



CHAPTER THREE
Biodiversity

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BIODIVERSITY

3.1 The term 'biodiversity' encompasses the variety of life on Earth. It is defined as the variability among living organisms and the ecological complexes of which they are part, including diversity within and between species and ecosystems. Biodiversity manifests at species genetic and ecosystem levels. Biodiversity has direct consumptive value in food, agriculture, medicine, industry, etc. It also has aesthetic and recreational value.

3.2 India is one of the 12 mega-biodiversity countries of the world. From about 70% of the total geographical area surveyed so far, 46,000 plant species and 81,000 animal species representing about 7% of the world's flora and 6.5% of the world's fauna, respectively, have been described. Out of the total twelve biodiversity hot spots in the world, India has two, one is the north east region and other the western ghats.

3.3 Plant biodiversity as a national and global resource is extremely valuable but is poorly understood, inadequately documented and often wasted. The preservation of biodiversity is both a matter of investment and insurance to a) sustain and improve agricultural, forestry and fisheries production, b) act as a buffer against harmful environmental changes, c) provide raw materials for scientific and industrial innovations, and d) safe guard transferring biological richness to future generations.

3.4 Biodiversity the world over is in peril because the habitats are threatened due to such development programmes as creation of reservoirs, mining, forest clearing, laying of transport and communication networks, etc. It is estimated that in the world wide

perspective, slightly over 1000 animal species and sub-species are threatened with an extinction rate of one per year, while 20,000 flowering plants are thought to be at risk.

Conservation Measures

Biospheres:

3.5 Areas rich in biodiversity and encompassing unique and representative ecosystems are identified and designated as Biosphere Reserves. The goal is to facilitate conservation of representative landscape and India's immense biological diversity as described above. Till date, 13 Biosphere Reserves have been set up, the last one was set up on 12.11.2001 at Agasthyamalai in Kerala.

Project Tiger

3.6 As per the recommendations of a special task-force of the Indian Board of Wildlife, Project Tiger was launched in 1973 with the following objectives:-

- To ensure maintenance of available population of tiger in India for scientific, economic, aesthetic, cultural and ecological value.
- To preserve, for all times, the areas of such biological importance as a national heritage for the benefit, education and enjoyment of the people.

3.7 At present, there are 27 Tiger Reserves spreading over in 14 states and covering an area of about 37,761 sq. kms. The population of tigers is estimated through tiger census conducted once in 4 to 6 years. The last such census was conducted in 2001-02.

National Parks and Wild life Sanctuaries

The wild life Act provided for setting up National parks and sanctuaries for wild life. The basic idea in trying to encourage wild life is that human welfare is initially linked with it. The Government of India has pledged for all out efforts to conserve which not only seeks to protect and preserve what remains of wild fauna and flora but also seeks to augment this priceless national heritage.

3.8 Multipronged pressures on forests come from population, cattle grazing, fuel and fodder collection, industry and forest fires, etc. The remaining good forest cover is, therefore, estimated to be just 11% against the desirable 33% of the total land area as per the National Forest Policy. Up to the late seventies, forest land was a prime target for diversion for resettlement, agriculture and industrialization, and this trend was contained only by the Forest (Conservation) Act, 1980.

3.9 A two pronged strategy to increase forest cover essentially comprises of

- Improving canopy cover in the forest land; and
- Undertaking afforestation in non-forest and degraded lands, preferably contiguous to forest blocks.

3.10 Realising the role of forests in controlling soil erosion, moderation of floods, recharging of ground aquifers, as habitat for wildlife, conservation of biodiversity and gene pool, etc., programmes were launched as early as the Second Five Year Plan for extensive Watershed Management followed later by establishment of a Protected Areas Network, under the Wildlife (Protection) Act, 1972, comprising of Biosphere Reserves, National Parks and Sanctuaries- both terrestrial and aquatic. This Network in 1999 comprised of

13 Biosphere Reserves, 87 National Parks, 485 Sanctuaries, along with such dedicated conservation programmes as Project Tiger, Crocodile Rehabilitation and Project Elephant. The Central Zoo Authority caters to the ex-situ conservation of wildlife through 275 zoos, deer parks, safari parks and aquaria, etc. India is also signatory to several International Conventions like CITES, International Whaling Convention (IWC); Convention on Migratory Species (CMS), World Heritage Convention (WHC), etc. India has recently taken the lead in the formation of the Global Tiger Forum.

Agro Biodiversity

3.11 The National Bureau of Plant Genetic Resources (NBGR) established in 1976 as an institution under Indian Council of Agricultural Research (ICAR) emerged as an important organization dealing with various establishments of plant genetic resources. The organization is entrusted with the vital responsibility of germ plasm, exchange with appropriate quarantine measures, survey exploration, their organization, planning and coordination, comprising evaluation, documentation and conservation of diverse plant genetic resources. The National Gene Bank has also been established within the complex. Within the new trade related intellectual property rights (TRIPS) within World Trade Organisation related agreements, documentation of our genetic resources is very important. Similarly, the documentation of fish genetic resources is the responsibility of National Bureau of Fish Genetic Resource, Lucknow also an institution under ICAR. Similarly, the National Bureau of Animal Genetic Resources located at Karnal maintains the germ plasm of Indian Cattle and Buffalo breeds. This organization is also an institution of ICAR umbrella.

TABLE 3.1.1 : NUMBER AND STATUS OF PLANT SPECIES IN INDIA

Sl. No.	Type	No. of Known Species in the World	No. of Known Species in India	Percentage of Occurrence in India	No. of Species Endemic	No. of Species Endangered	No. of Species Extinct
1	2	3	4	5	6	7	8
I	Flowering Plants						
1	Gymnosperm	650	48	7.38	8*	7*	Not Known
2	Angiosperm	250000	17672	7.00	5725*	1700*	28
II	Non-flowering Plants						
1	Fern & Fernallics	10000	1135	11.35	193*	113*	Not Known
2	Algae	40000	6500	16.25	1100*	120*	Not Known
3	Fungi	70000	14500	20.71	3500*	140*	Not Known
4	Lichens	13500	2021	14.97	417*	400*	Not Known
5	Liverworts	7500	852	11.26	260*	100*	Not Known
6	Mosses	7000	2000	28.6	608*	115	Not Known

Source : Botanical Survey of India, Kolkata.

* : Approximate

India has a rich heritage of species and genetic strains of flora. Overall about six percent of world species are found in India. It is estimated that India is tenth among the plant rich countries of the world and sixth among the centres of diversity and origin of agrodiversity. Out of the total twelve biodiversity hot-spots in the world, India has two, one is the north east region and other is western ghats (Khoshoo, T.N., 1995). The growing urbanization and industrialization causes the decrease of Natural habitats, which further results in the loss to biological diversity. Biodiversity, once lost cannot be recovered.

**TABLE 3.1.2 : RARE AND THREATENED SPECIES
(VASCULAR PLANTS)**

Sl. No.	Category	Approximate Number
1	2	3
1	Rare	287
2	Vulnerable	167
3	Endangered	1366
4	Possibly Extinct	40
5	Extinct	28

Source : Botanical Survey of India, Kolkata.

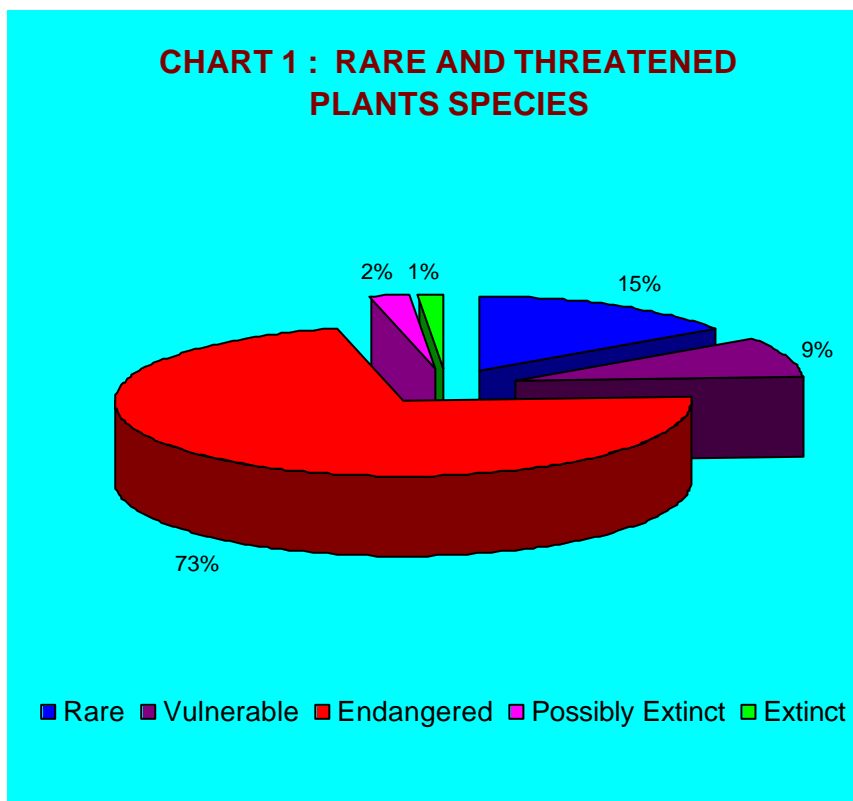


TABLE 3.1.3 : REFERENCE COLLECTIONS OF FLORA

Sl. No.	Category	Total Number	Total Holdings of Collections and Specimens
1	2	3	4
1	Herbarium	51	4594795
2	Museums	18	60100

Source : Botanical Survey of India, Kolkata.

TABLE 3.1.4 : CONSERVATION MEASURES

Sl. No.	Category	Number	Total Geographical Area (Sq. Km.)
1	2	3	4
I	Within Habitats (insitu)		
1	Biosphere Reserves	13	55550
2	National Parks	87	40631
3	Sanctuaries	485	115374
4	Reserve Forests	NA	416547
5	Protected Forests	19	223321
II	Outside Habitats (ex situ)		
1	Botanical Gardens	120	26.24
2	Gene Banks	NA	NA

Source : Botanical Survey of India, Kolkata.

TABLE 3.1.5 : BIOSPHERE RESERVES SETUP IN INDIA UPTO MARCH, 2002

Sl. No.	Name of Biosphere Reserve	Area (in sq.km.)	Date of Setting up/Notification	Location (State) and Bio-Geographic Zones
1	2	3	4	5
1	Nilgiri	5520.00	01.08.1986	Part of Wynad, Nagarhole, Bandipur and Mudumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka)-Western Ghats
2	Nanda Devi	5860.69	18.01.1988	Part of Chamoli, Pithoragarh & Almora Districts (Uttranchal)-West Himalayas
3	Nokrek	820.00	01.09.1988	Part of Garo Hills (Meghalaya)-East Himalayas
4	Manas	2837.00	14.03.1989	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup and Darang districts (Assam)-East Himalayas
5	Sunderbans	9630.00	29.03.1989	Part of Delta of Ganges & Barahmaputra river system (West Bengal)-Gigantic Delta
6	Gulf of Mannar	10500.00	18.02.1989	Indian part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu)-Coasts
7	Great Nicobar	885.00	06.01.1989	Southern most Islands of Andaman and Nicobar (A & N Islands)-Islands
8	Similipal	4374.00	21.06.1994	Part of Mayurbhanj district (Orissa)-Deccan Peninsula
9	Dibru Saikhowa	765.00	28.07.1997	Part of Dibrugarh and Tinsukhia districts (Assam)-East Himalayas
10	Dehang Debang	5112.00	02.09.1998	Part of Siang and Debang valley in Arunachal Pradesh-East Himalayas
11	Pachmarhi	4926.28	03.03.1999	Part of Hoshangabad, Betul and Chindwara districts of Madhya Pradesh-Semi-Arid-Gujarat Rajputana
12	Kanchanjunga	2619.92	07.02.2000	Parts of Kanchanjunga Hills in Sikkim-East Himalayas
13	Agasthyamalai	1701.00	12.11.2001	Neyyar, Peppara and Shenduruny Wildlife Sanctuaries and their adjoining areas in Kerala

Source: Ministry of Environment and Forests, Annual Report 2002-2003

TABLE 3.1.6 : STATUS OF EX-SITU CONSERVATION (BASE COLLECTION) OF ORTHODOX SEEDS, AT -20⁰ C

(As on 31st October, 2002)

Sl. No.	Crop Group	Species	Accessions
1	2	3	4
1	Cereals	111	100780
2	Millets & Forages	32	30793
3	Pseudocereals	19	2753
4	Grain Legumes	66	35394
5	Oil seeds	23	29096
6	Fibre Crops	11	7235
7	Vegetables	56	10613
8	Fruits	6	176
9	Medicinal & Aromatic Plants	239	1201
10	Narcotics	2	919
11	Species & Condiments	8	2153
12	Genetic Stocks	50	273
13	Released Varieties	82	1193
14	Duplicate Safety Samples	2	10235
Total		707	232814

Source : National Bureau of Plant Genetic Resources

TABLE 3.1.7 : STATUS OF IN-VITRO CONSERVATION

(As on 30th September, 2002)

SI. No.	Crops	Storage Temp. (°C)	Optimum Subculture Interval (Months)	No. of Accessions in Culture
1	2	3	4	5
I	Fruits			
1	Musa spp.	25	8-12	394
2	Actinidia chinensis	25	8	3
3	Fragaria spp.	25	8-10	20
4	Prunus spp.	25	4	2
5	Rubus spp.	25	8-10	5
6	Malus spp.	25	3-4	2
7	Morus sp.	25	6-8	10
II	Bulbous Crops			
1	Allium sativum	25,4	6-12	97
2	Allium spp.	25,4	4-23	14
III	Tuber Crops			
4	Alocasia spp.	25	10	1
5	Colocasia esculenta	25	8-10	63
6	Dioscorea spp.	25	8-12	43
7	Ipomoea batatas	25	8-12	230
8	Xanthosoma sagittifolia	25	10	3
IV	Medicinal and Aromatic Plants			
1	Aconitum violaceum	-	-	1
2	Bacopa monneierii	25	6	6
3	Coleus forskohlii	25	12	11
4	Cholorophytum sp.	-	-	1
5	Digitalis spp.	4	11	6
6	Eremostachys superba	25	6	2
7	Gentiana kurroo	4	12	1
8	Kaempferia spp.	-	-	6
9	Mentha sp.	25,4	12	22
10	Picrorhiza kurroa	4	12	4
11	Plumbago zeylanica	-	-	2
12	Pogostemon patchouli	25	12	2
13	Pycnanthemum spp.	25,4	8-12	4
14	Rauvolfia spp.	25	22	8
15	Rheum spp.	4	12	3
16	Saussurea lappa	4	12	3
17	Swertia chirayta	4	6	3
18	Tylophora indica	25	12	4
19	Valeriana wallichii	4	12	4
V	Spices			
1	Curcuma spp.	25	6-10	62
2	Elettaria spp.	25	15	5
3	Piper spp.	25	10-22	6
4	Zingiber spp.	25	8-24	173
5	Vanilla planifolia	25	6	5
VI	Industrial Plants			
1	Humulus lupulus	25	-	8
2	Simmondsia chinensis	25	6	12
VII	Others			
1	Cicer microphyllum	-	-	1
2	Gladiolous cv.	-	-	1
	Number of species: 114			
Total				1254

Source : National Bureau of Plant Genetic Resources

**TABLE 3.1.8 : STATUS OF CRYOPRESERVED GERMLASM
AT NATIONAL CRYOBANK**

(As on 30th September 2002)

Sl. No.	Category	No. of Species	No. of Accessions
1	2	3	4
I	Intermediate & Recalcitrant		
1	Fruits & Nuts	78	703
2	Spices & Condiments	8	70
3	Plantation Crops	2	20
4	Agroforestry Sp.	14	1575
II	Orthodox		
1	Cereals	4	193
2	Milletts and Forages	11	212
3	Pseudo-cereals	17	59
4	Grain Legumes	20	444
5	Oilseeds	7	222
6	Fibre Crops	5	28
7	Vegetables	42	271
8	Medicinal & Aromatic Plants	196	618
9	Narcotics	2	30
10	Wild Sp.	49	164
Total		455	4609

Source : National Bureau of Plant Genetic Resources

TABLE 3.1.9 : STATUS OF CRYOPRESERVATION OF POLLEN

(As on 31st October 2002)

Sl. No.	Plant Species	No. of Accession
1	2	3
1	Brassica spp. (oleracea, napus, campestris, carinata, juncea, nigra)	43
2	Camellia sinensis	1
3	Cicer microphyllum	1
4	Citrus sp.	4
5	Eruca sativa	2
6	Raphanus sativus	4
7	Sesamum sp.	1
8	Zea mays & allied genera	9
Total		65

Source : National Bureau of Plant Genetic Resources

TABLE 3.2.1 : STATE/UT WISE FOREST AREA

							(Sq.km)
Sl. No.	State/Uts	Geographic Area	Reserved Forest	Protected Forest	Unclassified Forest	Recorded Forest Cover	% of Forest to Geographic Area
1	2	3	4	5	6	7	8
1	Andhra Pradesh	275069	50479	12365	970	63814	23.20
2	Arunachal Pradesh	83743	19880	0	31660	51540	61.55
3	Assam	78438	18060	0	8958	27018	34.45
4	Bihar	94163	693	5384	1	6078	6.45
5	Chhattisgarh	135191	23966	31107	4212	59285	43.85
6	Delhi	1483	78	7	0	85	5.73
7	Goa	3702	236	0	988	1224	33.07
8	Gujarat	196022	13904	396	4699	18999	9.69
9	Haryana	44212	249	1155	147	1551	3.51
10	Himachal Pradesh	55673	1896	33043	2094	37033	66.52
11	Jammu & Kashmir	222236	20230	0	0	20230	9.10
12	Jharkhand	79714	4387	19185	33	23605	29.61
13	Karnataka	191791	28611	3932	6181	38724	20.19
14	Kerala	38863	11038	183	0	11221	28.87
15	Madhya Pradesh	308245	58734	35587	900	95221	30.89
16	Maharashtra	307713	49217	8196	4526	61939	20.13
17	Manipur	22327	1467	4171	11780	17418	78.01
18	Meghalaya	22429	1112	12	8372	9496	42.34
19	Mizoram	21081	7127	3568	5240	15935	75.59
20	Nagaland	16579	308	508	7813	8629	52.05
21	Orissa	155707	26329	15524	16282	58135	37.34
22	Punjab	50362	44	1112	1903	3059	6.07
23	Rajasthan	342239	11860	17658	2976	32494	9.49
24	Sikkim	7096	5376	285	104	5765	81.24
25	Tamil Nadu	130058	19325	2240	1306	22871	17.59
26	Tripura	10486	3588	509	2196	6293	60.01
27	Uttar Pradesh	240928	11078	2425	3323	16826	6.98
28	Uttaranchal	53483	23827	10673	162	34662	64.81
29	West Bengal	88752	7054	3772	1053	11879	13.38
30	A. & N. Islands	8249	2929	4242	0	7171	86.93
31	Chandigarh	114	31	0	2	32	28.45
32	Dadra & Nagar Haveli	491	198	5	0	203	41.34
33	Daman & Diu	112	0	1	0	1	0.63
34	Lakshadweep	32	0	0	0	0	0.00
35	Pondicherry	480	0	0	0	0	0.00
Total		3287263	423311	217245	127881	768436	23.38

Source : State of Forest Report 2001

India has 76.84 million hectares of recorded forest area in March 1999. This accounts for 23.38% of total geographic area. Per Capita availability of forests in India is 0.08 ha which is much lower than the world average of 0.8 ha.

CHART 2 : FOREST COVER IN DIFFERENT STATES AS COMPARED TO TOTAL GEOGRAPHIC AREA

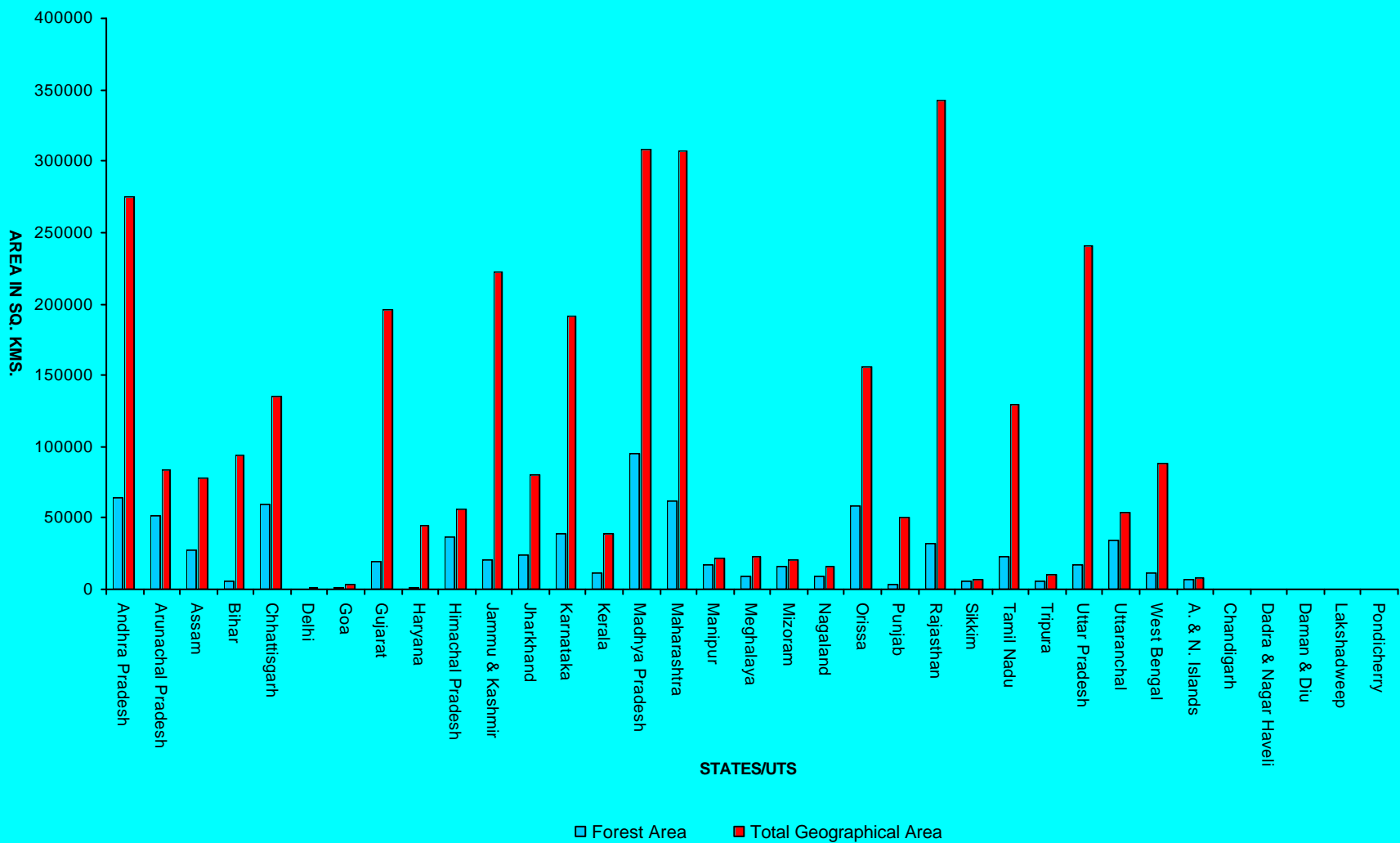


TABLE 3.2.2 : FOREST COVER AS PER 2001 ASSESSMENT

Land Use	Area in Sq. Kms.	Percentage of Geographical Area
1	2	3
Forest Cover		
Dense Forest	416809	12.68
Open Forest	258729	7.87
Total Forest Cover*	675538	20.55
Non-Forest		
Scrub	47318	1.44
Total Non-Forest **	2611725	79.45
Total Geographic Area	3287263	100.00

Source : State of Forest Report, 2001

* : Includes 4482 km² under mangroves (0.14% of country's geographic area)

** : Includes Scrub

TABLE 3.2.3(a) : FOREST AREA BY OWNERSHIP(AS ON 31-3-2000)

(Sq.km)

Sl. No.	State/ Union Territory	Forest Department					Others		
		Reserved	Protected	Unclassed	Total	Area Under Sanctioned Working Plans	Revenue Department Forests	Corporate Bodies Forest/ Community Ownership	Private Forest
1	2	3	4	5	6	7	8	9	10
1	Andhra Pradesh	50479.00	12365.00	975.00	63819.00	Nil	Nil	Nil	Nil
2	Arunachal Pradesh	9552.32	7.80	31771.52	41331.64	9247.84	1544.17	Nil	N.A.
3	Assam	17421.94	2814.63	5893.99	26130.56	N.A.	N.A.	N.A.	N.A.
4	Bihar	5051.43	25019.51	7.09	30078.03	30078.00	12200.00	10160.00	Nil
5	Delhi	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
6	Goa	N.A.	N.A.	319.84	319.84	1224.00	N.A.	N.A.	200.00
7	Gujarat	13741.25	395.62	4641.13	18778.00	14083.58	N.A.	N.A.	N.A.
8	Haryana	249.00	1154.00	21.00	1424.00	427.91	N.A.	N.A.	127.00
9	Himachal Pradesh	1896.00	33043.00	976.00	35915.00	24535.00	N.A.	42.00	1076.00
10	Jammu & Kashmir	N.A.	20230.00	N.A.	20230.00	20194.00	N.A.	N.A.	N.A.
11	Karnataka	28689.96	3930.72	5231.00	37851.68	17102.01	124.20	N.A.	308.42
12	Kerala	9371.30	1752.94	N.A.	11124.23	1028.39	N.A.	N.A.	N.A.
13	Madhya Pradesh	82700.13	66693.79	5112.48	154506.40	1545506.40	N.A.	N.A.	N.A.
14	Maharashtra	43898.00	8025.00	3455	55378.00	41045.00	2422.00	3559.00	558.00
15	Manipur	1467.00	4141.00	11780.00	17418.00	N.A.	N.A.	N.A.	N.A.
16	Meghalaya	712.74	12.39	399.48	1124.61	294.41	N.A.	N.A.	N.A.
17	Mizoram	6798.00	1045.00	N.A.	7843.00	Nil	Nil	2622.00	Nil
18	Nagaland	85.83	507.56	192.47	785.86	Nil	Nil	N.A.	7621.09
19	Orissa	26329.12	15524.46	20.55	41874.13	30281.45	16261.34	N.A.	12.29
20	Punjab	43.36	1111.67	196.55	1351.58	1349.22	N.A.	873.35	831.15
21	Rajasthan	11780.66	17604.03	2924.45	32309.14	N.A.	N.A.	N.A.	N.A.
22	Sikkim	5652.50	N.A.	6760.25	12412.75	N.A.	N.A.	N.A.	N.A.
23	Tripura	35188.18	509.02	2195.47	6292.68	459.60	N.A.	N.A.	N.A.
24	Uttar Pradesh	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
25	West Bengal	7054.00	3772.00	1053.00	11879.00	11381.00	N.A.	N.A.	N.A.
26	A&N Islands	2928.76	4241.93	Nil	7170.69	5628.62	Nil	Nil	Nil
27	D&N Haveli	198.76	4.82	N.A.	209.58	198.76	N.A.	N.A.	N.A.
28	Daman & Diu	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
29	Chandigarh	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
30	Lakshadweep	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
31	Pondicherry	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Total		361289.24	223905.89	83926.27	669121.40	1754065.19	32551.71	17256.35	10733.95

FOREST

Source : Forestry Statistics India, 2001

TABLE 3.2.3(b) : FOREST AREA BY COMPOSITION (AS ON 31-3-2000)

(sq.km)

FORESTS

Sl. No.	State/ Union Territory	Coniferous forest			Broad Leaved Forest				Mixed Coniferous/ Broad leaved	Total
		Chir	Deodar	Others Conifers	Sal	Teak	Mixed Leaved Forest	Mangrove		
1	2	3	4	5	6	7	8	9	10	11
1	Andhra Pradesh	Nil	Nil	Nil	47.00	9145.00	54103.00	519.00	N.A.	N.A.
2	Arunachal Pradesh	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3	Assam	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
4	Bihar	Nil	Nil	Nil	22378.00	8.91	7691.12	Nil	Nil	30078.03
5	Delhi	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
6	Goa	N.A.	N.A.	N.A.	N.A.	92.08	1130.14	1.78	N.A.	1224.00
7	Gujarat	N.A.	N.A.	N.A.	N.A.	N.A.	6430.00	3979.00	N.A.	10409.00
8	Haryana	23.00	N.A.	N.A.	30.00	N.A.	1371.00	N.A.	N.A.	1424.00
9	Himachal Pradesh	1436.00	811.00	6685.00	183.00	N.A.	1079.00	N.A.	5880.00	16074.00
10	Jammu & Kashmir	1825.00	1075.00	5369.00	N.A.	N.A.	1885.00	N.A.	10076.00	20230.00
11	Karnataka	N.A.	N.A.	N.A.	N.A.	N.A.	38224.28	60.00	N.A.	38284.28
12	Kerala	N.A.	N.A.	N.A.	N.A.	4100.00	7024.23	N.A.	N.A.	11124.23
13	Madhya Pradesh	Nil	Nil	Nil	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
14	Maharashtra	N.A.	N.A.	N.A.	N.A.	9161.00	31776.00	108.00	N.A.	41045.00
15	Manipur	Nil	Nil	2442.77	Nil	610.74	9444.00	Nil	4886.49	17384.00
16	Meghalaya	N.A.	N.A.	145.14	N.A.	N.A.	732.94	N.A.	N.A.	878.08
17	Mizoram	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
18	Nagaland	Nil	Nil	277.50	Nil	Nil	2269.00	Nil	Nil	2546.50
19	Orissa	N.A.	N.A.	3.99	16938.25	2030.64	21024.34	215.00	N.A.	40212.22
20	Punjab	121.75	N.A.	N.A.	N.A.	N.A.	2907.74	N.A.	26.59	3056.08
21	Rajasthan	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
22	Sikkim	N.A.	N.A.	903.45	80.57	N.A.	1799.71	N.A.	N.A.	2783.73
23	Tamil Nadu	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	21.00	19294.00	19315.00
24	Tripura	N.A.	N.A.	N.A.	270.31	1510.15	4163.56	N.A.	N.A.	5944.02
25	Uttar Pradesh	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
26	West Bengal	N.A.	N.A.	89.00	N.A.	N.A.	N.A.	2109.00	9681.00	11879.00
27	A&N Islands	N.A.	N.A.	N.A.	N.A.	N.A.	6204.69	966.00	N.A.	7170.69
28	D&N Haveli	N.A.	N.A.	N.A.	N.A.	N.A.	203.58	N.A.	203.58	407.16
29	Daman & Diu	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
30	Chandigarh	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	32.43	32.43
31	Lakshadweep	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
32	Pondicherry	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Total		3405.75	1886.00	15915.85	39927.13	26658.52	199463.33	7978.78	50080.09	345315.45

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Source : Forestry Statistics India, 2001

TABLE 3.2.4 : CUMULATIVE AREA OF FOREST PLANTATIONS BY ALL AGENCIES IN THE STATES/UT'S FROM 1951 TO 1999

(*'000 ha*)

Sl. No.	State/UT's	Total Cumulative Plantation Area	Area of Block Plantation	Area Covered from Seedlings Distributed
1	2	3	4	5
1	Andhra Pradesh	2496.56	1260.30	1236.26
2	Arunachal Pradesh	160.95	155.73	5.22
3	Assam	451.78	433.58	18.20
4	Bihar	1326.23	942.12	384.11
5	Delhi	44.05	20.18	23.87
6	Goa	65.60	46.04	19.56
7	Gujarat	2981.08	1293.95	1687.13
8	Haryana	742.74	597.02	145.72
9	Himachal Pradesh	719.44	665.84	53.60
10	Jammu & Kashmir	382.43	323.04	59.39
11	Karnataka	2163.22	1573.19	590.03
12	Kerala	688.12	483.63	204.49
13	Madhya Pradesh	3364.13	2848.52	515.61
14	Maharashtra	2965.07	2130.39	834.68
15	Manipur	154.76	139.69	15.07
16	Meghalaya	164.48	130.67	33.81
17	Mizoram	308.55	255.73	52.82
18	Nagaland	174.20	116.43	57.77
19	Orissa	1827.41	1458.49	368.92
20	Punjab	512.38	417.60	94.78
21	Rajasthan	1410.10	1150.79	259.31
22	Sikkim	119.23	107.53	11.70
23	Tamil Nadu	2268.18	1616.18	652.00
24	Tripura	246.64	215.61	31.03
25	Uttar Pradesh	4185.77	1844.36	2341.41
26	West Bengal	1157.73	610.93	546.80
27	Andaman & Nicobar Islan	88.14	83.13	5.01
28	Chandigarh	10.07	9.85	0.22
29	Dadra & Nagar Haveli	18.36	11.01	7.35
30	Daman & Diu	1.39	0.85	0.54
31	Lakshadweep	2.50	0.57	1.93
32	Pondicherry	7.88	1.91	5.97
Total		31209.17	20944.86	10264.31 *

Source : State of Forest Report, 1999

* : The area has been estimated by FSI using 1990-1999 figures of NAEB MOEF where breakup of block plantation and seedlings distributed are available.

TABLE 3.2.5(a) : COMPARATIVE SITUATION OF FOREST COVER IN INDIA

Sl. No.	States/Uts	2001 Assessment	1999 Assessment	1997 Assessment	Change in 2001 (3-4)	Change in 1999 (4-5)
1	2	3	4	5	6	7
1	Andhra Pradesh	44637	44229	43290	+408	+939
2	Arunachal Pradesh	68045	68847	68602	-802	+245
3	Assam	27714	23688	23824	+4026	-136
4	Bihar	5720	4830	4832	+890	-2
5	Chhatisgarh	56448	56693	56435	-245	+258
6	Delhi	111	88	26	+23	+62
7	Goa	2095	1251	1252	+844	-1
8	Gujarat	15152	12965	12578	+2187	+387
9	Haryana	1754	964	604	+790	+360
10	Himachal Pradesh	14360	13082	12521	+1278	+561
11	Jammu & Kashmir	21237	20441	20440	+796	+1
12	Jharkhand	22637	21644	21692	+993	-48
13	Karnataka	36991	32467	32403	+4524	+64
14	Kerala	15560	10323	10334	+5237	-11
15	Madhya Pradesh	77265	75137	74760	+2128	+377
16	Maharashtra	47482	46672	46143	+810	+529
17	Manipur	16926	17384	17418	-458	-34
18	Meghalaya	15584	15633	15657	-49	-24
19	Mizoram	17494	18338	18775	-844	-437
20	Nagaland	13345	14164	14221	-819	-57
21	Orissa	48838	47033	46941	+1805	+92
22	Punjab	2432	1412	1387	+1020	+25
23	Rajasthan	16367	13871	13353	+2496	+518
24	Sikkim	3193	3118	3129	+75	-11
25	Tamil Nadu	21482	17078	17064	+4404	+14
26	Tripura	7065	5745	5546	+1320	+199
27	Uttar Pradesh	13746	10756	10751	+2990	+5
28	Uttaranchal	23938	23260	23243	+678	+17
29	West Bengal	10693	8362	8349	+2331	+13
30	A. & N. Islands	6930	7606	7613	-676	-7
31	Chandigarh	9	7	7	+2	+0
32	Dadra & Nagar Haveli	219	202	204	+17	-2
33	Daman & Diu	6	3	3	+3	0
34	Lakshadweep	27	0	0	+27	0
35	Pondicherry	36	0	0	+36	0
	Total	675538	637293	633397	+38245	+3896

Source : State of Forest Report, 2001

*: Including Mangroves

In the year 2001, as compared to 1997, the total forest cover had increased by 38245 Sq. Kms. The states which have shown significant decrease in the forest covers are Arunachal Pradesh, Manipur, Mizoram, Nagaland, A & N Islands. Whereas the states of Assam, Bihar, Himachal Pradesh, Karnataka, Tamil Nadu, Gujarat, Maharashtra, Mizoram, Punjab, West Bengal and Rajasthan have shown an increase in forest cover. However, it has increased in 1999 by 3896 Sq. Kms. as compared to 1997.

TABLE 3.2.5(b) : CHANGE IN FOREST COVER OF THE NORTH-EASTERN REGION DURING 1990s*(Sq. Km.)*

Sl. No.	State	Forest Cover 1999 Assessment	Change during different assessments			
			1993-95	1995-97	1997-99	1999-2001
1	2	3	5	6	7	8
1	Arunachal Pradesh	68847	- 40	- 19	+ 245	- 802
2	Assam	23688	- 447	- 237	- 136	+ 4026
3	Manipur	17384	- 63	- 140	- 34	- 458
4	Meghalaya	15633	- 55	- 57	- 24	- 49
5	Mizoram	18338	- 121	+ 199	- 437	- 844
6	Nagaland	14164	- 57	- 70	- 57	- 819
7	Tripura	5745	0	+ 8	+ 199	+ 1320
Total		163799	- 783	- 316	- 244	+ 2374

Source : State of Forest Report, 2001

The forest cover in the North-Eastern Region (NER) is about 64% of the Geographical Area.

The forest cover decrease in the NER was maximum during the year 1993-95. However, there has been significant increase in the forest cover in 2001 over the year 1999 by 2374 sq. km. mainly due to increase in the forest area cover in Assam and Tripura while other NE States have shown decrease in forest cover in the same period.

FORESTS

Table: 3.2.6: Forest Products of India

('000 cum)

Sl. No.	Forest Produce	1991	1992	1993	1994	1995	
1	2	3	4	5	6	7	
1	Roundwood	C	10055	10200	10345	10489	10636
		NC	256732	261427	266123	270818	275615
2	Fuelwood	C	7286	7429	7572	7715	7860
		NC	235000	239600	244200	248800	253500
3	Industrial Roundwood	C	2769	2771	2773	2774	2776
		NC	21732	21827	21923	22018	22115
4	Pulp wood	C	145	145	145	145	145
		NC	1063	1063	1063	1063	1063
5	Sawnwood	C	2500	2500	2500	2500	2500
		NC	14960	14960	14960	14960	14960
6	Wood based Pannels		378	357	348	348	348
7	Veneer Sheets		24	18	7	7	7
8	Plywood		250	231	245	245	245
9	Particle Board		59	60	60	60	60
10	Fibre Board		45	48	36	36	36
11	Wood Pulp		986	987	1147	1196	1205
12	News Print		300	320	320	350	400
13	Printing & Writing Paper		990	1060	1085	1112	1150

Source: Forestry Statistics India, 2000

C : Coniferous

NC : Non Coniferous

TABLE 3.2.7 :STATE-WISE PRODUCTION OF FOREST PRODUCE

Sl. No.	State/Union Territory	Timber (Cu. Metre)		Poles (Cu. Metre)		Pulp & Matchwood (Cu. Metre)		Fuelwood (Metric Tonne)	
		1998-99	1999-2000	1998-99	1999-2000	1998-99	1999-2000	1998-99	1999-2000
1	2	3	4	5	6	7	8	9	10
1	Andhra Pradesh	43663.00	42838.00	N.A.	N.A.	54602.00	61633.00	1000975.00	105099.00
2	Arunachal Pradesh	61586.64	44705.79	27.60	20.39	N.A.	N.A.	11138.00	5292.00
3	Assam								
4	Bihar	17008.00	8034.00	4621.00	2154.00	Nil	Nil	840000.00	392000.00
5	Delhi								
6	Goa	13.32	5.70	2.00	N.A.	N.A.	N.A.	N.A.	23.40
7	Gujarat	34402.00	22654.00	N.A.	N.A.	N.A.	N.A.	19187.00	21775.00
8	Haryana	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
9	Himachal Pradesh	411999.00	N.A.	N.A.	N.A.	N.A.	N.A.	5432.00	N.A.
10	Jammu & Kashmir	217120.00	165030.00	N.A.	N.A.	N.A.	N.A.	1101.00	1306.00
11	Karnataka	65036.00	58705.00	1145.00	2059.00	269031.00	216312.00	1248863.00	1288322.00
12	Kerala	26664.00	44519.26	8252.00	13662.00	162304.00	128094.36	64484.00	49669.00
13	Madhya Pradesh	391517.00	159019.00	N.A.	N.A.	Nil	Nil	781977.00	328979.00
14	Maharashtra	N.A.	75300.00	N.A.	N.A.	N.A.	N.A.	N.A.	749648.00
15	Manipur	3503.97	149.51	N.A.	N.A.	N.A.	N.A.	29780.53	26477.00
16	Meghalaya	607.08	N.A.	Nil	N.A.	Nil	N.A.	Nil	N.A.
17	Mizoram	560.66	661.61	144.00	20.00	Nil	Nil	14193.00	22684.00
18	Nagaland	45924.00	20842.00	N.A.	N.A.	N.A.	N.A.	32766.00	2810.00
19	Orissa	33134.48	N.A.	83.25	N.A.	N.A.	N.A.	17509.58	N.A.
20	Punjab	78592.00	164824.00	N.A.	N.A.	N.A.	N.A.	2119.00	5984.00
21	Rajasthan	574.60	4874.00	Nil	Nil	Nil	Nil	51394.00	37500.00
22	Sikkim	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
23	Tamil Nadu	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
24	Tripura	N.A.	N.A.	N.A.	N.R.	N.A.	N.A.	N.A.	N.A.
25	Uttar Pradesh	476480.00	N.R.	N.A.	N.A.	N.A.	N.R.	38482.50	N.R.
26	West Bengal	43487.00	76875.00	42833.00	67941.00	6917.00	54501.00	512162.00	858470.00
27	A & N Islands	52342.00	42426.00	6637.20	6505.11	10291.00	5208.00	107261.00	81420.50
28	D. & N. Haveli	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
29	Chandigarh	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
30	Lakshadweep	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
31	Pondicherry	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Total		2004214.75	931462.87	63745.05	92361.50	503145.00	465748.36	4778824.61	3977458.90

TABLE 3.2.8 :PHYSIOGRAPHIC ZONE WISE TREE COVER ESTIMATES

Sl. No.	Physiographic Zone	Geographic Area (Km ²)	CNFA (Km ²)	Trees per ha	Number of Trees (000)	Tree Cover		
						Area (Km ²)	% of Geog.	% of CNFA
1	2	3	4	5	6	7	8	9
1	W. Himalayas	338556	94004	14.70	138462	3069	0.91	3.26
2	E. Himalayas	65317	10390	9.80	10224	392	0.60	3.77
3	North East	123138	30013	14.10	42291	642	0.52	2.14
4	Northern Plains	307489	277818	15.60	434517	10098	3.28	3.63
5	Eastern Plains	234215	163730	15.30	250607	8323	3.55	5.08
6	Western Plains	319098	302495	2.60	77821	3875	1.21	1.28
7	Central Highlands	366706	282029	8.00	226749	7077	1.93	2.51
8	North Deccan	355988	260951	9.40	246593	6905	1.94	2.65
9	East Deccan	331525	200006	9.00	179637	9760	2.94	4.88
10	South Deccan	292416	232236	11.40	265327	11468	3.92	4.94
11	Western Ghats	69703	38260	23.50	90078	3957	5.68	10.34
12	Eastern Ghats	191698	129856	5.60	72801	1788	0.93	1.38
13	West Coast	123921	91603	18.20	166406	3699	2.98	4.04
14	East Coast	167493	132042	19.70	260081	10419	6.22	7.89
Total		3287263	2245431	11.0	2461593	81472	2.48	3.63

Source : State of Forest Report, 2001

TABLE 3.2.9 :STATE/UT WISE TREE COVER ESTIMATES

SI. No.	State/UT	Geographic Area (Km ²)	CNFA (Km ²)	Trees per ha	Number of Trees (000)	Tree Cover		
						Area (Km ²)	% of Geog.	% of CNFA
1	2	3	4	5	6	7	8	9
1	Andhra Pradesh	275069	205673	11.2	230923	9011	3.28	4.38
2	Arunachal Pradesh	83743	14792	11.1	16432	478	0.57	3.23
3	Assam	78438	40827	15.1	61804	1942	2.48	4.76
4	Bihar	94163	73556	14.8	109004	3693	3.92	5.02
5	Chhattisgarh	135191	73464	8.8	64981	3535	2.62	4.81
6	Delhi	1483	1353	12.5	1688	40	2.69	2.95
7	Goa	3702	1559	18.0	2801	62	1.68	3.98
8	Gujarat	196022	172915	8.1	139396	4036	2.06	2.33
9	Haryana	44212	42049	15.6	65598	1526	3.45	3.63
10	Himachal Pradesh	55673	12091	14.8	17850	397	0.71	3.28
11	Jammu & Kashmir	222236	68258	14.7	100287	2217	1.00	3.25
12	Jharkhand	79714	54339	9.1	49669	2694	3.38	4.96
13	Karnataka	191791	147993	11.8	174997	7446	3.88	5.03
14	Kerala	38863	22731	18.8	42652	1146	2.95	5.04
15	Madhya Pradesh	308245	208981	8.6	179304	5751	1.87	2.75
16	Maharashtra	307713	236441	11.4	269356	8269	2.69	3.50
17	Manipur	22327	4517	14.1	6365	95	0.43	2.11
18	Meghalaya	22429	6756	14.1	9523	140	0.62	2.07
19	Mizoram	21081	3576	14.1	5030	95	0.45	2.66
20	Nagaland	16579	3214	14.1	4529	70	0.42	2.19
21	Orissa	155707	94359	10.5	98873	4364	2.80	4.62
22	Punjab	50362	45204	15.6	70402	1634	3.24	3.61
23	Rajasthan	342239	306523	4.6	140446	5286	1.54	1.72
24	Sikkim	7096	443	14.7	651	14	0.20	3.25
25	Tamil Nadu	130058	103768	15.2	157418	6054	4.65	5.83
26	Tripura	10486	3376	14.1	4759	68	0.65	2.03
27	Uttar Pradesh	240928	216864	14.6	317561	7545	3.13	3.48
28	Uttaranchal	53483	13180	15.0	19798	448	0.84	3.40
29	West Bengal	88752	64690	14.8	95723	3264	3.68	5.05
30	A. & N. Islands	8249	1060	19.7	2092	83	1.01	7.87
31	Chandigarh	114	81	9.4	76	2	1.63	2.29
32	Dadra & Nagar Haveli	491	261	24.2	631	27	5.54	10.42
33	Daman & Diu	112	105	13.4	141	4	3.29	3.50
34	Lakshadweep	32	3	13.5	4	0	0.27	2.76
35	Pondicherry	480	431	19.3	830	35	7.19	8.01
Total		3287263	2245431	11.0	2461594	81471	2.48	3.63

Source : State of Forest Report, 2001

BLE 3.2.10 : ESTIMATES OF GROWING STOCK IN INDIA BASED ON THE FOREST COVER AREA AND INVENTORY RESULT

FORESTS

Sl. No.	Name of State/UT	Forest Cover Area			Estimated Total Growing Stock				
		Dense Forest (sq.km)	Open Forest (sq.km)	Total Forest (sq.km)	Dense Forest (000cu m)	Open Forest (000cu m)	Total Forest (mill cu m)	Overall Volume Per ha (cu m)	%age of Growing Stock to Total
1	2	3	4	5	6	7	8	9	10
1	Andhra Pradesh	25008	22248	47256	211265	80129	291.39	61.66	6.15
2	Arunachal Pradesh	54510	14151	68661	702969	72156	775.13	112.80	16.35
3	Assam	15998	8510	24508	248057	56366	304.42	124.20	6.42
4	Bihar	13172	13415	26587	65634	31086	96.72	36.38	2.04
5	Goa, Daman & Diu	995	255	1250	12235	409	12.64	101.16	0.27
6	Gujarat	6301	5743	12044	42633	21288	63.92	53.07	1.35
7	Haryana	329	184	513	1266	166	1.43	27.92	0.03
8	Himachal Pradesh	9565	2937	12502	237030	17380	254.41	203.50	5.37
9	Jammu & Kashmir	10953	9490	20443	328543	130386	458.93	224.49	9.68
10	Karnataka	24852	7491	32343	250249	22162	272.41	84.23	5.75
11	Kerala	8421	1915	10336	82082	16801	98.88	95.67	2.08
12	Madhya Pradesh	95537	39859	135396	592931	105251	698.18	51.56	14.73
13	Maharashtra	25680	18179	43859	173740	51814	225.55	51.43	4.76
14	Manipur	5307	12314	17621	59309	36143	95.45	54.10	2.01
15	Meghalaya	3305	12464	15769	51024	53116	104.14	66.00	2.20
16	Mizoram	4238	14459	18697	29487	36525	66.01	35.30	1.39
17	Nagaland	3487	10861	14348	42622	52265	94.89	66.10	2.00
18	Orissa	27151	19994	47145	183737	62413	246.15	52.21	5.19
19	Punjab	481	862	1343	556	394	0.95	7.07	0.02
20	Rajasthan	3581	9518	13099	6107	6785	12.89	9.84	0.27
21	Sikkim	2395	724	3119	35032	4254	39.29	125.90	0.83
22	Tamil Nadu	9422	8304	17726	49283	20319	69.60	39.31	1.47
23	Tripura	1819	3719	5538	6219	9233	15.45	27.90	0.33
24	Uttar Pradesh	22965	10996	33961	300889	37744	338.63	99.71	7.14
25	West Bengal	3362	2705	6067	21257	1602	22.86	37.68	0.48
26	Andaman & Nicobar Island	6567	91	6658	79247	397	79.64	119.62	1.68
27	Chandigarh	4	1	5	NA	NA	NA	NA	NA
28	Dadra & Nagar Haveli	159	47	206	817	54	0.87	42.20	0.02
29	Delhi	12	10	22	NA	NA	NA	NA	NA
30	Lakshadweep	NA	NA	NA	NA	NA	NA	NA	NA
31	Pondicherry	NA	NA	NA	NA	NA	NA	NA	NA
Total (Excluding Mangrove forests)		385576	251446	637022	3814220	926638	4740.86	74.42	100.00

Source: Forest Survey of India: Extent, Composition, Density, Growing Stock and Annual Increment of India's Forests (1995)

TABLE 3.2.11 : ESTIMATES OF WASTELANDS IN INDIA.*(Thousand Sq. Km.)*

Sl. No.	States/Uts.	Non Forest Degraded Area	Forest Degraded Area	Total
1	2	3	4	5
1	Andhra Pradesh	76.82	37.34	114.16
2	Assam	9.35	7.95	17.30
3	Bihar	38.96	15.62	54.58
4	Gujarat	71.53	6.83	78.36
5	Haryana	24.04	0.74	24.78
6	Himachal Pradesh	14.24	5.34	19.58
7	Jammu & Kashmir	5.31	10.34	15.65
8	Karnataka	71.22	20.43	91.65
9	Kerala	10.53	2.26	12.79
10	Madhya Pradesh	129.47	71.95	201.42
11	Maharashtra	115.6	28.41	144.01
12	Manipur	0.14	14.24	14.38
13	Meghalaya	8.15	11.03	19.18
14	Nagaland	5.08	8.78	13.86
15	Orissa	31.57	32.27	63.84
16	Punjab	11.51	0.79	12.30
17	Rajasthan	180.01	19.33	199.34
18	Sikkim	1.31	1.5	2.81
19	Tamilnadu	33.92	10.09	44.01
20	Tripura	1.08	8.65	9.73
21	Uttar Pradesh	66.35	14.26	80.61
22	West Bengal	21.77	3.59	25.36
23	UTs	8.89	27.15	36.04
Total		936.91	358.89	1295.80

Source : Forestry Statistics India, 2000

CHART 3 : FOREST AND NON-FOREST DEGRADED AREA

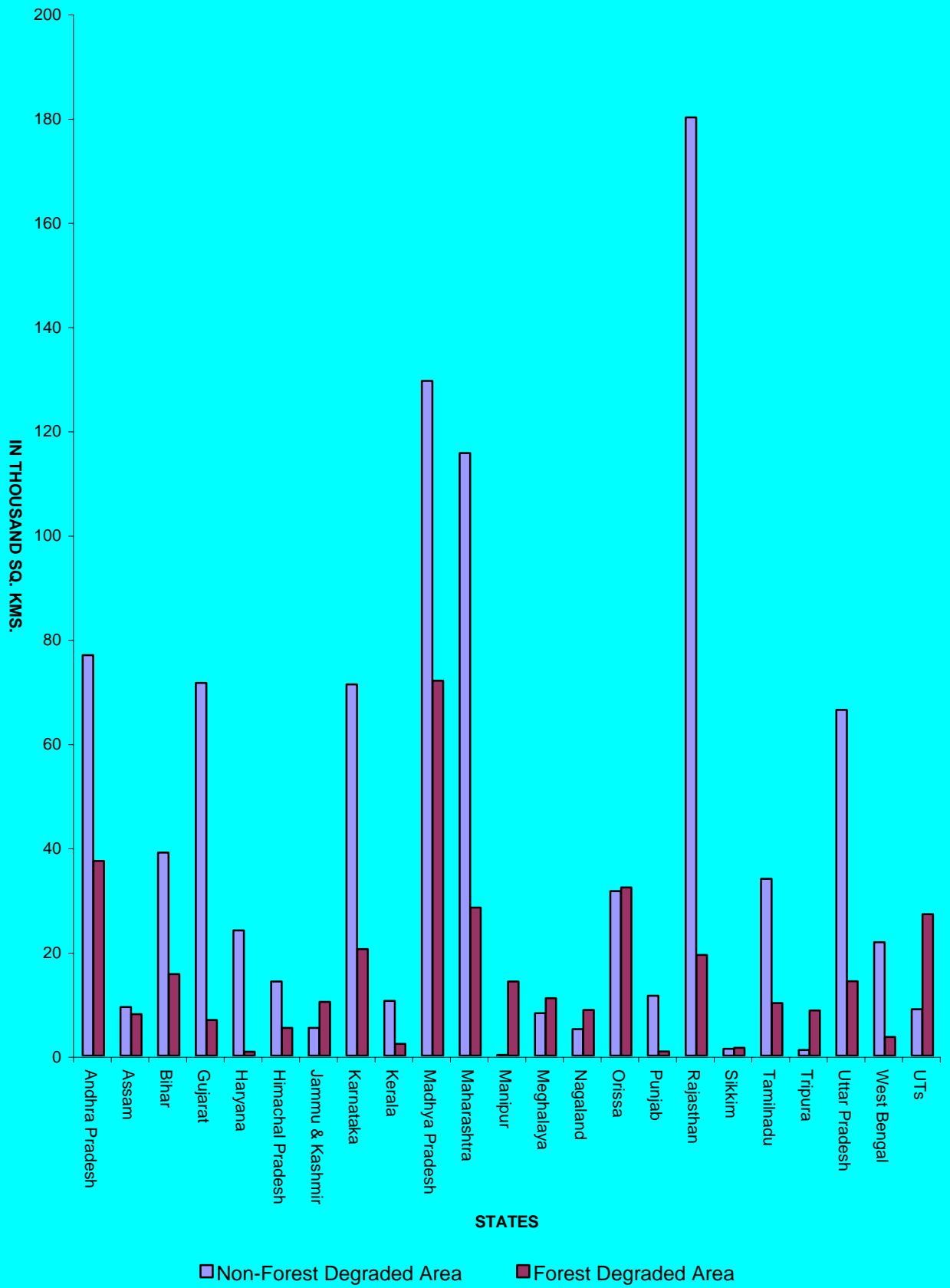


TABLE 3.2.12 : ESTIMATES OF NON-FOREST WASTELANDS IN INDIA*(000' Sq.km)*

Sl. No.	States/UTs.	Saline & Alkaline Lands	Wind Eroded Area	Water Eroded Area	Total
1	2	3	4	5	6
1	Andhra Pradesh	2.40	....	....	76.82
2	Assam	....	....	9.35	9.35
3	Bihar	0.04	....	38.92	38.96
4	Gujarat	12.14	7.04	52.35	71.53
5	Haryana	5.26	15.99	2.76	24.01
6	Himachal Pradesh	....	....	14.24	14.24
7	Jammu & Kashmir	....	....	5.31	5.31
8	Karnataka	4.04	....	67.18	71.22
9	Kerala	0.16	....	10.37	10.53
10	Madhya Pradesh	2.42	....	127.05	129.47
11	Maharashtra	5.34	....	110.26	115.6
12	Manipur	....	....	0.14	0.14
13	Meghalaya	....	....	8.15	8.15
14	Nagaland	....	....	5.08	5.08
15	Orissa	4.04	....	27.53	31.57
16	Punjab	6.88	....	4.63	11.51
17	Rajasthan	7.28	106.23	66.59	180.1
18	Sikkim	....	....	1.31	1.31
19	Tamilnadu	0.04	....	33.88	33.92
20	Tripura	....	....	1.08	1.08
21	Uttar Pradesh	12.95	....	53.4	66.35
22	West Bengal	8.5	....	13.27	21.77
23	Uts	0.16	....	8.73	8.89
Total		71.65	129.26	736	936.91

Source : Forestry Statistics India, 2000.

FORESTS

TABLE 3.2.13 : DIVERSION OF FOREST LAND FOR NON FOREST USE SINCE THE ENFORCEMENT OF FOREST CONSERVATION ACT,1980

(Area in ha.)

Sl. No.	Year	Forest Land Diversion
1	2	3
1	1980	Nil
2	1981	2672.04
3	1982	3246.54
4	1983	5702.01
5	1984	7837.59
6	1985	10608.07
7	1986	11963.11
8	1987	72780.05
9	1988	18765.35
10	1989	20365.05
11	1990	138551.38 *
12	1991	625.21
13	1992	5686.94
14	1993	11785.64
15	1994	13527.69
16	1995	46158.52
17	1996	8764.79
18	1997	16313.20
19	1998	12630.00

Source : Forestry Statistics India, 2000

* 1990 data Includes :

- I. 1.83 lakh ha. for regularisation of encroachments in MP
- II. 0.12 lakh ha. for field firing range of Indian Army in Sagar

CHART 4 : FOREST LAND DIVERSION

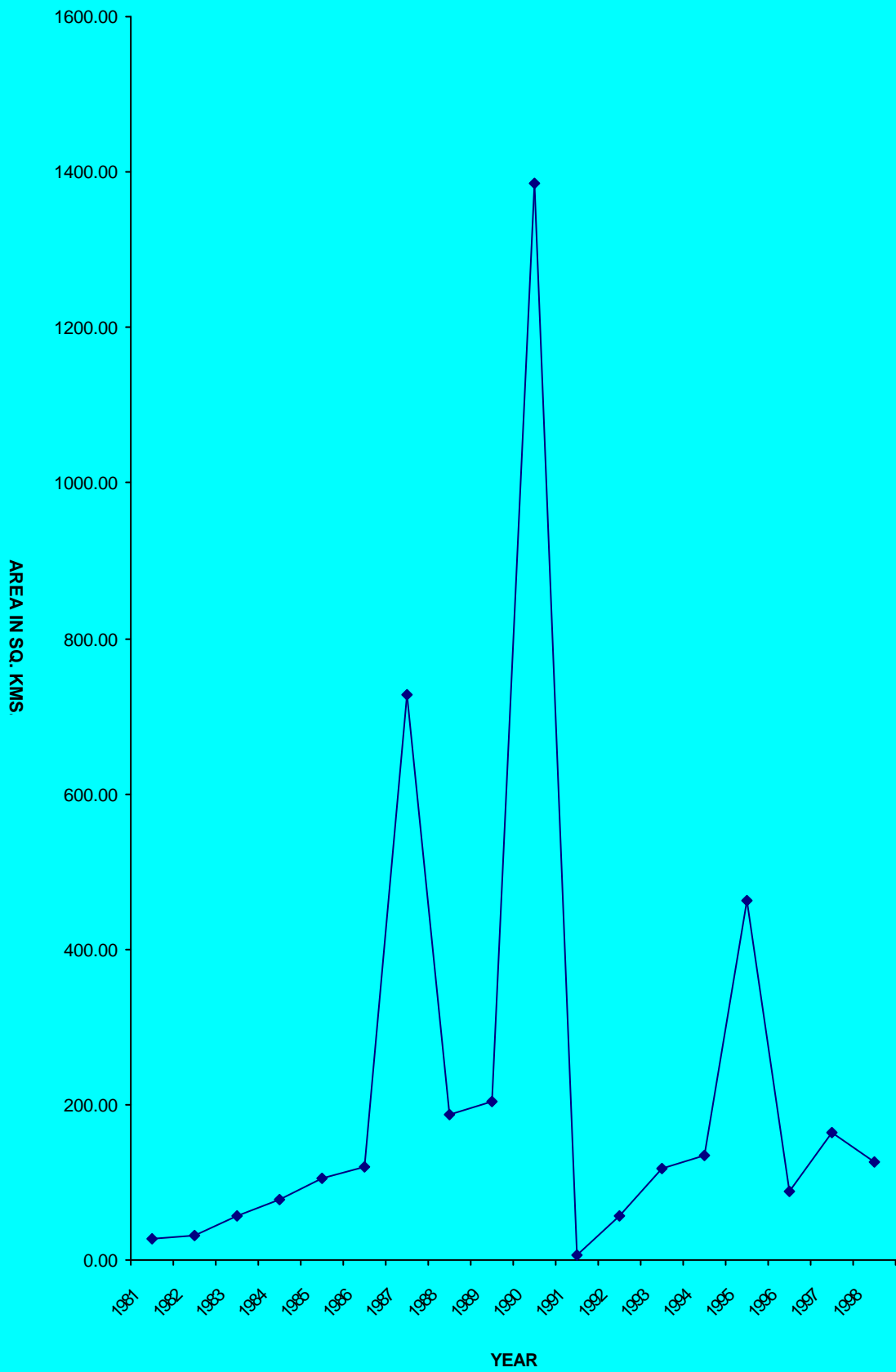


TABLE: 3.2.14 : AREA UNDER JOINT FOREST MANAGEMENT

Sl. No.	State/Uts	Date of Notification	No. of JFM Committees	Area Under JFM ('000ha)
1	2	3	4	5
1	Andhra Pradesh	28.09.92	6575	1632.19
2	Arunachal Pradesh	03.10.97	10	5.29
3	Assam	10.11.98	101	3.06
4	Bihar	08.11.90	1675	935.08
6	Gujarat	13.03.91	706	91.07
7	Himachal Pradesh	12.05.93	203	62.00
8	Haryana	13.06.90	350	60.73
9	Jammu & Kashmir	19.03.92	1599	79.27
10	Karnataka	12.04.93	1212	12.80
11	Kerala	16.01.98	21	4.00
12	Madhya Pradesh	10.12.91	12038	5800.00
13	Maharashtra	16.03.92	502	94.73
14	Mizoram	18.09.98	103	5.87
15	Nagaland	05.03.97	55	0.65
16	Orissa	3.08.88	3704	419.31
17	Punjab	14.07.93	89	38.99
18	Rajasthan	16.03.91	2705	235.63
19	Sikkim	26.06.98	98	2.19
20	Tamil Nadu	8.08.97	599	224.38
21	Tripura	20.12.91	157	16.23
22	Uttar Pradesh	30.08.97	197	34.59
23	West Bengal	12.07.89	3431	490.58
Total			36130	10248.64

Source: State of Forest Report, 1999

Participation of people in the protection and management of forests has been emphasised in the National Forest Policy, 1988. Pursuant to this policy, Government of India through its resolution dated 1st June '90 formalised the JFM Programme. The JFM is being practiced through constitution of forest protection committees. The mechanism of sharing usufructs differs from state to state. About 36,130 committees are managing a total of 10.25 million ha of forest area under IFM. Details of

TABLE 3.2.15 : FOREST COVER IN MINING AREAS BY STATE

Sl. No.	State	Lease Area (hectare)	Forest Cover (hectare)		
			Dense	Open	Total
1	2	3	4	5	6
1	Chhattisgarh	19935	12102	2555	14657
2	Jharkhand	21589	7564	2587	10151
3	Madhya Pradesh	11507	8286	860	9146
4	Orissa	37664	9764	9499	19263
Total		90695	37716	15501	53217

Source: State of Forest Report, 1999 (Supplementary).

The Forest Survey of India in collaboration with the Indian Bureau of Mines, Nagpur, undertook a study in 1998 relating to assessment of forest cover in areas leased for mining of five important metallic minerals (Bauxite, Copper, Iron, Chromite, and Manganese) in three mineral rich states, namely, Bihar, M.P, Orissa. The forest cover maps on 1:50,000 scale were overlaid on the composite mineral maps. It has been found out that out of 90,695 ha of leased area, 53,217 is under forest cover of which 71% is under dense forest and 29% is under open forest.

TABLE 3.3.1 : INDIA'S MAJOR BIOGEOGRAPHIC HABITATS

Sl. No.	Biogeographic Zone	Biotic Province	Total Area (Sq.Km)
1	2	3	4
1	Trans-Himalayan	Upper Regions	186200
2	Himalayan	North-Western	69000
		Western	72000
		Central	123000
		Eastern	83000
3	Desert	Kachchh	45000
		Thar	180000
		Ladakh (cold)	NA
4	Semi-Arid	Central India	107600
		Gujarat-Rajwara	400400
5	Western Ghats	Malabar Coast	59700
		Western Ghat Mountains	99300
6	Deccan Peninsula	Deccan South Plateau	378000
		Central Plateau	341000
		Eastern Plateau	198000
		Chhota Nagpur	217000
		Central Highlands	287000
7	Gangetic Plain	Upper Gangetic	206400
		Lower Gangetic	153000
8	North-East India	Brahmaputra Valley	65200
		North-Eastern Hills	106200
9	Islands	Andaman Islands	6397
		Nicobar Islands	1930
		Lakshadweep	180
10	Coasts	West Coast	6500
		East Coast	6500

Source : "Conserving our Biological Wealth", WWF for Nature-India (modified) and Zoological Survey of India

TABLE 3.3.2 : ESTIMATED NUMBER OF SPECIES

Sl. No.	Taxonomic Group	No. of Species		% In India
		India	World	
1	2	3	4	5
I	PROTISTA	2577	31250	8.24
1	Protozoa	2577	31250	8.24
II	ANIMALIA	86808*	1196903	7.25
1	Mesozoa	10	71	14.08
2	Porifera	486	4562	10.65
3	Cnidaria	842	9916	8.49
4	Ctenophora	12	100	12.00
5	Platyhelminthes	1622	17500	9.27
6	Nemertinea	--	600	--
7	Rotifera	330	2500	13.20
8	Gastrotricha	100	3000	3.33
9	Kinorhyncha	10	100	10.00
10	Nematoda	2850	30000	9.50
11	Nematomorpha	--	250	--
12	Acanthocephala	229	800	2862.00
13	Sipuncula	35	145	24.14
14	Mollusca	5070	66535	7.62
15	Echiura	43	127	33.86
16	Annelida	840	12700	6.61
17	Onychophora	1	100	1.00
	Arthropoda	68389	987949	6.90
1	Crustacea	2934	35534	8.26
2	Insecta	59353	867391	6.83
3	Arachnida	5818	73440	7.90
4	Pycnogonida	16	600	2.67
5	Paupoda	--	360	--
6	Chilopoda	100	3000	3.33
7	Diplopoda	162	7500	2.16
8	Symphyla	4	120	3.33
9	Merostomata	2	4	50.00
10	Phoronida	3	11	27.27
11	Bryozoa (Ectoprocta)	200	4000	5.00
12	Entoprocta	10	60	16.66
13	Brachiopoda	3	300	1.00
14	Pogonophora	--	80	--
15	Priapulida	--	8	--
16	Pentastomida	--	70	--
17	Chaetognatha	30	111	27.02
18	Tardigrada	30	514	5.83
19	Echinodermata	765	6223	12.29
20	Hemichordata	12	120	10.00

TABLE 3.3.2 : ESTIMATED NUMBER OF SPECIES--Concl.

Sl. No.	Taxonomic Group	No. of Species		% in India
		India	World	
1	2	3	4	5
	Chordata	4886*	48451	10.07*
1	Protochordata (Cephalochordata +Urochordata)	119	2106	5.65
2	Pisces	2546	21723	11.72
3	Amphibia	209	5150	4.06
4	Reptilia	456	5817	7.84
5	Aves	1166*	9026	12.91*
6	Mammalia	390	4629	8.42
Grand Total (Protista I + Animalia II)		89385*	1228153	7.28

Source : Faunal Diversity in India (1998) with updated
(*) figures Zoological Survey of India

TABLE 3.3.3 (a): RARE AND THREATENED SPECIES (VERTEBRATES)

Sl. No.	Category	Approximate Number				
		Mammalia	Aves	Reptilia	Amphibia	Total
1	2	3	4	5	6	7
1	Rare	--	2	--	--	2
2	Vulnerable	28	22	4	--	54
3	Endangered	29	21	16	1	67
4	Critical*	3	8	--	--	11
5	Extinct**	1	2	--	--	3
6	Insufficiently Known	16	--	--	--	16
Total		77	55	20	1	153

Source : The Red Data Book of Indian Animals (1994), Zoological Survey of India.

* **Mammal** - Brow - Antlered Deer, Yak, Hispid Hare

Aves - Christmas Island Frigate Bird, Mrs. Hume's Bartailed Pheasant, Burmese Peafowl, Blacknecked Crane, Hooded Crane, Masked Finfoot, Jerdon's Courser, Forest Spotted Owlet.

** **Mammal** - Cheetah.

Aves - Pinkheaded Duck, Mountain Quail

A taxon is **Extinct**, when there is no reasonable doubt that the last Individual has died.

A taxon is **Critical** when it is facing an extremely high probability of extinction in the wild in the immediate future.

A taxon is **Endangered** when it is not critical but is facing a very high probability of extinction in the wild in the near future.

A taxon is **Vulnerable** when it is not critical or endangered but is facing a high probability of extinction in the wild in the medium-term future.

A taxon is **Rare** when its populations are small and at present not endangered or vulnerable but are at risk .

A taxon is **Insufficiently Known** when an evaluation has been made but the available data are inadequate to assign a category.

3.3.3b: RECENT ADDITION IN THE LIST OF THREATENED/ ENDANGERED SPECIES

As per the Gazette Notification number 1-4/95 WL dated 5th November, 2001, published in Part II Section 3, subsection (II), Extraordinary Gazette of India, the Central Government (Ministry of Environment and Forests) has made amendments in Schedule I and Schedule IV of the Subsection (1) of section 61 of the Wild Life (Protection) Act, 1972 and included the following species in the Schedules of Threatened and endangered species

1 Schedule 1

- a) in Para II related to " Fishes" for serial number 2 and the entry relating thereto the following serial number and entries shall be substituted, namely
- "2. Shark and Ray
- (i) Anoxypristis cuspidate
 - (ii) Carcharhinus hemiodon
 - (iii) Glyphius gangeticus
 - (iv) Glyphius glyphius
 - (v) Himantura fluviatilis
 - (vi) Pristis microdon
 - (vii) Pristis zijsron
 - (viii) Rhynchobatus djiddensis
 - (ix) Urogymnus asperrimus
- (b) for Part IVB, relating to Mollusca and the entries relating there to, the following Part IVB and the entries shall be substituted, namely:-

"Part IV B-Mollusca

- 1 Cassis cornuta
- 2 Charonia tritonis
- 3 Conus milmedwardsi4.
- 4 Cypraeassis rufa
- 5 Hippopus hippopu
- 6 Nautilus pompilus
- 7 Tridacna maxima
- 8 Tridacna squamosa
- 9 Tudicla spiralis".;

2 **In Schedule IV** to the said Act, after serial number 18 and the entries relating there to, the following serial numbers and entries shall be added, namely:-

"19. Mollusca

- i. Cypraea limacine
- ii. Cypraea mappa
- iii. Cypraea talpa
- iv. Fasciolaria trapezium
- v. Harpulina arausica
- vi. Lambis chiragra
- vii. Lambis chiragraarthritis
- viii. Lambis crocea
- ix. Lambis millepeda
- x. Lambis Scorpio
- xi. Lambis truncata
- xii. Placenta placenta
- xiii. Strombus plicatus sibbaldi
- xiv. Trochus niloticus
- xv. Turbo marmoratus

Source : Zoological Survey of India.

TABLE 3.3.4 : ESTIMATED NUMBER/PERCENTAGE OF ENDEMIC SPECIES IN INDIA

Sl. No.	Taxon	Number of Species		Percentage
		Total	Endemic	
1	2	3	4	5
1	Protozoa			
I	Free living	1247	90	7.21
II	Parasitic	1330	550	41.33
2	Mesozoa	10	10	100.00
3	Porifera			
I	Freshwater	31	13	41.93
4	Cnidaria	842	10 *	--
5	Platyhelminthes	1622	1160	71.88
6	Rotifera	330	23	7.00
7	Gastroticha	100	64	64.00
8	Kinorhyncha	10	7	70.00
9	Nematoda	2850	400 *	--
10	Acanthocephala	229	203	88.64
11	Mollusca			
I	Terrestrial	1487	498	33.50
II	Freshwater	183	77	41.80
12	Echiura	43	12	28.00
13	Annelida			
I	Oligochaeta	473	368	77.80
II	Hirudinea	59	25	42.37
14	Arthropoda			
I	Crustacea	2934	501	17.07
II	Insecta	59353	20717	34.90
III	Arachnida	5818	2623	45.08
15	Phoronida	11	1	9.00
16	Bryozoa	4000	12 *	--
17	Entoprocta	10	1	10.00
18	Chaetognatha	111	3	2.70
19	Chordata			
I	Pisces	2546	223	8.75
II	Amphibia	209	128	61.24
III	Reptilia	456	214	47.00
IV	Aves	1166 **	50 **	4.29 **
V	Mammalia	390	42 **	11.28

Source : Faunal Diversity in India (1998) with updated (**) figures, Zoological Survey of India.

* : Complete data not available, hence percentage not calculated

** : Rec. Zool. Survey of India, occasional paper no. 200 (2002)
Rec. Zool. Survey of India, occasional paper no. 201 (2002)

TABLE 3.3.5 : NATIONAL PARKS AND WILDLIFE SANCTUARIES OF INDIA**(Sq. Km.)**

Sl. No.	State	National Parks		Wildlife Sanctuaries		Total Area
		Number	Area	Number	Area	
1	2	3	4	5	6	7
1	Andhra Pradesh	4	3314.50	21	12530.09	15844.59
2	Arunachal Pradesh	2	2468.23	10	7114.45	9582.68
3	Assam	3	1173.71	13	939.88	2113.59
4	Bihar	1	335.65	11	2068.25	2403.90
5	Chhatisgarh	2	1458.00	10	3419.41	4877.41
6	Delhi	0	0.00	1	27.60	27.60
7	Goa	1	107.00	6	647.96	754.96
8	Gujarat	4	479.67	21	16422.71	16902.38
9	Haryana	1	1.43	9	278.32	279.75
10	Himachal Pradesh	2	1429.40	32	5736.85	7166.25
11	Jammu & Kashmir	4	4650.07	16	10172.15	14822.22
12	Jharkhand	1	231.67	10	1822.00	2053.67
13	Karnataka	5	2472.18	20	3930.61	6402.79
14	Kerala	3	536.52	12	2143.36	2679.88
15	Madhya Pradesh	9	5016.69	25	7284.64	12301.33
16	Maharashtra	5	955.93	33	14387.78	15343.71
17	Manipur	2	81.80	1	184.85	266.65
18	Meghalaya	2	267.48	3	34.20	301.68
19	Mizoram	2	250.00	4	634.00	884.00
20	Nagaland	1	202.02	3	24.41	226.43
21	Orissa	2	990.70	18	6971.15	7961.85
22	Punjab	0	0.00	11	317.79	317.79
23	Rajasthan	4	3856.53	24	5712.83	9569.36
24	Sikkim	1	1784.00	5	265.10	2049.10
25	Tamil Nadu	5	307.85	19	2602.07	2909.92
26	Tripura	0	0.00	4	603.62	603.62
27	Uttaranchal	6	4920.82	6	2396.39	7317.21
28	Uttar Pradesh	1	490.00	23	5198.15	5688.15
29	West Bengal	5	1692.65	15	1103.48	2796.13
30	Andaman & Nicobar Islands	9	1157.14	96	372.13	1529.27
31	Chandigarh	0	0.00	1	26.01	26.01
32	Dadra & Nagar Haveli	0	0.00	0	0.00	0.00
33	Daman & Diu	0	0.00	1	2.18	2.18
34	Lakshadweep	0	0.00	0	0.00	0.00
35	Pondicherry	0	0.00	0	0.00	0.00
Total		87	40631.64	485	115374.42	156006.06

Source: Forest Survey of India, State Forest Report, 1999.

The Wildlife (Protection) Act, 1972 provided for setting up National Parks and Sanctuaries for Wildlife. The basic idea of these National Parks and Sanctuaries is to provide natural habitats for the Wildlife. The aim is not only to protect and preserve what remains of wild fauna and flora but also to augment this price-less national heritage.

In India, at present there are 485 Wildlife Sanctuaries and 87 National Parks, covering an area of 156006.06 Sq. Km.

TABLE 3.3.6 : ALL INDIA TIGER POPULATION

Sl. No.	Name of State	Years						
		1972	1979	1984	1989	1993	1997	2001-02 **
1	2	3	4	5	6	7	8	9
1	Andhra Pradesh	35	148	164	235	197	171	192
2	Arunachal Pradesh	69	139	219	135	180	*	NR
3	Assam	147	300	376	376	325	458	354
4	Bihar	85	110	138	157	137	103	76
5	Chhattisgarh	--	--	--	--	--	--	227
6	Goa Daman & Diu	--	--	--	2	3	6	5
7	Gujarat	8	7	9	9	5	1	Nil
8	Jharkhand	--	--	--	--	--	--	34
9	Karnataka	102	156	202	257	305	350	401
10	Kerala	60	134	89	45	57	73	71
11	Madhya Pradesh	457	529	786	985	912	927	710
12	Maharashtra	160	174	301	417	276	257	238
13	Manipur	1	10	6	31	--	*	NR
14	Meghalaya	32	35	125	34	53	*	47
15	Mizoram	--	65	33	18	28	12	28
16	Nagaland	80	102	104	104	83	*	23
17	Orissa	142	173	202	243	226	194	173
18	Rajasthan	74	79	96	99	64	58	58
19	Sikkim	--	--	2	4	2	*	NR
20	Tamil Nadu	33	65	97	95	97	62	60
21	Uttar Pradesh	262	487	698	735	465	475	284
22	Uttaranchal	--	--	--	--	--	--	251
23	West Bengal	73	296	352	353	335	361	349
24	Haryana	--	--	1	--	--	--	--
25	Tripura	7	6	5	--	--	*	NR
Total		1827	3015	4005	4334	3750	3508	3581

Source: Project Tiger, Ministry of Environment & Forests

N.R. : Not Reported by States

* : Tiger census was not carried out in North Eastern States in 1997.

** : under compilation/vetting

TABLE 3.3.7 : AREA OF TIGER RESERVES IN TIGER RANGE STATES

Sl. No.	Year of Creation	Name of Tiger Reserve	State	Total Area in sq. Kms.
1	2	3	4	5
1	1973-74	Bandipur	Karnataka	866
	1999-2000	Nagarhole (extension)		643
2	1973-74	Corbett	Uttar Pradesh	1316
3	1973-74	Kanha	Madhya pradesh	1945
4	1973-74	Manas	Assam	2840
5	1973-74	Melghat	Maharashtra	1677
6	1973-74	Palamau	Bihar	1026
7	1973-74	Ranthambhore	Rajasthan	1334
8	1973-74	Similipal	Orissa	2750
9	1973-74	Sunderbans	West Bengal	2585
10	1978-79	Periyar	Kerala	777
11	1978-79	Sariska	Rajasthan	866
12	1982-83	Buxa	West Bengal	759
13	1982-83	Indravati	Madhya Pradesh	2799
14	1982-83	Nagarjunsagar	Andhra Pradesh	3568
15	1982-83	Namdapha	Arunachal Pradesh	1985
16	1987-88	Dudhwa	Uttar Pradesh	811
	1999-2000	Katerniaghat (extension)		551
17	1988-89	Kalakad- Mundathurai	Tamil Nadu	800
18	1989-90	Valmiki	Bihar	840
19	1992-93	Pench	Madhya Pradesh	758
20	1993-94	Tadoba-Andheri	Maharashtra	620
21	1993-94	Bandhavgarh	Madhya Pradesh	1162
22	1994-95	Panna	Madhya Pradesh	542
23	1994-95	Dampha	Mizoram	500
24	1998-99	Bhadra	Karnataka	492
25	1998-99	Pench	Maharashtra	257
26	1999-2000	Pakhuri-Nameri	Arunachal Pradesh-Assam	1206
27	1999-2000	Bori, Satpura, Panchmar	Madhya pradesh	1486
Total				37761

Source : Ministry of Environment and Forests, Annual Report, 2002-2003

TABLE 3.3.8 : POPULATION OF TIGERS IN TIGER RESERVES

Sl. No.	Name of Tiger Reserve	Year of Creation	State	1979	1984	1989	1993	1995	1997	2001-02*
1	2	3	4	5	6	7	8	9	10	11
1	Bandhavgarh	1993-94	Madhya Pradesh	--	--	--	41	46	46	56
2	Bandipur	1973-74	Karnataka	39	53	50	66	74	75	82
3	Bhadra		Karnataka	--	--	--	--	--	--	35
4	Bori-Satpura-Pachmari		Madhya Pradesh	--	--	--	--	--	--	35
5	Buxa	1982-83	West Bengal	--	15	33	29	31	32	31
6	Corbett	1973-74	Uttanchal	84	90	91	123	128	138	137
7	Dampha	1994-95	Mizoram	--	--	--	7	4	5	4
8	Dudhwa	1987-88	Uttar Pradesh	--	--	90	94	98	104	76
9	Indravati	1982-83	Madhya Pradesh	--	38	28	18	15	15	29
10	Kalakad	1988-89	Tamilnadu	--	--	22	17	16	28	27
11	Kanha	1973-74	Madhya Pradesh	71	109	97	100	97	114	127
12	Manas	1973-74	Assam	69	123	92	81	94	125	65
13	Melghat	1973-74	Maharashtra	63	80	77	72	71	73	73
14	Nagarjunsagar	1982-83	Andhra Pradesh	--	65	94	44	34	39	67
15	Namdhapa	1982-83	Arunachal Pradesh	--	43	47	47	52	57	61
16	Pakhui-Nameri		Arunachal Pradesh	--	--	--	--	--	--	26 (Nameri)
17	Palamau	1973-74	Jharkhand	37	62	55	44	47	44	32
18	Panna	1994-95	Madhya Pradesh	--	--	--	25	22	22	31
19	Pench	1992-93	Madhya Pradesh	--	--	--	39	27	29	40
20	Pench		Maharashtra	--	--	--	--	--	--	14
21	Periyar	1978-79	Kerala	34	44	45	30	39	40	36
22	Ranthambhore	1973-74	Rajasthan	25	38	44	36	38	32	35
23	Sariska	1978-79	Rajasthan	19	26	19	24	25	24	22
24	Similipal	1973-74	Orissa	65	71	93	95	97	98	99
25	Sunderbans	1973-74	West Bengal	205	264	269	251	242	263	245
26	Tadoba	1993-94	Maharashtra	--	--	--	34	36	42	38
27	Valmiki	1989-90	Bihar	--	--	81	49	NR	53	53
Total				711	1121	1327	1366	1333	1498	1576

Source: Project Tiger, Ministry of Environment & Forests

NR : Not Reported by States

* : Under compilation/vetting

The tiger reserves are the specially constituted reserves representing different habitat types with the aim of maintenance of available tiger population in India in its natural environment. One of the main achievements of Project tiger launched in 1973 is the excellent recovery of habitat and increase in the population of all species of wildlife in the Reserves. Tiger population in these reserves has increased from 711 in 1979 to 1576 in 2001-02.

TABLE 3.3.9 : INDIA'S LIVESTOCK POPULATION*(In Thousand)*

Sl. No.	Livestock	Number of Animals				
		1977	1982	1987	1992	1997
1	2	3	4	5	6	7
1	Cattle	180140	192453	199695	204584	198882
2	Buffaloes	62019	69783	75967	84206	89918
3	Sheep	40907	48765	45703	50783	57494
4	Goats	75620	95255	110207	115279	122721
5	Horses & Ponnies	916	900	797	817	826
6	Pigs	7647	10071	10626	12788	13291
7	Mules	89	131	167	193	220
8	Donkeys	978	1024	958	967	881
9	Camels	1068	1078	1001	1031	911
II Other Livestock						
1	Yaks	132	128	36	58	59
2	Mithuns	129	154	129	154	177
Total		369645	419742	445286	470860	485379

Source : India Live Stock Census, Ministry of Agriculture

The livestock population in the country increased from 292 million in 1951 to the current estimate of 485 million. Grazing by Livestock puts pressure on grasslands and forests. Because of excessive grazing, natural regeneration is either absent or inadequate in 52.8% of the forests in the country.

An analysis of forests vis-a-vis livestock indicates continued free access to the forest area which has resulted in high rates of growth of livestock population causing land degradation and arresting the development of markets for forage crops. Overgrazing impedes regeneration, retards growth of vegetation, and leads to extinction of good palatable grasses which are replaced by less palatable and inferior grasses. Extensive areas have been invaded by bushes which are not browsed, excessive trampling makes the soil compact and impervious and prevents circulation of air, water, thus exposing the soil to erosion by wind and water. Degradation of the forest and grazing lands may be attributed in a large measure to an increase in the goat population, which rose by 159% from 1951 to 1997.

CHART 5 : INDIA'S LIVESTOCK POPULATION

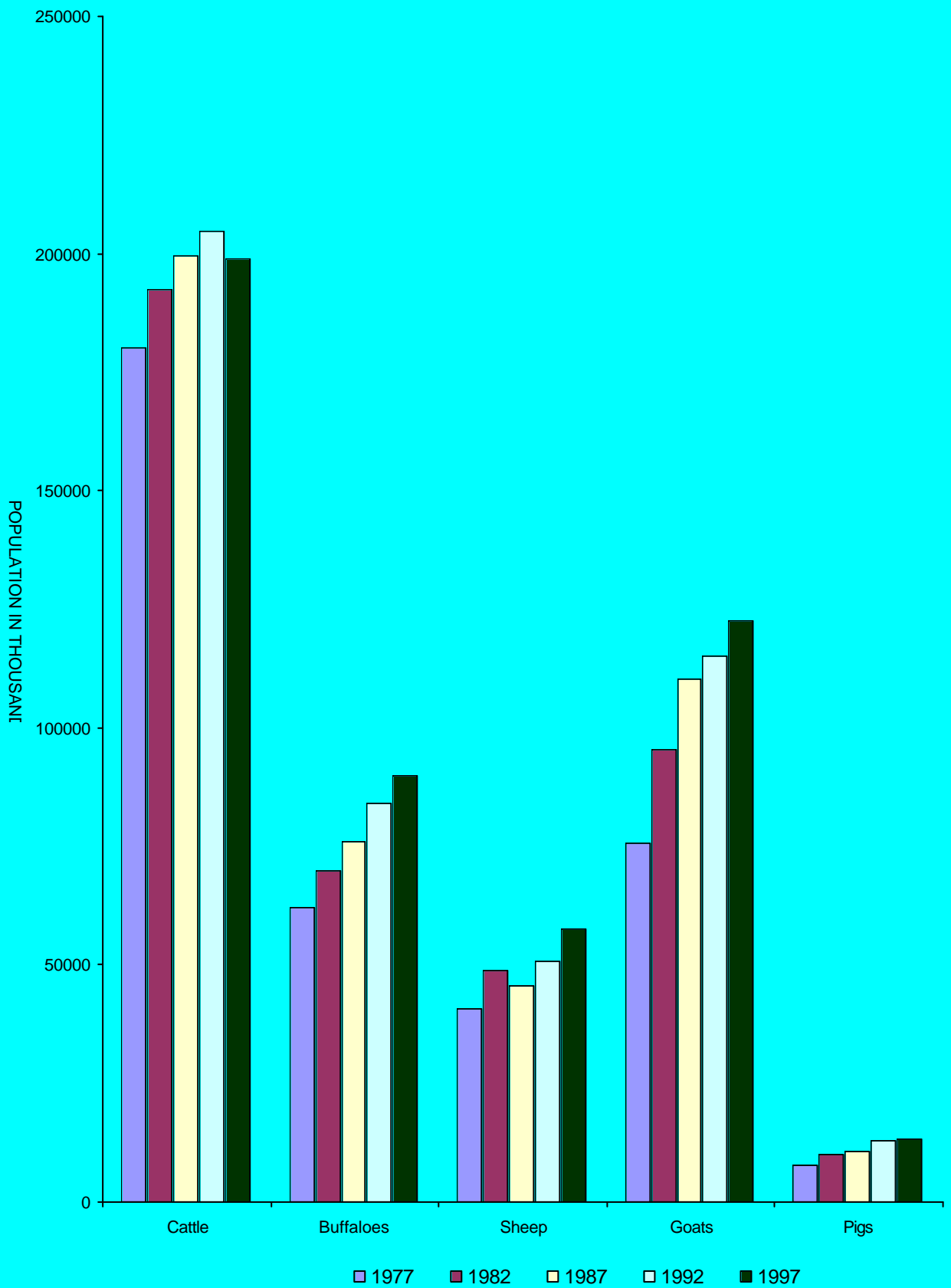


TABLE 3.3.10 : LIVESTOCK POPULATION AS PER 1997 CENSUS

FAUNA

Sl. No.	State/UTs	Cattle			Buffaloes	Sheep	Goats	Pigs	Horses and ponies	Mules	Donkeys	Camel	Yaks	Mithun	Total Livestock	Total Poultry
		Crossbred	Indigenou s	Total												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Andhra Pradesh	751	9851	10602	9658	9743	5213	748	7	1	37	0	0	0	36009	63396
2	Arunachal Pradesh	11	441	451	12	27	154	249	6	0	0	0	14	124	1037	1292
3	Assam	369	7727	8097	728	84	2717	1082	12	0	0	0	0	0	12720	18210
4	Bihar	232	24366	24598	5879	1956	20229	924	120	8	28	0	0	0	53742	19890
5	Chhattisgarh	105	8680	8786	1941	196	2154	456	9	0	1	0	0	0	13543	6771
6	Goa	7	81	88	40	0	13	105	0	0	0	0	0	0	246	790
7	Gujarat	342	6406	6749	6285	2158	4386	198	14	0	74	65	0	0	19930	7236
8	Haryana	848	1552	2401	4823	1275	968	700	49	34	63	99	0	0	10413	9225
9	Himachal Pradesh	368	1805	2174	748	1080	1168	7	13	18	8	0	7	0	5224	865
10	Jammu & Kashmir	1083	2092	3175	787	3170	1864	12	141	21	23	4	33	0	9228	5557
11	Karnataka	1293	9539	10831	4367	8003	4875	405	16	0	28	0	0	0	28526	21399
12	Kerala	1957	533	2491	111	3	1598	88	0	0	0	0	0	0	4292	18397
13	Madhya Pradesh	177	19320	19497	6648	657	6470	375	55	7	49	10	0	0	33768	7261
14	Maharashtra	2457	15615	18072	6073	3368	11434	567	42	1	71	3	0	0	39630	35392
15	Manipur	69	439	508	95	8	33	388	2	0	0	0	0	17	1051	3055
16	Meghalaya	17	738	756	17	17	280	351	2	0	1	0	0	0	1424	2152
17	Mizoram	8	26	33	5	1	15	163	2	0	0	0	0	0	222	1307
18	Nagaland	154	230	383	36	2	161	571	1	0	0	0	0	33	1188	2444
19	Orissa	912	12898	13810	1388	1765	5772	602	0	0	0	0	0	0	23338	18435
20	Punjab	1828	810	2638	6171	436	414	96	34	17	22	30	0	0	9858	11022
21	Rajasthan	211	11931	12141	9770	14585	16971	305	24	3	186	669	0	0	54655	4406
22	Sikkim	52	91	143	2	5	86	27	5	0	0	0	5	0	273	221
23	Tamil Nadu	3506	5541	9046	2741	5259	6416	609	11	0	43	0	0	0	24126	36511
24	Tripura	73	1155	1228	18	6	639	211	2	0	0	0	0	0	2105	3595
25	Uttar Pradesh	2105	17911	20016	18996	1905	11784	3135	216	84	245	31	0	0	56414	12116
26	Uttaranchal	103	1927	2031	1094	311	1070	32	23	24	1	0	0	0	4586	971
27	West Bengal	936	16895	17832	1233	1462	15648	805	18	0	0	0	0	0	36998	33309
28	A & N Islands	6	54	60	14	0	71	43	0	0	0	0	0	0	188	801
29	Chandigarh	6	1	7	23	0	1	3	0	0	0	0	0	0	35	304
30	D & N Haveli	1	59	60	4	0	20	0	0	0	0	0	0	0	84	24
31	Daman & Diu	0	5	5	1	0	5	0	0	0	0	0	0	0	11	411
32	Delhi	60	36	96	203	11	25	31	1	1	1	0	0	0	369	647
33	Lakshadweep	1	3	4	0	0	26	0	0	0	0	0	0	0	30	79
34	Pondicherry	50	23	73	4	2	41	1	0	0	0	0	0	0	121	121
	All India	20099	178782	198882	89918	57494	122721	13291	826	220	881	911	59	176	485379	347611

Source : Department of Animal Husbandry & Dairying, Ministry of Agriculture.

Note : For Bihar, Himachal Pradesh, West Bengal and Dadra & Nagar Haveli, projections were used.

TABLE 3.3.11 : FISH PRODUCTION*(Lakh tonne)*

SI No.	Year	Marine	Inland	Total
1	2	3	4	5
1	1950-51	5.34	2.18	7.52
2	1960-61	8.80	2.80	11.60
3	1970-71	10.86	6.70	17.56
4	1980-81	15.55	8.87	24.42
5	1981-82	14.45	9.99	24.44
6	1982-83	14.27	9.40	23.67
7	1983-84	15.19	9.87	25.06
8	1984-85	16.98	11.03	28.01
9	1985-86	17.16	11.60	28.76
10	1986-87	17.13	12.29	29.42
11	1987-88	16.58	13.01	29.59
12	1988-89	18.17	13.35	31.52
13	1989-90	22.75	14.02	36.77
14	1990-91	23.00	15.36	38.36
15	1991-92	24.47	17.10	41.57
16	1992-93	25.76	17.89	43.65
17	1993-94	26.49	19.95	46.44
18	1994-95	26.92	20.97	47.89
19	1995-96	27.07	22.42	49.49
20	1996-97	29.67	23.81	53.48
21	1997-98	29.50	24.38	53.88
22	1998-99	26.96	26.02	52.98
23	1999-00	28.52	28.23	56.75
24	2000-01	28.11	28.45	56.56
25	2001-02 P	28.60	31.26	59.86

Source : Statistics at a glance 2003, Ministry of Agriculture

P: Provisional**TABLE 3.3.12 : MARINE FISHERY RESOURCES OF INDIA**

Sl. No.	State/Union Territory	Continental Shelf ('000 Sq Kms.)	Number of Landing Centres	Number of Fishing Villages	App. Length of Coast Line (Kms.)
1	Andhra Pradesh	33	508	508	974
2	Goa	10	88	72	104
3	Gujarat	164	190	190	1600
4	Karnataka	27	29	221	300
5	Kerala (P)	40	226	222	590
6	Maharashtra	112	184	395	720
7	Orissa	24	67	589	480
8	Tamil Nadu	41	362	591	1076
9	West Bengal	17	65	652	158
10	Andaman & Nicobar Islands (P)	35	57	45	1912
11	Daman & Diu (P)	-	7	31	27
12	Lakshadweep (P)	4	11	10	132
13	Pondicherry	1	28	45	45
TOTAL		508	1822	3571	8118

Source: Annual Report 2002-03, Department of Animal Husbandry and Dairying, Ministry of Agriculture
(P) - Provisional

TABLE 3.3.13 : STATE-WISE FISH PRODUCTION

(Tonnes)

FAUNA

Sl. No.	States/UT's	1999-2000			2000-2001			2001-2002 (P)		
		Marine	Inland	Total	Marine	Inland	Total	Marine	Inland	Total
1	2	3	4	5	6	7	8	9	10	11
1	Andhra Pradesh	166482	380580	547062	182502	407186	589688	204940	471165	676105
2	Arunachal Pradesh	0	2395	2395	0	2500	2500	0	2600	2600
3	Assam	0	159768	159768	0	158620	158620	0	161450	161450
4	Bihar	0	254740	254740	0	222160	222160	0	240400	240400
5	Goa	62113	3509	65622	67328	4240	71568	66550	3368	69918
6	Gujarat	670951	70328	741279	620474	40261	660735	650829	50774	701603
7	Haryana	0	30000	30000	0	33040	33040	0	34568	34568
8	Himachal Pradesh	0	6995	6995	0	7020	7020	0	7215	7215
9	Jammu & Kashmir	0	19010	19010	0	17510	17510	0	18850	18850
10	Karnataka	165653	126646	292299	175906	127468	303374	128415	121196	249611
11	Kerala	593950	73900	667850	566571	85234	651805	593783	78039	671822
12	Madhya Pradesh	0	127429	127429	0	48844	48844	0	47457	47457
13	Maharashtra	397901	135390	533291	402838	123266	526104	414268	122785	537053
14	Manipur	0	15506	15506	0	16050	16050	0	16450	16450
15	Meghalaya	0	4676	4676	0	6179	6179	0	4968	4968
16	Mizoram	0	2890	2890	0	2860	2860	0	3147	3147
17	Nagaland	0	5000	5000	0	5500	5500	0	5200	5200
18	Orissa	125935	135303	261238	121086	138556	259642	113893	168056	281949
19	Punjab	0	47177	47177	0	52000	52000	0	58000	58000
20	Rajasthan	0	12968	12968	0	12121	12121	0	14269	14269
21	Sikkim	0	140	140	0	140	140	0	140	140
22	Tamil Nadu	363000	112000	475000	367855	113560	481415	370998	114000	484998
23	Tripura	0	29340	29340	0	29420	29420	0	29450	29450
24	Uttar Pradesh	0	192714	192714	0	208286	208286	0	225371	225371
25	West Bengal	180000	865700	1045700	181000	879230	1060230	184300	915800	1100100
26	A & N Islands	28147	56	28203	27618	66	27684	27021	61	27082
27	Chandigarh	0	2	2	0	82	82	0	44	44
28	Dadar & Nagar Haveli	0	29	29	0	43	43	0	55	55
29	Daman & Diu	15946	0	15946	16382	0	16382	21524	0	21524
30	Delhi	0	4300	4300	0	3980	3980	0	3200	3200
31	Lakshadweep	13600	0	13600	12000	0	12000	13650	0	13650
32	Pondicherry	38620	4210	42830	38950	4350	43300	39600	4900	44500
33	Chattisgarh	0	0	0	0	43386	43386 **	0	95763	95763
34	Uttranchal	0	0	0	0	9074	9074 **	0	6422	6422
35	Jharkhand	0	0	0	0	43600	43600 **	0	101000	101000
36	Deep Sea	30000	0	30000	30000	0	30000 @	30000	0	30000
	Fishing Sector									
	Total	2852298	2822701	5674999	2810510	2845832	5656342	2859771	3126163	5985934

Source : Department of Animal Husbandary and Dairying, Ministry of Agriculture

** : For the period December 2000 to March 2001

@ : Estimated

TABLE 3.3.14 : INLAND FISHERY WATER RESOURCES OF INDIA

Sl. No.	State/UTs	Rivers & Canals (Kms.)	Reservoirs (Lakh Ha)	Tanks & Ponds (Lakh Ha)	Floodplain Lakes & Derelict Water (Lakh Ha)	Brackish Water (Lakh Ha)
1	2	3	4	5	6	7
1	Andhra Pradesh	13,891	2.34	4.63	-	1.5
2	Arunachal Pradesh	2,000	-	2.5	2	-
3	Assam	4,820	0.02	0.26	1.27	-
4	Bihar	2,000	0.06	0.64	0.4	-
5	Chhattisgarh	3,573	0.84	0.63	-	1.47
6	Goa	250	0.03	0.03	-	-
7	Gujarat	3,865	2.43	0.71	0.12	3.76
8	Haryana	5,000	0.09	0.1	-	0.3
9	Himachal Pradesh	3,000	0.42	0.01	-	-
10	Jammu & Kashmir	27,781	0.07	0.25	0.06	-
11	Jharkhand	1,200	0.94	0.29	-	-
12	Karnataka	9,000	2.11	2.9	-	0.08
13	Kerala	3,092	0.3	0.3	2.43	2.43
14	Madhya Pradesh	17,088	2.27	0.6	-	-
15	Maharashtra	16,000	2.79	0.59	-	0.1
16	Manipur	3,360	0.01	0.05	0.04	-
17	Meghalaya	3,194	0.08	0.02	Neg	-
18	Mizoram	1,750	-	0.02	-	-
19	Nagaland	1,600	0.03	0.5	Neg	-
20	Orissa	7,219	1.96	1.16	1.8	4.18
21	Punjab	15,270	Neg	0.07	-	-
22	Rajasthan (P)	6,802	1.2	1.8	-	-
23	Sikkim	900	1.2	-	0.03	-
24	Tamil Nadu	7,420	0.52	2.56	0.07	0.56
25	Tripura	1,200	0.05	0.13	-	-
26	Uttar Pradesh	28,500	1.38	1.61	1.33	-
27	Uttaranchal	2,686	0.2	Neg.	Neg.	-
28	West Bengal	2,526	0.17	2.76	0.42	2.1
29	Andaman & Nicobar Islands	115	0.01	0.03	-	0.37
30	Chandigarh	2	-	Neg	Neg	-
31	Dadra & Nagar Haveli	54	0.05	-	-	-
32	Daman & Diu	12	-	Neg	-	Neg
33	Delhi	150	0.04	-	-	-
34	Lakshadweep	-	-	-	-	-
35	Pondicherry	247	-	Neg	0.01	0.01
Total		195,567	21.61	25.15	9.98	16.86

Source: Annual Report 2002-03, Department of Animal Husbandry and Dairying, Ministry of Agriculture
(P) - Provisional
Neg - Negligible

TABLE 3.3.15: INCIDENCE OF LIVESTOCK AND POULTRY DISEASES IN INDIA*(Jan-Dec2001)*

Sl. No.	Disease Name	Species	Number of Outbreak	Attack	Death
1	Foot and mouth disease	Bovine	2661	62522	1291
		Buffalo	19	6807	105
		Ovine/Caprine	21	12583	208
		Swine	28	82	29
		NS	789	11757	28
2	Haemorrhagic septicaemia	Bovine	1157	6280	2873
		Buffalo	380	2399	894
		Ovine/Caprine	11	1460	159
		NS	32	505	39
3	Black quarter	Bovine	846	3019	1282
		Buffalo	11	106	44
		Ovine/Caprine	1	45	41
4	Anthrax	Bovine/	170	720	447
		Buffalo	3	15	13
		Ovine/Caprine	128	456	388
		NS	5	10	7
5	Fascioliasis	Bovine	632	49095	4
		Buffalo	9	24	0
		Ovine/Caprine	117	1802	59
		Swine	2	2	0
		NS	83	9273	368
6	Enterotoxaemia	Ovine/Caprine	421	4340	1694
7	Sheep pox and goat pox	Ovine/Caprine	436	7489	1910
8	Cow pox	Bovine	5	24	0
9	Buffalo pox	Buffalo	1	28	0
10	Bluetongue	Ovine/Caprine	710	17983	1884
11	Contagious caprine pleuropneumonia	Caprine	17	968	197
12	Amphistomiasis	Bovine	231	3993	14
		Buffalo	2	7	0
		Ovine/Caprine	24	307	2
		NS	4	95	0
13	Schistosomiasis	Bovine	63	591	0
		Buffalo	1	2	0
14	Swine fever	Swine	236	13224	1195
15	Salmonellosis	Bovine	1	100	23
		Swine	24	336	6
		Avian	146	205161	5472
16	Ranikhet (New castle)disease	Avian	1395	71652	28084

TABLE 3.3.15: INCIDENCE OF LIVESTOCK AND POULTRY DISEASES IN INDIA (ConId.)
2001 (Jan-Dec)

Sl. No.	Disease Name	Species	Number of Outbreak	Attack	Death
17	Coccidiosis	Avian	998	191701	12866
		Bovine	104	17840	278
		Buffalo	31	202	0
		Ovine/Caprine	62	3745	0
		Swine	32	569	47
		NS	129	1053	194
18	Fowl pox	Avian	429	15256	1194
19	Fowl cholera	Avian	80	1494	373
20	Marek's disease	Avian	4	149	0
21	Infectious bursal (Gumboro) disease	Avian	516	153078	10777
22	Duck plague	Avian	24	1434	400
23	Canine distemper	Canine	436	2984	571
24	Rabies	Bovine	83	297	297
		Buffalo	5	41	41
		Canine	21	72	72
		Ovine/Caprine	10	65	65
		NS	11	75	75
25	Brucellosis	Bovine	2	34	1
		Ovine/Caprine	2	51	0
26	Chronic respiratory disease	Avian	165	129392	4329
27	Babesiosis	Bovine	449	9540	26
		Buffalo	15	33	0
		Ovine/Caprine	27	196	0
		Camel	1	1	0
		NS	2	56	1
28	Anaplasmosis	Bovine	36	332	0
29	Mastitis	Bovine	162	25714	9
		Buffalo	20	162	0
		Caprine	26	3940	0
30	Theileriasis	Bovine			
31	Trypanosomiasis	Bovine	49	529	62
		Camel	1	1	0
32	Mange	Bovine	88	3990	4
		Ovine/Caprine	3	18	0
		Canine	280	1303	5
		Swine	494	5917	1
		NS	1	150	0
33	Peste Des Petits Ruminants(PPR)	Ovine/Caprine	321	35125	5479
34	Coryza	Avian	5	1207	779

Source: Annual Report 2002-03, Department of Animal Husbandry and Dairying, Ministry of Agriculture