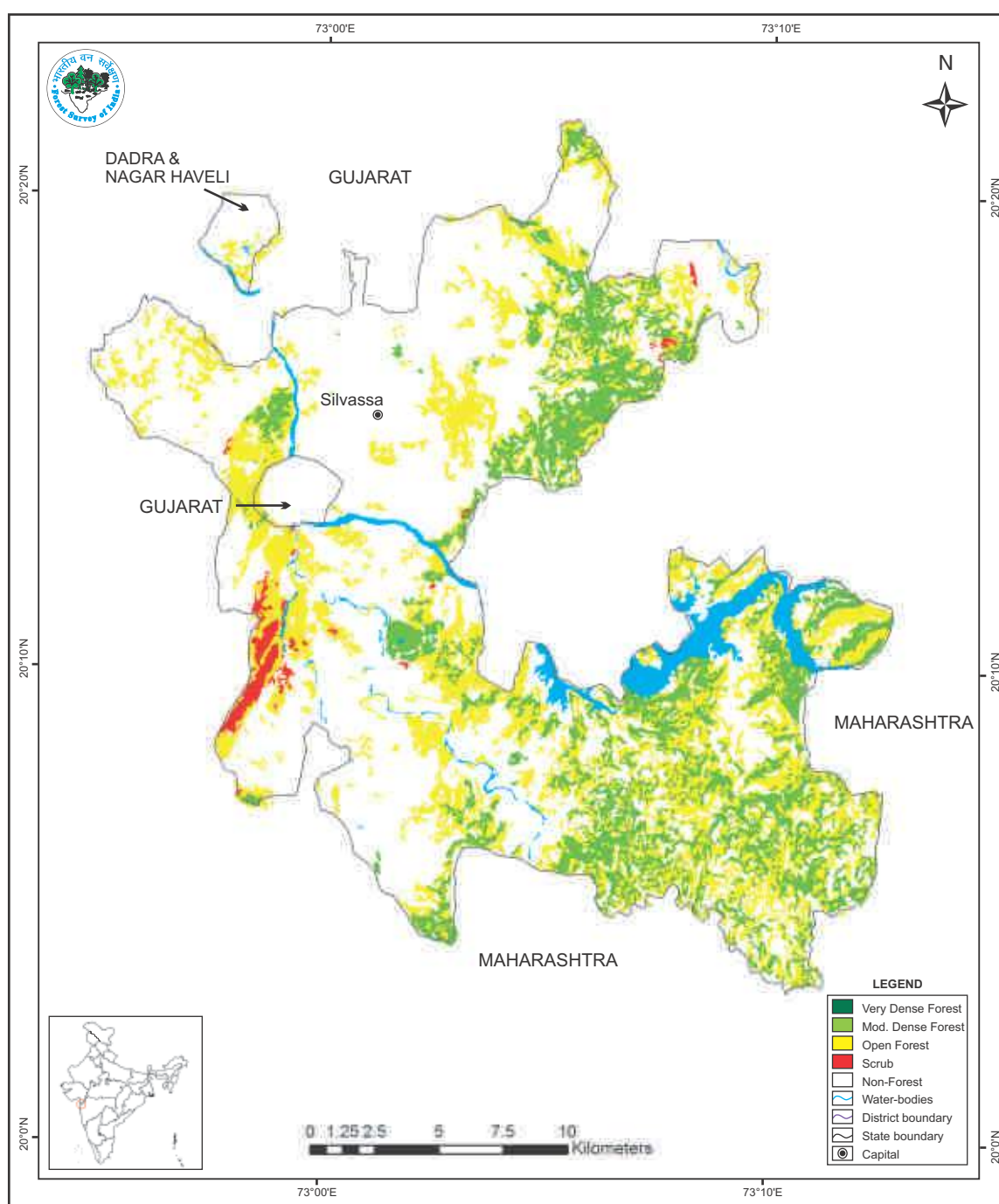


TABLE 11.33.8 Wetlands inside the Recorded Forest Area (or Green Wash) (in ha)

Wetland Category	No. of Wetlands	Total Wetland Area
Inland Wetlands - Natural		
River/Stream	3	58
Sub - Total	3	58
Inland Wetlands - Man-made		
Reservoir/Barrage	1	263
Sub - Total	1	263
Wetlands (<2.25 ha)	1	1
Total	5	322
Total Recorded Forest (or Green Wash) Area (in ha)		21,053
% of Wetland inside Recorded Forest (or Green Wash) Area		1.53%

(analysis based on the National Wetland Atlas: India, 2011)

11.33.3 Forest Types & Biodiversity

Forest Type Maps of 2011 have been refined in the recently completed exercise by FSI. Percentage area under different forest types of Dadra & Nagar Haveli as per the Champion & Seth classification (1968), according to the latest exercise are presented in the following table.

TABLE 11.33.9 Percentage area under different forest types of Dadra & Nagar Haveli

Sl.No.	Forest Type	% of Forest cover
1.	3B/C1b Moist Teak Forest	9.44
2.	3B/C2 Southern Moist Mixed Deciduous	77.66
3.	5A/C3 Southern Dry Mixed Deciduous	4.31
4.	5B/DS1 Dry Deciduous Scrub	2.51
5.	Plantation/ TOF	6.08
	Total	100.00

11.33.3.1 Assessment of Biodiversity

Findings of the Rapid Assessment of Biodiversity carried out at the national level for natural forests during September 2018 to May 2019 as part of the forest type mapping exercise is summarized below in table 11.33.10 and table 11.33.11 in respect of Dadra & Nagar Haveli.

TABLE 11.33.10 No. of species observed during the rapid assessment

Plant Type	Number of Species
Tree	25
Shrub	8
Herb	11

TABLE 11.33.11 Shannon-Wiener Index of Tree, Shrub and Herb species in different Type Groups of Dadra & Nagar Haveli

Sl.No.	Forest Type Group	Shannon-Wiener Index		
		Tree	Shrub	Herb
1.	Group 3- Tropical Moist Deciduous Forests	2.48	0.97	1.33
2.	Group 5- Tropical Dry Deciduous Forests	*	*	0.69

*adequate number of sample plots were not available

11.33.4 Fire Prone Forest Areas

Geographical area under different classes of forest fire proneness are given in the following table.

TABLE 11.33.12 Forest Fire Prone Classes (in sq km)

Sl. No.	Forest Fire Prone Classes	Geographical Area	% of Total forest cover
1.	Extremely fire prone	0.00	0
2.	Very highly fire prone	0.00	0
3.	Highly fire prone	0.00	0
4.	Moderately fire prone	21.09	0
5.	Less fire prone	458.08	100.00
	Total	479.17	100.00

11.33.5 Tree Cover

Forest cover presented in the section 11.33.2 accounts for tree patches of size 1 ha and more having canopy density more than 10%. However, trees occurring in patches of size less than 1 ha including scattered trees are assessed through sampling based methodology. Tree cover in Dadra & Nagar Haveli has been estimated as given in table 11.33.13.

TABLE 11.33.13 Tree Cover in Dadra & Nagar Haveli (in sq km)

Tree Cover	Area
	28

Tree cover of Dadra & Nagar Haveli has decreased by 2 sq km as compared to the previous assessment reported in ISFR 2017.

11.33.6 Extent of Trees Outside Forest (TOF)

Trees outside Forests (TOF) refer to tree resources found outside the forests as defined in the Government records. FSI maps forest cover using satellite data and assesses tree cover outside forests using sampling based method. Forest Cover outside the recorded forest area is derived using boundaries of RFA or Green Wash. Extent of TOF therefore may be estimated as the sum of extent of forest cover outside the recorded forest areas (RFA) and tree cover as given in the preceding section.

TABLE 11.33.14 Extent of TOF in Dadra & Nagar Haveli (in sq km)

Forest Cover outside the RFA/GW	Tree Cover	Extent of TOF
47	28	75

11.33.7 Growing Stock in Forest

Growing stock in the recorded forest areas (RFA) in Dadra & Nagar Haveli is given in the table 11.33.15. Diameter class-wise distribution of top 5 species in numbers, derived from the forest inventory data is presented in the table 11.33.16

TABLE 11.33.15 Growing Stock in Dadra & Nagar Haveli (in m cum)

Growing Stock (GS)		% of Country's GS
Growing Stock in Recorded Forest Area	0.74	0.02
Growing Stock in TOF	1.16	0.07

TABLE 11.33.16 Diameter class distribution of top five species inside RFA in Dadra & Nagar Haveli (in '000)

Sl.No.	Species	Dia class (cm)		
		10-30	30-60	>60
1.	<i>Terminalia crenulata</i>	458	0	0
2.	<i>Tectona grandis</i>	295	0	0
3.	<i>Butea monosperma</i>	162	27	0
4.	<i>Bridelia retusa</i>	297	27	0
5.	<i>Anogeissus latifolia</i>	269	0	0

11.33.8 Carbon Stock in Forest

The total Carbon stock of forests in the UT including the TOF patches which are more than 1 ha in size is 1.80 million tonnes (6.60 million tonnes of CO₂ equivalent) which is 0.0253% of total forest carbon of the country. Pool wise forest carbon in Dadra & Nagar Haveli is given in the following table

TABLE 11.33.17 Forest Carbon in Dadra & Nagar Haveli in different pools (in '000 tonnes)

AGB	BGB	Dead wood	Litter	SOC	Total
500	113	7	47	1,133	1,800

11.33.9 Dominant tree species in Trees Outside Forests (TOF)

Top five species in numbers in Trees Outside Forests in Dadra & Nagar Haveli in Rural and Urban areas are given in the table 11.33.18 and table 11.33.19 respectively

TABLE 11.33.18 Top five tree species in TOF (Rural) in Dadra & Nagar Haveli

Sl. No.	Species	Relative Abundance (%)
1.	<i>Phoenix sylvestris</i>	21.69
2.	<i>Saccopetalum tomentosum</i>	11.15
3.	<i>Terminalia tomentosa</i>	9.64
4.	<i>Butea frondosa</i>	8.56
5.	<i>Wrightia tinctoria</i>	8.56

TABLE 11.33.19 Top five tree species in TOF (Urban) in Dadra & Nagar Haveli

Sl. No.	Species	Relative Abundance (%)
1.	<i>Cocos nucifera</i>	21.71
2.	<i>Mangifera indica</i>	13.66
3.	Palm oil tree	8.85
4.	<i>Polyalthia species</i>	7.23
5.	<i>Moringa species</i>	5.23

11.33.10 Major NTFP and Invasive Species

Major NTFP and invasive species as assessed from forest inventory data are presented in the table 11.33.20 and table 11.33.21 respectively.

TABLE 11.33.20 Major NTFP species in the UT of Dadra & Nagar Haveli

Sl. No.	Species	Plant Type	Relative Abundance (%)
1.	<i>Anogeissus latifolia</i>	Tree	30.30
2.	<i>Lannea coromandelica</i>	Tree	27.27
3.	<i>Diospyros melanoxylon</i>	Tree	15.15
4.	<i>Madhuca indica</i>	Tree	9.09
5.	<i>Acacia catechu</i>	Tree	9.09

TABLE 11.33.21 Major invasive species in the UT inside the RFA/Green Wash in Dadra & Nagar Haveli

(in sq km)

Sl. No.	Species	Estimated Extent
1.	<i>Cassia tora</i>	7
2.	<i>Glinsoga parviflora</i>	3
3.	<i>Chromolaena odorata</i>	1
4.	<i>Ageratum conyzoides</i>	1

Major invasive species are given in terms of their estimated extent.

11.33.11 Quantified estimation of Dependence of People living in forest fringe villages on forests in Dadra & Nagar Haveli

Through a nation-wide study, FSI has done estimation of dependence of people living in the villages close to forest for fuel wood, fodder, small timber and bamboo in quantified terms for each State & UT of the country (Please refer to Chapter 10 in Vol. I for details). The estimated quantities of the four produce for Dadra & Nagar Haveli is given in the table 11.33.22

TABLE 11.33.22 Estimation of Dependence of People in Forest Fringe Villages on Forests in Dadra & Nagar Haveli

Fuel wood (tonnes)	Fodder (tonnes)	Bamboo (tonnes)	Small Timber (cum)
32,518	2,73,884	3,102	8,057

