

13.22

RAJASTHAN



Geographical Area

3,42,239 sq km

Geographical Coordinates

Latitude- 23°4' N to 30° 11' N

Longitude- 69° 29' E to 78° 17' E

Population (as per Census 2011)

68.55 million

Urban 17.05 million (24.87%)

Rural 51.50 million (75.13%)

Tribal 9.24 million (13.48%)

Average Population Density

200 per sq km

Livestock population

(as per 19th Live Stock Census)

57.73 million

No. of Districts

33

No. of Hill Districts

0

No. of Tribal Districts

5



Table 13.22.1 Land Use Pattern

Land Use Types	Area (in '000 ha)	Percentage
Geographical Area	34,224	
Reporting area for land utilization	34,287	100.00
Forests	2,756	8.04
Not available for land cultivation	4,366	12.73
Permanent pastures and other grazing lands	1,673	4.88
Land under misc. tree crops and groves	24	0.07
Culturable wasteland	3,831	11.17
Fallow land other than current fallows	1,992	5.81
Current fallows	1,742	5.08
Net area sown	17,903	52.22

Source: Land Use Statistics, Ministry of Agriculture, GOI, (2017-18)

13.22.1 Forest Cover

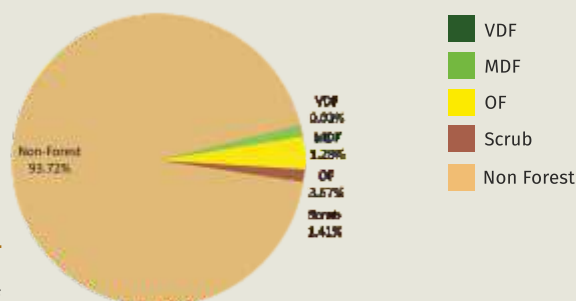


Figure 13.22.1
Forest Cover of
Rajasthan

Table 13.22.2 Forest Cover
of Rajasthan (in sq km)

Class	Area	% of GA
VDF	78.15	0.02
MDF	4,368.65	1.28
OF	12,208.16	3.57
Total	16,654.96	4.87
Scrub	4,808.51	1.41

Table 13.22.3 District- wise Forest Cover in Rajasthan

(in sq km)

District	Geo-geographical Area (GA)	2021 Assessment				%of GA	Change wrt 2019 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Ajmer	8,481	0.00	46.49	285.07	331.56	3.91	26.45	175.72
Alwar	8,380	59.70	334.65	801.56	1,195.91	14.27	-0.75	243.08
Banswara ^T	4,522	0.00	38.52	230.09	268.61	5.94	0.19	60.17
Baran	6,992	0.00	153.66	856.39	1,010.05	14.45	-0.94	98.93
Barmer	28,387	0.00	4.79	284.43	289.22	1.02	-0.57	223.18
Bharatpur	5,066	0.00	26.33	194.73	221.06	4.36	-9.21	77.15
Bhilwara	10,455	0.00	33.31	191.00	224.31	2.15	0.12	189.76
Bikaner	30,239	0.88	28.06	250.77	279.71	0.92	24.10	49.86
Bundi	5,776	1.00	138.98	424.37	564.35	9.77	7.17	172.67
Chittaurgarh	7,822	0.00	222.01	768.04	990.05	12.66	1.25	107.42
Churu	13,835	0.00	2.44	75.25	77.69	0.56	-4.31	27.48
Dausa	3,432	0.00	11.15	105.45	116.60	3.40	-0.40	94.66
Dhaulpur	3,033	0.00	79.75	339.32	419.07	13.82	0.07	76.07
Dungarpur ^T	3,770	0.00	42.53	262.01	304.54	8.08	2.24	83.37
Ganganagar	10,978	0.00	9.87	105.22	115.09	1.05	2.17	15.78
Hanumangarh	9,656	1.01	6.80	85.16	92.97	0.96	3.01	6.71
Jaipur	11,143	12.00	97.20	445.66	554.86	4.98	2.10	272.85
Jaisalmer	38,401	3.56	48.64	270.19	322.39	0.84	-3.38	206.14
Jalor	10,640	0.00	22.67	212.94	235.61	2.21	-32.46	221.89
Jhalawar	6,219	0.00	83.39	353.28	436.67	7.02	1.09	102.57
Jhunjhunun	5,928	0.00	20.79	180.17	200.96	3.39	0.19	179.54
Jodhpur	22,850	0.00	4.26	104.99	109.25	0.48	1.47	163.53
Karauli	5,524	0.00	96.04	747.80	843.84	15.28	-26.16	300.54
Kota	5,217	0.00	153.28	391.55	544.83	10.44	-1.90	135.83
Nagaur	17,718	0.00	14.11	155.65	169.76	0.96	22.72	87.71

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(in sq km)

District	Geo-graphical Area (GA)	2021 Assessment				%of GA	Change wrt 2019 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Pali	12,387	0.00	211.60	489.26	700.86	5.66	26.01	357.60
Pratapgarh [†]	4,449	0.00	562.97	470.80	1,033.77	23.24	-4.14	59.05
Rajsamand	4,655	0.00	129.94	386.93	516.87	11.10	-4.92	126.06
Sawai Madhopur	4,498	0.00	171.30	293.31	464.61	10.33	1.92	138.52
Sikar	7,732	0.00	31.51	170.67	202.18	2.61	9.12	198.68
Sirohi [†]	5,136	0.00	300.96	597.46	898.42	17.49	-13.49	247.50
Tonk	7,194	0.00	27.72	138.18	165.90	2.31	0.84	68.96
Udaipur [†]	11,724	0.00	1,212.93	1,540.46	2,753.39	23.49	-4.15	239.53
Grand Total	3,42,239	78.15	4,368.65	12,208.16	16,654.96	4.87	25.45	4,808.51

13.22.1.1 Forest Cover Inside and Outside Recorded Forest Area (or Green Wash)

The Forest Cover inside and outside Recorded Forest Area (RFA) has been analysed in different categories and presented in Table given below.

Table 13.22.4 Forest Cover Inside and Outside Recorded Forest Area (or Green Wash) in Rajasthan (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
74	3,999	8,487	12,560	4	370	3,721	4,095
0.59%	31.84%	67.57%		0.10%	9.03%	90.87%	

**in case of Rajasthan, RFA boundaries have been used.*

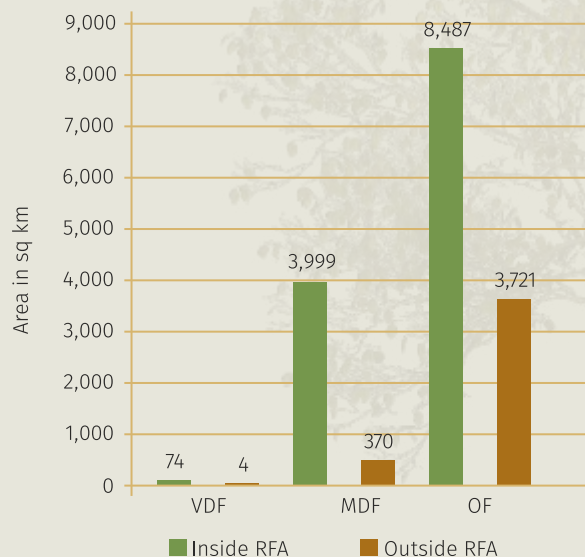


Figure 13.22.2
Forest Cover Inside and Outside of RFA in Rajasthan

Table 13.22.5 Forest Cover Change Matrix for Rajasthan

(in sq km)

Class	2021 Assessment					Total ISFR 2019
	VDF	MDF	OF	Scrub	NF	
Very Dense Forest	77	1	0	0	0	78
Moderately Dense Forest	1	4,272	36	3	30	4,342
Open Forest	0	88	11,478	253	391	12,210
Scrub	0	1	258	4,064	437	4,760
Non Forest	0	7	436	489	3,19,917	3,20,849
Total ISFR 2021	78	4,369	12,208	4,809	3,20,775	3,42,239
Net Change	0	27	-2	49	-74	

Table 13.22.6 Altitude-wise Forest Cover in Rajasthan

(in sq km)

Altitude Zone (m)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-500	3,24,954	27	2,567	9,384	11,978	4,065
500-1000	17,070	51	1,688	2,776	4,515	739
1000-2000	215	0	114	48	162	5
Total	3,42,239	78	4,369	12,208	16,655	4,809

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

Table 13.22.7 Forest Cover in different slope classes in Rajasthan

(in sq km)

Slope (in degrees)	Geographical Area	VDF	MDF	OF	Total	Scrub
0-5	3,15,978	21	1,569	7,215	8,805	3,471
5-10	15,796	15	849	1,922	2,786	597
10-15	4,729	12	673	1,175	1,860	294
15-20	2,656	11	542	822	1,375	196
20-25	1,650	9	382	565	956	129
25-30	901	6	219	324	549	78
>30	529	4	135	185	324	44
Total	3,42,239	78	4,369	12,208	16,655	4,809

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

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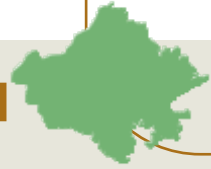


Figure 13.22.3 Forest Cover Map of Rajasthan



- LEGEND**
- Very Dense Forest
 - Moderately Dense Forest
 - Open Forest
 - Scrub
 - Non-Forest
 - Water-bodies
 - International Boundary
 - State Boundary
 - District Boundary
 - Capital

13.22.2 Forest Types

The area under different forest types of Rajasthan as per the Champion & Seth classification (1968), according to the Atlas Forest Types of India 2020 are presented in the following Table.



Table 13.22.8 Area statistics of the Forest Types found in Rajasthan

(in sq km)

Sl. No.	Forest Type	Area	% of the total mapped area*
1.	5A/C1a Very dry teak forest	1,052.53	4.92
2.	5A/C1b Dry teak forest	45.03	0.22
3.	5B/C2 Northern dry mixed deciduous forest	8,294.34	38.78
4.	5/DS1 Dry deciduous scrub	2,335.13	10.92
5.	5/DS2 Dry savannah forest	2.87	0.01
6.	5/E1 <i>Anogeissus pendula</i> forest	3,162.27	14.78
7.	5/E1/DS1 <i>Anogeissus pendula</i> scrub	523.55	2.45
8.	5/E2 <i>Boswellia</i> forest	151.04	0.71
9.	5/E5 <i>Butea</i> forest	54.34	0.25
10.	5/E6 <i>Aegle</i> forest	1.69	0.01
11.	5/E8a <i>Phoenix</i> savannah	2.03	0.01
12.	5/IS1 Dry tropical riverain forest	49.86	0.23
13.	5/IS2 <i>Khair-sissu</i> forest	304.35	1.42
14.	6B/C1 Desert thorn forest	813.43	3.80
15.	6B/C2 Ravine thorn forest	329.48	1.54
16.	6B/DS1 <i>Ziziphus</i> scrub	164.31	0.77
17.	6B/DS2 Tropical <i>Euphorbia</i> scrub	2.92	0.01
18.	6/E1 <i>Euphorbia</i> scrub	133.47	0.62
19.	6/E2 <i>Acacia senegal</i> forest	46.44	0.22
20.	6/IS1 Desert dune scrub	969.52	4.53
	Sub Total	18,438.60	86.20
21.	TOF/Plantation	2,950.95	13.80
	Total (Forest Cover & Scrub)	21,389.55	100.00

*Forest Types have been assigned to the natural forest formations under forest cover and scrub categories shown in forest cover mapping (ISFR, 2019). The total mapped area, therefore, is sum of forest cover and scrub.

Table 13.22.9 Forest Fire Prone Classes

(in sq km)

Sl. No.	Forest Fire Prone Classes	Forest Cover	% of Total Forest Cover
1.	Extremely fire prone	0.00	0.00
2.	Very highly fire prone	197.33	1.18
3.	Highly fire prone	366.57	2.20
4.	Moderately fire prone	705.56	4.24
5.	Less fire prone	15,385.54	92.38
	Total	16,655.00	100.00

13.22.3 Fire Prone Forest Areas

Forest Cover under different classes of forest fire proneness is given in following table.

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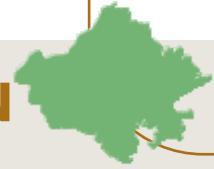


Figure 13.22.4 Fire prone forest areas under different fire prone classes

LEGEND

- Extremely Fire Prone
- Very Highly Fire Prone
- Highly Fire Prone
- Moderately Fire Prone
- Less Fire Prone
- Water-bodies
- International Boundary
- State Boundary
- District Boundary
- Capital

13.22.4 Tree Cover

Tree cover is defined as all tree patches of size less than 1 ha occurring outside the recorded forest area. Tree cover includes trees in all formations including scattered trees. Tree cover in Rajasthan has been estimated as given in following table.

Table 13.22.10 Tree Cover in Rajasthan

(in sq km)

2019 Assessment	2021 Assessment	Change wrt 2019 Assessment
8,112	8,733	621

13.22.5 Extent of Trees Outside Forest (TOF)

Trees outside Forests (TOF) refer to tree resources found outside the forests as defined in the Government records. 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 following table.

Table 13.22.11 Extent of TOF in Rajasthan

(in sq km)

Forest Cover outside the RFA/GW	Tree Cover	Extent of TOF
4,095	8,733	12,828

13.22.6 Growing Stock in Forest

Growing stock in the recorded forest areas (RFA) in Rajasthan is given in the Table 13.22.12. Diameter class-wise distribution of top 5 species in numbers derived from the forest inventory data is presented in the table 13.22.13.

Table 13.22.12 Growing Stock in Rajasthan

(in m cum)

Sl. No.	Growing Stock (GS)	2019 Assessment	2021 Assessment	Change wrt 2019 Assessment	% of Country's GS
1.	Growing Stock in Recorded Forest Area	24.39	26.56	2.17	0.61
2.	Growing Stock in TOF	89.07	90.63	1.56	5.09

Table 13.22.13 Diameter class distribution of top five tree species inside RFA in Rajasthan

(in '000)

Sl. No.	Species	Dia class (cm)		
		10-30	30-60	>60
1.	<i>Anogeissus pendula</i>	51,228	606	27
2.	<i>Butea monosperma</i>	18,945	2,121	53
3.	<i>Boswellia serrata</i>	7,808	3,212	0
4.	<i>Acacia catechu</i>	9,382	122	0
5.	<i>Lannea coromandelica</i>	7,340	1,958	52

13.22.7 Dominant tree species in Trees Outside Forests (TOF)

Top five species in numbers in Trees Outside Forests in Rajasthan in Rural and Urban areas are given in the Table 13.22.14 and Table 13.22.15 respectively

Table 13.22.14 Top five tree species in TOF (Rural) in Rajasthan

Sl. No.	Species	Relative Abundance (%)
1.	<i>Prosopis cineraria</i>	22.45
2.	<i>Prosopis juliflora</i>	10.13
3.	<i>Acacia arabica</i>	8.78
4.	<i>Azadirachta indica</i>	8.33
5.	<i>Acacia tortolis</i>	7.40

Table 13.22.15 Top five tree species in TOF (Urban) in Rajasthan

Sl. No.	Species	Relative Abundance (%)
1.	<i>Azadirachta indica</i>	23.42
2.	<i>Prosopis juliflora</i>	14.89
3.	<i>Acacia arabica</i>	7.95
4.	<i>Prosopis cineraria</i>	5.92
5.	<i>Zizyphus mauritiana</i>	4.00

13.22.8 Carbon Stock in Forest

The total Carbon stock of forest in the State including the TOF patches which are more than 1ha in size is 110.77 million tonnes (406.16 million tonnes of CO₂ equivalent) which is 1.54 % of total forest carbon of the country. Pool wise forest carbon in Rajasthan is given in the following table.

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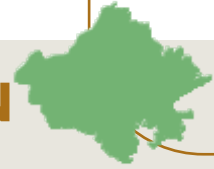


Table 13.22.16 Forest Carbon in Rajasthan in different pools (in '000 tonnes)

Sl. No.	Carbon Pools	Forest Carbon
1.	AGB	26,714
2.	BGB	10,803
3.	Dead wood	462
4.	Litter	1,476
5.	SOC	71,319
Total		1,10,774

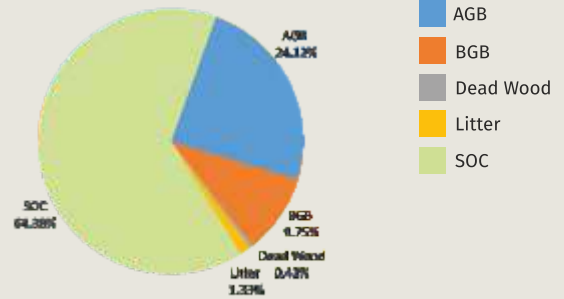


Figure 13.22.5 Forest Carbon in Rajasthan

13.22.9 Growing Stock of Bamboo

Bamboo bearing area and growing stock inside the recorded forest area (RFA)/ Green Wash which include culms of 1 year age and above are given in the following table.

Table 13.22.17 Growing Stock of Bamboo in Rajasthan

Growing Stock (GS)		% of Country's GS of Bamboo
Bamboo bearing area inside RFA/Green Wash (in sq km)	1,555	1.04
Total number of culms (in millions)	382	0.72
Total equivalent green weight (in '000 tonnes)	2,640	0.66

13.22.10 Major NTFP and Invasive Species

Major NTFP and invasive species as assessed from forest inventory data are presented in the Table 13.22.18 and Table 13.22.19 respectively.

Table 13.22.18 Major NTFP species in Rajasthan

Sl. No.	Species	Plant Type	Relative Abundance (%)
1.	<i>Butea monosperma</i>	Tree	48.33
2.	<i>Boswellia serrata</i>	Tree	23.15
3.	<i>Diospyros melanoxylon</i>	Tree	10.48
4.	<i>Wrightia arborea/Wrightia tomentosa</i>	Tree	7.30
5.	<i>Aegla Marmelos</i>	Tree	6.36

Table 13.22.19 Major invasive species in the State inside the RFA/Green Wash in Rajasthan (in sq km)

Sl. No.	Species	Estimated Extent
1.	<i>Cassia tora</i>	192
2.	<i>Lantana camara</i>	108
3.	<i>Senna occidentalis</i>	100
4.	<i>Prosopis juliflora</i>	83
5.	<i>Triumfetta rhomboidea</i>	28

Major NTFP species are given in terms of relative abundance whereas invasive species are given in terms of their estimated extent.

