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**Natural Resources -
Survey
&
Exploration**

Survey of Flora

Botanical Survey of India

Introduction

The Botanical Survey of India (BSI) was established in 13th February, 1890 with the basic objective to explore the plant resources of the country and to identify the plants species with economic virtues. It remained quiescent till 1954, when Government as a part of scientific development of the country re-organised this department. During the successive plan periods, the functional base of Botanical Survey of India was further expanded to include various new areas such as inventorising of endemic, rare and threatened plant species; evolving conservation strategies; studies on fragile ecosystems and protected areas like Sanctuaries, National Park and Biosphere Reserve; monitoring of changes in floristic components; conservation; multiplication and maintenance of germplasm of plant genetic resources, endemic and threatened species, wild ornamentals etc., in Botanic Gardens and Orchidaria; ethnobotanical and geobotanical studies and development of National Database on Herbarium (including type specimens) and live collections, plant genetic resources, plant distribution and nomenclature. Headquarter of BSI is located at Kolkata and its various circles are located throughout the country. The BSI has opened its Decan Circle in Hyderabad on 15th December, 2005.

Objectives

The objectives of BSI are:

- ◆ Exploration, inventorisation and documentation of phytodiversity in general and protected areas, hotspots, fragile ecosystems and sacred groves in particular; publication of National, State and District Floras.
- ◆ Monitoring Phytodiversity to evaluate the qualitative changes in species rich and sensitive areas; *ex-situ* conservation of critically threatened taxa in botanical gardens.
- ◆ Identification of species with traditional economic uses and preparation of protocols for their conservation and sustainable utilization.
- ◆ To complete a National database of plant species, herbarium specimens, live specimens, illustrations, relatives of cultivated species and economically important species.
- ◆ Survey, inventorisation and documentation of non-flowering plants.
- ◆ Qualitative and quantitative study of the diversity of selected economically useful species.
- ◆ Develop and maintain botanical gardens, musea and herbaria.
- ◆ Preparation of Pollen Atlas of Indian Plants.

Activities undertaken under various programmes during the year

Forty-four field/ exploration/ collection tours were undertaken by different circle offices and units of BSI covering various parts of the country including National Parks and Sanctuaries and Wetlands. During the field/ exploration /collection tours, more than 4,500 specimens have been collected including lower groups of plants viz. Algae, Fungi, Lichens, Bryophytes and Pteridophytes. About 3,500 specimens belonging to 385 species were identified by different circles/units of BSI.

Twelve herbarium consultation tours/study tours were also undertaken in connection with the following revisionary and floristic studies under National/ State/ Regional flora.

- ◆ Flora of India; Orchidaceae (Genus: Oberonia, Microstylis, Liparis, Oreorchis & Corallorrhiza)

- ◆ Flora of India: Lamiaceae (Plectranthus group incl. Coleus)
- ◆ Pteridophytic flora of Western Himalayas
- ◆ Monocot Flora of Dibang Valley, Arunachal Pradesh
- ◆ Flora of Uttar Pradesh, Vol.II
- ◆ Coastal & Marine Flora of Malvan Marine Sanctuary, Goa
- ◆ Floristic Diversity of Upper Subansiri District, Arunachal Pradesh
- ◆ Flora of Tawang District, Arunachal Pradesh
- ◆ Flora of Nongkhylllem Wildlife Sanctuary, Meghalaya
- ◆ Flora of Sikkim (Family: Rubiaceae)
- ◆ Preparation of Checklist of Algal Flora of India.

Documentation of Phytodiversity

National Flora (Flora of India)

- ◆ Orchidaceae (Genera – *Oberonia*, *Microstylis*, *Liparis*, *Orcorchis* & *Corallorrhiza*): Manuscript of 26 species completed.
- ◆ Lauraceae (Excl. *Litsea*, *Neolitsea* & *Lindera*): Completed taxonomic description of 18 species of *Actinodaphne*, *Cryptocarya*, *Alseodaphne*, *Deilschmiedia*, *Cinnamomum*, *Dodecadenia*.
- ◆ Cyperaceae (Genus – *Kylinga*, *Pycreus*, *Mariscus* & *Courtoisina*): Made description for four species and corrected 2 descriptions made earlier.
- ◆ Similacaceae: Completed the manuscript for 23 species of *Smilax* & two species of *Heterosmilax*. Key to the species is under preparation.
- ◆ Orchidaceae (13 genera excluding *Oberonia*, *Microstylis*, *Liparis*, *Orcorchis* & *Corallorrhiza*): Completed studies on 15 species.



Fig 1. Flame of Forest – an ornamental flower in Nehru Park, Delhi



Fig 2. Golden Lily in Nandadevi National Park

- ◆ Thymelaeaceae (13 genera, 27 species): Studied nine species belonging to genera *Wikstroemia*, *Aquilaria*, *Gnidia*, *Phaleria*, *Enkleia*.
- ◆ Loganiaceae (Seven genera, 27 species): Completed the taxonomic description of *Fabraea*, *Gardneria*, *Gelsemium*, *Spigelia*, *Strychnos thorelii*.
- ◆ Acanthaceae (Six genera, 50 species): Completed description of six species of *Lepidagathis* and two species of *Dicliptera*.

- ◆ Lamiaceae (Plectranthus group incl. Coleus): Completed 15 species.
- ◆ Amaranthaceae (Nine genera, 55 species): Completed taxonomic description of 15 species.
- ◆ Ranunculaceae (Genus – *Ranunculus*): Studied several specimens of *Ranunculus* housed in Royal Botanic Garden, Kew and in British Museum. Relevant protologues compiled.

Regional Flora

- ◆ Pteridophytic Flora of Western Himalaya: 32 species completed.
- ◆ Aphyllorphales of North West Himalaya: 45 species completed.
- ◆ Flora of Cold Deserts of Western Himalaya, Vol.II: five species completed.
- ◆ Flora of India Botanic Garden: manuscript of 17 species completed.
- ◆ Flora of Barapani Experimental Garden, Shillong:
 - ◇ Prepared nomenclature cards for 113 monocot species
 - ◇ Identified 40 herbarium specimens collected from the garden
 - ◇ Completed taxonomic description of 145 species of Orchidaceae, 32 species of Poaceae, 18 species of Zingiberaceae and 21 species of Arecaceae
 - ◇ Communicated a research paper entitled ‘Orchidaceae of Botanical Garden of Barapani’ which includes 135 species belonging to 45 genera

State Flora

- ◆ Flora of Assam, Vol.II: Manuscript finalized and is under publication.
- ◆ Flora of Mizoram, Vol.II: Taxonomic description of 97 species completed.
- ◆ Flora of Sikkim: Taxonomic description of 52 species completed.
- ◆ Flora of Uttar Pradesh, Vol.II: Taxonomic description of 199 species completed.
- ◆ Flora of Jammu & Kashmir, Vol.II: Taxonomic description of 98 species completed.



Fig 3. *Cratava nurvala* – a medicinal specie in flowering



Fig 4. *Clematis hedysarifolia* in flower

◆ Flora of Kerala, Vol.II:

◇ Rubiaceae: Literature collected completed for all taxa in terms of citations and distribution.

◇ Asclepiadaceae, Periplocaceae: Described 15 species and collected literature on *Pergularia*, *Marsdenia*, *Ceropegia*, *Caralluma*.

◇ Mimosaceae, Apiaceae, Araliaceae, Hydrophyllaceae: Completed rewriting as per new format for 10 genera & 30 species of Mimosaceae, 15 genera & 20 species of Apiaceae, three genera & 10 species of Araliaceae and one species of Hydrophyllaceae.

◇ Asteraceae (Tribe – Anthemideae, Asteraceae, Heliantheae and Iruleae): Regional flora references to 35 species added.

◆ Flora of Andaman & Nicobar Islands, Vol. II:

◇ Boraginaceae & Hydrophyllaceae: Writing of manuscript is in progress

◇ Nyctaginaceae, Aristolochiaceae: Specimens belonging to Nyctaginaceae & Aristolochiaceae critically examined and listed.

◇ Aviceniaceae & Loganiaceae: Completed both the families.

◇ Lentibulariaceae, Gesneriaceae, Bignoniaceae, and Cassytheaceae: Completed all the families.

◆ A revised checklist (upto class gamopetalae) for the Flora of Andaman & Nicobar Islands have been finalized after consultation of various publications (upto 2005) and herbarium specimens deposited in the herbarium of BSI – Andaman & Nicobar Circle, Port Blair.

◆ Flora of West Bengal, Vol.II: Manuscript finalized and is under publication.

◆ Flora of West Bengal, Vol. III:

◇ Acanthaceae – Final manuscript comprising of 36 genera & 132 species have been submitted;

◇ Asteraceae – Completed description of 20 species. Manuscript is under preparation and illustrations completed for three species;

◇ Araceae & Cyperaceae – Completed description of 10 Cyperus species and Araceae family comprising 40 species completed;

◇ Polemoniaceae & Menyanthaceae – Completed taxonomic description of two genera & two species.

- ◆ Pteridophytic Flora of West Bengal: Introductory chapters for the flora and work of eleven families have been completed.
- ◆ Flora of Lakshadweep Islands: 52 field numbers of specimens have been identified.

District Flora

- ◆ Sangli district, Maharashtra: Checklist of plants completed.
- ◆ Moss Flora of Tawang District, Arunachal Pradesh: Survey work completed; 250 specimens have been identified. In total 950 specimens out of the collected 1028 specimens were identified.
- ◆ Flora of Mareduilli District, Andhra Pradesh: Manuscript of 900 species with key to the families has been completed.
- ◆ Flora of Medak District, Andhra Pradesh: The manuscript being finalized and almost 90% corrections were carried out and will be submitted for publication shortly.
- ◆ Lichen Flora of North 24 Paraganas district, West Bengal: Project completed and manuscript is being prepared.

Documentation of indigenous knowledge of plant resources

Ethnobotanical study of Jharkhand

Eighty four plant specimens, collected from Ranchi district were identified. Thirty five ethnobotanical data have also been collected from literature for comparison.

Taxonomic study of Aromatic Plants and Cosmetic yielding plants in India

Taxonomic studies of 125 Aromatic Plants and Cosmetic yielding plants have been completed.



Fig 5. Wild Turmeric in bloom

Micropropagation Activities and *Ex-situ* conservation

Under Micropropagation and *ex-situ* conservation, following activities were continued:

- ◆ Micropropagation of rare, endangered plants in Experimental Botanic Garden, BSI, South Circle, Yercaud
- ◆ Micropropagation of rare, endangered and threatened plants of North East India in Experimental Botanic Garden, BSI, Eastern Circle, Shillong
- ◆ *Ex-situ* conservation in the Indian Botanic Gardens of BSI

Chemical/Pharmacognostic studies on Indian Flora

The following projects under the programme were continued during the year:

- ◆ Isolation of flavanoids from *Bauhinia* plants and its contribution to the chemotaxonomy of the family Leguminosae
- ◆ Phytochemical investigations of endangered plant species in India including Negative List of Export and their Biological Assessment.
- ◆ Pharmacognostic Studies on the selected plants of the Negative list of Export.

Special information

New Species/Variety Discovered

<i>Flickingeria abhaycharanii</i> Phulkan & Mao	[Orchidaceae]
<i>Porphyra malvanensis</i> Anil Kumar & P.S.N. Rao	[Rhodophyceae]
<i>Eriocaulon peninsulare</i> Punekar & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon maharashtrense</i> Punekar & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon apetalum</i> Punekar, Malpure & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon cookie</i> Punekar, Malpure & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon koynense</i> Punekar, Malpure & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon sahyadricum</i> Punekar, Malpure & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon anshiense</i> Punekar, Malpure & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon konanense</i> Punekar, Malpure & Lakshminarasimhan	[Eriocaulaceae]
<i>Eriocaulon kanarense</i> Punekar, Watve & Lakshminarasimhan	[Eriocaulaceae]
<i>Arisaema murrayi</i> var. <i>sonubeniae</i> P. Tetali, Punekar & Lakshminarasimhan	[Araceae]
<i>Strobilanthes pothigainesis</i> R. Gopalan & V. Chithra	[Acanthaceae]
<i>Symplocos nootiboomiana</i> R. Gopalan & V. Chithra	[Symplocaceae]
<i>Symplocos shettyana</i> R. Gopalan & V. Chithra	[Symplocaceae]
<i>Festuca sanjappae</i> K. Chandrasekar & S.K. Srivastava	[Poaceae]
<i>Tragia sanjappae</i> Chakrab. & N.P. Balakr.	[Ephorbiaceae]
<i>Tragia praetervisa</i> Chakrab. & N.P. Balakr.	[Ephorbiaceae]

New Records for India

<i>Bulbophyllum ambrosia</i> (Hance) Schltr	[Orchidaceae]
<i>Cleisostoma duplicilobum</i> (J.J. Sm.) Garay	[Orchidaceae]
<i>Ehrharta stipoides</i> Labill.	[Poaceae]

<i>Megistostigma burmanicum</i> (Kurz) Airy Shaw	[Euphorbiaceae]
<i>Waldheimia huegelli</i> (Sch.Bit.) Tzvelev	[Asteraceae]
<i>Amandinea extenuate</i> (Mull. Arg.) Marbach	[Physciaceae] – Lichens
<i>Anisomeridium ambiguum</i> (Zahlbr.) R.C. Harris	[Pyrenulaceae] – Lichens
<i>Echinoplaca argentea</i> (Mont.) R. Sant.	[Gomphillaceae] – Lichens
<i>Enterographa mesomela</i> Sparrius <i>et.al</i>	[Opegraphaceae] – Lichens
<i>Strigula hypothallina</i> R.C. Harris	[Strigulaceae] – Lichens
<i>Tapellaria malmei</i> R. Sant.	[Ectolichiaceae] – Lichens

New Record for State

<i>Bulbophyllum ambrosia</i> (Hance) Schltr	[Orchidaceae] – Meghalaya
<i>Cleisostoma duplicilobum</i> (J.J. Sm.) Garay	[Orchidaceae] – Nagaland
<i>Neottia alternifolia</i> (Kind & Prantl.) Szlach.	[Orchidaceae] – Arunachal Pradesh
<i>Enydra fluctans</i> Lour.	[Asteraceae] – Rajasthan
<i>Polysiphonia unguiformis</i> Boergesen	[Rhodomelaceae] – Maharashtra
<i>Xyris indica</i> L.	[Xyridaceae] – Andaman & Nicobar Islands
<i>Boerhaavia procumbens</i> Banks ex Roxb.	[Nyctaginaceae] – Andaman & Nicobar Islands
<i>Mischodon zeylanicus</i> Thw.	[Euphorbiaceae] – Andaman & Nicobar Islands
<i>Plecosperrum spinosum</i> Trec.	[Moraceae] – Arunachal Pradesh
<i>Byssoloma leucoblepharum</i> (Nyl.) Vainio	[Pilocarpaceae] – Sikkim (Lichens)

Plants collected after 30 years or more

- ◆ *Peranema cyatherides* D. Don – a rare, endangered and threatened pteridophytic species of Peranemataceae family collected after 93 years from Uttaranchal.
- ◆ *Taxocarpus concanensis* Hook. F. – a rare, endangered and threatened species of Apocynaceae collected after 50 years from Maharashtra.
- ◆ *Agapetes smithiana* Sleum. – a rare, endangered and threatened species of Ericaceae collected after 30 years from Sikkim.
- ◆ *Elaeocarpus accumintus* – a Red Data Book plant collected from Dibang, Arunachal Pradesh.

Publication

- ◆ A checklist of Marine Algae housed in Central National Herbarium and Industrial Section Indian Museum has been finalized and is under publication.
- ◆ Twenty three crude drug samples received



Fig 6. *Bentinckia nicobarica* – a palm endemic to Nicobar Islands

from Customs Authorities have been pharmacognostically studied, identified and authenticated. Materials have been collected and computerized for the preparation of 'A Manual of CITES plants in India (Negative List of Export)'.

Major Training/ Seminars/ Symposia/ Workshops organized

- ◆ BSI – Northern Circle, Dehradun organized 3 days “National Symposium on Plant Science Research in India: Challenges & Prospects and 28th Indian Botanical Conference” on 24-26 October, 2005. More than 500 delegates attended the conference/Symposium. The Symposium was inaugurated by His Excellency The Governor of Uttaranchal and many Stalwarts of Botany like Prof. H.Y. Mohan Ram, Prof. A.K. Kaul, Prof. S.N. Chaturvedi, Prof. S.V.S. Chauhan, Prof. P.M. Swamy, Prof. T. Pullaiah, Prof. A.N. Purohit, Dr. R.R. Rao, and Director, Additional Director & Senior Scientists of BSI were present during Symposium and Conference.
- ◆ ENVIS Centre, BSI, organized a workshop on Herbarium Tech. & methodology on 12th-13th March, 2005. 95 researchers including 75 post graduate students of taxonomy specialization from different universities participated in the workshop.
- ◆ National Orchidarium & Experimental Garden, Yercaud imparted training on Plant Tissue Culture programme from 02.06.05 to 30.06.05 and participated in 29th Annual flower show at Yercaud and received 2nd prize.
- ◆ The Andaman & Nicobar Circle of BSI conducted a training programme of IFS probationers for their job training at Port Blair by enlightening them about endemic plants of Andaman Islands.
- ◆ Employees of BSI attended the training on IT awareness and e-Governance organized by CMC Limited at Kolkata, New Delhi, Coimbatore & Pune.

Survey of Fauna

Zoological Survey of India

Introduction & Objectives

The Zoological Survey of India (ZSI), a premier institute under the Ministry, has been undertaking survey, exploration and research leading to the advancement of our knowledge on the exceptionally rich faunal diversity of the country since its inception in 1916. With its headquarters at Kolkata and 16 Regional Stations located in different parts of the country, ZSI in recent years, has reoriented its plan of work by grouping the survey and studies under the following five major programmes:

- ◆ Fauna of States
- ◆ Fauna of Conservation Areas
- ◆ Fauna of Important Ecosystems
- ◆ Status Survey of endangered species, and
- ◆ Ecological Studies/Environment Impact Assessment Survey.

Besides these, the ongoing Fauna of India programme was also continued.

Activities undertaken during the year

- ◆ One hundred and one extensive faunal surveys were undertaken to different States/UTs including important ecosystems and some selected conservation/protected areas.
- ◆ Two status surveys one for Tibetan Wild Ass (Kiang) and another for Himalayan Marmot of Ladakh were carried out.

- ◆ Two environment impact assessment surveys, one rapid survey was conducted from Iona Bangalow to Hindu Gymkhana, Mahabaleshwar (Maharashtra) and another to Rowghat of Bhilai Steel Plant in Orissa.
- ◆ Several short duration intensive surveys for ecological studies were also undertaken
- ◆ Detailed taxonomic studies were carried out on the material collected during these as well as earlier surveys.
- ◆ Ecological studies including status survey of endangered animals and studies on some other projects like documentation of some important faunal groups were continued.
- ◆ The National Zoological Collection was further enriched by the addition of 11294 identified specimens belonging to 592 species.
- ◆ Identification and Advisory Services were rendered to 142 individuals or institutions in India and abroad. The training courses were also organized under Training and Extension Programme.

Details of Activities/Achievements made under various programmes

Faunal Explorations and Surveys

Wetlands Ecosystems

A total of twenty two extensive surveys, eight in Himachal Pradesh, five in Govind Sagar, two in Pong Dam and one in Moolbury Watershed and Beas River, two surveys each in Bhoj Wetland in Madhya Pradesh, Pulicat Lake in Tamil Nadu and Hooghly River in West Bengal were conducted. Besides one survey each to Flood Plain Wetland (Assam), Chauris of Ganges River in North Bihar, Shoreline habitats of southern Orissa, Nayar River Valley of Paurigarhwal in Uttaranchal State, Nal-Sarovar in Gujarat and to Madhupur-Bhagwanpur in Bihar were also undertaken.



Fig 7. Cheetals (*Axis axis*) at Pench Tiger Reserve, Madhya Pradesh

Deserts Ecosystem

One extensive faunal exploration to Cold Desert of Ladakh in Jammu & Kashmir was carried out.

Estuarine Ecosystem

Under this ecosystem, Vamsadhara Nagavali Estuary in Andhra Pradesh was extensively surveyed.

Coastal/Marine Ecosystem

Three extensive surveys, one to Orissa Coast and two to Gulf of Mannar Islands (Tamil Nadu) were carried out.

Biosphere Reserve Conservation Area

One survey to Amarkantak in Chhattisgarh State was carried out.

National Parks Conservation Area

A total of 13 surveys, four to Pench in Maharashtra, three to Kangerghati and two to Bandhavgarh in Madhya Pradesh and one survey each to Hazriabagh in Bihar, Hemis in Jammu and Kashmir, Keoladeo Ghana in Rajasthan and Kudermukh in Karnataka were carried out.

Wildlife Sanctuaries Conservation Area

A total of eleven faunal explorations, three to Bhimshankar and two to Lonar in Maharashtra, two to Talchapar in Rajasthan, two to Simbalbara in Himachal Pradesh and one survey each to Pabitora in Assam and one to Point Calimere Bird Sanctuary in Tamil Nadu were carried out.

Tiger Reserve Conservation Area

Five surveys, two each to Corbett in Uttaranchal and Sariska in Rajasthan and one to Kanha in Madhya Pradesh were carried out.

States and Union Territories

Under this programme, 42 surveys were conducted in several districts of Andhra Pradesh, Arunachal Pradesh, Assam, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, Rajasthan, Tamil Nadu, Goa, Gujarat, Orissa, Uttaranchal and West Bengal.

Ecological/Status Survey

Two status surveys one for Tibetan Wild Ass (Kiang) and another for Himalayan Marmot of Ladakh were carried out during the year.

E.I.A. Survey

One rapid survey of Aerial Ropeway from Iona Bangalow to



Fig 8. Starred Tortoise – an endangered species, needs protection



Fig 9. Adjutant Stork in grassland ecosystem



Fig 10. Great Indian Bustard (*Ardeotis nigriceps*) at Desert National Park, Rajasthan

Hindu Gymkhana, Mahabaleswar (Maharashtra) and another to Rowghat of Bhilai Steel Plant in Orissa were carried out.

Research Activities

Identification of New Taxa

During the year, following taxa were discovered as new to science.

Phylum - Arthropoda
Class - Insecta
Order - Hymenoptera
Family - Pteromalidae

1. *Macroglenus sivani* sp. nov.
2. *Theocolax radhakrishnani* sp. nov.
3. *Ophelosia maculata* sp. nov.

Family – Eurytomidae

4. *Totramesa calicutensis* sp. nov.

Class – Crustacea

Family – Daphniidae

5. *Simocephalus goensis* sp. nov.

Taxonomic Studies

The research work carried out on the fauna collected from different states, conservation areas and other ecosystems are as follows:

Fauna of India

The following volume was published during the year Fauna of India : Aquatic Oligochaeta.

Fauna of States

Details of the number of specimens collected and species identified (in parentheses), based on collections made from different states are given in Table-1.

Fauna of Conservation Areas

Tiger Reserve

Sariska (Rajasthan)

Six specimens pertaining to two species of Nematoda and 15 specimens belonging to 15 species of Coleoptera: Scarabaeidae were studied and determined.

National Parks

Pench, Maharashtra

154 specimens pertaining to five species of Thysanoptera and five specimens belonging to five species of Mantodea were studied and identified.

Tadoba, Maharashtra

Eighty three specimens comprising four species of Pisces were studied and recognized.

Sanjay Gandhi, Borivali, Maharashtra

Two hundred and thirty three specimens consisting of 11 species of Hemiptera were studied and identified.

Kangerhati (Chhattisgarh)

As a result of studies conducted on the fauna of this park, 15 specimens belonging to five species



Fig 11. Gaur (*Bos gaurus*) at Pench Tiger Reserve, Madhya Pradesh

Table-1
Groups of Animal collected, Numbers of Specimens and species (in parenthesis)

States/UT's	GROUPS										
	Rotifera	Nematoda	Annelida	Mollusca	Odonata	Isoptera	Hemiptera	Mantodea	Lepidoptera	Coloptera	
Assam	21(9)	-	-	-	-	-	-	-	-	-	-
Andhra Pradesh	-	-	-	17(5)	-	-	-	-	-	-	-
Goa	-	-	-	71(24)	111(17)	-	-	-	-	-	-
Gujarat	-	13(7)	-	-	-	-	-	-	-	-	27(5)
Himachal Pradesh	-	-	37(4)	-	-	-	-	-	-	-	-
Karnataka	-	-	-	76(8)	-	-	-	-	-	-	-
Kerala	-	-	-	-	101(20)	-	-	-	-	-	-
Maharashtra	-	-	-	-	152(9)	-	10(4)	1(1)	-	-	-
Orissa	-	-	-	-	-	-	-	1(1)	-	-	-
Rajasthan	-	94(20)	-	-	-	1266(17)	-	-	-	-	1078(15)
Tamil Nadu	-	-	156(18)	-	-	-	-	-	-	-	-
Uttaranchal	-	23(9)	-	-	-	-	384(25)	-	71(15)	-	-
Uttar Pradesh	-	-	-	-	-	-	6(5)	-	-	-	-
West Bengal	-	-	69(4)	-	-	-	-	-	-	-	-

States/UT's	Hymenoptera	Crustacea	Acarina	Araneae	Scorpionid	Chilopoda	Pisces	Amphibia	Reptilia	Mammalia
Assam	-	13(7)	-	-	-	-	-	9(6)	5(1)	-
Andhra Pradesh	-	-	-	-	43(2)	-	324(27)	-	-	-
Arunachal Pradesh	25(9)	-	93(2)	-	-	-	-	-	-	-
Goa	-	444(21)	-	14(4)	-	4(7)	66(12)	71(6)	-	-
Karnataka	-	-	-	-	-	-	55(13)	174(7)	-	-
Kerala	20(8)	-	-	-	-	-	663(15)	-	-	-
Madhya Pradesh	-	-	-	-	35(6)	-	-	-	-	-
Maharashtra	-	-	-	-	-	2(1)	39(5)	-	1(1)	20(3)
Meghalaya	-	-	-	-	-	-	60(10)	-	3(1)	-
Nagaland	-	-	-	-	-	-	78(10)	5(3)	26(8)	-
Orissa	27(11)	-	-	-	-	-	-	-	-	-
Rajasthan	-	-	-	5(1)	-	-	-	-	-	-
Uttaranchal	96(25)	-	85(4)	-	-	-	2(2)	18(8)	13(8)	5(3)

of Odonata, 116 specimens comprising 38 species of Lepidoptera, 17 specimens pertaining to six species of Coleoptera: Scarabaeidae and 44 specimens consisting of two species of Acarina were determined.

Hazaribagh, Bihar

Nine specimens belonging to four species of aquatic Hemiptera, 10 specimens comprising two species of Lepidoptera and five specimens pertaining to two species of aquatic Coleoptera were studied and identified.

Pin Valley, Himachal Pradesh

Thirty Six specimens comprising three species of Oligochaeta (earthworms) and 17 specimens pertaining to one species of Pisces were studied and recognized.

Bandhavgarh, M.P.

Fourteen specimens belonging to six species of Odonata and 159 specimens comprising 30 species of Lepidoptera were studied and determined.

Bannerghata, Karnataka

As a result of studies conducted on the fauna of this park, six specimens pertaining to six species of Rotifera, 1796 specimens comprising 16 species of Hemiptera, 63 specimens belonging to eight species of Orthoptera and 140 specimens consisting of four species of Crustacea were identified.

Kudremukh, Karnataka

On hundred and five specimens belonging to six species of Pisces were studied and recognized.

Keoladeo, Rajasthan

Nineteen specimens comprising 11 species of Cladocera: Crustacea (zooplanktons) were studied and determined.

Ranthambore, Rajasthan

Taxonomic studies on the fauna of this park were continued and four specimens belonging to four species of Odonata, 18 specimens comprising nine species of Isoptera, four specimens pertaining to four species of Dermoptera, four specimens consisting of two species of Orthoptera, 188 specimens belonging to 12 species of Coleoptera, 24 specimens belonging to 15 species of Hymenoptera and two specimens pertaining to two species of Scorpionida were identified.

Wildlife Sanctuaries

Pabitora, Assam

As a result of studies conducted on the zooplankton diversity of 12 perineal and ephemeral flood plain lakes of this sanctuary, 64 species of Rotifera belonging to 21 genera under 15 families were recognized.



Fig 12. A pair of Sambar Deer in natural habitat

Lonar Crater (Maharashtra)

Two specimens belonging to two species of Rotifera, 38 specimens comprising 11 species of Mollusca, six specimens belonging to three species of Scorpionida and one specimen (one species) of Pisces were determined.



Fig 13. A python (*Python molurus*) in a grassland forest

Talchhapar, Rajasthan

The taxonomic investigation recorded on the fauna of this sanctuary includes six specimens comprising six species of Nematoda including one species recorded for the first time from the state, 248 specimens pertaining to seven species of Isoptera, 97 specimens belonging to 13 species of Coleoptera and two specimens consisting of two species of Scorpionida.

Bhimsankar (Maharashtra)

One specimen pertaining to one species of Chilopoda was determined.

Fauna of Important Ecosystems

Desert

Thar Desert

A total of 790 specimens comprising 12 species of Coleoptera were studied and determined.

Himalayan

Western Doon Shiwaliks, Uttaranchal

Fifteen specimens belonging to eight species of Amphibia were studied and recognized.

Fresh water/Riverine/Wetlands

Nal-Sarovar, Punjab

Two specimens belonging to two species of Rotifera and four specimens pertaining to two species of Coleoptera were studied and recognized.

Bhoj, M.P.

Two specimens belonging to two species of Ostracoda: Crustacea and six specimens comprising three species of Cladocera: Crustacea were studied and determined.

Madhupur-Bhagwanpur, Bihar

Eleven specimens consisting of seven species of aquatic Hemiptera and six specimens comprising of three species of semi aquatic Coleoptera were studied and identified.



Fig 14. Crest serpent eagle – a species rarely found

Pong dam, Himachal Pradesh

Eight specimens comprising of five species of Pisces and four specimens pertaining to two species of Amphibia were studied and recognized.

Western Watersheds Simla, H.P.

In connection with the studies on the faunal diversity and their relationship with flora and socio-economy, the data on the pests/parasites/predators/pollinators for two watersheds was prepared.

Flood plain lakes Assam

As a result of studies conducted on zooplankton diversity of flood plain wetlands of this state, the plankton samples collected from different beels of Kamrup district were analyzed and 54 specimens belonging to 45 species of Rotifera and four specimens pertaining to three species of Cladocera:Crustacea were determined.

Korapuzha, Kerala

One hundred and fifteen species pertaining to 24 species of Pisces were studied and identified.

Nayar River, Pauri Garhwal, Uttaranchal

Eight specimens belonging to eight species of Pisces were studied and identified.

Govind Sagar, H.P.

Thirty specimens comprising three species of Oligochaeta, 16 specimens belonging to two species of Pisces and eight specimens pertaining to one species of Amphibia were studied and recognized.

Shoreline habitats, South Orissa

Twelve specimens pertaining to three species of Hymenoptera, three specimens belonging to two species of Mantodea and 10 specimens one species) of Diptera were studied and identified.

Estuarine

As a result of studies conducted on the fauna of this estuary three specimens comprising one species of Coelenterata: Valeillidae, 12 specimens belonging to three species of Crustacea and 17 specimens comprising 5 species of Pisces were recognized.

Coastal/Marine

Kerala Coast

Twenty five specimens belonging to five species of Porifera (marine sponges) and 38 specimens comprising 12 species of Mollusca were studied and determined.

Orissa Coast

One hundred and nineteen specimens belonging to 52 species of Pisces were studied and identified.



Fig 15. Chinkara (*Gazella gazella*) at Desert National Park, Rajasthan

Tamil Nadu Coast

The physico-chemical and biological parameters were analysed from the seawater, collected all along the coast of Tamil Nadu as part of the rapid assessment of impact of tsunami on this coast. The salinity of seawater ranged from 28.50 to 32.80 ppt at Pitachavaram and Nagapattinam respectively, while pH varied between 7.82 at Karaikal and 8.17 at Poomarichan Island, Mandapam. The total cell count and species diversity of phytoplankton found to be maximum at Kilakarai and minimum at Colachel and their values were 138.06 No. 10 L & 3.21 and 61.38 No. X 10 L & 1.87 respectively. Like phytoplankton, zooplankton also followed the similar trend of variation of their numerical abundance and species diversity. However, zooplankton numerical density ranged from 8730 to 38660 in 100 m while, species diversity varied from 1.10 to 2.28 at Kilakarai and Colachel respectively.

Besides, 11 specimens pertaining to two species of Porifera (Marine sponges) were studied and recognized.

Maharashtra Coast

A total of 248 specimens pertaining to 37 species of Pisces were studied and identified.

South Eastern Coast: Pulicat Lake

As a result of studies conducted on the seasonal variation and faunal composition of this lake, a total of 22 species belonging to seven groups of zooplanktons 15 species of Mollusca and six species of Pisces were determined.



Fig 16. Some of the marine fishes (*molluscas and crustaceans*) used for processing

Other studies

Pictorial Handbook on Butterflies

The diagnostic characters of 15 species of Lepidoptera (Butterflies) were written out.

Pictorial Handbook on Brachyuran crabs of East Coast of India

Additional drawings were made of the figurative keys for *Doclea canalifera* Stempson

Identification and Advisory Services

The ZSI continued to render identification and advisory services free of cost of research and teaching institutes in India and abroad, Central and State Government/Agencies, Non-governmental organization, industries and individuals on Zoological matters.

Development of National Zoological Collection

The ZSI, which is a national repository of Zoological specimens, maintains the collection of a large number of identified examples of species belonging to almost all groups of animals of the country. The National zoological collection was further enriched by the addition of 11294 identified specimens pertaining to 590 species.

Training and Extension

Three training courses on (i) Environmental Awareness and Wildlife Preservation, (ii) Collection, Preservation and Identification of insects and mites of economic importance, and (iii) Refresher course in Collection and Preservation Techniques were organized during the year.

Publications

Fauna of India

- ◆ Aquatic Oligochaeta

Records of Zoological Survey of India

- ◆ Vol. 104, Part 1 to Part 4
- ◆ Vol. 105 Part 1 to Part 4

Occasional Papers

- ◆ Catalogue of Chiroptera in the collection of Zoological Survey of India (Part I: Megachiroptera)
- ◆ Echinodermata of Andaman & Nicobar Islands, Bay of Bengal: An Annotated list.
- ◆ Ants (Hymenoptera:Formicidae) of Rabindra Sarovar, Kolkata
- ◆ Hydrography in relation to Berchic Macro Invertebrates in Mir-Alam Lake, Hyderabad, Andhra Pradesh

Memoirs of the Zoological Survey of India

Studies on some spiders from Eastern Coastal Region of India. Vol. 20, No. 3.

Handbooks & Pictorial Guides

- ◆ Birds of Chennai
- ◆ Dragonflies & Damselflies of Kerala
- ◆ Reef-Dwelling fishes of India, Parrot fishes (family: Scaridae)

- ◆ Indian Land snails
- ◆ Indian Water birds.

Special publications

- ◆ Red Data Book (Part-2)
- ◆ Butterflies of India

State Fauna Series

- ◆ Fauna of Manipur, part-I (Vertebrates & Animal fossils)
- ◆ Fauna of Andhra Pradesh, Part Five (Invertebrates)

Fauna of Conservation Area

- ◆ Faunal diversity of Marine National Park, Gulf of Kutch (Gujarat)
- ◆ Fauna of Melghat Tiger Reserve (Maharashtra)
- ◆ Fauna of Andheri Tadoba Tiger Reserve (Maharashtra)

Wetland Ecosystem Series

- ◆ Fauna of Nathsagar Wetland and Jaikwara Bird Sanctuary (Maharashtra).

Forest Resources and Survey

Forest Survey of India

Introduction

Forest Survey of India (FSI) was created with effect from June 1, 1981 as a successor to the "Preinvestment Survey of Forest Resources" (PISFR), a project initiated in 1965 by the Government of India and sponsored by FAO and UNDP. The main objectives of PISFR was to ascertain the availability of raw materials for the establishment of wood based industries in selected areas of the country. Further, the National Commission on Agriculture (NCA), in its report in 1976, recommended the creation of a National Forest Survey Organization for collection of data on scientific lines through country wide comprehensive forest resource surveys at regular intervals. Consequently, PISFR was reorganized into the Forest Survey of India (FSI) with its headquarter in Dehradun.

Objectives

Forest Survey of India (FSI) an organization of the Ministry is engaged in generating information and database on forest cover and forest resources in the country besides providing services of training, research and extension. After a critical review of the activities undertaken by FSI, the Government of India, in 1986, redefined its mandate in order to make it more purposeful and relevant to the needs of the country. The major activities of FSI are as under:

- ◆ Forest Cover Assessment
- ◆ Inventory of Forest Areas
- ◆ Assessment of Trees Outside Forests (Rural & Urban)
- ◆ Inventory Data Processing
- ◆ Methodology Design
- ◆ Training and Extension
- ◆ Special studies and Consultancies

Location of the Organisation and its branches

The headquarters of the Forest Survey of India is at Dehradun. The activities at the headquarters include (i) Forest Cover mapping, (ii) Assessment of Trees Outside Forests (TOF), (Urban and Rural), (iii) Inventory Data Processing, (iv) Training, (v) Creation of National Basic Forest Inventory System (NBFIS), (vi) Special Studies, and (vii) Consultancies.

The organization has four zonal offices. The Northern Zone is located at Shimla, the Eastern Zone at Kolkata, the Central Zone at Nagpur and the Southern Zone at Bangalore. The activities of the zonal offices include (i) Forest inventory, (ii) Thematic Mapping, (iii) Special Studies, and (iv) Consultancies.

Achievements made during the year

The most important mandate of FSI is to assess the forest cover of the country on a two year cycle and to publish the information in the form of “State of Forest Report” (SFR). Its first assessment was published as SFR, 1987. Steady improvements have been made in the forest cover assessments by employing the latest data with higher resolution and scale, more intensive coverage under ground verification and by using superior techniques of interpretation.

The latest assessment, ninth in the series i.e., SFR – 2003 was released by the Hon’ble Union Minister, Environment and Forests, on the 19th of July, 2005 at Press Information Bureau, New Delhi. This report provided the forest & tree cover of the country based on the interpretation of data from Indian Remote Sensing satellites for the year 2002. In the ninth assessment, high resolution (23.5m × 23.5m) data of IRS, LISS-III has been used and the interpretation has been done on a 1:50,000 scale.

The SFR-2003 provides a more comprehensive account of the Forest and Tree cover in the country than the previous eight reports. The Report of the ninth assessment contains seven chapters and a number of annexures providing a wealth of statistics and spatial information about the forest and tree cover in the country.

Special significance in SFR-2003 are:

- ◆ Introduction of an additional class of forest cover by splitting the dense forest cover (canopy density above 40%) into two classes, namely, very dense forest (canopy density more than 70%) and moderately dense forest (canopy density between 40-70%) while the open forest cover having a density of 10-40% remain the same. The same criterion has been applied in the case of mangroves also (Fig. 17).
- ◆ Another newly incorporated feature is the chapter on Growing Stock of wood, which provides the information on volumes of wood in forest and non-forest areas.
- ◆ The extent of water bodies within the forest cover have also been assessed.

The forest cover in the country has been assessed as 678,333 km², which constitutes 20.64% of the country’s geographical area (Fig. 18). Of this,

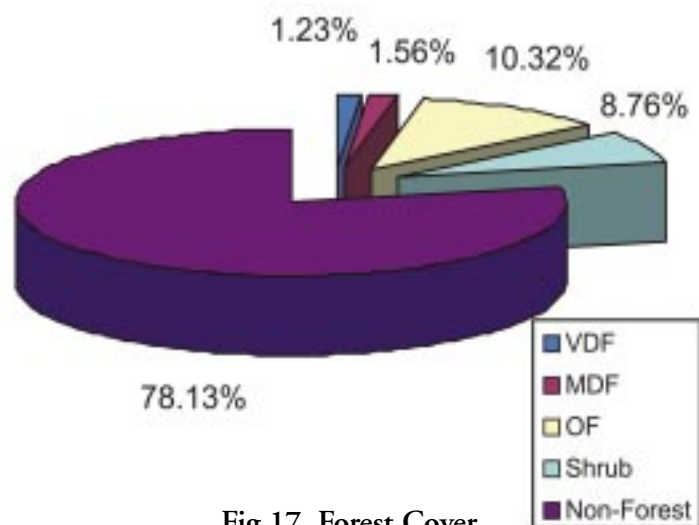


Fig 17. Forest Cover

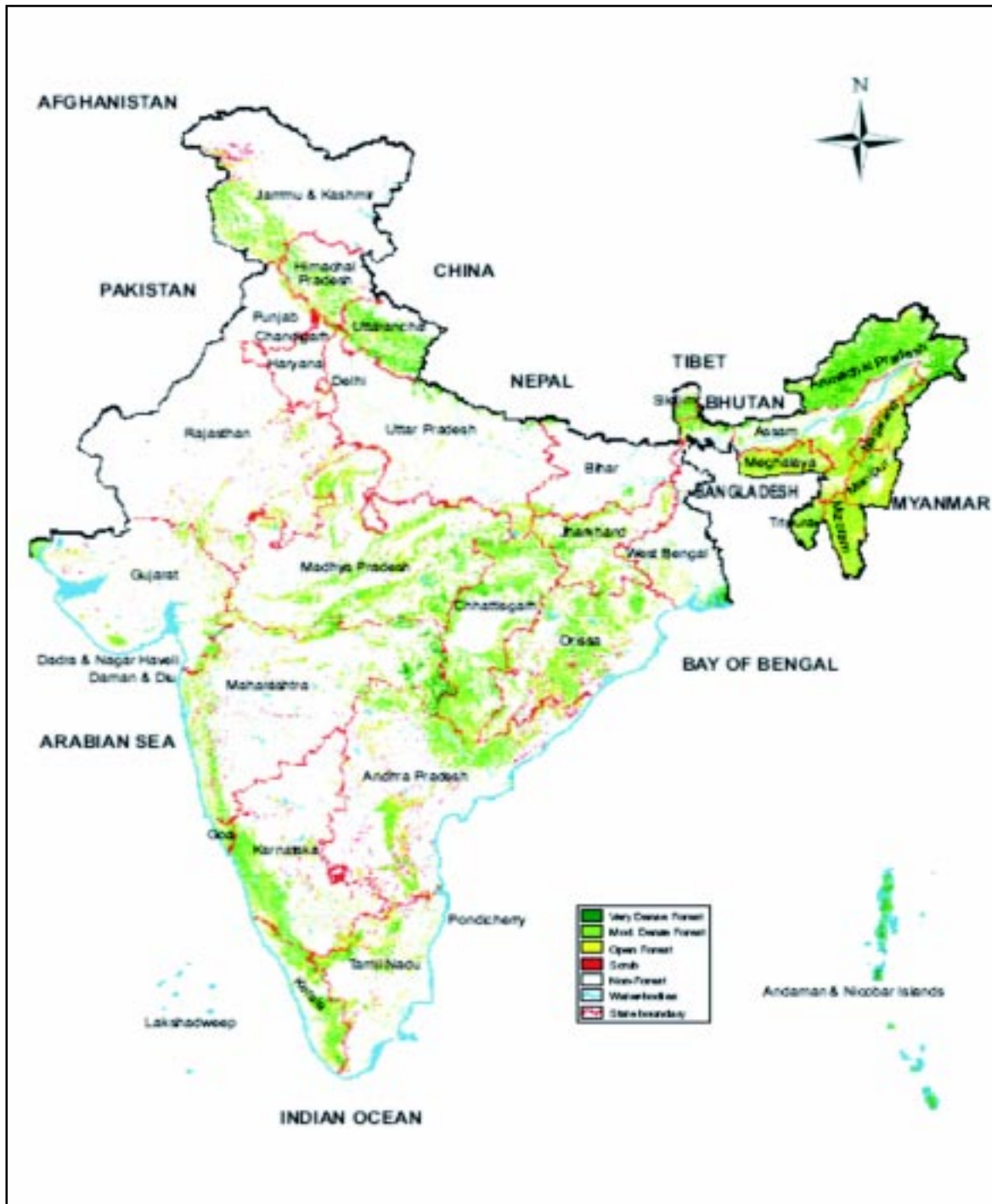


Fig 18. Forest Cover Map of India

the very dense forest (canopy density > 70%) are spread over 51,285 km² (1.56%), moderately dense forest (canopy density between 40-70%) are spread over 339,279 km² (10.32%) and open forests (canopy density between 10-40%) cover an area of 287,769 km² (8.76%).

The country is covered by 393 Survey of India toposheets on 1:250,000 scale. For the tenth assessment i.e. SFR 2005, the satellite data for the entire country has been procured and the work of rectification and interpretation is in progress as per schedule.

Comparison of Forest Cover

State-wise Comparison of forest cover of the country from 1987 to 2003 is given in Table-2.

Budget Allocation

The budget allocation of the organization under Plan and Non-Plan during the year is Rs.5.00 crore and Rs.5.77 crore respectively.

Survey and Utilisation (SU)

The following programmes/activities related to forestry sector are dealt with by SU Division in the Ministry:

Development of National Forestry Database Management System (NFDMS)

India is a signatory of International Tropical Timber Organization (ITTO) wherein various demand and supply, production and consumption data regarding timber and fuel wood etc. are required on annual basis. Besides fulfilling the International commitments, the Ministry has constituted an Expert/Advisory/Working Group on 26th May, 2005 with the main aim to plan, guide and support implementation of an integrated National Forestry Database Management System (NFDMS) in a comprehensive manner including strengthening of the technological, institutional and human capabilities to ensure continuing and effective dissemination and use of forest statistics. The preparation of 'blue print' to -



Fig 19. A view of Nilgiri landscape

Table-2. Comparison of Forest Cover from 1987 to 2003

State/UT	1987 Forest cover	1989 Forest cover	1991 Forest cover	1993 Forest cover	1995 Forest cover	1997 Forest cover	1999 Forest cover	2001 Forest cover	2003 Forest cover
Andhra Pradesh	49,573	47,290	47,290	47,256	47,112	43,290	44,229	44,637	44,419
Arunachal Pradesh	64,132	69,002	68,757	68,661	68,621	68,602	68,847	68,045	68,019
Assam	25,160	24,832	24,751	24,508	24,061	23,824	23,688	27,714	27,826
Bihar	28,482	26,668	36,668	26,587	26,561	4,832	4,830	5,720	5,558
Jharkhand	-	-	-	-	-	21,692	21,644	22,637	22,716
Delhi	15	22	22	22	26	26	88	111	170
Goa	1,240	1,255	1,255	1,250	1,250	1,252	1,251	2,095	2,156
Gujarat	11,991	11,921	11,907	12,044	12,320	12,578	12,965	15,152	14,946
Haryana	513	513	513	513	603	604	964	1,754	1,517
Himachal Pradesh	12,480	12,480	12,480	12,502	12,501	12,521	13,082	14,360	14,353
Jammu & Kashmir	20,905	20,449	20,449	20,443	20,433	20,440	20,441	21,237	21,267
Karnataka	32,268	32,104	32,199	32,343	32,382	32,403	32,467	36,991	36,449
Kerala	10,292	10,292	10,292	10,336	10,336	10,334	10,323	15,560	15,577
Madhya Pradesh	130,099	135,541	135,541	135,396	135,164	74,760	75,137	77,265	76,429
Chhattisgarh	-	-	-	-	-	56,435	56,693	56,448	55,998
Maharashtra	45,616	44,044	44,044	43,859	43,843	46,143	46,672	47,482	46,865
Manipur	17,475	17,685	17,685	17,621	17,558	17,418	17,384	16,926	17,219
Meghalaya	16,466	15,645	15,875	15,769	15,714	15,657	15,633	15,584	16,839
Mizoram	19,084	18,170	18,853	18,697	18,576	18,775	18,338	17,494	18,430
Nagaland	14,394	14,399	14,321	14,348	14,291	14,221	14,164	13,345	13,609
Orissa	53,253	47,227	47,205	47,145	47,107	46,941	47,033	48,838	48,366
Punjab	943	1,338	1,343	1,343	1,342	1,387	1,412	2,432	1,580
Rajasthan	12,758	12,884	12,889	13,099	13,280	13,353	13,871	16,367	15,826
Sikkam	2,756	3,041	3,041	3,119	3,127	3,129	3,118	3,193	3,262
Tamil Nadu	17,472	16,992	16,992	17,005	17,045	17,064	17,078	21,482	22,643
Tripura	5,953	5,535	5,535	5,538	5,538	5,546	5,745	7,065	8,093
Uttar Pradesh	31,226	33,627	33,609	33,961	33,986	10,751	10,756	13,746	14,118
Urranchal	-	-	-	-	-	23,243	23,260	23,938	24,465
West Bengal	8,432	8,015	8,015	8,186	8,276	8,349	8,362	10,693	12,343
Andaman & Nicobar Islands	7,601	7,622	7,622	7,624	7,615	7,613	7,606	6,930	6,964
Chandigarh	2	5	5	5	7	7	7	9	15
Dadar & Nagar Haveli	238	206	206	206	204	204	202	219	225
Daman & Diu	0	0	0	0	0	0	0	6	8.34
Lakshadweep	0	0	0	0	0	0	0	27	23
Pondicherry	0	0	0	0	0	0	0	36	40
Grand Total	648,819	638,804	639,364	639,368	638,879	633,397	637,293	675,538	678,333
Percent (%)	19.49	19.43	19.45	19.45	19.43	19.27	19.39	20.55	20.64

wards the development of NFDMS is pre-requisite for the development of software and necessary data networking for the same. The Information Need Analysis (INA), Functional Requirement Study (FRS) will be carried out having the necessary interaction with the States/UTs in smaller groups to address the problems to find solutions and identify the region specific parameters for necessary data collection, compilation and dissemination promptly. The production, consumption statistics alongwith the export/import data will further strengthen the forestry database.

'Forest Certification' of Timber, Non-Timber Forest Products

Forest Certification has emerged as a market-based mechanism in support of Sustainable Forest Management (SFM). Certification initiatives rely on consumers exercising purchasing choice in favour of products labeled as originating from forests certified to have been sustainably managed. Certification and Eco-labeling are the hall mark to enhance the product positioning for a premium price on one hand and ensuring better forest management practices on the other hand. Basic objectives of certification are:

- ◆ A system that assures the public that environmental concerns and values have been addressed.
- ◆ Manage resources holistically so that healthy environments are maintained.
- ◆ Control resource management techniques.
- ◆ Control resources economically
- ◆ Improve livelihoods
- ◆ Diminish the amount of regulation that is being imposed on a forestland owner
- ◆ Balance the need to extract resources from the environment while maintaining sustainable ecosystems.
- ◆ Control the values of private forestland owners, or for private forestland owners to maintain their values in the face of society's drive to impose its values on them.

General Types of Certifications

Depending on the party responsible for certification and defining of standards, the process can be classified as:

- ◆ First party certification: it's an internal assessment process, where the organization itself sets up standards to evaluate its own management systems and practices.
- ◆ Second party Certification: The assessment is done by the consumer or an outside trade organization.
- ◆ Third party Certification: The standards are pre-defined and accepted, against which the performance of the applicant is evaluated.

There are different 'forest certification' processes in the world such as;

- ◆ Swedish FSC standard for 'forest certification'
- ◆ Programme for Endorsement of Forest Certification (PEFC)
- ◆ Canadian Standards' Association
 - ◆ ISO 14,000 (International Organization for Standardization) Series
 - ◆ Malaysian Timber Certification Council (MTCC)
 - ◆ Phased Approach of International Tropical Timber Council (ITTC) Towards 'Forest Certification'
 - ◆ In recent times, there has been a paradigm shift for timber oriented forest

management to Non-Timber Forest Products oriented multi-type forest management. Standards for certification of NTFP include the technical specification of the raw-materials as well as the process materials required by the end-users and industry e.g. pharmaceutical industry in case of medicinal plants. NTFPs are collected by the local communities in India and therefore, before setting any standards both for product as well as management practices, a detailed in-depth study/research is highly inevitable for each of the NTFPs with respect to silviculture management, harvesting and post-harvesting practices in order to ensure the requisite quality of raw-materials for user industry in the country and abroad.

- ◆ Even during the pre-modern era, management of forestry was given high importance and was also in sustainable manner. The very basis of modern management of forestry in India is and has been sustainable yield, which in real terms is sustainable management. Thus, the term Sustainable Forest Management (SFM) is not new to the Indian Forestry but, 'Forest Certification' is a relatively new concept to India.
- ◆ The Nation Forest policy, 1988 maintains the long term viability of commercial forests, protects bio-diversity and provides a continuous stream of social and economic benefits. In India timber markets largely dictate forestry practices. India thus, has to initiate a process of certifying forest/ forest products to get access to Green markets and receive a premium price in the international market. This shall ultimately benefit the local communities by sustainable and improved price for the resources and value added handicraft products.
- ◆ Bhopal-India process evolved criteria and Indicators for SFM but they are yet to be implemented at the national level. Looking at the development in the global scenario, it has become imperative to have a national policy on 'forest certification'. From domestic (National) point of view also, certification is necessary to ensure the continuity of forest goods and services through SFM approach.
- ◆ The Ministry has constituted a National Working Group/Governing Body to frame the policy guidelines on 'Forest Certification' for timber and NTFPs. The National Working Group/Governing Body has prepared the 'Terms of Reference (TOR)' for the composition and functioning of the following three committees:-
 - ◇ Committee for Certificate Criteria
 - ◇ Committee for Certificate Processes
 - ◇ Committee for Accreditation Criteria and Process

These sub-committees will further prepare the road map and the necessary criteria and processes for the National certification of forests, timber and Non-Timber Forest Products in the country at par with the International standards.

Study of Applied Rates and the Import Duties of Forestry Products for Multi-Lateral and Bilateral Trade Negotiations

- ◆ A study report on Domestic sensitivity on imports was given by Research Information System (RIS) for the Non-aligned and other developing countries. This study had been commissioned by the Ministry of Commerce for recommending the various tariffs to be imposed for import. This Ministry then constituted a Core Group consisting of experts and representatives from the stakeholders to study the report. The Core Group recommended the report of the RIS, which was mainly related to the bound-rates essential for the Ministry of Commerce and Industry for the WTO Negotiations. These recommendations are:

- ✧ In general, the country should follow the conservative scenario proposed in the RIS study Report in respect of wood and forest products sector albeit with higher tariff escalation in case of some selected items.
- ✧ In respect of round wood logs, wood pulp, and scraps although the bound rate may be reduced from the current 25% to 16% as worked out in the RIS Report in the conservative scenario, the applied tariff should be maintained at the current level i.e. five per cent till the country attains self-sufficiency in respect of industrial round wood using allowable cut from the natural forests supplemented by harvests from plantations.
- ✧ In respect of finished products like Plywood, Particleboard, Fiberboards etc. the bound rate need to be kept at the present rates i.e. 40% although the conservative scenario indicates bound rate of 22.5%- 25.8% which is lower than the applied rates of 25% against the current bound rates of 35-40%.
- ✧ For negotiating at the WTO bound rates should be the starting point, which gives more flexibility compared to the applied rates. Moreover, since applied rates are much lower than the bound rates, any reduction in bound rates in the course of negotiations are not likely to have immediate adverse impact on import of wood/wood products.
- ◆ Besides the bound-rates, the applied rates and the import duties etc. are the factors which play significant role in the import of commodities including forestry products and in the multi-lateral/bilateral trade negotiations. To protect the interest of farmers regarding agro and farm forestry and the forestry products like resin and rosin, there is an urgent need to have a detailed dialogue/discussions to recommend some solutions, by way of fixing annual quota or by revising/introducing increased import duties, commodity-wise and within the forestry sector, species-wise.
- ◆ It has been referred by various entrepreneurs and stakeholders that on account of liberalised import policy and reduction in import duties on resin and rosin, the price of domestic resin have come down. This has resulted into a major disincentive to the farmers to further grow and protect Chir tree. It has also been mentioned that on account of liberalised import policy and reduction in import duties on Gambier, the price of Khair (*Accacia catchu*) and Katha have come down drastically in the State of Himachal Pradesh. Gambier is largely used for tanning leather. It is also being used as a substitute of Katha by nefarious pan massala/gutka manufactures. Gambier is injurious for human consumption. This policy has adversely affected the genuine katha traders and is discouraging the farmers from growing khair trees.
- ◆ In view of these facts, the Ministry constituted a Core Group to study the applied rates and the import duties which play a significant role for import of commodities including forestry products and in the multi-lateral/bilateral trade negotiations so that various alternatives may be discussed alongwith objectives and constraints and correct specifications of the models encompassing the timber and other forestry products in raw, semi-finished and finished form, can be formulated. These discussions are highly essential and inevitable to make any comments on forestry products for Preferential Trade Agreement (PTA), Free Trade Agreement (FTA) etc. The efforts of the Core Group on the aforesaid subject will finalise these issues in the forestry sector which will facilitate lucid comments and pragmatic view/stand on the forestry items for PTA, FTA etc. and protecting the interest of the farmers and local growers as well. The first meeting of the Core Group was held on 6th September, 2005 and discussed the issues related to the applied rates and import duties. 'Terms of Reference (TOR)' of the Core Group is as follows:
 - ✧ Protection of the interest of the farmers regarding Agro and Farm Forestry like resin, rosin, poplar, Khair etc. by way of fixing annual quota or by revising/introducing increased import duties communitywise and within the forestry sector specieswise.

- ❖ Formulation of objectives and constraints as well as correct specifications of the modules encompassing the timber and other forestry products in raw, semi-finished and finished form; and
- ❖ Decision on the approved rates, and increase/decrease of import duties on commodities/products related to the forestry sector.

International Tropical Timber Organization (ITTO)

- ◆ The International Tropical Timber Organization (ITTO) was established by the International Tropical Timber Agreement (ITTA), 1983 to administer the provisions of ITTA and also to supervise the operation of the Agreement. The ITTO is a commodity organization bringing together the producer and consumer member countries to discuss and exchange information and develop policies of all aspects of the World Tropical Timber Economy. There are 59 member countries in ITTO at present with its headquarter at Yokohama, Japan. Out of these 59 countries, there are 33 Producer member countries and 26 Consumer member countries. India belongs to the group of the producing member countries. The ITTO's membership represents 90% of world trade in tropical timber and 80% of the world's tropical forests.
- ◆ In 1990, ITTO members agreed to strive for an international trade of tropical timber from sustainably managed forests by the century's end. This commitment became known as the Year 2000 Objective, and a large part of the ITTO programme of projects and activities are devoted to its achievement.

ITTA, 1994 and India's Participation

The 'International Tropical Timber Agreement (ITTA), 1994', successor Agreement to ITTA, 1983 was negotiated in 1994 and came into force on 1st January, 1997. This Agreement is due to expire on 31st December, 2006.

- ◆ India has actively participated in the successive International Tropical Timber Council (ITTC) Sessions and the Negotiations for the Successor Agreement to International Tropical Timber Agreement (ITTA), 1994. One project of Indian Council of Forestry Research and Education (ICFRE) titled 'Establishment of network to facilitate collection, processing and dissemination of statistics pertaining to tropical timber and other forestry parameters in India', has been funded by ITTO and other project titled 'Operationalizing of Sustainable Forest Development with Community Participation in India', being executed by Indian Institute of Forest Management (IIFM), Bhopal has been extended for two years starting from January, 2006. Similarly one pre-project titled 'Sustainable Management of Non-Timber Forest Products (NTFPs) in Maharashtra State, India', has also been extended in the 39th Session of ITTC. Besides, two projects and three pre-projects have been submitted to ITTO for necessary financial assistance.
- ◆ The active participation of the Indian delegation in the 1st, 2nd and 3rd and 4th part of the Negotiations under the auspices of UNCTAD has been appreciated and the final International Tropical Timber Agreement has been reached with various new inputs, in January, 2006.

The Andaman and Nicobar Islands Forest and Plantation Development Corporation Limited (ANIFPDCL)

Objectives

- ◆ The Andaman and Nicobar Islands Forest and Plantation Development Corporation Limited (ANIFPDCL), a Government of India Public Sector Undertaking was created in 1977 with the broad objectives of development and managing forestry plantations on the Andaman and Nicobar Islands.

Activities in progress

◆ After the Hon'ble Supreme Court's order dated 10.10.2001, the activities of the Corporation start reducing as its main activity was timber operation. However, efforts are now on to revive the Corporation by restructuring it in public interest. Due to natural catastrophe in the form of earthquake and tsunami on 26.12.2004 the condition of ANIFPDCL further worsened. It caused serious adverse effects on the Red Oil Palm Project. As a result, the revision of the Cabinet Note became necessary. The revised draft Note for the Cabinet so prepared has been submitted, after due consultations with various Ministries/Departments concerned. This draft Note for Cabinet seeks to downsize the ANIFPDCL and reduce its current liabilities in an attempt to ensure its revival. The Corporation is also in the process to diversify its activities wherever possible within the ambit of its objectives.



Fig 20. Loss of littoral rain forest in Great Nicobar Biosphere Reserve after Tsunami