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Chapter 1
Introduction

1.1 Background: Genesis of the Commission

Pursuant upon the recommendation made by the Indian Board of Wildlife in its 21st meeting held on 21 January 2002 under the chairmanship of Honorable Prime Minister of India, Government of India resolved to constitute a National Forest Commission to review the working of the forest and wildlife sector. The resolution recalled that the livelihood issue of around seven crore tribal and more than 20 crore non-tribal rural population is linked with the forest. The necessity of meeting the demand for wood for commercial and industrial purposes through agroforestry and plantations, and the desirability of evolving appropriate strategy and knowledge base for in situ conservation and ex situ propagation of medicinal plants in view of their increasing demand, were further recognized. The resolution emphasized the paradigm shift in the tenets of forest management from timber primacy to ecological and stakeholder-oriented forestry taking cognizance of the recommendations of the Forest Policy of 1988, of the Stockholm Conference (1972) and the Rio de Janeiro Conference (1992), and of the continued pressure of encroachers and poachers on forest and wildlife despite the enactment of the Wild Life (Protection) Act, 1972, and the Forest (Conservation) Act, 1980. The resolution also underlined the importance of joint forest management and community/people's participation, with gender equality, for providing for the growing demand of forest products particularly to the population of four crore humans living in 1.73 lakh villages in or around the forest, along with the desirability of working out special measures for the attainment of tree and forest cover to 25 % of the land area of the country by 2007 and up to 33 % by 2012.

For the fulfilment of the above resolution, the Ministry of Environment and Forests (MoEF), Government of India, through notification S.O. 142 E dated 7 February 2003, constituted the National Forest Commission (NFC) to review the working of the forest and wildlife sector, with the following terms of reference (TOR):

- Review and assess the existing policy and legal framework and their impact in a holistic manner from the ecological, economic, social and cultural viewpoint.
- Examine the current status of forest administration and the forestry institutions both at all India and State level to meet the emerging needs of the civil society.
- Make suggestions indicating specific policy options for achieving sustainable forest and wildlife management and ecological security.
- Suggest ways and means to make forest administration more effective with a view to help achieve the above policy options.
- Establish meaningful partnership and interface between forestry management and local communities including the tribals.

The composition of the Commission is as follows: -

1.	Justice B.N. Kirpal, ex-Chief Justice of India	Chairman (Part-time)
2.	Director General of Forests	Member (ex-officio) and Special Secretary, MoEF
3.	Prof. J. S. Singh, Banaras Hindu University	Member (Part-time)
4.	Sh. Chandi Prasad Bhatt	Member (Part-time)
5.	Dr. M. K Ranjitsinh	Member (Part-time)

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6. Sh. A. P. Muthuswami — Member (Part-time)
7. Addl. Director General of Forest, MoEF — Member Secretary (ex-officio)

Initially the tenure of the Commission was for two years i.e. up to 6 February 2005. However, it was given three extensions, thus having a total tenure of more than three years up to 31 March 2006.

1.2 Deliberation of the Commission

The National Forest Commission (NFC) had 29 meetings in all, the first being on 21 February 2003 which discussed the mandate and scope of work, finalization of rules and business procedures to be adopted, identification of stakeholders, development of the questionnaire, allocation of subjects, report format and infrastructural support for the Commission. These points were deliberated on in subsequent meetings as well and additional issues were included for discussion. The last meeting of the Commission was held on 28 February and 1 March 2006 in which the Report of the Commission was adopted. The dates of the meetings and details of the members present are given in Annexure I.

1.3 Methodology and Procedure

To receive the desired inputs from different stakeholders, the Commission decided to adopt the following methodology:

1. Obtaining responses of the general public through public notices.
2. Obtaining responses from selected target groups through replies of questionnaires.
3. Interacting with various stakeholders including State Governments, local communities, non-governmental organizations (NGOs), institutions, individuals, etc., through visit to the various places.
4. Soliciting the views of various Ministries of the Government of India.
5. Organizing workshops to get input on specific issues.

To get the responses of the public in general, an advertisement was published in the national dailies in English and other vernacular languages throughout the country intimating the constitution of NFC along with its terms of reference, and requesting the people to send their views on forestry and the wildlife sector. The copy of the advertisement is given in Annexure – II. In response to these advertisements, the Commission received responses from 2021 persons, which were compiled, tabulated and analyzed to get the proper input.

As the responses to the public notification were being received, the Commission developed a questionnaire, after due deliberation, the same was sent to selected target groups, including the Chief Ministers of States and Union Territories through a DO letter from the Chairman of the Commission on 20.10.2003. The questionnaire was also sent to different Principal Chief Conservators of Forests (PCCFs) of State and Union Territories, NGOs, conservationists, social activists, environmentalists, private sector, local bodies, etc., by the Director General of Forests and Special Secretary. A copy of the questionnaire is given in Annexure – III. The questionnaire was responded to by 1,635 persons. However, as many as 1,471 responses were verbatim copy of one another from the villages where the Gujarat-based NGO Adivasi Sarvangi Vikas Sangh is in operation. Of the remaining 164 responses, category-wise break up was as follows:

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Respondent Category	No of Respondents
Public Representatives	22
Central Ministries	3
State Governments.	36
Forest Corporations	3
Representatives of Associations/Unions	10
Educational/Research Institutes	25
Non-government Organizations	30
Representative of Village Level Organizations.	9
Representatives of Industry	4
Foreign Funding Agencies/Institutions/ Individuals	1
Experts/Researchers/Academicians	5
Environmentalists	5
Tribals or their Representatives	2
Forest Dwellers or Their Representatives	2
Interested Citizens/Others	7
Total	164

Most of the responses were received from Gujarat, Nagaland and Karnataka, numbering 67, 22 and 13 respectively. There was no response from States / Union Territories (UTs) of Goa, Kerala, Manipur, Meghalaya, Mizoram, Tamil Nadu, Tripura, Dadra and Nagar Haveli, Lakshadweep, and Pondicherry. The stakeholders responding to the questionnaires ranged from teachers, farmers, tribal communities, forest guards to a Chief Minister.

While the responses of the public, in general, and target groups, in particular, were being analyzed, the Commission decided to have interaction with various stakeholders including State Governments, local communities, non-governmental organizations, institutions, individuals, etc., by visiting various places. The places visited and the interaction done is discussed in subsequent paragraphs.

Though it was important to have interaction with State Governments, it was also desirable to have the views of other Ministries of the Government of India, whose activities are closely related to the forest. Accordingly, the Commission requested 30 Departments/Ministries to send their views with respect to the terms of reference of the Commission. However, only the following three Ministries and one institution responded.

1. Indian Council of Agriculture Research, Krishi Bhavan, New Delhi
2. Ministry of Commerce and Industry, Department of Industrial Policy and Promotion, Udyog Bhavan, New Delhi
3. Ministry of Coal and Mines
4. Ministry of Shipping, Road Transport and Highway, Department of Road Transport and Highways

While the consultations were going on with the various stakeholders, inputs received in response to the public notices and questionnaires were being documented and analyzed, the Commission also decided to constitute subcommittees to prepare reports on the

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various TORs of the Commission. Accordingly, the following four subcommittees were constituted :-

To report on TOR no.1

1	Sh. A.P. Muthuswami	Chairman
2	Dr. J.S. Singh	Member
3	Dr. Leena Sreevastva	Member
4	Sh. Manoj Misra	Member
5	Sh. J.V. Sharma, DIG	Member Secretary

To report on TOR nos. 2 and 4

1	Dr. M.K. Ranjitsinh,	Chairman
2	Sh. Samar Singh	Member
3	Dr. R.V. Singh	Member
4	Dr. V.B. Easwaran	Member
5	Dr. Gopa Pandey	Member
6	Sh. A.K. Goyal, DIG	Member Secretary

To report on TOR no. 3

1	Dr. M.K. Ranjitsinh	Chairman
2	Sh. H.S. Panwar	Member
3	Sh. S.S. Patnaik	Member
4	Dr. A.R. Rahmani, BNHS	Member
5	Sh. Vivek Menon, WTI	Member
6	Dr. Rajesh Gopal, IG	Member Secretary
7	Dr. L.M. Nath	Special invitee

To report on TOR – 5

1	Sh. Chandi Prasad Bhatt	Chairman
2	Sh. Anupam Misra	Member
3	Sh. M.S. Kanwar	Member
4	Sh. Ramesh Pahari	Member
5	Dr. R. N. Dube	Member
6	Dr. Sanjay Kumar, Director	Member Secretary

These subcommittees were constituted on 18 August 2004 with the request that the reports be submitted by 30 November 2004. The subcommittees held a number of meetings and could complete their work by 31 March 2005. The reports of these subcommittees form the basis of this report, though their recommendations have been suitably modified after due deliberations, by the members of the Commission in the final report.

The Commission also desired to have additional information on a few issues like agroforestry and joint forest management. Consequently, the following two workshops were organized in the month of December 2005, which were attended by the following resource persons.

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Workshop on Joint Forest Management

1. Dr. S.B. Roy, Director, IBRAD, Calcutta
2. Sh. R.C. Sharma, (Retd.), Principal Chief Project Director, Chhattisgarh
3. Sh. R.B.S. Rawat, Chief Project Director, Uttaranchal Project, Dehradun
4. Sh. Ramesh Kalaghatgi, Chief Conservator of Forest, Andhra Pradesh, Hyderabad
5. Dr. S.K. Barik, North-Eastern Hill University, Shillong
6. Sh. Vinet Kumar, Conservator, Himachal Pradesh, Shimla
7. Sh. B.B. Panda, Regional Centre for Development Cooperation, Bhubaneshwar
8. Sh Vijay Kaushal, Vikram Sarabai Centre for Development Interaction, Ahmedabad
9. Dr. K.D. Singh, ex-FAO Expert

Workshop on Agroforestry

1. Pradeep Khanna, Additional Chief Conservator of Forest, Gujarat
2. Dr. Pravej Ahmed, Managing Director, Forest Corporation, Haryana
3. Sh. R.B.S. Rawat, Chief Project Director, Uttaranchal Project, Dehradun
4. Dr. PP Boj Vaid, The Energy Research Institute, Delhi
5. Sh. V.P. Singh, *ex*-Additional Principal Chief Conservator of Forest, West Bengal
6. Sh.. S.K. Dhyani, Director, Agroforesty Institute, Jhansi
7. Dr. Pyarelal, Managing Director, Pragati Bio-Technology, Phagwada, Punjab
8. Sh. Raj Chaurasia, *formerly with* BILT, New Delhi
9. Sh. Ashwani Kumar, Chief Conservator of Forest, Allahabad
10. Sh. Rajiv Kumar, CF, Agra
11. Sh. H.D. Kulkarni, ITC, Hyderabad
12. Sh. Ram Gopal Saini, Nursery Owner, Sharanpur, Uttar Pradesh

1.4 Consultations

The following table summarizes the visits of the Commission to various places and details of the stakeholder with whom consultations were made:

Table 1.1 – Visits of the Commission to various Places

Sl. No.	Date	Place	Stakeholder with whom interacted
1	22 - 23 January 2004	Dehradun	Government of Uttaranchal Indian Council of Forestry Research and Education Indira Gandhi National Forest Academy Forest Survey of India Wildlife Institute of India Director, Forest Education IFS Association - Dehradun Unit Federation of Forestry Scientists – Dehradun Land Benefit–deprived Land Owner Forum
2	10 April 2004	Delhi	IFS Association, Central Unit
3	24 - 25 May 2004	Bangalore	Government of Kerala Government of Karnataka Government of Andaman and Nicobar Islands Government of Pondicherry

			Indian Plywood Industries Research and Training Institute Foundation for Revitalization of Local Health Traditions, FRLHT, Bangalore (NGO) IFS Association, Karnataka IFS Association of Kerala State Forest Service Association, Karnataka Forest Rangers Association, Karnataka Forest Law Association, Karnataka
4	29 - 30 June 2004	Bhopal	Government of Chhattisgarh Government of Madhya Pradesh Indian Institute of Forest Management, Bhopal State Forest Research Institute, Jabalpur IFS Association, Madhya Pradesh IFS Association, Chhattisgarh Chhattisgarh Forest Rangers Association, Raipur Madhya Pradesh Rajya Van Seva Sangh, Bhopal State Forest Range Officers (Gazetted) Association, Madhya Pradesh Madhya Pradesh Forest, Wildlife Conservation and Social Forestry Akhil Bharatiya Vanvasi Gramin Majdoor Mahasangh, Bhopal Panchmarhi Cantonment and Civil Areas reg. Panchmarhi Sanctuary, Madhya Pradesh Narmada Valley Development Authority Narmada Vikas Samiti Society for Environment and Ecology Saroj Khadi Gramodyog Sansthan Bhopal Timber Merchants and Sawmills Owners Association National Centre for Human Settlement and Environment, Bhopal Retired forest officers including Dr. J.B. Lal, Sh. V.B. Saharia, Sh. D.P. Singh, Sh. M. Dixit and Sh. R.C. Saxena
5	1 -2 August 2004	Mumbai	Government of Gujarat Government of Maharashtra Government of Goa IFS Association, Maharashtra Maharashtra State Gazetted Forest Officers Association Association of RFO and ACF (combine) Gujarat Forest Rangers Association All Goa Forest Executive Employee Association Gujarat Timber Merchants Association Bombay Environmental Action Group Bombay Natural History Society GEER Foundation

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6	18 - 19 October 2004	Ahmedabad	Government of Gujarat – Tribals Members of JFM Committees working with SAKHAM - organized through VIKSAT (Vikram Sarabai Centre for Development Interaction)
7	31 August 2004 and 24 September 2004	Delhi	Representatives of Paper Industries through Confederation of Indian Industries.
8	1 - 2 December 2004	Delhi	Government of Punjab Government of Himachal Pradesh IFS Association, Punjab IFS Association, Himachal Pradesh Unit Punjab Non-Gazetted Forest Officers Union Forest Ministerial Staff Association, Punjab World Bank
9	10 - 12 January 2005	Guwahati	Government of Assam Government of Meghalaya Government of Mizoram Government of Nagaland Government of Manipur Government of Arunachal Pradesh Bodoland Territorial Council Karbi Anglong Autonomous Council North Cachar Hills Autonomous Council IFS Association, Assam IFS Association, Arunachal Pradesh Continued Assam Forest Service (C-I) Association Arunachal Pradesh Range Forest Officers' Association Assam Forest Rangers' Association Arunachal Pradesh Forest Service Officers' Association Mizoram Forest Rangers' Association Assam Forest Employees' Association Mizoram Environment and Forest Field Staff Association Retired Forest Officers' Association, Assam Human Rights Network of Indigenous Tribal Peoples (HR-NIT) Primate Research Centre Wildlife Areas Development and Welfare Trust Dibru – Saikhowa Wildlife Conservation Society Centre for Environment Protection
10	22 - 23 February 2005	Delhi	Ministry of Environment and Forests, Government of India Government of Tripura Government of National Capital Territory, Delhi Government of Haryana Government of Uttar Pradesh

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			Government of Jammu and Kashmir Government of Rajasthan Government of Union Territory, Chandigarh IFS Association, Haryana IFS Association, Tripura Delhi Van Karmchari Association Uttar Pradesh Van Rakshak Sangh Sh. Pyarelal of Pragati Biotechnologies, Dr. K. D. Singh, Global Forest Assessment Specialist Sh. A.K. Mukerji, ex-DG, Forests, GOI
11	2 - 3 April 2005	Delhi	Government of West Bengal Government of Jharkhand Government of Sikkim Government of Bihar West Bengal Forest Service Association Dr. V.K. Bahuguna, MD, Tripura Forest Development and Plantation Corporation Ltd. Sh. P.K. Sen, Tiger and Wildlife Programme, WWF-India
12	15 - 16 July 2006	Hyderabad	Government of Andhra Pradesh Government of Orissa Government of Tamil Nadu IFS Association, Andhra Pradesh State Forest Service Officer, Andhra Pradesh Joint Association of Range Officers' and other field staff. Association of Retired Forest Officers Various NGOs

Presentations on behalf of the State Governments were mostly done by the Secretaries of Forest, and the PCCFs of the States, and in some cases Forest Ministers and Chief Secretaries of the States were also present. In the case of Uttaranchal, the Chief Minister, Sh. N. D. Tiwari made himself available for interaction.

In the case of Madhya Pradesh, Sh. Digvijay Singh, the then Chief Minister of Madhya Pradesh made a presentation before the NFC on 13 May 2003 in MP Bhawan in New Delhi. Further, during the Commission's visit to Bhopal, it also interacted with Ms Uma Bharati, the then Chief Minister of Madhya Pradesh.

The presentations made by the various States during these consultations have been documented and kept as the record of the Commission. The list of documents is given in Annexure IV.

It would have been of great value to the Commission if at the very outset MoEF would have made a presentation to the Commission, outlining the problems both at the national and state levels and conveyed to the Commission its own suggestions in this regard. This, the Ministry chose not to do. After more than one reminder, MoEF did make a brief presentation towards the end of the proceedings of the Commission, which never met the Secretary, MoEF.

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In the 19th meeting of the Commission held at Guwahati on 11 January 2005 Sh. Chandi Prasad Bhatt, Member of the Commission, underlined the need of having greater interaction with the tribals by visiting the areas having predominant tribal population. During the discussion it was decided that Sh. Bhatt should identify the places to be visited so that some members accompanied by the Ministry official could visit such areas. Accordingly, Sh. C.P. Bhatt, along with Sh. D.C. Khanduri, Forestry Expert in the Office of the National Forest Commission, New Delhi, visited Koraput in Orissa and Vishakhapatnam District of Andhra Pradesh in the 1st week of February 2005.

Similarly, while drafting the chapter on the North-East, it was felt that sufficient input, particularly on shifting cultivation, had not been received and therefore the Commission in its 25th meeting held in Delhi on 14 November 2005 requested Sh. Chandi Prasad Bhatt to undertake the visit of North-East and prepare a report. Accordingly, Sh. Chandi Prasad Bhatt along with Sh. D.C. Khanduri, Forestry Expert visited Shillong and Guwahati in the first week of December 2005 and had discussion with researchers, administrators, politicians, village representatives, villagers, students and thinkers in NIRD, NEHU, NEC, ICAR, CBTC, Guwahati University, etc.

1.5 Drafting of the Report

Having collected the information and inputs from various stakeholders, the Commission constituted a drafting committee in its meeting held on 2 and 3 October, 2005 with the following members :-

1. Dr. M.K. Ranjitsinh
2. Prof. J.S. Singh

The Drafting Committee held a number of sessions and after incorporating the various suggestions and comments made by the members of the National Forest Commission, circulated a draft to the members on 18 February 2006 which was discussed in the last meeting of the Commission, held on 28 February and 1 March 2006.

1.6 Scope of the Report

The Report examines the current status of forests, reviews the forest policy, legal framework, institutions, and the administrative structure of the forestry sector. Goals and constraints of the forestry sector, approaches to forest, wildlife and nature conservation, farm and agroforestry, centre-state relations, forests and local communities and peoples' participation have been considered in depth. The Report also examines forest-related international instruments, forestry research, relation between forests and industries, and financial support to the forestry sector. Emerging thoughts on the place of forests in national resource accounting have been discussed. The above considerations have led to an array of recommendations which need to be implemented so that the goals of ecologically sustainable forest and wildlife management, enhancing ecological security, meeting needs of the civil society, and establishing a meaningful partnership between forest management and local communities can be realised. The Report is divided into 23 chapters

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1.7 Adoption of Report

The Drafting Committee, after including the views of the Members of the Commission on different chapters, submitted a complete draft to the Chairman and other members of the Commission on 18 February 2006. The Commission considered the Report at its 29th and final meeting held on 28 February and 1 March 2006 and adopted the final version of the Report* and signed it on 1 March 2006. The Commission resolved to present it to the Prime Minister in the last week of March 2006.

(Justice B N Kirpal)
Chairman

(J C Kala) DG (F)
Member

(Prof J S Singh)
Member

(Chandi Prasad Bhatt)
Member

(Dr M K Ranjitsinh)
Member

(A P Muthuswami)
Member

(G K Prasad) ADG (F)
Member Secretary

***Dissents** : Four members namely Shri J.C. Kala, DG (F), Shri Chandi Prasad Bhatt, Shri A.P. Muthuswami and Shri G.K. Prasad, ADG (F), have expressed reservations for inclusion of Sub Cadre element in various recommendations. The dissent note is at Annexure V.

: Similarly Shri Chandi Prasad Bhatt does not agree with the recommendation Nos. 340 to 345 regarding proposed Scheduled Tribes (Recognition of Forest Rights) Bill. The dissent note is at Annexure VI.

(J C Kala)

(Chandi Prasad Bhatt)

(A P Muthuswami)

(G K Prasad)

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1.8 Acknowledgements

The Commission wishes to express its thanks to the Government of India and to the Indian Board of Wildlife and its chair, for giving us an opportunity to undertake the review of the forest and wildlife sector in India. This had been a wonderful experience for all of us and it is hoped that the implementation of the recommendations of the Commission will result in making forest and wildlife sector in India more responsive to the aspirations of various sections of civil society and in the long-term survival and amelioration of the invaluable natural resources and heritage of the nation.

In reply to the public notice, the Commission received encouraging response. Similarly, the questionnaire addressed to the selected target group, had also encouraging response. Our sincere thanks to all those who expressed their views in response to the public notice and questionnaire, and helped us in framing our recommendations.

To interact with various stakeholders, particularly with the State Governments, the Commission held interaction either in Delhi or visited some of the state capitals. The Commission is thankful to the public representative and bureaucrats of the States in making their presentations and having interaction with the Commission on various issues. During these interactions, the Commission visited Dehradun, Bangalore, Bhopal, Mumbai, Ahmedabad, Guwahati and Hyderabad. The Commission wishes to express its sincere thanks to these State Governments for providing courtesy during the visit of the Commission. Though, during interaction, in many cases the State Forest Ministers were present, whose presence is thankfully acknowledged. The Commission wishes to express special thanks to Sh. Digvijay Singh, the then Chief Minister of Madhya Pradesh, Sh. N D Tiwari, Chief Minister of Uttaranchal and Ms Uma Bharati, the then Chief Minister of Madhya Pradesh, for contributing by expressing their views.

The Commission is also thankful to other Ministries of the Union Government who responded to the request of the Commission and flagged the important issues that concern forest and wildlife sector.

Our interaction with non-governmental organizations, individuals, retired forest officers, public activists and villagers had been extremely useful and of immense help to us in preparing the Report of the Commission. We wish to thank them for their contributions and in this context we wish to make special reference of SAKHAM and VIKSAT, Ahmedabad, various JFM Committees of Koraput in Orissa, Van Samrakshan Samities (VSS) of tribal areas of Andhra Pradesh and numerous autonomous councils of North-eastern States.

For responding to various issues, four subcommittees under the chairmanship of the members of the Commission were constituted. Their reports were of immense help in preparing the final report of the Commission for which all the members and Member Secretaries of these subcommittees deserve special thanks. The inputs from Prof. Kanchan Chopra, Prof. Madhu Verma, Dr. T. R. Manoharan, Dr Mohit Gera and Sh. D.C. Khanduri in chapter 19 are gratefully acknowledged.

Since specific staff could not be provided for the functioning of the Commission separately, this work was handled by Forest Policy Division in the Ministry of Environment and Forests, and therefore, for the support and help which was provided by

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Sh. J V Shrama, DIG, and other staff of the Forest Policy Division is thankfully acknowledged. So far as contribution of official members of the Commission is concerned, Sh. N K Joshi, the then DG of Forest, had the longest association, initially as Member Secretary and subsequently as Director General, with the Commission. He not only provided valuable suggestions but also helped in smooth functioning of the Commission for which the Commission wishes to record its sincere thanks.

Last but not the least, our thanks are due to our consultants – Indian Institute of Forest Management, Bhopal including the core team at the Institute, the professionals in the New Delhi office and the editor, without whose support it would not have been possible to prepare this report, particularly Sh. D. C. Khanduri, Forestry Expert, provided extremely valuable assistance to the Commission in all its deliberations and writing of the Report. The Commission expresses special thanks to him.

Chapter 2
Forests of India

2.1 Definition of Forests

The Oxford English Dictionary defines forests as below:

> 1 An extensive tract of land covered with trees and undergrowth, sometimes intermingled with pasture. 2 Historically, an area, typically owned by the sovereign … and having its own laws.

The Encyclopedia Britannica considers a forest to be a:

> Complex ecological system, in which trees are the dominant life form.

A more ecological definition can be seen in a more modern source – Wikipedia.org[1]:

> A forest is an area with a high density of trees. These plant communities cover large areas of the globe and function as carbon dioxide sinks, animal habitats, hydrologic flow modulators, and soil conservers, constituting one of the most important aspects of our biosphere.

In the Indian context, the highest authority for tenable definitions, the Supreme Court of India, ruling in the context of the Forest (Conservation) Act, 1980, chose the following words[2]:

> The word 'forest' must be understood according to its dictionary meaning. This description covers all statutorily recognized forests, whether designated as reserved, protected or otherwise for the purpose of section 2 (1) of the Forest (Conservation) Act. The term 'forest land', occurring in section 2, will not only include 'forest' as understood in the dictionary sense, but also any area recorded as forest in the Government record irrespective of ownership…

The awareness of these definitions is crucial to the treatment of the subject in this report.

2.2 Importance of Forests

Forests play a vital role in social, cultural, historical, economic and industrial development of any country and in maintaining its ecological balance. They are the resource base for sustenance of its population and a storehouse of biodiversity. Other vocations of land use, such as agriculture and animal husbandry, are dependent on forests and forestlands. Forests not only maintain and improve the moisture regime and provide clean air but also produce humus and maintain soil fertility. The Hindi proverb *Vano ke hain teen upkar, mitti, pani aur bayar* beautifully brings forth the varied utility of forests. Having understood the importance of forests and desirability of forest conservation, our ancestors in ancient times worshipped trees and lived in harmony with the environment.

The premium on forests can be understood by recognizing them as the primary producers and protectors of several natural resources. As long as the economic benefits in terms of climate control, pollution abatement, and wildlife maintenance are not satisfactorily calculated, timber and pulp are regarded the chief economic products of forests. But the

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[1] As on 4 November 2005. Given the very nature of Wikipedia, the entry is likely to evolve on a continual basis.

[2] **In** T. N. Godavarman Thirumulkpad vs. Union of India and Others, Writ Petition (Civil) 202/1995. Order dated 12 December 1996

economic importance of non-timber forest products (NTFP) and efforts to evaluate them are on the rise. Forests are also vital as watersheds. Because of the thick humus layer, loose soil and the soil-retaining powers of tree-roots, forests are vitally important for maintaining and regulating water flows and sub-soil water regimes. Almost all water ultimately comes from forestlands, forest-rivers and lakes and from forest-derived water tables. In addition, forests are habitats for diverse species; they sustain the majority of diversity in nature. The wild counterparts of our food plants and livestock, the genetic importance of which is being increasingly realized, occur in the forests and grasslands. They also harbour our wild medicinal plants. They provide recreation and aesthetic refreshment for people, and irreplaceable supplies of oxygen and soil nutrients. Forests clean the environment by muffling noises, buffering strong winds and trapping dust and gases. They also moderate extremes of temperature. The most important benefit that the human race has been deriving from these ecosystems is the security of life-support systems. Viable populations of fauna and flora by their interdependent collective activities, ensure that the quality of natural systems is kept at levels that maintain their life-giving quality for all life forms. Deforestation has become a major environmental concern, as it can destabilize the earth's temperature, humidity, and carbon dioxide levels.

As per formal estimates, forestry and logging contributed Rs. 23,798 crores in 2001-02 (at current price), which was roughly 1.5% of the total GDP of the country[3]. However, since most of the trade and use of forest products is informal and if one takes into account all the kinds of removals of forest products, the estimate of the contribution from forest is greatly enhanced. It increases even further if the non-tangible benefits, e.g. ecological services of the forests, for which there has been renewed interest and increasing demand in recent years, are also taken into consideration. Forests are increasingly being looked upon as major performers in poverty alleviation programmes[3].

2.3 Forest and the Constitution of India

As part of the natural environment and life-support system, forests have engaged the attention of all sections of society. The Constitution of India has given due recognition to forest and wildlife and the tribal communities dependent on forests.

Under Section 10 of the Constitution (Forty–second Amendment) Act 1976, amendments were made in Article 48, which reads as under:

> 48 A Protection and improvement of environment and safeguarding of forests and wildlife – The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country.

Similarly, under Section 11 of the Constitution (Forty–second Amendment) Act 1976, a new Article 51 A under Part V-A, was added to the Constitution in 1976. This Article reads as under:

> 51 A Fundamental Duties – It shall be the duty of every citizen of India - (g) To protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.

[3] Kumar, N. et al. 2000. *India, alleviating poverty through forest development – Evaluation. Country case studies series.* Washington D.C., World Bank

In addition to the above two Articles, the Honorable Supreme Court of India has also adjudicated cases concerning forest and environment under Article 14 – Equity before Law, and Article 21 – Protection of Life and Personal Liberty.

So far as protection of tribal communities is concerned, it has been provided under Article 46 which states

> 46 Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes and other weaker sections – The State shall promote with special care the educational and economic interests of the weaker sections of the people, and, in particular, of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation.

2.4 Diversity

India, the largest democratic republic of the world, has the seventh largest area (328.73 million ha) and second largest human population (more than 1.00 billion). With about 2.5% of the world's geographical and 1.8% of the forest area, the country at present is supporting 16% of the world's population and 18% of the domestic cattle population, amounting to about 500 million.

India is a country of diversity. It has diverse geographical features and varied climates. It has 14 major basins through which drain numerous rivers. While rivers such as the Ganga originating from the mountains are snow-fed, those emanating from central and southern India are rain-fed, with little perennial water. The annual rainfall varies from less than 37 cm in Rajasthan to 1500 cm in Cherapunji, Meghalaya. Three different seasons – winter, summer and monsoons are experienced. However, the seasonal severity varies considerably.

The diversity in physical and climatic setting produces a markedly diverse fauna and flora. The vegetation ranges from xerophytic in Rajasthan, evergreen in the North-East and the Ghat areas, mangroves of coastal areas, conifers of the hills and the dry deciduous forests of central India to alpine pastures in the high reaches of the Himalaya. These account for about 8% of world's biodiversity, and make India one of the twelve mega biodiversity countries of the world. It also has two global terrestrial biodiversity hot spots – the North-eastern States and the Western Ghats. Naturally, such a diverse flora provides for a very diverse fauna

The forests of the country (from tropical rain forests in the south and the northeast to the dry alpine forests in the northwest Himalaya) have been classified into 16 types and 251 subtypes on the basis of climatic and edaphic conditions. Some of the principal commercial species are highly valued and are becoming increasingly costly, e.g. teak (*Tectona grandis*), sal (*Shorea robusta*), *Dipterocarpu*s spp., and conifers (pine, fir, spruce, deodar, etc.). Together with a host of non-timber forest products such as gums, resins, fruits, nuts, oil, dyes and medicinal plants, the value of forest products, both for subsistence and industrial use, is increasing exponentially. Forests are also the most important source for fibre for paper and pulp industries, with bamboo occupying the key position.

India's natural habitats range from the Palearctic Trans-Himalayan in the north to the Indo-Malayan region in the northeast, the Indo-Ethiopian region in the west and the Oriental region in peninsular India besides the coastal and island ecosystems. These ecosystems have given India 10 biodiversity rich zoogeographic zones.

2.5 Human Impact

Humans, especially those living in and around forests, were earlier using natural resource just for sustenance and not for commercial purposes. With modern civilization being consumption-oriented, our natural resources and particularly forests, had to bear the brunt of indiscriminate use. Poverty, hunger, illiteracy and unmanageable population are some of the possible reasons of the apathy of developing countries towards conservation of their natural resources.

With increasing human and development activities, forests have been severely fragmented and at many places degraded, causing threat of local extinction to many wild species of plants and animals. By and large, people in India are not aware that our national stakes in biodiversity wealth are of the order of more than 80, 000 known species of animals and 45,000 species of plants, of which 15,000 are known to be of medicinal value. Almost 3,200 wild relatives of agricultural crops and 131 wild relatives of domesticated animals are found in India. Our stakes also cover those animals and plants that are found only in small areas and not elsewhere. These endemic species include 5,150 species of the plant kingdom and 1,837 species of the animal kingdom. It is estimated that 33% of all these species are facing the threat of extinction. Once lost, we lose them forever. The predilections and imperatives of island biogeography are well known. Endemism is a major threat to species found on our islands - the Narcondom hornbill, the Andaman teal and the Nicobar megapod being a few examples. Such endemism may lead to total extinction as a direct cause of even natural disasters, such as the recent tsunami.

The present status of forests is none too satisfactory at best and deplorable at worst. Sustainability of forest ecosystem is an essential component of the environmental conservation efforts and any degradation of forests will have an adverse impact on various systems such as water resources, agriculture, biodiversity, environment, climate and human health, besides upon the subsistence living of tribal and other communities living in and around forest areas. Therefore, the functions with respect to conservation of soil, water and biodiversity are vital for the welfare of present and future generations.

About 41% of forest cover of the country has already been degraded and dense forests are losing their crown density and productivity continuously. A large number of India's livestock population graze in forests, causing serious damage to regeneration and productivity. The use of forests beyond its carrying capacity and encroachments, upon forestlands are the main cause of the continuous degradation of forests. At present 70% forests have no natural regeneration and 55% are prone to fire. In the year 2002, the Government of India set a goal of achieving 25% forest and tree cover by 2007 and 33% forest and tree cover by 2012, targets which the government will find impossible to achieve unless it gives the objectives the priority they deserve, providing them support and the active involvement of the stakeholders.

2.6 Status of Forests

2.6.1 Land Use

The total geographic area of the country is 328.73 million ha, while the reporting area for land utilization is 306.05 million ha. The break-up is as follows:

Table 2.1: Land Use in India[4]

Land use	Area in million ha	Percentage
Total geographic area	328.73	
Reporting area for land utilization	306.05	100.0
Forests	69.02	22.6
Not available for cultivation	42.41	13.9
Permanent pasture and grazing land	11.04	3.6
Land under misc. tree crops and groves	3.62	1.2
Culturable wasteland	13.83	4.5
Fallow land and other than current fallows	10.11	3.3
Current fallows	14.80	4.8
Net area sown	141.23	46.1

The area of forests given in Table 2.1 does not tally with recorded forest area as per State Forest Departments' reports because the former is based on revenue records.

Forestry and agriculture are the two most important land uses in the country, the latter competing with the former under relentless pressure of an ever increasing population, which has grown from 361 million in 1951 to 1,028 million in 2001. The per capita availability of forests has, thus, declined to a poor 0.08 ha, which is one of the lowest in the world.

2.6.2 Forest Cover

The forest cover of the country was estimated to be 678,333 km^2, which is 20.64% of the geographic area of the country[5]. Very dense forest, moderately dense forest, open forest and mangroves constitute 1.56%, 10.32%, 8.76% and 0.14% of the geographic area respectively. Scrub and non-forest areas are the other classes in the scheme of classification. Summary of the assessment is presented in Table 2.2.

Table 2.2: Forest Cover in India 2003[6]

Class	**Area in km^2**	**Percentage of geographic area**
Very dense forest	51,285	1.56
Moderately dense forest	339,279	10.32
Open forest	287,769	8.76
Sub-Total	*678,333*	*20.64*
Mangrove	4,461	0.14
Scrub	40,269	1.23
Culturable non-forest area	2,568,661	78.13
Total geographic area	3,287,263	100.00

[4] *Agricultural Statistics at a Glance*, *2003.* New Delhi: Ministry of Agriculture, Government of India.
[5] *State of Forest Report, 2003*. Dehradun, Forest Survey of India.
[6] *Ibid.*

Among the states, Madhya Pradesh accounts for 11.27% of the forest cover of the country, followed by Arunachal Pradesh (10.03%), Orissa (7.13%), Maharashtra (6.91%) and Andhra Pradesh (6.55%).

In the statistics provided by the Forest Survey of India (FSI), forestland cover (i.e. in the recorded forest boundaries) is not separated from the cover due to orchards, coffee plantations, etc.

2.6.3 Change in Forest Cover

The State of Forest Report 2003 published by the Forest Survey of India indicates a 2,795 km^2 increase in the forest cover in the country over the 2001 assessment. The area under dense forest cover in the 2003 assessment, however, is 26,245 km^2 less than in 2001, while mangroves are down by 21 km^2 (Table 2.3). But the open forests have increased by 29,040 km^2. The states in which the increase in forest cover has been reported in the 2003 Report are: Assam, Goa, Delhi, Jammu and Kashmir, Jharkhand, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttaranchal, West Bengal, Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, and Pondicherry. The States and the Union Territories showing lesser forest cover are Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan and Lakshadweep.

Table 2.3: Class-wise Change in Forest Covers (km^2)[7]

Class	Assessment 1999	Assessment 2001	Change 1999-2001	Assessment 2003	Change 2001-2003
Dense forest*	382,229	416,809	+34,580	390,564	-26,245
Open forest	255,064	258,729	+3,665	287,769	+29,040
Mangrove	4,871	4,482	-389	4,461	-21
Total	637,293	675,538	+38,245	678,333	+2,774

* Including mangroves.

Change in any category of forests in the Table 2.3 may be a result of improvement somewhere and degradation elsewhere. A change matrix gives a quantitative estimate of net change category-wise and also the flux of change among the categories. Three major reasons of flux in the change matrix are (i) degradation of dense forest into open forest, scrub or non-forest, (ii) improvement of open forest into dense forest at some places and its degradation to scrub or non-forest at other and (iii) improvement of scrub or non-forest generally into open forest and sparingly to dense forest. No efforts to correlate the matrix of change with current policies, practices or programmes have been made. Thus, it is difficult to say how much forest has regenerated due to people's participation in joint forest management or regeneration due to afforestation by governments. The 1999 to 2003 assessments, however, are redeeming in the sense that the past trend of deforestation appears to have been halted (Table 2.4).

[7] *State of Forest Report 2001* and *State of Forest Report 2003*. Dehradun, Forest Survey of India.

Table 2.4: Forest Cover as estimated by the FSI from 1987 to 2003 (km^2)[8]

Cycle	Year of publication	Forest cover estimate (km^2)	Percentage of total area of country
First	1987	640,819	19.49
Second	1989	638,804	19.43
Third	1991	639,364	19.45
Fourth	1993	639,386	19.45
Fifth	1995	638,879	19.43
Sixth	1997	633,397	19.27
Seventh	1999	637,293	19.39
Eighth	2001	675,538	20.55
Ninth	2003	678,333	20.64

2.6.4 Legal Classification

Three types of forests such as reserve forests (RF), village forests (VF) and protected forests (PF) are recognised in the Indian Forest Act, 1927 under chapters II, III and IV respectively.[9] Village forests are those reserve forests which are assigned to the village communities for management. This leads to two conclusions: first, that RFs and PFs are to be managed by the Government (Forest Department), and second, legally speaking, there are only two types of notified forests, RF and PF (Fig 2.1).

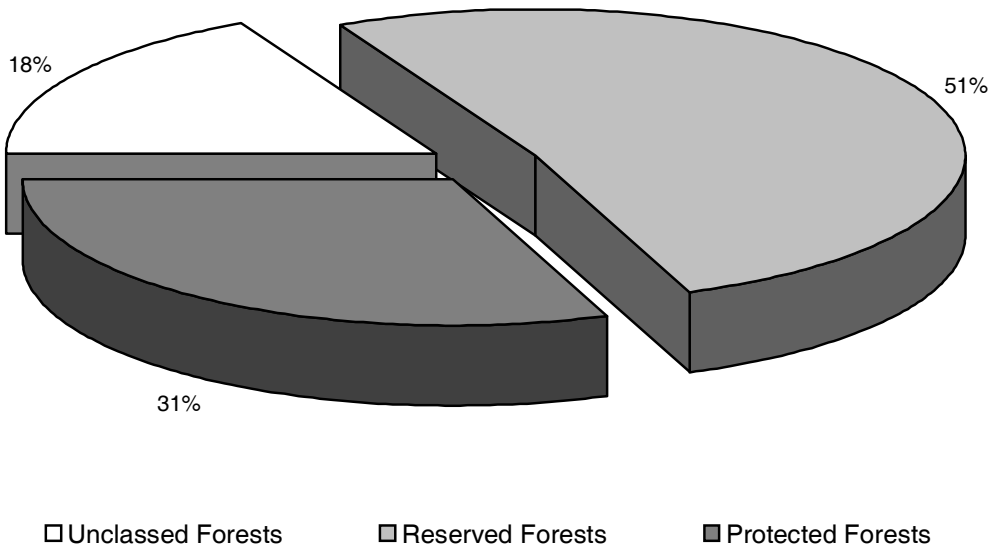

Fig. 2.1: Extent of Forests based on Legal Classification

Source: *State of Forest Report 2003*[10]

[8] *State of Forest Report 2003, Dehradun.* FSI.
[9] There is another type in forest records but not in the Indian Forest Act – the Unclassed Forests (UFs), which are forests not notified yet as RF or PF, but whose reservation as RF or PF might be under progress.
[10] *State of Forest Report 2003.* Dehra Dun. FSI.

2.7 The Policy Outlook

A society is constantly in a process of reviewing values and uses this review to change priorities. At the most basic level, a picture of this change may be had from the subjects and content of national policies and their periodic alterations.

The first public policy statement on the subject of forests was enunciated in 1894. It aimed at managing the state forests for public benefit. It provided regulation of rights and restriction of privileges for the use of forest by the neighboring population. It allowed use of forestland for cultivation and managing certain inferior forest for fulfiling fodder and grazing needs of the local communities. The Policy of 1894 gives the impression that forestry was not given the importance it deserved and in respect of land use it was placed second to agriculture. It reflects the then prevalent abundance of forests.

Another in 1952 replaced this Forest Policy, after independence. It envisaged evolving a system of land use under which different types of land would be allotted to different uses, to lead to optimal production without degrading its worth. The productive, protective and recreational values of forests were recognized and the policy also spoke of the minimum of one third of the geographical area to be under forests.

The National Commission on Agriculture (NCA) in 1976 ushered in a major shift in the forestry sector, when it pronounced the need of a new forest policy to address the production of industrial wood for forest based industry, defence and communication and the present and future demand for protective and re-creative functions of forests.

The policy that was enunciated in 1988 and is in effect on date, is a comprehensive document with directives on afforestation, forestry and farm forestry, management of forests, rights and concessions, diversion of forestland, wildlife conservation, tribal communities, discouragement of shifting cultivation, management of forest fires and grazing, forest based industries, forest extension, forest education, forestry research, personnel management, forest survey and database, and legal and financial support.

The evolving policies supported by various Acts and Rules and the administrative set-up checked to some extent the downhill trend in forest resources. Among the various steps taken, two, viz. creation of protected areas and joint forest management, are briefly recalled here. Details appear in subsequent sections of the report.

2.8 Protected Areas

In order that we do not lose sight of the importance of our national natural heritage and destroy it unwittingly, the Indian Board for Wildlife was constituted in 1952 to advise the Government on measures to be adopted for the conservation of our wildlife resources. Over the past five decades there have been stories of success as well as of failures in achieving the targets set by the Board from time to time. In order to protect critical ecosystems and also to preserve the genetic resources of un-quantifiable commercial as well as non-commercial values, 95 national parks and over 500 wildlife sanctuaries, and two conservation reserves have been created in India, over the years, with the prime objective of preserving them as samples of interdependent ecological gene-pool combinations and a gene-bank capital. These are all under tremendous stress caused by human interventions. Almost 40% of these protected areas are subject to effects of traditional livestock grazing, fodder extraction; timber extraction, non-timber forest

produce collection and more than 45% have public thoroughfares dissecting them into smaller parts. Almost all have human habitations in or around them and a conflict of interest pervades the interface areas between the gene-pool reserves and the exploiters of the forest resources. These pressures are increasing with the rapid rise in the population of the country.

The disproportionately large human and livestock populations have made setting aside 4.7% of country's geographical area under the PA system increasingly difficult. People are not aware that more than 300 rivers originate in India's national parks and sanctuaries and many more do so in the forestlands outside these protected areas. However, since their role in promoting our natural life-insurance policy is invisible to most people, our consumerist preoccupation for exploitation of forestlands and the life forms inhabiting them, for short-term gains, has created a barrier of indifference, resistance and even misdirected opposition against the imperative to preserve the resource capital and the gene-pool repositories of the nation's biodiversity. However, it would be clear to any rational thought that this is but a small investment to ensure the long-term survival of the country's natural heritage, gene-banks and biodiversity, and as the prime providers of water and indeed biomass for the burgeoning human and livestock populations. In the face of the fast-increasing human and livestock pressures on our country's woodlands and aquatic habitats, and the undisguised hunger for land of various land-based activities, the protection of wildlife inside and outside our protected areas is progressively facing heavy odds and is fast becoming a difficult proposition. Indeed, we have lost some of the grandest species of flora and fauna forever, but we have also continued to protect a large number of species which otherwise would have been extinct by now. The contributions of the Indian Board for Wildlife have been widely admired and respected. Following a decision taken under the National Wildlife Action Plan, adopted by the country in 2002 for meeting the new challenges in wildlife conservation, the National Board for Wildlife was constituted in September 2003 as a statutory authority, with full strength of law of the land behind it and is now entrusted with the responsibility for providing thrust to conservation activities.

2.9 Joint Forest Management

Joint Forest Management (JFM), which has taken firm roots in the country since 1990, is now [2005] the central policy of forestry sector in all the 28 States. As per available information, around 84 thousand committees were looking after 17 million ha of forestlands in September 2003, which numbers have significantly risen since then because of institutional funding under the Ministry of Environment and Forests' (MoEF) National Afforestation Programme (NAP) and externally-aided forestry sector projects.[11] NAP, which is being implemented through a two-tier decentralized setup of the Forest Development Agency (FDA) at the forest division level and Joint Forest Management Committee (JFMC) at the village level, intends to operationalise FDAs in all 811 forest divisions of the country by the end of 10th Five Year Plan. In order to give a fillip to JFM, a component, "Strengthening of Joint Forest Management", was added in NAP in 2004, with a view to constitute JFMCs in all 1.73 lakh forest fringe villages in the country and work these forests through participatory micro-plans. With the 10th Five

[11] The figures for 2005 were being compiled by JFM Cell of MoEF when this report was written.

Year Plan allocation of Rs. 1,115 crores, NAP has emerged as the single largest forestry intervention instrument in the country.

The pace of institutionalization of JFM in the country has, however, been highly uneven. It is contended that in some of the northern and southern States, the programme has been perilously dependent on government funding, giving rise to serious questions about its sustainability as an institution. The question of sustainability acquires significance in view of the conflict between JFM organizations and traditional or Panchayati Raj organizations. The Panchayati Raj organizations with a political mandate to look after social and farm forestry in particular and natural resource planning in general under 73rd Constitutional Amendment of 1993 and the Panchayati Raj (Extension to Schedule Areas) Act of 1996, have started making more concerted jurisdictional claims over the forests vis-à-vis Joint Forest Management Committees (JFMCs).[12] Proponents of this view challenge the authority of State Governments to devolve forest management to JFMCs as an antithesis of democratic decentralization and the three-tier system of political governance in India, under the 73rd and 74th Constitutional Amendments. Concern that introduction of JFM in Van Panchayat areas (e.g. in Uttaranchal) or communally managed areas (e.g. in Orissa) is in fact a retrograde step in terms of people's empowerment and decentralization, has also been raised from time to time. Concerns are also raised about the legitimacy of JFMCs, as JFM order/notification/ resolution have not been issued by most of the State Governments under any Rule or Act. It is contended that unless JFM tenures are made more secure by way of enactment, public investment in JFM forests would always remain sub optimal, thereby rendering JFM unsustainable in the long run. Further, the existing JFM arrangements, with limited scope for lateral expansion, are not considered sufficient to address the livelihoods[13] and poverty issues, which are multi-dimensional by nature incorporating a complex web of social, economic, political, physical, natural and financial capitals. These concerns notwithstanding, the intentions made by these orders/ notifications/ resolutions make evident that JFM and similar such interventions in participatory forestry are likely to be strengthened further as a dominant strategy of natural resource management in the country. Further, it is also a fact that the 84 thousand or so JFMCs in the country were constituted after painstaking processes at the local level and many of these have been in existence for over two decades and have contributed to successful regeneration of almost 25 per cent of the country's forests on their own, without significant level of investment of public finances. Further, it is also a fact that the JFM institutions are continuously evolving and maturing. It may not, therefore, be proper to scrap these organizations or replace them altogether with new ones at this stage.

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[12] Panchayats of 13 villages in Gurdaspur District, Punjab, have challenged the routing of funds through JFMCs in Civil Writ Petition No. 4198 of 2004 before the High Court of Punjab and Haryana. The case is being heard.

[13] Livelihoods comprise bundle of activities which a household pursues in a given vulnerability context with available social, human, financial, physical and natural capitals within the existing constraints of formal and informal institutions leading to different outcomes (*definition* taken from Carney, D. (1998) *Sustainable livelihoods: What contributions can we make.* Department for International Development, London).

2.10 The Task Ahead

The specific problems confronting the Indian Forest Sector, first documented in NFAP (1999), are listed below:

1. Loss of forests through diversion, encroachment and degradation (including desertification and soil erosion).
2. Declining forest productivity through overuse beyond sustainable limits.
3. Inadequate investment in afforestation and forest protection, management and development - inability to fully implement multiple use/protected area management.
4. Inadequate rural energy sources and lack of viable alternative energy available to rural communities.
5. High cattle population with low productivity in rural areas and inadequate fodder production resulting in very high grazing pressure on forest areas.
6. Inadequate and ineffective participation of local communities and private initiatives in forestry, lack of legal support to JFM programme, uncertainty regarding rights of private land owners for trees grown on forestlands, regulations regarding harvesting and transportation of forest produce, uncertain market conditions for forest products.
7. Forestry legislation, institutions, programmers not fully conform to goals and objectives envisaged in the National Forest Policy.
8. Forest fire and shifting cultivation.
9. Insufficient and inadequate regeneration and enrichment planting to restock/ rehabilitate degraded forests.
10. Inadequate distribution of protected areas for full representation of biodiversity and ecosystems.
11. Ever-increasing biotic pressures on forests due to continuous rise in human and cattle population and poverty in areas close to forests.
12. Inadequate and non-prioritized forest research and extension in bringing knowledge and technology to field.
13. Inadequate incentives and delivery mechanism in social forestry and JFM schemes.
14. Inadequate extension support to farmers for agro/farm forestry - lack of appropriate agroforestry production models and other extension services.
15. Over and wasteful use of forest products due to hidden subsidies, low user fee and unrealistic pricing.
16. Organizational inefficiencies within national and state forestry organizations and inadequate linkages with related institutions.
17. Over reliance on rules and procedures of forestry organizations, rather than on productivity and efficiency.
18. Inadequate forest protection against illicit felling of trees, poaching of animals and other forest offences.
19. Inefficient forest industry in terms of scale of operations, equipment, technology, management, shortage of raw material, protection, etc.

20. Inadequate infrastructure and institutional support for marketing and distribution of wood and non-wood forest products.
21. Insufficient database and information systems for resource utilization and management planning.
22. Lack of effective national and state land use policy, planning and rationalization of priorities.
23. Breakdown of linkages between technical forestry issues and financial planning.
24. Forestry education not abreast with the latest developments in the forestry sector.
25. Lack of viable economic/social alternatives for rural poor and tribal people.
26. Vast potential of biodiversity and non-wood forest products found in forests of the country not tapped adequately.

In the context outlined by these problems, India is faced with certain key issues that need to be addressed, either due to the urgency created by the mingling of some of the problems listed above or as a response to international trends, or more often, both. The task now at hand, is an overall review of the forest sector in India and, in the light of the above, to investigate the causes and possible rectifications.

The current land use statistics and forest cover assessment reveal that there is significant shortfall compared to the National Forest Policy goal of achieving one-third forest and tree cover. Notwithstanding the recent reversal in the long trend of deforestation in the country, there are concerns that net forest and tree cover loss may resurge in view of slowed down investment in tree planting and the enhancing biotic pressures. The concern also stems from the fact that despite concerted conservation measures the country has lost almost 4 million ha of forestland due to diversion for non-forest use, encroachment and shifting cultivation between 1980 and 1990[14]. A growing rural population with limited income opportunities and the related widespread rural poverty, especially amongst the landless/ marginal farmers, has led to inappropriate and sometimes illegal removal of forest products, especially fuel wood, which in turn accentuates forest degradation and crowding of forest dependent communities.

Thus, three distinct medium term forestry sector goals are to:

1. meet the subsistence requirement of the forest-fringe communities for fuelwood, fodder, small timber and non-wood forest products through a system that ensures prevention of further degradation of the well stocked areas and regeneration of the degraded areas;
2. meet the ecological requirements of biodiversity conservation, wildlife preservation and ecological goods and services (soil conservation, fertility management, maintenance of hydrology, disease and storm protection, culture, recreation, etc.); and
3. meet the market requirements, including the needs of forest-based industries, through increased productivity of the existing forests and expansion of forest and tree cover by encouraging investments by all stakeholders, especially on private land holdings.

[14] FAO. (2003). Summary of the *Final Report of the Forest Resources Assessment.* Rome.

Each of the above goals could be attained in a sustainable manner if the interventions create economic and livelihood opportunities for members of the forest-fringe communities and benefit farm forestry. This in turn necessitates further strengthening of local forest management in the country. Indeed, the country has vast experience of multiple forms of people's participation in forestry, ranging from forest cooperatives in Kangra (Himachal Pradesh) to community management in the Northeast and Uttaranchal.

2.11 Recommendations

[1] Forests be classified on the basis of their status, such as pristine, climax, managed and degraded forests. There is a need to undertake scientific research to assess the optimum forest/tree cover in a given area according to the forest type and topography to meet the intended objectives. The quality of the forest be classified as under 'open forest', 'dense forests' and 'very dense forests' and the rest may be in the form of grassland, glacier, desert, etc. Extent of forest cover in recorded forest boundaries needs to be separated from tree cover due to plantations of species such as coffee, tea, apple, mango, palm, orange, etc, as well as to exotics like lantana.

[2] The National Forest Commission endorses the recommendation of the Forest Policy of 1988 that one-third of the landmass of India should be under tree cover, with 60% in the Himalaya.

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Chapter 3

Forest Policy

3.1 Forest Policy of Princely States and Colonial India

Before the advent of the East India Company and subsequent establishment of British Raj in India, though there was no formal forest policy, various princely states had different approaches to forestry resources available in their areas. Generally speaking, the approach was twofold. While no protection was afforded to the forest area in general, and rulers tried to encourage agrarian extension by remitting revenues and providing credit to those peasants who cleared fresh land for agriculture, certain specific pockets of forests were protected, either as hunting areas (*Shikargahas*) or for defence purposes. Most of the rulers maintained their hunting areas in which no one was allowed to disturb the fauna and flora and accordingly, these areas were well preserved. There are instances of protection being afforded to the forest area from defence point of view as well. The zamindars of Avadh protected the thickest of bushes and trees around their forts so as to have a "secure asylum" from revenue collectors. The zamindars of Avadh even tried to maintain and increase the vegetation around forest and on riverfronts by curbing grazing, tree felling and cultivation by peasants. However, there are a few exceptions to the apathy of the rulers regarding forest protection. One such example has been narrated by Dr. Brandis in his book of a forest maintained by Thakur of Badnor near Udaipur, which was in complete contrast to the neighbouring denuded forest area and provided shelter to the human and animal population during the famine of 1867. Though the rulers were selective in providing protection to forest areas, there were indeed some customary restraints on the use of tree, as in the sacred groves protected by communities. Many of these areas are still in existence. These sacred groves were found all over the country from the Garo and Khasi hills in North-East to Pratapgarh and Banswada in Rajasthan, near Gorakhpur in Uttar Pradesh to Coorg and Salem in South India.

In the Presidencies – Bombay, Madras, Calcutta – the policy was to fell the trees indiscriminately for supply to the Navy and to the shipbuilding industry, for the construction of rail wagons as also for earning revenue. The introduction of tea cultivation in Assam and Bengal and of coffee and tea cultivation on the uplands of southern India has been also major causes for the attenuation of the forests of the country.

In Goa and other Portuguese possessions, the Policy was to give concessions for exploitation, the result being that at the end of the Portuguese rule, only in the remote Western Ghats at the edge of the colony of Goa did natural forests survive.

3.2 First Forest Policy (1894)

After the establishment of a structured forestry set up in 1864, with the appointment of Dr. Dietrich Brandis as the first Inspector General of Forest, the first National Forest Policy was formulated in 1894. This document, which was circular No.22-F dated 19th October 1894, was based on 8th and 9th Chapters of Dr. Voelcker's Report on Improvement of Indian Agriculture and Review of Forest Administration in British India for 1892-93. These documents differed in their approach considerably. While Dr.

Voelcker attempted to recommend the role of forestry as subservient to agriculture, the Inspector General of Forest adopted a conservative approach and discussed in detail the principles, which should underlie the management of a state forest in India. However, efforts were made to accommodate both viewpoints and to produce a document, which lays down the general policy regarding management of forests in British India. As per the policy, forests, being state property were broadly classified under four headings namely, Forest for Preservation, Forest for Commercial purposes, Minor Forests and Pasture Lands. Though, the aim of this policy was to manage state forests for public benefit, certain regulation of rights and restriction of privileges for the use of forest by the neighbouring populations was provided in this policy. Further, para 6 of the policy clearly mentioned:

> … whenever an effective demand for cultural land exists and can only be supplied from forest, the land should ordinarily be relinquished without hesitation.

This Forest Policy of 1894 did not accord proper recognition to forestry which was called for and in respect of land use, it was placed next to the agriculture.

3.3 Policy After Independence

After independence, the 1894 policy was replaced by another policy in 1952. This policy identified vital national needs; which included a system of balanced and complementary land use, need of checking of denudation of mountainous regions, erosion of river banks and invasion of sea-sands on coastal tracts and the need of ensuring supply of fodder and small wood, etc. This policy also classified forests in four groups, namely, protected forest, national forest, village forest and tree lands. On the point of relinquishment of forestland for agriculture purposes, the policy under paragraph 8, clearly mentioned:

> The notion widely entertained that forestry, as such, has no intrinsic right to land but may be permitted on sufferance on residual land not required for any other purpose, has to be combated.

The policy also dealt upon the proportion of forest areas and for the first time, a target was identified –

> India, as a whole, should aim at maintaining one-third of its total land area under forests.

However, even after enunciation of the National Forest Policy of 1952, matters did not change materially on the ground. On the contrary, large forest areas were cleared for rehabilitating displaced persons, as a result of partition of the country and also for other purposes. This resulted in shrinkage in forest area in different parts of the country.

3.4 Recommendations of the National Commission on Agriculture (1976)

However, a major shift was noticed in forestry sector after the National Commission on Agriculture (NCA), constituted in 1970, was entrusted with the task of making recommendations on improvement of forestry sector under the terms of reference 2 B (v), which reads:

> In particular to investigate and report the following aspects of agriculture
>
> B. Animal Products, Fisheries and Forestry
>
> (v) Development of forestry, including farm forestry as a factor in agriculture progress and as a source of raw material for industry, exports as well as for sustaining the ecological balance in nature and for providing employment opportunities to large sections of tribal and other population living in these areas.

After deliberating for years, the National Commission on Agriculture gave its report in 15 parts, of which part IX was entitled as "Forestry" and had the following six chapters.

1. Forest Policy
2. Production and Social Forestry
3. Minor Forest Produce
4. Forest Ecology and Wildlife Management
5. Forest Protection and Law
6. Forest Planning, Research and Education

Specific recommendations have been made in all the chapters. Under Chapter 41, Forest Policy, 22 important recommendations were made (pages 26-29) of part - IX of the Report. Two major recommendation of the Commission were:

> Institutional changes should be brought about in the management for production forestry, and man-made forests be raised on an extensive scale with the aid of institutional financing.
>
> The existing system of harvesting of major and minor forest produce through the intermediary contractor must be replaced by taking it up either directly by the SFDs or by a network of forest labour cooperative societies, or by a combination of both.

Both these recommendations were in total contrast to the tradition that had existed in the Indian forestry for over a century and directly flowed from the increasing threats to existing forests. People's demands for fuelwood and fodder were sought to be met through social forestry, which was deemed to further reduce the pressure on forests. However, social forestry could not live up to its expectations and resulted in the alienation of people from the forests, which has had several adverse effects.

The recommendations of the National Commission on Agriculture (NCA) are based on recognizing the protective and aesthetic functions of the forests which include regulation of grazing and shifting cultivation, satisfying the domestic needs of the people for various forest products, undertaking large scale industrial plantations, carrying out forestry operations either departmentally or through forest labour cooperative societies, adoption of social forestry and preference to socially backward and unemployed in providing employment through forestry operations.

For production and social forestry, recommendations of the NCA included identification of 48 million ha of forestland being dedicated as production forest, promulgation of grazing rules, increasing of the grazing fee, prohibiting grazing in regeneration areas, planting of fodder trees, overcoming the problem of shifting cultivation, allotment of homestead lands to tribals, creating a full-fledged Department of Forest in the Ministry of Government of India and appointing of the Principal Chief Conservator of Forest (PCCF) as Secretary Forest in the State.

Regarding minor forest produce, the NCA recommended that development of minor forest produce should be the responsibility of the Forest Department.

For protection of forests and wildlife management, the NCA was of the view that there should be sufficient buffer zone at the boundary of the national park and the Wildlife Division in the Government of India be headed by an officer of the rank of Additional Inspector General of Forests.

On forest protection and law, the Commission suggested soliciting support of voluntary associations, issuing letter of appreciation and cash reward to panchayats, undertaking large scale social forestry programme and creating *nistar bhandar* (depots) to supply timbers to villagers and the enactment of an All India Forest Act by Parliament.

On forest planning, research and education, the NCA recommended taking up of aerial photography for rapid forest survey.

Based on the recommendation of the NCA, the Government of India took the following important steps:

1. Creation of Forest Corporations by various State Governments for harvesting the forest produce and thereby eliminating the middleman as a contractor.
2. Establishment of the Indian Institute of Forest Management to produce managers managing the resource as a business concern.
3. Initiating the programme of social forestry on village and forestlands.
4. Formulating a new National Forest Policy in 1988, thereby replacing the Forest Policy of 1952.
5. Making Forestry a subject of concurrent jurisdiction, whereby both the Centre and States have the powers to legislate, through the 42nd Amendment of the Indian Constitution in 1976. Since then the Central Government generally sets the broad national policy and legal framework, and supporting statutes. These, at the national level, act as a guiding framework for the States.
6. Creating a separate Ministry of Environment and Forests in 1984.
7. Ensuring people's participation through a resolution issued in 1990 for adoption of Joint Forest Management as a tool of managing the forest resource.
8. Conferring ownership right of minor forest product to Panchayats through constitutional amendment.
9. Enactment of Panchayati Raj (Extension to Scheduled Areas) Act, 1996.

3.5 Present Forest Policy (1988)

Acting upon the recommendation of the National Commission on Agriculture, Government of India, through a resolution dated 7 December 1988 formulated a new forest policy with the following basic objectives: -

- Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.
- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country.
- Checking soil erosion and denudation in the catchment areas of rivers, lakes, and reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.

- Checking the extension of sand dunes in the desert areas of Rajasthan and along the coastal tracts.
- Increasing the sustainability of the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.
- Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.
- Increasing the productivity of forests to meet essential national needs.
- Encouraging efficient utilization of forest produce and maximising substitution of wood.
- Creating a massive people's movement with the involvement of women for achieving these objectives and to minimise pressure on existing forests.

This was a clear improvement over the Forest Policy in 1952, as for the first time "environmental stability" was considered as the prime object of the Forest Policy and direct economic benefits were subordinated to this principal aim. While initiating this policy, it was acknowledged in the "Preamble" that despite the 1952 Policy, forests in the country have suffered serious depletion.

Para 4.3.4.3 of the new policy reads as follows:

> The life of tribals and other poor living within and near forest revolves around forests. The rights and concessions enjoyed by them should be fully protected. Their domestic requirements of fuel wood, fodder, MFPs and construction timber should be the first charge on the forest produce.

This pronouncement was in stark contrast to the opinion of the NCA which had maintained that:

> Free supply of forest produce to the rural population and their rights and privileges has brought destruction to the forest and so it is necessary to reverse the process. The rural people have not contributed much towards the maintenance or regeneration of the forests. Having over-exploited the forest, they cannot in all fairness expect that somebody else will take the trouble of providing them with forest produce free of charge.

Even prior to the current policy, the needs of the forest dependent communities were recognized and the Dhebar Commission in 1966 recommended revising the approach of the government towards the tribal villages in tribal areas[15]. The Commission went on to recommend the following regarding the tribals:

> The Forest Department in consultation with Agriculture, Industries and Development departments in each region should prepare a time schedule so as to provide work for the tribals all the year round.
>
> The tribals residing in and around the forests should be organised into permanent labour corps for the purposes of obtaining labour of the right type for forest operations.

Thus, from a policy of policing against the forest dwellers, we have now shifted to an integrated approach to the management of forests[16], where the pressing needs of the

[15] Scheduled Areas and Scheduled Tribes Commission, 1966. (Chairman: U N Dhebar). Popularly referred to as Dhebar Commission.

[16] Saxena, N.C. (1995). *Forests, people and profit – New equations for sustainability.* Dehradun, Nataraj Publishers

forest dwellers, the most important stakeholders, are duly incorporated in the scheme of things.

The policy after enumerating the essentials of forest management, mentions a strategy which included area under forest afforestation of state forests, rights and concessions, diversion of forestlands for non-forest purposes, wildlife conservation, tribal people and the forest, shifting cultivation, damage from encroachment, forest-based industry, forest extension, forestry education and forestry research, personnel management, forest survey and database, legal support and infrastructure development and financial support for forestry. This policy also maintained that national goal, should be to have a minimum of one-third area of total land area under forest or tree cover.

3.5.1 Rights and Concessions

The Forest Policy of 1894 was the first official move towards regulating the rights and concessions enjoyed by the forest-dependent communities:

> The cardinal principle to be observed is that the rights and privileges of individuals must be limited, otherwise than for their own benefit, only in such degree as is absolutely necessary to secure that advantage (NFP 1894, para 2)

However, the Policy also clarified that every attempt should be made for the full and easy satisfaction of the needs of the forest-dependent people.

> Considerations of income should be made secondary to the full satisfaction of local needs…no restrictions should be placed upon reasonable local demands merely in order to increase the state revenue. (NFP 1894, para 8)

The Forest Policy of 1952 was principally intended for the purpose of increasing revenue for the State. Production of timber for industries, railways, markets, exports and for defence needs were national interests which were to be accorded priority over domestic and agricultural needs.

> The scientific conservation of a forest inevitably involves the regulation of rights and restrictions of privileges of user, depending upon the value and importance of the forest, however irksome, such restraint may be to the neighbouring areas. (NFP 1952, para 7).

The Forest Policy of 1988 was the most rational of all the three policies as regards the rights and concessions of the forest-dependent communities. It duly recognized the rights and concessions of the tribals and other poor, living near the forests and advocated their protection. It also recognized their domestic requirements as the first charge on the forest produce. However, it also mentioned that the rights and concessions should remain related to the carrying capacity of the forests and should be enjoyed only by the communities living within and around the forest areas.

3.5.2 Grazing

The Forest Policy of 1894 was the most elaborate of all the policies in explaining the modalities of grazing in the various classifications of the forests.

> The question whether any particular area can be made to support a greater number of cattle by preserving the grass and cutting it for fodder, or by permitting grazing upon it, is one that must be decided by the local circumstances of each case. (NFP 1894, para 11).

The Forest Policy of 1952 being extremely critical of unlimited and uncontrolled grazing, refuted it as contrary to the principles of scientific management. However, it also admitted that in many regions, a little amount of grazing does little harm, and may even

do a great deal of indirect good in reducing the risk of fire and in suspending regression at a desirable stage. Subsequently, the Dhebar Commission recommended that the forest department should promote growth of improved varieties of grass in forest areas and grazing fees should be regulated. The NCA advocated for strict control and regulation of grazing for the feeding of the essential livestock. It also stated that the grazing by goats in forestlands should be prohibited and that by sheep allowed only in specially earmarked grasslands under strict rotational control. The Commission also recommended the promulgation of grazing rules by each State Government specifying the grazing rates and providing for the manner in which grazing should be permitted.

The current Forest Policy of 1988 is in consonance with the views in the previous policy on the issue of grazing, except for an important qualification that the grazing in forest areas should be regulated with the involvement of the community. It also laid special emphasis on raising of fodder trees and grasses by the farmers to reduce grazing pressure on forests.

> Land laws should be modified wherever necessary so as to facilitate and motivate individuals and institutions to undertake tree farming and grow fodder plants, grasses and legumes. (NFP 1988, para 4.2.4)

3.5.3 Fuelwood

Similar to grazing, supply of fuelwood was not an issue at the time of the Forest Policy of 1894 because the Government was of the view that the demand of fuelwood could be easily met from the margins of forest tracts without causing much harm to the valuable timber species. For the class three forests , the Policy specially mentioned that:

> These must be managed mainly in the interests of the population of the tracts which obtained its forest requirements from this source. (NFP 1894, para 9).

The 1952 Policy termed

> the need for ensuring progressively increasing supplies of firewood to release the cattle dung for manure to step up food production. (NFP 1952, para 3)

This policy for the first time recommended the promotion of tree planting by farmers on their own lands for the supply of their needs including fuelwood.

The 1988 Policy states:

> A massive need-based and time-bound programme of afforestation and tree planting, with particular emphasis on fuelwood and fodder development, on all degraded and denuded lands in the country, whether forest or non-forestland is a national imperative. (NFP 1988, para 4.2.1)

This realization that the demands for fuelwood could not be met alone from existing forests and additional sources of supply need to be developed had dawned upon the Government by the early 1970s. It had ultimately led to the conception of the social forestry programme. However, the 1988 Policy differed from the social forestry programme in one respect – it recommended that denuded and degraded forests should also be developed as fuel and fodder reserves unlike social forestry, which proposed tree planting only on private holdings. This policy also recommended bridging the gap between the demand and supply of fuelwood by enhancing the productivity of the forests.

3.5.4 Shifting Cultivation

Though the Forest Policy of 1894 made it amply cleat that the claims of cultivation are stronger than the claims of forest preservation, it was against the honeycombing of a valuable forest by patches of cultivation and maintained that cultivation must be permanent. On the question of shifting cultivation, it stated that:

> A system of shifting cultivation which denudes a large area of forest growth in order to place a small area under crops, costs more to the community than it is worth, and can only be permitted under due regulation, where forest tribes depend on it for their sustenance. (NFP 1894, para 7).

The 1952 policy held similar views on shifting cultivation and suggested:

> To wean away the aborigines, who eke out a precarious living from axe-cultivation moving from area to area, away from their age-old and wasteful practices, requires persuasion, not coercion: a missionary, not an authoritarian approach. (NFP 1952, para 23).

The Policy suggested exploring the possibilities of regulating shifting cultivation by combining it with forest regeneration (Taungya), to the benefit of both forests and the communities. On similar lines, the NCA recommended expeditious regulating, containing and replacing shifting cultivation by resorting to agri-silvicultural applications, apart from other methods.

Similar to the two previous policies, the Policy of 1988 too was critical of shifting cultivation and held it guilty of affecting the environment and productivity of the land. It advocated checking of shifting agriculture by popularizing alternative agricultural practices in the regions already affected by it. It also recommended that the areas damaged by such cultivation should be rehabilitated through social forestry and energy plantations.

3.6 Other Commissions and Committees

3.6.1 Introduction

The Central Government has been taking policy initiatives in the forestry sector, based on its administrative judgment. However, on adopting a democratic setup in 1947, the need for the wider consultation before issuing any policy document was felt even more. To address this requirement, the Government has set up a number of commissions/committees to give recommendations on various issues pertaining to forestry and tribals. In 1966, the "Scheduled Areas and Scheduled Tribes Commission" was set up under the chairmanship of U.N. Dhebar. Since forestry was the mandate of the Ministry of Food, Agriculture, Community Development and Cooperation till January 1985, the subject of forestry was covered in detail by the "National Commission on Agriculture", constituted under the chairmanship of C. Subramanium in August, 1970. The Commission gave many important recommendations, some of which have been implemented and formed the basis of governance in the forestry sector in the country today. Further to orient the Forest Policy of 1952 a " Committee on Forests and Tribals under the chairmanship of B. K. Roy Burman was formed in 1980 by the Ministry of Home Affairs, Government of India. Though the revised National Forest Policy was issued in 1988, yet there were many issues which required detailed examination. In particular, the 73rd Constitutional Amendment which heralded the new era of democratic governance through Panchayati Raj Institutions (PRIs) mandated that Acts and policies related to the subjects which have been made the responsibility of the PRIs be re-looked

at to ensure conformity with the Constitutional Amendment. Accordingly, in 1997 four expert committees, namely, "To Review the National Forest Policy, 1988, and its implementation"; "Conferring Ownership Rights of MFPs on Panchayat/Gram Sabhas"; "Review of Afforestation Policy and Rehabilitation of Wastelands" and "To Finalise Guidelines for Approval of Forestry Working Plans" were constituted under the chairmanship of C.D. Pandeya, ex-DGF; C.S. Chadha, the then Secretary, Forests, Government of Madhya Pradesh.; A.K. Mukerji, ex-DGF and A.R. Maslekar, ex-PCCF, Maharashtra. Further, to remove the gender bias in the Forest Policy, an "Advisory Committee to Promote the Involvement of Women in Forestry Sector" was set up in 1998, under the chairpersonship of Prof. Rita Verma, then Member of Parliament (Lok Sabha). Finally, a Committee for preparing an "Action Plan for Forestry Sector for next 20 years" was constituted under the chairmanship of C. P. Bhatt in 1998.

The recommendations made by these Commissions/ Committees are being discussed in brief in the following paragraphs:

3.6.2 Dhebar Commission

The Commission felt that the Forest Policy of 1952 puts the tribals at a disadvantageous position and therefore, it required revision. Accordingly, its suggested changes in Forest Policy of 1952 by allowing forestland for agriculture, supplying the need of the villagers from Reserve Forests, eliminating the middleman between inhabitants and State Forest Departments in relation to exploitation of forests, security of tenure for settlers in forest villages, providing all amenities to the forest villagers, abolishing rights of individuals in private forests and stressing that Forest Department should also undertake the responsibility of tribal development.

In relation to the execution, the Commission recommended that policy decisions must be implemented, the management of village forests should be with the panchayats, all revenue of forest villages should go to panchayats, areas for afforestation be handed over to panchayats, growth of improved variety of grass be promoted, grazing fee be regulated, tribals be provided employment round the year in consultation with the Agriculture Department, tribals be organised into labour cooperatives, Cooperative Finance and Development Corporation be organized, etc.

Some of these recommendations were incorporated in the 1988 Forest Policy by having one of the basic objectives as "meeting the requirement of fuel, fodder, minor forest produce and small timber of rural and tribal population".

3.6.3 Roy Burman Committee

The Roy Burman Committee submitted its Report in September 1982 and gave recommendations under 11 heads, namely, forest policy, forest and tribal development programmes, shifting cultivation, village forests, social forestry, forest-based industry, minor forest produce, forest labour cooperative societies, biosphere reserves, management systems, and legislation.

The Committee recommended that the forest policy must fulfil three sets of need - a) ecological security, b) food, and c) cottage industries requirements, recognition of forest rights, undertaking large scale plantation, budgetary allocation to tribal sub-plan, providing gainful employment in forestry working, encouraging tribal farmers to take up

farm forestry, identification of beneficiary-oriented programme in the forestry sector, preparation of comprehensive projects to tackle shifting cultivation, working out a programme of developing valley lands for cultivation to settle the shifting cultivators, converting forest villages into revenue villages, providing all economic development programmes to the revenue villages, evolving comprehensive approach for village wood-lots, giving assistance for developing income generating programmes, encouraging cooperative sectors for participating in social forestry, setting up more forest-based industry in cooperative sectors, making forest-based industries as joint ventures, planting industrial raw material with buyback guarantee by the industries, carrying out item-wise resource inventory survey of minor forest produce (MFP) ensuring right of collection of tribals of MFP without restrictions, according priority to cooperativisation of MFP, organizing first-stage processing of MFP within tribal areas, executing forestry operations through cooperatives of forest labourers, declaring virgin areas rich in flora and fauna as biosphere reserves, rehabilitating tribal families displaced by national parks and sanctuaries, non-creation of tribal reserves on the mainland, integrating tribal and forest economies, ensuring strong backward and forward linkages between forestry and other development sectors, modulating forest management practices to generate employment round the year, non-abridging traditional rights, concessions and privileges of the tribal in respect of forest produce, grazing and hunting, restricting deforestation of areas vulnerable to soil erosion, vesting the ownership right on the tree growing in the holding allotted to a tribal in a forest village, etc.

3.6.4 Pandeya Committee

Though the National Forest Policy was formulated in 1988 and there was no serious objection to the Policy as such, yet at times various pressure groups raised question marks regarding the justification of having one-third area of the country under forest cover. To settle the issue after the meeting of the State Forest Secretaries and PCCFs held in September 1977, the Ministry of Environment and Forests (MoEF) constituted an Expert Committee to review the National Forest Policy, 1988, and its implementation under the chairmanship of Sh. C. D. Pandeya, IGF (Retd). The Committee made 20 recommendations, most important of which are:

1. The National Forest Policy, 1988, *per se*, does not require major changes.
2. The goal stipulated in the National Forest Policy, 1988, to bring minimum of one-third of total land area of the county under forest/tree cover, is realistic, necessary and based on pragmatic consideration.
3. A National Grazing Policy should come into effect at the earliest.
4. The fulfilment of rights and concessions should have a bearing on responsibility and be beneficial to forest protection particularly against grazing.

3.6.5 Mukerji Committee

The Committee, under the chairmanship of Sh. A. K Mukerji, DGF (Retd.), deliberated on "Review of Afforestation Policy and Rehabilitation of Wastelands". It submitted its report on 30th January 1998 and recommended that:

1. Vigorous efforts have to be made by MoEF to obtain more funds for the afforestation programme from the Planning Commission.

2. Creation of an autonomous funding agency for the 200,000 villages in and around forest areas. This agency could be termed as Joint Forest Management and Development Agency (JFMDA), and function on the lines of DRDAs. The DFO would act as the Chief Executive.
3. Each State Government should set aside a minimum of 25% of the revenue collected from the sale of forest produce in a Forest Development Fund under the Forest Department.
4. MoEF while giving environmental clearance for projects may ensure that there is an additional funding of at least 5% of the project cost for new projects and 1% of the annual running cost for existing and new projects.
5. A separate JFM cell be established in all the states under the Chief Conservator of Forests to implement JFM and support other extension activities, and for interacting with the JFM cell in the MoEF.

3.6.6 Chadha Committee

The Committee under the Chairmanship of Sh. K. M. Chadha, examined the Panchayat (Extension of Schedule Area) Act 1996 (PESA Act) which endows panchayats with the ownership of minor forest produce (MFP). The Committee also deliberated on the definition of the term MFP, as it has not been defined in PESA Act and legal aspects of the term ownership. The Committee felt that the Panchayats will not be able to discharge their responsibilities in protecting and managing the ecosystems, whose impact cuts across artificial geographical boundaries of panchayats, districts, states and even the national frontiers. The Committee felt that net revenue should be distributed judiciously in accordance with the contribution of the people in collecting minor forest produce. The Committee, thus, recommended that Gram Sabhas not only in the Scheduled Area but also all over the country be given usufructory rights over MFPs in all Government forests except the Protected Areas. Harvesting of MFPs has essentially to be done on a non-destructive basis and in accordance with the prescriptions of the approved management plans. The net surplus available from the MFPs should be transferred back to the Gram Sabhas through the agency responsible for the trade in MFPs, with the stipulation that at least 25% of the surplus is invested for the development of MFPs and 25% for Community Development. The agencies involved in trade of nationalized MFPs should also take up research and development in the field of conservation, collection, storage, processing, marketing, etc of non-nationalized items and depending upon their viability should take up trading of newer items of MFPs. It also recommended that the present arrangement of corporations/federations carrying out trade in MFPs should continue as it is and that they should involve the Gram Sabha/Joint Forest Management agencies in the trade and no other agency, nominated or elected, should be involved in this activity.

3.6.7 Maslekar Committee

The Committee had seven Terms of Reference including suggesting modifications in the Working Plan guidelines, procedure for preparation, submission and approval of Working Plan, improving quality of Working Plan by using available technology, ideal set of infra-structure and examining financial implications and harmonization of JFM-oriented micro-plans into regular Working Plans. The Committee gave a number of

recommendations under each term of reference. Some of the important recommendations are reproduced below:

- A Central Working Plan Code should be formulated for the entire forests of the country and notified in the *Gazette of India* to make it legally enforceable.
- Working Plans should be prepared taking revenue administrative division i.e. district as a unit covering all forests of that district irrespective of classification and ownership thereof.
- There should be no clear felling in natural forests and in plantation areas also it should be restricted and considered only on merits.
- Altitude should not be exclusive criteria to ban all fellings in critical areas for which strategy should be to scientifically manage and/or afforest them.
- Working Plan Officer should conduct socioeconomic surveys for assessment of biotic pressures as well as to elicit willingness of people for joint forest management in problem areas. Such surveys should also be computerized for regular updating.
- Final Working Plan should be submitted by every State/UT Government by a Committee headed by PCCF (WP) having amongst others a representative of the concerned Regional Office of the Ministry, not below the rank of a Conservator of Forest.
- No deviations should normally be allowed from the prescriptions of an approved Working Plan.
- Latest technologies of remote sensing, aerial photo-interpretation and GIS etc should be gainfully utilized in the preparation of Working Plans to make them dynamic and to improve their quality.
- The minimum period of posting of a WPO should be three years or till the completion of works of preparation/revision of Working Plan, as the case may be. In the event of promotion of a WPO to a next higher post/grade, the post of WPO should be temporarily upgraded to ensure continuity of works.
- No new areas for any kind of harvesting should be taken up unless funds for its regeneration during subsequent period are assured.
- JFM-oriented micro-plan should be prepared by the concerned territorial DFOs being an administrative exercise, within the broad outline of silvicultural system prescribed for a given area in its Working Plan.
- The Ministry should consider launching of a Centrally-sponsored Scheme to provide for preparation of Working Plans of all the forests of the country irrespective of classification and ownership thereof.
- A Working Plan Cell (as existing during eighties) should be revived in the Ministry.

3.6.8 Rita Verma Committee

To address the problems of women in relation to forestry, an "Advisory Committee to Promote the involvement of Women in Forestry Sector" under the Chairpersonship of Ms Rita Verma, Member of Parliament, was constituted in October 1988 to review the existing status of women's participation, ascertain the felt needs and expectations, critically examine the plans and programmes in the forestry sector and to suggest a suitable policy and field level interventions required to actively promote women's participation in forestry sector.

The Committee while submitting its report to the Ministry of Environment and Forests, made the following important recommendations:

1. Adopt the policy of ensuring that all expert committees set up by it have at least some gender balance.
2. Urgently take up revision of the induction and refresher training curricula to incorporate gender sensitization and attitudinal change in them.
3. Women NTFP producers cooperatives and other groups with membership restricted to actual producers, should be promoted and provided organizational and technical support for taking up collective marketing in both JFM and non-JFM areas, through developing their own cooperative marketing federations.
4. Due to women being the primary forest users in most areas, they should have majority representation in the Management Committee (MC) of the village institution.
5. Women should have independent rights and entitlements to both forest products and any shares of income, which may be available for distribution among community members.
6. MoEF must ensure that employment for all cadre levels of FDs in all States and Union Territories is open to women at the earliest, in conformity with the equal rights guaranteed by the Constitution.

3.6.9 Chandi Prasad Bhatt Committee

Having obtained the report on various issues concerning the forestry sector and having acknowledged the fact that the goal stipulated in the National Forest Policy, 1988, to bring a minimum of one-third of the total land area of the country under forest/tree cover, is a realistic necessity, MoEF constituted a committee for preparing an "Action Plan for Forestry Sector for the next 20 years under the Chairmanship of Sh. Chandi Prasad Bhatt (vide its notification dated 9.11.98). The Committee submitted its report on 27th August 2001 and after dealing with implementable plan of afforestation, formulation of an effective R&D Policy, resource mobilization, legal aspects relevant to action plan, suggested the creation of a Central Board of Forestry (which has not functioned since 1987) to implement the suggested action plan.

1. Forest should be brought under two categories –

a. **Village Forest**: Every village should have its own forest managed by a Van Panchayat. Such provisions should be made in the Indian Forest Act that all States prepare forest panchayat rules giving the power for the conservation, propagation,

utilization and benefit sharing of the forest and no interference should be there from other agencies. The members of the Van Panchayat should be from the village whose main occupation is agriculture, animal husbandry, horticulture and village cottage industries with a majority of women. These panchayats should be empowered to punish those who are found misusing the forest and encroaching upon the forestland. Laws and policies be amended to fulfil this objective.

b. **Government Forest**: The forests other than village forests should be considered as government forests. These forests should be managed by the Forest Department

2. The Forest Department should assist constituting village forest in development blocks. The existing Assistant Development Officer (Forest) should be assigned the task of constituting village forest.

3. In order to make a Van Panchayat financially sound, it should have a Gram Van Nidhi. This fund should be utilized for development of nurseries, afforestation, forest protection, enhancement in forest produce, utilization of development techniques for harvesting, protection of wildlife and for providing compensation towards the damage caused by wild animals.

4. In order to make the forest policy people-oriented, efforts should be made to reinstall faith and confidence among the common people.

5. Village cottage industries based on forest produce should be developed in the village. A package for financial assistance on a priority basis, providing technical know-how, raw material and facilities for marketing should be provided.

6. Forest laws should be made people-oriented and practically applicable, but at the same time it should be strict so that those who are found damaging forestland can be checked. The law should be simple to understand and transparent, so that forest offenders cannot go unpunished.

3.7 Recommendations

[3] The Commission is of the considered view that there is no need to amend the 1988 Forest Policy. The recommendations made by the National Forest Commission can be adopted within the broad framework of the existing Forest Policy of 1988.

[4] Within the broad parameters of the National Forest Policy, each State should have its own forest policy statement, for the sustainable management of its forest and wildlife resources.

[5] Making provisions in a National Forest Policy/State Forest Policy statement cannot achieve the desired results unless these are properly implemented. A mechanism needs to be put in place at the MoEF and State levels to monitor implementation of forest policy provisions and suggest rectifications

Chapter 4

Legal Framework

4.1 History of Forest Legislation in India

The first attempt on forest legislation was made in 1865 with the enactment of the Indian Forest Act. The Act was not comprehensive and mainly provided for the protection of trees, prevention of fire, and prohibition of cultivation and grazing in forest areas. This Act was later revised in 1878, which extended to most Provinces of British India. The 1878 Act provided for the constitution of 'Reserve' and 'Protected' forests.

4.2 Indian Forest Act, 1927

Prior to the formulation of a comprehensive Indian Forest Act in 1927, several acts and amendments covering forest administration in British India were enacted - the Indian Forest Act, 1878; the Act of 1890; the amending Acts of 1891; 1901 and 1911; the repealing and amending Act, 1914; the Indian Forest Amendment Act, 1918; and the Devolution Act, 1920.

The 1927 Act provided enabling provisions to make rules and regulations, which makes it quite distinct from other acts of that time. It is this distinct provision that enabled this Central Act to continue when the item "forest" was made a subject of the Provincial Governments. The Act has 86 sections, in 13 chapters - preliminary; reserved forests, village forests, protected forests, control over forest and lands not being the property of the Government, duty on timber and other forest produce, control of timber and other forest produce in transit; collection of drift and stranded timber, penalties and procedure; cattle trespass, forest officers, subsidiary rules, and miscellaneous regulations.

4.3 Forest (Conservation) Act, 1980

This Act was enacted to check indiscriminate diversion of forestland. Under this legislation, approval of the Central Government is required before any forestland (noted as such in Government records) is diverted for non-forestry purposes.

Moreover, the transfer is allowed only with the provision that compensatory plantations/ afforestation in an equivalent area of non-forestland, or double the area in degraded forestlands, are raised.

In 1988, the Act was amended to make existing provisions more stringent. Some procedural difficulties were, however, experienced in implementing the Act. In order to streamline disposal of applications under the Act, the process of decision-making has been decentralized and procedures and requirements have been rationalized. Revised and comprehensive rules and guidelines under the Act, were issued in 1992.

This Act is, by far, the most important tool the Government of India has to regulate and control the change in the land use of recorded forestland. On the positive side, this Act has helped reduce diversion of forestland for non-forestry purposes. On the negative side, it is alleged that it has delayed developmental projects in forested districts, where the

availability of land other than forestland for roads, bridges, etc., is severely restricted[17]. In general, there is urgent need for public awareness regarding this Act that it seeks to find alternatives and to compensate or minimize losses due to developmental activities and not put a stop to developmental activities altogether.

Another pressing problem that has arisen with the coming of the FCA has been the uncertain status of the lands under shifting cultivation in Orissa, Andhra Pradesh, Madhya Pradesh and the North-Eastern States. The State Governments often do not spare enough time and resources to make proper proposals under the Act with suitable compensatory mechanisms[18] .

The Act has come as an obstacle to the regularization of encroachments of forestlands. Though the 1990 Guidelines under the Act provide detailed procedure to be followed in such cases, the States have virtually given up because of prerequisites, such as provision of equal lands for compensatory afforestation, filing of proof that such regularization was agreed to as a matter of policy prior to 15 October 1980 (the date of promulgation of the Act), etc. This has also denied the opportunity to those who have been settled on forestlands by the intermediary tenure holders in pre-land reform (zamindari abolition) years, or those whose lands have been notified under the Indian Forest Act pending settlement of their claims. The Honorable Supreme Court order in CWP 202/1995 (referred to in Section) has sought further strengthening of the administrative set up for early and time-bound removal of all encroachments. Yet, the States failed to make distinction between cases involving disputed claims and cases of pure encroachment. Such non-discretionary application of the directives of the Honorable Supreme Court was bound to give rise to more conflicts and provide better platform for the opponents of the Act to resurge to somehow circumvent the provision of this Act and the directions of the Apex Court. Indeed, the recent efforts by the Ministry of Tribal Affairs of the Government of India to table the Schedule Tribe (Recognition of Forest Right) Bill 2005 has given fillip to such efforts.

4.4 The Wild Life (Protection) Act, 1972

This is an Act to provide for the protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country. The new provisions of the Act following the amendment of 2002, pertain to establishing the Zoo Authority of India to oversee management of all zoos in the country, protection of rare and endangered species of plants and animals and providing individual with the power to file complaints against offenders. The Act has 11 Chapters and 121 Sections and has categorized animals, birds, and plants in six Schedules.

Schedule I lists endangered species of mammals, amphibians, reptiles, birds, crustaceans and insects. For the possession, transportation, translocation, etc., of these species permission from the Government of India is needed. Penalties for contravention of the

[17] This has begun to change though. MoEF has recently given general approval, valid for another two years (i.e. up to December 2006), for developmental projects involving up to 1 ha forest area to be cleared by the State Governments.

[18] See also, Saxena, N.C. (1995). *Forests, people and profits – New equations for sustainability.* Dehradun, Nataraj Publishers.

Act for Schedule I species are very stringent. The Act provides for the setting of protected areas such as national parks, wildlife sanctuaries, conservation reserves and community reserves. It also has provisions for control of trade and taxidermy in wildlife and for the setting of wildlife advisory boards to advise Central and State Governments.

4.5 The Environment (Protection) Act, 1986

This Act provides for the protection and improvement of environment and for matters connected therewith. India participated at the United Nations Conference on the Human Environment held at Stockholm in June 1972 and decided to take appropriate steps for the protection and improvement of environment and the prevention of hazards to human life and health, other living creatures, plants and property. The Act has 4 Chapters and 26 Sections.

4.6 The Biological Diversity Act, 2002

The Act has a reference to the United Nations Convention on Biological Diversity at Rio de Janeiro in 1992, which reaffirmed the sovereign rights of the States over their biological resources. The Act provides for the conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for connected matters. It has 12 Chapters and 65 Sections.

4.7 The Mines and Minerals (Regulation and Development) Act, 1957

The Act provides for the development and regulation of mines and minerals and gives the Governments, authority to reserve certain areas for the purpose of conservation. The Act also stresses reclamation and rehabilitation of lands and restoration of flora.

4.8 Panchayati Raj Act, 1992

Through the Constitution (Seventy-third Amendment Act, 1992) Part IX "The Panchayats" was inserted in the Constitution, paving the way for "Village Panchayats" by making provisions for the constitution of Panchayats, their composition, election, powers, authority, responsibility, audit, etc. This Act does not apply to Scheduled Areas referred to in clause (1) and to tribal areas referred to in clause (2) of Article 244 and certain other specified areas. Village Panchayats have been given the responsibility of social/farm forestry, minor forest produce (MFP), and soil conservation through the Eleventh Schedule.

4.9 The Panchayat (Extension to the Scheduled Areas) Act, 1996

This Act extends the provisions of the Panchayat Act to the Scheduled Areas and confers ownership right on various resources, including ownership rights on NTFP to Panchayats/Gram Sabhas.

4.10 The Freedom of Information Act, 2005

An Act to provide freedom to every citizen to secure access to information under the control of public authorities, consistent with public interest, in order to promote openness, transparency and accountability in administration and in relation to matters connected therewith or incidental thereto.

4.11 Rules and Guidelines

4.11.1 Joint Forest Management Guidelines/Rules

As per the provisions of National Forest Policy, 1988, Government of India, vide letter No. 6.21/89-PP dated 1st June, 1990, outlined and conveyed to State Governments a framework for creating massive people's movement through the involvement of village committees for the protection, regeneration and development of degraded forestlands situated in the vicinity of villages. This gave birth to JFM. Guidelines were issued in 2000 and 2002 for further strengthening JFM. Guidelines in brief are:

1. Joint Forest Management Committees (JFMCs) have been registered under different names in various States but many of them do not have legal support. A uniform name i.e. JFMC should be adopted and registration should be done under the Societies Registration Act, 1860 to provide them with legal power.
2. A Memorandum of Understanding (MoU) with clearly defined roles and responsibilities for different work and/or areas to be separately assigned and signed between the State Governments and the Committees.
3. All adults of the villages should be eligible to become members of the JFMC.
4. Considering the immense potential and genuine need for women's participation in JFM, at least 50% members of the JFM general body should be women. For the general body meeting, the presence of at least 50% women members should be a prerequisite for holding the general body meeting. At least 33% of the membership in the JFM Executive Committee/Management Committee should be filled from amongst the women members. The quorum for holding meeting of such an Executive/Management Committee should be one-third of women executive members or a minimum of one whichever is more. One of the posts of office bearer i.e. President/Vice-President/Secretary should be filled by a woman member of the Committee.
5. Joint Forest Management programme should cover both the degraded as well as good forests (except the Protected Area Network) with a crown density above 40%. JFM activities should concentrate on NTFP management i.e. regeneration, development and sustainable harvesting of NTFP which can be given free or concessional rates, as per the existing practice in degraded areas under JFM. The benefit sharing mechanism will also be different for the good forest areas. JFM Committees will be eligible for benefit sharing for timber only if they have satisfactorily protected the good forests for a minimum period of the previous 10 years and the sharing percentage should be kept limited to a maximum of 20% of the revenue from the final harvest. The extent of good forest areas to be allowed will depend upon the number of village household and should be restricted to a maximum limit of 100 ha and generally limited to 2 km from the village boundary. For degraded forests as far as possible JFM should be first concentrated on areas up to 5 km from the village boundary.
6. New Working Plans should provide for a JFM overlapping working circle with prescriptions keeping in mind the health of the forest and the needs of the forest dependent community. Micro-plans should be prepared at the local level after

detailed participatory rural appraisal exercise and should reflect the consumption and livelihood needs of the local communities as well as sustainability of resource.

7. Forums or working groups at various levels need to be established for conflict resolution.
8. Community groups in many States who have been traditionally protecting and assisting in the regeneration of forests, need to be identified, recognized and registered as JFMCs.
9. For long-term sustainability of resources, it is essential that not less than 25% of the revenue earned from final harvest should form the share of village community and deposited in the village development fund for meeting the conservation and development needs of the forests. A matching contribution may be made by the Forest Department from its share of such sales.
10. Concurrent monitoring of progress and performance should be undertaken at Division and State levels.

4.11.2 Private Tree Felling Rules/Regulations

The State/UT Governments in order to protect forests and maintain ecological balance have regulated felling of private trees through various Rules and Regulations. Forest and police officers have been given powers to take cognizance of offences committed under these Rules/Regulations. There are provisions for fine and imprisonment for the violation of the rules.

4.11.3 Transit of Forest Produce Rules/Regulations

The State/Union Territory Governments, in order to protect forests and maintain ecological balance have regulated transit of forest produce through various Rules and Regulations. Forest and police officers have been given the powers to take cognizance of offences committed under these Rules/Regulations. There are provisions for fine and imprisonment for the violation of the rules.

4.11.4 Honorable Supreme Court's Judgment

TN Godavarman Thirumulkpad, etc. vs. Union of India and others represents the single largest judicial intervention in the forest sector. This case was brought before the Honorable Supreme Court of India for seeking judicial intervention for implementation of the provisions of the National Forest Policy, 1988 and forest laws. A series of orders have been passed in this case, having long-term implications on forest governance.

1. Order dated 12.12.1996 in WP No. 202/1995 states:

   > ... The term "forestland" occurring in Sec 2, will not only include "forest" as understood in the dictionary sense, but also any area recorded as forest in the Government record irrespective of its ownership. This is how it has to be understood for the purpose of Sec 2 of the Act. The provisions enacted in the Forest (Conservation) Act, 1980 for the conservation of forests, and the matters connected therewith must apply clearly to all forests so understood irrespective of the ownership or classification thereof…

Thus, the definition of forests has been widened to cover any area understood as forest according to the dictionary meaning.

2. Order dated 30.10.2002 in IA No. 566 in 202/1995 states:

   …An independent system of concurrent monitoring and evaluation shall be evolved and implemented through the Compensatory Afforestation Fund to ensure effective and proper utilization of funds.

The environmental audit of the compensatory afforestation and their publication has been made mandatory.

3. The forests will be worked strictly in accordance with the prescriptions of approved Working Plans.

4.12 Other Laws and Rules

Provision of the Contract Act, Evidence Act, Indian Penal Code, and Criminal Procedure Code can also be invoked in situations warranting their application, in safeguarding forest property.

4.13 Legislation of State Governments

State forest laws and regulations help implement the national legal framework. Each State applies a suite of state-level laws to govern forests and forest management. A common feature for many States (e.g. Central and Eastern States) is the strong influence played by the umbrella Indian Forest Act, 1927. These States have formally adopted the Indian Forest Act, 1927 and have followed up with a number of other state-level Acts, rules and regulations, to provide for more local flexibility. The remaining States (e.g. North-Eastern and Southern States) operate under a rather unique legal framework (e.g. the Assam Forest Regulation Act, 1891 is the umbrella operative law in Assam rather the Indian Forest Act, 1927). In many ways, however, the legal direction of such State Acts corresponds to the Indian Forest Act 1927. Various orders passed by State Governments since 1927 (e.g. Forest Produce Transit Regulations, Sawmill and Forest Depot Regulations, etc.) have contributed to a more restrictive legal framework, although it is largely how these acts are interpreted and implemented that directly affects community rights and responsibilities.

In addition, State Governments have enacted several legislations to control trade, especially of minor forest products. These enactments were made to protect the primary collectors from the poor forest-fringe communities from exploitative trade and patron-client relationships. The most common regulations relate to *Kendu* leaves (syn., *Tendu* patta) trade, but a separate set of legislation may also cover other nationalized NTFPs. The trend now is to reverse the nationalization era of the 1970s and early 1980s. More and more NTFP species are being taken out from the regulated list now. Orissa has gone ahead to not only denationalize most NTFPs of the State (except *Tendu patta*), but to put their transport and trade under the control of the Panchayati Raj Institutions (PRIs).

4.14 Recommendations

[6] The Indian Forest Act, 1927, needs revamping, taking into account current requirements, inter alia:

a) The revised version must give emphasis to the conservation of forestlands and not only forest alone. It must address itself to the ecology, biodiversity and overall significance of forests including grasslands and wetlands and to forests

as a biotic community and as a life–supporting factor to the local communities and to the populace downstream.

b) *The term 'forest' needs to be defined for the purpose of the Act*

c) *Non-timber Forest Products need to be defined.*

d) *Bamboo, including ringal and cane must be included in minor forest produce and excluded from 'tree', under Sec. 2 of the Indian Forest Act, 1927.*

e) *There needs to be greater control over unsustainable biotic pressures - especially over grazing and tendu leaves, sal seed and fuelwood extraction.*

f) *Powers of summary eviction of encroachment may be vested with the local Divisional Forest Officer.*

g) *Limits of penalties prescribed under the various sections of the Act be raised and there need to be more warrant cases.*

h) *Responsibility of prevention and control of fire needs to be fixed upon those responsible for the management of the forest concerned and punishments for non-compliance, have to be provided for and should be stringent.*

i) *Forest officers should be given the power of confiscation, including of vehicles used for illegal purposes under the Act.*

j) *A Central Board for Forestry with adequate functions and powers be set up.*

k) *Indigenous knowledge of the forest communities and their intellectual property rights in this regard need to be safeguarded.*

[7] Felling regulations on private lands may be restricted to 'Highly Restricted Tree Species', meaning such endangered and valuable tree species which are almost entirely found in forest areas. Some examples are sandalwood, red sanders, rosewood, khair, sal, deodar, bhojpatra, taxus, Quercus semicarpifolia.

[8] Transit rules /regulations are preventive tools for forest protection and should continue on such highly restricted and endangered tree species only and there should be no restriction and regulation on the felling and removal of other trees planted on private holdings.

[9] Under the Land Ceiling Act, no land ceiling shall be imposed on land under plantation of forest tree species. This will motivate the corporate sector and big farmers to invest in plantations.

[10] As regards saw milling regulations / rules,

a) *The state government should assess the demand and supply of wood.*

b) *The working capacity of the sawmills should be assessed by the respective State Government.*

c) *The number of licenses should be based on the legal and ecologically sustainable timber supply and the working capacity of the sawmills.*

[11] In respect of the Biological Diversity Act, 2002, no agency has been identified for the implementation of this Act. The implementing agency may be the Forest

Department (FD), in coordination with other agencies, in areas under the control of the FD.

[12] With respect to the Environment Protection Act, 1986, no agency has been identified for the implementation of this Act at the field level. The Forest department may be considered as an implementing agency for this Act in areas under its control. It may coordinate its efforts with those of other agencies.

[13] The Forest Conservation Act, 1980, serves its purpose only in its existing stringent form. It may not be diluted or made less effective.

[14] In respect of the Wild Life (Protection) Amendment Act, 2002,

a) List of endangered species in different schedules needs to be periodically reviewed

b) Species may be added or deleted to the list on the basis of review

c) Rules for community reserves and conservation reserves need to be framed.

Chapter 5

Ecological Security

5.1 Imperatives Of Ecological Security

India has an unparalleled range of natural ecosystems because of her wide latitudinal range, varied physiognomic features, diverse climatic regimes, long coastlines and tropical islands, and because of the coming together of three of the eight global 'Centres of Origin of Life' (Biogeographic Realms). Human societies with a long-standing conservation ethos anchored in the cultural and religious traditions of several millennia have used this natural bounty. This use has gradually given rise to rich secondary ecosystems, which have their own unique assemblages of floral and faunal communities and are the notable abodes of large agglomerations of spectacular animals and birds. Many such abodes form the nuclei of our Protected Areas (PAs).

The ecological imperatives of forests are immense. The succinct statement of the National Wildlife Action Plan (NWAP) 2002, need only be reiterated –

> Natural processes, forests and other wild habitats recharge aquifers, maintain water regimes and moderate the impact of floods, droughts and cyclones. Thereby, they ensure food security and regulate climate change. They are also a source of food, fodder, fuel and other products supplementing the sustenance of local communities.

Water and fertile soil are the two most important prerequisites of our food security. Both are irrevocably linked with forest and watershed conservation. The gravity and consequences of India's water scarcity are as yet not fully realized and hence it has not yet been universally acknowledged that the greatest product of our forests - both qualitative as well as quantitative- is water. Natural vegetation, both forests and grasslands, are the prime conservers of soil and the providers of nutrients and humus. The functional lifespan of most of our hydro-projects has been drastically reduced due to exponential siltation, caused by overuse and abuse of forests and rangelands. Indeed, had the effective lifespan of a dam project been known most of these projects would not have been viable and perhaps would not even have been commissioned.

The fact that the significance of wilderness is not as just an ephemeral, elitist concept but is a crucial ecological entity, is only now being realized in our over-populous country, in which there is hardly any area other than that under permanent snow that is not under some form of demographic impact.

> Water, wilderness and wildlife are irrevocably interlinked. (NWAP)

India is a major mega-biodiversity country, but true and maximum biodiversity is manifested only in a climax if not pristine biomes, and can only be ensured in a disturbance-free wilderness. Where such areas exist, they must be treasured as national natural heritages. It must also be borne in view that evergreen forests, if they do get subjected to a large scale fire – which does happen more frequently now than ever before, changes the complexion of the evergreen forest forever.

Wherever possible, unique and representative ecosystems and biotypes must be effectively preserved and allowed to progress to their climax vegetation level. If they can be brought under the aegis of the nation's PA system, that would be the ideal situation. If not, they can be made eco-sensitive areas under the Environment Protection Act (EPA). As a senior bureaucrat has said, natural climax forests must be treated as "CO_2 sinks, oxygen banks and biodiversity pools" and not as commercial commodities.

Other than traditional forest areas, biomes such as grasslands and arid zones have also several ecological imperatives. Besides providing habitat, shelter, and food, both to livestock and wildlife, grasslands also serve as important catchments for rivers, streams, reservoirs, dams, check-dams and village ponds. In short, grasslands also greatly help in the water regime and hydrological cycle of the country. Therefore, it is imperative to recognize the ecological, hydrological, economic and sociological role of grasslands as a source of survival for millions of livestock and rural people, as protectors of soil and water and of rare wildlife species and of biodiversity in general. Some of the rarest species of wildlife are found in grasslands, and many of them are totally dependent on them. The Bengal florican, one-horned rhinoceros, pygmy hog, hispid hare, wild buffalo, hog deer and the swamp deer in the terai grasslands, the great Indian bustard in dry, short grasslands, the lesser florican in monsoonal grasslands of western India, and the Nilgiri Tahr in the shola grasslands of the Western Ghats, are some examples.

Grasslands are the only breeding grounds of a number of avian species, whose nesting time is the monsoon. Due to the presence of crops in the fields, the monsoon is the period most affected by free-ranging livestock, who have nowhere else to go. This is the time when the grass grows. If grass is over-grazed at this time, it not only prevents fodder production and seed formation, but nests of ground-living birds are also trampled. No grasslands, however resilient, can bear the overuse and abuse that they are subjected to today in this country.

Some of the PAs of arid and semiarid regions have an important genetic resource in the form of grass and shrub species, which are important for the ecological and food security of the country. Therefore, these PAs and other types of protected areas should not be considered as important only for wildlife conservation, but as gene banks. For example, most of our cereals have originated from wild grasses. Arid and semiarid areas have important breeds of livestock that also need protection. Therefore, protection and enhancement of PAs in arid and semiarid regions and the protection of wildlife outside the PA system should be given high priority and should be integrated in the over-all land-use policy of the country.

'Single large or several small?' has been a conservation dilemma over the years, when debating the planning of protected areas. It has been shown by several ecological studies that models can broadly predict the minimum size that a protected area must encompass to have viable populations of target species that deserve conservation emphasis. However, such sizes only exist in theory, as implementation on ground will require taking into consideration geographical and topographical features, human usufruct usage and therefore the land available for effective conservation and other such important factors. Very often, therefore, "several small" has won over "single large". This type of conservation is also conducive to certain kinds of biodiversity conservation and certainly the most pragmatic when human numbers are very large. This applies to India and

therefore, 80% of the world's rhinoceroses are harboured in only 430 sq km of Kaziranga, on the other hand the Tsavo National Park in Kenya is 20,000 sq km in area. When using the "several-small" model as India has done effectively in the past, it is extremely important to link such protected areas by means of corridors for animal movement to facilitate gene flow, and stretches of habitat that represent the ecotones and ecological gradients between the two habitats, must be effectively conserved.

These linkages must be planned by viewing protected areas not in isolation, but as complexes that are representative of an ecological biome or an ecosystem. There should be a State level planning exercise that takes into account animal migration needs, representation of ecological gradients between habitats and the needs of local communities, as well as planned developmental projects in the area, to demarcate such linkages. Once clearly demarcated, they must be declared as PA corridors by relevant State Governments and must be protected as an Ecologically Sensitive Area under the EPA as a bare minimum. Their addition to a nearby-protected area should be considered and implemented wherever feasible. Such an exercise can begin with elephant corridors that are clearly documented and could also be used for several other kinds of habitat protection. Linkages should not, however, be limited to mega-mammal conservation and should be used in a broader strategy to link habitats and ecosystems and to provide genetic linkages for all life forms.

5.2 Forests and Water

The relationships between forest ecosystems and global hydrology form vital strands in the web of interconnections that sustain the earth. Arguments attempting to suggest the degree of this vitality range from the studied[19], to the extrapolative[20], to the plain passionate[21]. Though the study of the earth system involves poorly understood phenomena and hypotheses that have the weight of evidence vacillating for and against, a few certainties are, in fact, irrefutably established.

- That vegetation checks the rapid runoff and recharges aquifers.
- That evapo-transpiration from plants suffuses atmosphere of a locality with enough moisture to significantly cool the microclimate.

Yet, till date, uncertainties overwhelm certainties. From the year 2000 onwards, much has been argued in print about the connection – or the lack of it - between forests and rainfall or forests and climate. The *Nature* recently cautioned that the correlation between forests and rain may be too weak to be taken for granted[22]. Earlier studies in the same journal suggested that low reflectivity of forests[23], besides physiological responses[24], may

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19 Bruijnzeel, L.A. 1990. *Hydrology of moist tropical forests and effects of conversion: a state of knowledge review.* Paris, IHP-UNESCO Humid Tropical Programme. 224 pp.

20 Chomitz, K. and Kumari, K. 1998. *The domestic benefits of tropical forests: a critical review.* World Bank Research Observer 13.

21 See Box 1 – " *The Sponge Theory* "

[22] Kelves, D. J. 1999. A fistful of wishful thinking. *Nature* 401, p. 215

23 Otto-Bliesner, B.B. and Upchurch, B.R. 1997. *Vegetation-induced warming of high-latitude regions during the late Cretaceous period.* Nature 385, 804

24 Bettes, Richard et al. 1997. *Contrasting physiological and structural vegetation feedbacks in climate change simulations. Nature* 387, 796 - 799

actually have caused climate to warm. The question of whether old growth forests are net sinks or sources of carbon, remains unresolved.

Box 1

The "Sponge" Theory

Tropical rain-forests and tropical deserts..., both lie in tropical latitudes, yet on the one hand we have an abundance of water, and the rich, teeming cornucopia of life of the tropical rain forests - and on the other, we find parched, barren, forbidding and all but lifeless wastes of the deserts. Rain forests are characterized by a very stable climate where the temperatures vary only by about 20 degrees F. from 75 to 95 degrees F. between night and day the year round. In the deserts though, daily temperatures climb from near freezing at night, to 130 degrees F. in the shade during the day. This comes to a daily temperature swing of about 100 degrees F. With the massive eradication of continental forest cover, we are forcing the continents into the extreme temperature swings of desert climates.

Water is unique among all the fluids in that it absorbs and releases heat very slowly. This is known as the "thermal stability" of water. While daily temperatures on the continents vary by about 10 to 15 degree. between day and night in the mid-latitudes, the temperature of the oceans remain practically the same– all the year around..

It is well known that forests - any kind of forests anywhere on this Earth, and similar dense plant cover - are vast living 'sponges' of water. All forests hold vast amounts of water in the soil they shade, in their trunks, branches and leaves - and via transpiration - in the air around and above them. And the thermal stability of water is exactly the same - no matter whether the water is contained in the oceans – or in the forests of the continents.

The vast amounts of water stored by forests of the continents tempers continental climates just as effectively as the water of the oceans temper marine climates. For all intents and purposes, continental forests are huge, super-absorbent sponges saturated with water, and act exactly like diffuse oceans. Take away the forests of the continents, and instead of the very stable temperatures and climates of forested regions we get the extreme temperature fluctuations typical of waterless deserts.

Thermal stability of the water of the oceans is the fundamental stability factor of the global climate of the Earth. Without the oceans, the difference between night and day temperatures on the Earth would be about 300 degrees F. In exactly the same way, the thermal stability of water stored in the forests of the continents is the fundamental stability factor of continental climates. Take away the forests - and the vast amounts water they store - and the day-night temperature differential will be about 100 degrees F. The desert regions of the Earth are ample proof.
The escalating climatic extremes we have experienced make it abundantly clear that we have already gone below the global critical minimum amount of forests to maintain the stability of our continental climates.

Adapted from - http://www.truehealth.org/aclimate.html (10th Feb, 2005)

While we may spend time debating the causative connections of forests and rainfall, there is absolutely no scope for debate on the role of forests as water harvesters and purifiers. In the words of the FAO[25]:

> Forests help maintain healthy aquatic ecosystems and provide reliable supplies of clean freshwater. But not only do they filter and clean water -- forests also help prevent soil erosion, reduce sedimentation in reservoirs and mitigate the risks of mudslides and floods, all problems that can threaten downstream water supplies. And while forests themselves consume water, they also improve infiltration rates, thereby helping recharge underground aquifers.

India remains at the core an agrarian economy. A large portion of her farmers' incomes still come from water consuming crops. A burgeoning population makes an ever-increasing demand for potable water. A number of rivers emanate in mountains and criss-cross its face, quenching fields and throats. It is wishful to believe that even if the mountain ranges are denuded and all vegetation is shaved off, the water will flow unhindered in the same quality and quantity. When one speaks of water regulation, therefore, the concern is wider than biodiversity or forest conservation. The concern extends to the economy and is central to the lives of the masses. Water flow, both quantitative and qualitative, may now be regarded as the single greatest product of forests, since most of our rivers and rivulets emanate from forests and forests constitute the upper catchments of these water bodies. As the maintenance of water regimes requires effective protection, from biotic pressures, which today are only being provided in some of our PAs, water becomes a major rationale for the establishment and maintenance of the PAs.

It stands to reason that forest conservation is not merely a fixation with the "elite". It is directly related to the provision of water for India's teeming millions. While championing the cause of the sections of communities whose interests may appear to conflict with conservation dictates, one would do well to juxtapose in comparison the sheer numbers of the common public - the Indian citizenry - that needs water.

Lastly, much more economic sense than mere low cost pure water arises from the maintenance of natural system. Robert Constanza[26] has us believe, that besides being the source for most of it, a value greater than the world's GNP is generated by ecosystems in the biosphere.

5.3 Natural Areas

Predominant natural areas in different parts of India, as described below, provide regional as well as national ecological security.

5.3.1 Montane Regions of India

5.3.1.1 The Indian Trans-Himalaya

The Trans-Himalayan region (4,500 to 6,000 m above msl) consisting of Ladakh in Jammu and Kashmir, Lahul-Spiti in Himachal Pradesh, and a small area of north Sikkim,

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[25] FAO. 2005. *Forests and freshwater: vital connections.*
http://www.fao.org/english/newsroom/focus/2003/wfc2.htm Retrieved on 28th February, 2005.
Food and Agriculture Organization of the United Nations, Rome, 2005.

[26] Constanza, Robert et al. 1997. The value of world's ecosystem services and natural capital. *Nature* 387. 253-260 pp.

which are parts of the Tibetan plateau, encompasses about 1,86,200 sq km[27]. It has high mountains, wide valleys and arid upland plains and plateaux. Many major rivers, for example, the Brahmaputra, Sutlej and the Indus start from this region and many rivers end in vast lakes. Such lakes and marshes, mostly saline, are important breeding grounds for birds such as the long-necked crane, bar-headed goose, great-crested grebe, and others. While the plains provide habitat to the Tibetan sand grouse, horned lark and various species of wheatears, the Tibetan snow cock and the Himalayan snow cock can be seen on the treeless mountains, sometimes both the species occurring in the same area. Among mammals, we have the snow leopard, a flagship species of this region, and also various species of sheep, goats, goat-antelopes, true antelopes and equids. No area of equal size in the world has the species variety of large montane mammals as the State of Jammu and Kashmir. The Trans-Himalayan region, also known as the Indian cold desert, supports very sparse vegetation. Based on the physiognomy, three categories of natural vegetation are clearly discernible namely, alpine arid scrub or steppe formations, alpine arid pastures, and marsh meadows. The vegetation is dominated by the *Artemisia caragana*, *Hippophae myricaria*, and *Ephedra gerardiana* communities. The characteristic species in the Trans-Himalayan region are species of *Saussurea*, *Potentilla*, *Corydalis*, *Astragalus* and *Oxytropis*. In general, the Indian Trans-Himalayan region is poorer in floral diversity as compared to the moist alpine meadows of the Greater Himalaya.

The wetlands of the Trans-Himalayan region are extremely important for birds, especially globally threatened species. Most of the wetlands are found in the Changthang region of Ladakh, between the altitudes 4000 to 5000 m. The Changthang plains lie between the Leh and the Nyoma blocks of the Leh district in southeastern Ladakh, which is the western extension of the Tibetan Changthang. The Changthang Wilderness Area (Changthang Plateau) was notified in 1987 to provide a sanctuary for many species of mammals and birds, and also to protect the culture and language of this region. Some of the important high altitude lakes such as Tso Kar, Tso Morari, Pangong Tso and marshes such as Hanle, Phoktse and Chushul are located in this region and most of them have been identified as important bird areas (IBAs).

5.3.1.2 The Himalayan Region

The Himalayan region is spread over an area of approximately 2,36,300 sq km[28] within India. This region as a whole is very important for biodiversity and supports a wide range of vegetation types, ranging from the tropical to the alpine. It is home to over 8,000 species of flowering plants and nearly 10,000 species of lower plants. The zone above the natural tree line (c. 3,300 – 3,600 m in the western Himalaya and c. 3,800 – 4,000 m in the east) supports alpine vegetation, which is characterized by alpine scrub, meadows, moss-lichen laden rocky slopes and matted shrubs. Of all the categories, the meadows are of considerable ecological interest due to the adaptability of the plant forms and the great profusion of herbaceous species. The meadows are the repository of valuable fodder species as well as medicinal and aromatic plants. The alpine zone is generally separated

[27] Rotgers W. A. and Panwar H. S. Planning a protected area network in India. Dehradun, Wildlife Institute of India.
[28] Rotgers and Panwar . *Ibid.*

from other montane forests by a distinct tree line characterized by birch, rhododendron, fir and brown oak forests.

At a lower elevation (1,500-3,300 m), the major vegetation types in the northwest and western Himalaya include Himalayan dry temperate (Coniferous), Himalayan moist temperate (Broadleaf), Temperate grassy slopes (secondary formations), and secondary scrub. These habitats provide breeding grounds for a large number of birds and mammals. To the south, facing frequently burnt and exposed slopes; there are temperate grasslands throughout the western Himalaya. Dachigam NP in Kashmir represents one such grassland habitat that supports a highly threatened and the only subspecies of the Red deer (*Elaphus*) to be found in India, the hangul, now confined only to the Kashmir Valley and the state animal of Jammu and Kashmir. The montane region of Sikkim and Arunachal Pradesh bears Temperate Broadleaf Forests, Temperate Coniferous Forests, Sub-alpine Forests and scrub.

The eastern Himalaya of Sikkim and Arunachal Pradesh are one of the biodiversity hotspots of the world. It is also the least studied region of India, in which perhaps many taxa await discovery. As the human population density is low, this region still has good natural forest cover, and there is still opportunity to select a well-designed protected area system which would adequately protect the range of biological and other natural resource values. It is also one of the richest bird zones in India, where 536 bird species have been identified till now.

The Shivaliks or the sub-Himalayan zone which lies adjacent to the Indo-Gangetic plains has a subtropical climate, varied topography, rich alluvial soils and intermingling of taxa from the Indo-Malayan and Palaearctic regions, with very high biodiversity. The major forest types according to Champion and Seth (1968) from the west to the east along the increasing rainfall gradient, include *Dodonea* scrub, subtropical dry evergreen forests of *Olea cuspidata*, subtropical pine forests, northern dry mixed deciduous forest, dry Shivalik sal forest, moist mixed deciduous forest, subtropical broadleaf wet hill forest, northern tropical semi-evergreen forest, and northern tropical wet-evergreen forest. The Shivalik hills are best represented between the Ganga and Yamuna rivers in Uttaranchal. The entire belt covers an area of c. 40,000 sq km, of which only <2100 sq km falls under the Protected Area network. Ecologically, the entire Shivalik belt can be considered as a highly sensitive zone.

5.3.1.3 The Western Ghats

The Western Ghats, a chain of ancient mountains parallel to the west coast of the Indian Peninsula, occupies only c. 5% of India's land area (about 99,300 sq km[29]), yet it harbours nearly 27% of its total flora. It is one of the world's 25 terrestrial biodiversity hot spots. Except for the 25 km Palghat Gap, the Western Ghats stand unbroken. The highest peak in the range is Anamudi (2,700 m) in Kerala, included in the Eravikulam National Park. More than 500 species of birds have been reported from the Western Ghats, including 16 endemic species found nowhere else in the world. None of these are at present in danger of extinction, but habitat loss is a major concern.

[29] Rodgers and Panwar. *Op. cit*

Despite being tropical, the forests of the Western Ghats are comparatively poorer in bird life compared to similar forests in northeast India or southeast Asia. The Montane Rain Forests contain about a third of the plants, almost half of the reptiles, and more than three-fourths of the amphibians known in India. About 90 of India's 484 reptile species are endemic to these forests, including eight endemic genera (*Brachyophidium, Dravidogecko, Melanophidium, Plectrurus, Ristella, Salea, Teretrurus* and *Xylophis*). The amphibian fauna exhibits even greater levels of endemism; almost 50 per cent of India's 206 amphibian species are endemic to this region. Sixteen species of birds are endemic to the Western Ghats, of which the Nilgiri Wood Pigeon is globally threatened. Among mammals, the most famous endemic species is the Lion-tailed Macaque. The Nilgiri langur and the Nilgiri tahr are also restricted to the Western Ghats and the adjacent Palni Hills.

There is also a high degree of endemism amongst the flora. Certain species of ferns, for example, are restricted to the spray zone of the Jog Falls in Karnataka; some are now facing extinction due to the reduction in the post-monsoonal flow over the Falls as a result of the Sharavathi Project.

5.3.2 Wetlands

Wetlands are some of the most threatened natural ecosystems of India, as they have neither the charisma of forests nor the aesthetics of the mountains. They are mostly regarded as areas that are to be drained or filled in and have been traditionally associated with disease (malaria) and poverty. These areas however are a rich repository of biodiversity and provide waste-dissipative and aquifer services to the nation. The Ministry of Environment and Forests, (1990), estimates that India has about 4.1 million ha of wetlands (excluding paddy fields and mangroves), of which 1.5 million ha are natural and 2.6 million ha are man-made.

The predominant wetland types in India's geographical zones as per WWF's *Directory of Indian Wetlands* (1993), are:

a. Tanks, reservoirs, and other water bodies of the Deccan peninsula.
b. Backwaters and estuaries of the west coast of peninsular India.
c. The vast saline expanses of Rajasthan and Gujarat (mainly the Rann of Kutch and Sambhar Lake).
d. Freshwater lakes and reservoirs from Gujarat eastwards through Rajasthan and Madhya Pradesh.
e. Deltaic wetlands (including mangroves), lagoons, and salt swamps of India's east coast.
f. Marshes, jheels, terai swamps, and chaur lands of the Indo-Gangetic plain.
g. Floodplain of the Brahmaputra and the marshes and swamps in the hills of northeastern India.
h. Lakes and rivers of the montane (primarily Palaearctic) region of Kashmir and Ladakh.
i. Wetlands (primarily mangroves association and coral reefs) of India's island areas.

5.3.3 Grasslands

Grasslands are not managed by the Forest Department whose interest lies mainly in trees, nor by the Agriculture departments who are interested in agricultural crops, nor by the veterinary department who are concerned with livestock but not on the grass on which the livestock depend. Grasslands are mostly 'common' lands of the community and are the responsibility of none. They are among the most productive ecosystems in the subcontinent, but they belong to all, are controlled by none, and have no godfathers.

According to reports of the Wildlife Institute of India (WII), less than 1% of the grasslands come under the Protected Area network. With a livestock population of more than 500 million and growing, the grasslands are under tremendous biotic pressures, mainly grazing and conversion to other uses. Presence of such a huge livestock population and dependence of the rural population proves that protection; restoration and sustainable use of grasslands are important policy and ecological imperatives.

5.3.4 Arid and Semiarid Regions

The dry desert occupies nearly 10% of India's geographical area, mainly in Rajasthan and Gujarat. One of the smallest deserts in the world, the Indian Thar desert has a high avian diversity, being on the crossroads of the Palaearctic and Oriental biogeographic regions. As the Thar Desert is not isolated, avian endemicity is very low. Although no detailed work on the avifauna of the Indian Thar has been done, nearly 300 species of birds have been recorded. Important desert species are the great Indian bustard, houbara bustard, cream-coloured courser, hoopoe lark, and various species of sand grouse, raptors, wheatears, larks, pipits and munias. In the Rann of Kutch of Gujarat, both the Greater and Lesser flamingoes breed when conditions are suitable. Their nesting colonies come under increasing pressure due to tourist disturbance and a large number of nests have been reported to be destroyed. As the site of nesting colonies shift, depending upon inundation, it is difficult to protect them.

In the Thar Desert, there is only one national park the Desert National Park (3,162 sq km), although technically it is a wildlife sanctuary. There are five more wildlife sanctuaries of 12,914 sq km in this zone. On paper, 7.45% of the desert is under the PA network. However, the ground situation is very different. There are 44 villages inside the Desert National Park, and more than half of the Little Rann Wildlife Sanctuary (4,953 sq km) is under human occupation. Similarly, the Kutch Desert Sanctuary (7,506 sq km) is under military occupation, being located in the border area. Besides over-grazing, expansion of agriculture, salinization due to wrong irrigation practices, the desert ecosystem is also being altered due to invasive species such as *Prosopis chilensis* (= *Prosopis juliflora).*

The semiarid region has rainfall varying from 400 to 1000 mm and it is dominated by grass and shrub species. This region shows high avian numbers, especially of graminivorous species such as finches, munias, larks, doves and pigeons. It has dry deciduous forest, but extensive tracts of grasslands are seen in the Deccan plateau in central India, the Malwa plateau in western India, and in the Saurashtra region and Kutch in Gujarat. The semiarid region merges with the arid on the western side and with the Gangetic plains in the north. More than 100 bird species use the semiarid grasslands for foraging and/or nesting. A majority of species (83%) is present in other grassland types

or even small grassland patches within forests, but 17 species are exclusively present in this zone. Four species are found only in the semiarid and Deccan regions and nowhere else. They are the Malabar crested lark, Syke's crested lark, green munia, and the rock bush quail. The brown rock chat is another endemic bird found in the arid, semiarid and the Gangetic plains.

Perhaps the most endangered species of the semiarid region is the lesser florican *Sypheotides indica*. Its main breeding areas used to be the grasslands of the Malwa plateau, Kutch and Saurashtra, but due to destruction of the grasslands, this bird has disappeared from most of its range.

The semiarid zone occurring in eastern Rajasthan, Gujarat, western Madhya Pradesh, and parts of Uttar Pradesh, Haryana, Punjab and southern parts of Jammu and Kashmir, constitutes about 5,48,850 sq km or 16.60% of India's geographical area. In the semiarid zone, there are 8 National Parks, totaling 1,319 sq km or 0.24%, and 83 wildlife sanctuaries, covering nearly 14,000 sq km or 2.56% of surface area. Some sanctuaries are on paper only, with no effective control and management.

5.3.5 Coastal and Marine Ecosystems

The coastline of India, excluding the Andaman and Nicobar Islands, is about 7,500 km. The coasts and marine ecosystems are perhaps the most neglected biogeographical zones of India, mainly because of a mindset and because the Forest Department is still not tuned to include these ecosystems in their agenda. Although it is widely believed that charismatic species are not found here, whales, dolphins, sharks and coral reefs are both charismatic and spectacular. According to Rodgers et al. (2000)[30], the coastal biogeographic zone covers about 83,000 sq km or 2.52% of India's geographical area. There are five national parks covering an area of 1,731 sq km and 21 wildlife sanctuaries totaling about 3,888 sq km. India's coastal and economic zones cover millions of square kilometers in the sea, but there are very few marine sanctuaries. Millions of fishermen depend on a healthy coastal and marine environment to earn their livelihood through sustainable exploitation of sea resources.

5.3.6 Coral Reefs and Mangroves

The typical coastal ecosystem covers an area of c. 82,813 sq km in India. The area has mainly two types of vegetation, namely mangrove forests and dry sand dunes. However, on the Coromandel coast there is a typical dry-evergreen formation close to the coast. The mangroves are essentially semi-aquatic/wetland ecosystems, located along the estuaries of major rivers characterized by salt tolerant species such as *Rhizophora mucronata*, *Bruguiera gymnorhiza*, *Ceriops taga*, *Lumnitzera littorea*, *Avicennia officinalis*, *Heritiera littoralis*, *Acanthus ilicifolius* and *Acrostichum aureum*. Today most of India's mangrove vegetation is confined to certain protected areas such as the Sunderbans, Bhittarkanika, Coringa, Nelapattu, Point Calimere and Pirotan (Marine) National Park. Coral, sea grass beds and coastline are important habitat for the

[30] Rodgers, W. A., Pawwar, H. S., Mathur, V. B. *Wildlife protected area network in India: A review.* Dehradun, Wildlife Institute of India.

endangered species such as the Sea Cow, marine turtles and numerous fish. Two globally endangered bird species, the Snipe-billed or Asian dowitcher (*Limnodromus semipalmatus*) and the Spoon-billed sandpiper (*Calidris pygmea*) are reported from coasts. Mangroves, corals and sand dunes are also crucial for conservation of the coastal areas, as the recent tsunami on the eastern coast has proved.

5.3.7 Islands

Of all the biogeographic regions of the world, islands are the most prone to endemism, to adaptive specialization by species, both floral and faunal, and the most liable to their extinction if the delicate ecological balance that sustains them, is disturbed.

The Andaman and Nicobar archipelagoes today perhaps constitute the finest pristine and climax coastal and lowland *Dipterocarp* forests in the world. They hold some of the best hardwoods in the country. There have been unfortunate attempts to introduce exotics and to change the forest ecology, now luckily brought to a stop. On the faunal side, the introduction of the Chital has had a severe impact on the local biota. Other introduction such as those of open billed stork and of the leopard failed, but the propagation of domestic pig would lead to inter-breeding and loss of genetic value of the indigenous wild pig. Domestic pigs and the pi-dogs also threaten indigenous fauna like the Nicobar mega pod which lays conspicuous nests on the ground and the feral goats threaten the biota which sustains the endemic Narcondam hornbill. The large-scale clearance of the forests of the little Andaman poses a threat to the way of life of the indigenous Onge tribe.

Fellings in the Andaman have been stopped now. There is a need to take stock of those endemic species which are threatened of their habitat, and to establish PAs to save them. Amongst them are the Andaman teal, Nicobar megapod, dugong, Nicobar macaque and the edible nest swiftlet. Forest biomes must be preserved for the threatened indigenous tribe - the Sentinalese, the Onges, the Jarwas, the Shompens and the Andamanese.

On the western side are the Lakshadweep archipelagoes, where there are human populations on most islands and hence the indigenous biota has changed. These islands have to be conserved keeping in mind the interest of the local communities and not simply expose them to rash, unrestrained tourism which would ruin the fragile islands. The few uninhabited islands, especially Pitli, which, in fact, is the Galapagos of India, must be strictly preserved as PAs.

There are “Islands” in the Rann of Kutch, especially the island of Khadir, which get surrounded by water in the monsoon. These contain climax local biota and must also be preserved and sensitively managed.

There is a lesson to be learnt from the track record of island biogeography. The nation’s PAs are today mostly “islands”, biologically isolated and surrounded and ever threatened by seas of humanity. They need to be handled and safeguarded as islands as well.

5.4 Policy Initiatives

Policies and position papers have been adopted in the country, which have never been implemented; for example, Madhya Pradesh had a Grazing Policy and another for ‘nistar’

which have been moribund from the outset. However, it is recommended that policies listed below need to be formulated at both national and state levels and that the Government of India should not only facilitate their formulation, but also monitor and assist financially and otherwise in the implementation of these policies, on whose success would hinge the ecological, and hence the economic security of the country.

5.4.1 Grassland Management Policy

Grasslands are biomass-wise among the most productive ecosystems of the world. In an agrarian nation so dependent upon range grazing of its livestock, they are the most important component of the country's animal husbandry. Yet, they are the most neglected, most devastated and most diverted ecosystems of the country. Agriculture considers them as outside their purview. Animal husbandry is only concerned with livestock, but not the rangelands of which they subsist. Foresters, traditionally preoccupied with trees, have not considered grasslands as their bailiwick and these crucial biomes have had no protector and no protagonist. An anonymous English writer had written 200 years ago "It is indeed surprising that while we send to prison a person who steals a goose from the commons, yet we let go free those who steal the commons from underneath the goose"! If given a year's respite, grasslands recover dramatically, both qualitatively and quantitatively, as producers of fodder and regulators of water regimes.

5.4.2 Livestock Grazing Policy

Perhaps the single most deleterious impact on forests and grasslands has been the unlimited and relentless grazing by worthless livestock. This results in anthropogenic fire, soil compaction, prevention of regeneration, soil erosion and overall impoverishment. While stall-feeding is the ultimate panacea, it is not likely to happen in the foreseeable future in most areas.

5.4.3 Fuelwood Policy

Under the aegis of the Forest Act, 1927, the Forest Department used to permit the extraction of deadwood for the fuel needs of the people living within and around forests, for their personal bona fide use. In many instances this was incorporated in 'nistar' rules. With the establishment of democratic regimes, the concession was misused, but within limits. About three decades ago, the State Governments started passing orders permitting sale of 'head-loads' of fuelwood and head-loads were defined as a quantity that could be transported by rail, truck, cart or bicycle. A facility for personal use became a commercial commodity; a sustainable use by the local people became an instrumentation of devastation. Over 17,00 'head-loads' were being brought daily into the city of Jabalpur alone, way back in 1981. Deadwood was 'produced' by professional head-loaders who cut wood and collected in rotation what they had cut a week or month earlier and which had by then dried. The axe remained in the forest and the forest guard was kept happy as well. It suited everyone except the forest. The result is for all who wish to see it. No amount of forestation can compensate this off take. While supply of gas for cooking has eased the problem, it still remains one of the most important factors of forest degradation in many parts of the country.

There are millions of people in this country who depend upon wood as a source of energy for cooking and to a lesser degree for heat. The rural poor have no access to commercial sources of fuel and have no option but to scrounge the countryside for any wood available. The slightly better-off have the option of using cow and buffalo dung as fuel in the form of dried cow dung cakes – a tremendous waste of a very precious and much needed fertiliser.

The task of gathering fuel inevitably falls upon women and adds tremendously to their already heavy burden. This demand exerts a very heavy pressure on all available trees and the result can be seen wherever one looks. Trees are lopped and mutilated until the inevitable happens and they die. Wide expanses of the countryside have virtually no tree cover other than in private orchards and groves. The biggest pressure is on our shrinking forests, which are being inexorably nibbled away at the edges by the needs of the population, and attacked on even a larger scale by commercial exploitation. The Ministry of Environment and Forests estimates that the forests in India can yield 40 million tonnes of timber on a sustainable basis while the current extraction is perhaps around 500 million tonnes. Incidentally, the figure of 40 million may be sustainable in terms of the needs of the people and the existing forest cover , but does not allow for the recuperation of severely depleted forests.

While the forest have to be protected from the commercial greed of exploiters who have no thought for the future of the forests and the future of the country, they must also be protected from relentless foraging of a population starved of fuel. The effect of the search for fuelwood is particularly seen in the countryside although this extreme dearth of fuel is not merely a rural phenomenon. Hundreds of thousands of slum dwellers face an acute problem. In Delhi, for example, on a winter evening one can see the pall of smoke that rises over the city. This is the smoke from the burning of pine forests of the Himalaya. Timber extracted from them is used for transporting fruit to large markets in the capital; these packing sources form a major source of fuel when burnt. The effect of cutting down the forest in the hills is easily felt. We have already experienced climate change and the erosion due to deforestation. Today, water has become a scarce commodity, and the packing case in which fruit is transported should cost the grower more than the fruit inside but not if the wood is stolen as is often the case.

Sometimes it is overlooked that if we consider all forms of wildlife , and not merely large mammals who are the glamorous symbols, then there is very significant proportion of wildlife that is found not in protected areas or even reserve forests, bur living free in the countryside. Biomass cover is needed for their sustenance and shelter. It is not only the countless examples of small animals and birds that are found outside forests, bur even in the case of the tiger, almost half the wild tiger population in not in the protected areas.

Unless alternate sources of fuel, including wood, are made available to the population, particularly those dwelling in and around forest and protected areas, they have no option but to depend on forests and the few trees that remain in the countryside.

5.4.4 Policy for Shifting Cultivation

Shifting cultivation called ‘jhum’ in the North-East and ‘podu’ in parts of the South, has been a bane to forestry and at times a problem to the ecosystem. Previously, when the

populations were smaller and the felling was restricted to smaller patches on less steep slopes with long cycles of burning the forest, the land could recover. Not any more. The felling extends onto slopes of over 60% gradient and the burning cycles have been reduced to just three years. Even bamboo, the traditional fire succession vegetation, is not able to affect re-growth and realize effective regeneration in such a short duration.

5.5 Recommendations

[15] As a statewide application may not be feasible to implement, it is recommended that specific crucial grasslands be selected for effective conservation, as part of the Protected Area network, or as a part of watershed management under the EPA. Grazing would have to be regulated and fires prevented. Each area must have prescribed management practices, the emphasis being on harvesting grass rather than grazing it, which would result in augmentation of both the generation of grass as well as its nutrition value.

[16] A policy should be formulated to regulate inter-state movement of livestock to enable the States to control grazing pressure on eco-sensitive areas.

[17] The animal husbandry departments should relate the number of goats and sheep to the availability of natural fodder especially in such areas where these animals could cause further degradation to natural ecosystems.

[18] Efforts be enhanced to improve cattle quality, as it is proven that improved varieties tend to be stall-fed and sent less to free-graze on rangelands.

[19] The provision of a sustainable supply of fuel be undertaken by a newly created Fuelwood Mission. Not only will this mitigate the drudgery of millions of women who have no option but to forage for every possible scrap of fuel, but also will reduce pressure on trees and shrubs whereby our remaining forest and trees will be well-protected This can be started initially with a phased programme in and around forests and Protected Areas.

[20] Alternative sources of fuel, especially LPG connections, need to be provided to rural areas in and around forests. Solar energy also needs to be given a much greater impetus, especially in the mountainous and other areas where energy needs are greater and the sunshine available for a greater number of days in a year

[21] The sale of fuelwood head loads from forests by individual sellers must stop. Head loads should only be permitted for bonafide personal use of the local communities, as earlier. The forest departments should bring out fuelwood to depots and supply wood to those who are the current head loader-seller and who derive their livelihood from such sale, at subsidized / no loss basis, rather than the head-loaders being allowed to go into the forest.

[22] In the interest of the survival of the land, people, forests and the practice of shifting cultivation itself, jhum be regulated to a more sustainable level. This can only be achieved by the State Governments themselves, with active assistance of the Government of India.

[23] Some young members of the present generation of tribals are not keen to continue with jhum in many areas, and jhuming itself is becoming less and less

remunerative. People are looking for alternatives like settled agriculture, horticulture and animal husbandry, which must be extended to them forthwith.

Recommendations made to wean away the "jhumias" of the Northeastern states under Chapter 10, would also apply here as well.

[24] The main objective of forest management should be ecological security. For assessing the effectiveness of forests in contributing to ecological security on the basis of a number of parameters and paradigms such as volume of growing stock, biodiversity, health of forest soil, soil moisture, hydrology, carbon sequestration and crown density, the scope of work of the Forest Survey of India (FSI), Dehradun should be expanded and adequate infrastructure be provided for this purpose. Monitoring of ecological security should be done at five year's interval and a national level report should be published by the FSI. In addition, the FSI should undertake research required to conduct necessary forest surveys and assessments.

Chapter 6

Emerging Needs and Goals of Forestry Sector

6.1 Sustainable Forest Management to Meet Emerging Needs of the Society

Sustainable development has had many definitions, but the same in the case of forestry is generally understood as development involving changes in the production and/or distribution of desired goods and services which result, for a given target population an increase in welfare that can be sustained over time. Sustainability must refer to not only maintaining and/or improving environmental quality and the productive capacity of ecosystems, but also to maintaining and/or improving the well being of people and enhancing their capacity to utilize available resources effectively and efficiently over the long run to meet the needs of the present and the future generations

The forests in India can thus no longer be used in the same way now as they have been in the past and radical adjustments in managing them are required. Conflicts in values and uses of forests are conspicuous - between rich and poor, between forest dwellers and harvesting agencies, between the politically strong and the weak, between economic needs and environmental compulsions, between private interests and the public interest. Such conflicts confirm the inadequacy of current management practices and the need for new applications and new departure in making forests ecologically secure, reversing the process of degradation and in providing better livelihood and economic returns on a long-term basis. Those with political and economic power monopolize the decision-making and management and their interests are secured at the expense of forests and of the people. Those without power are reduced to protest and are further marginalized.

It must also be made clear that the word "sustainable" has been manipulated to augment different viewpoints and different agendas. Sustainable at what level? Sustainable use can also be carried out at the prevailing degraded level of forests, maintaining their current degraded status. Is that or should that be the objective? Obviously not. "Sustainable" should imply allowing the forest to recover to its optimum level of production and biodiversity and then harvesting it to maintain at all time in the future, that optimum level of production, biodiversity and ecological security.

6.1.1 Livelihood Needs and Poverty Alleviation

Studies have shown that there is a high percentage of population below the poverty line in forested areas, varying from 69.02% in south Orissa to 44% in Chhattisgarh, as against 37.2% being the national average (Saxena, 1999 [31]) . This clearly indicates that the local population is not being benefited by the revenue generated by forest as a natural resource. Therefore, existing situation needs corrections through policy interventions, under which

[31] Saxena, N. C. 1999. World Bank and the forestry sector in India. **In** World Bank. 1999. Alleviating poverty through participatory forest management; an evaluation of India's forest development and world Bank assistance. Washington, D.C., Operations Evaluation Department.

forests are used for the livelihood needs of the forest dwelling and forest dependent common people for their poverty alleviation.

The first charge of forest products must be in favour of the neighbouring people. Sustainable management of forests and proper use of forest products can help in alleviating poverty of the forest dwellers. Low productivity is a result of unsustainable management and consequent degradation.

The scope of generating employment potential from collection, value addition and sale of non-wood forest products (NWFPs) may be enhanced. The forest types in India are extremely rich in NWFPs of various kinds, which have a market value due to consumption at different levels. For instance, bamboo and cane in north eastern states, Tendu leaves in central India, Garcinia seeds and canes in Western Ghats. However, any exploitation of NWFP has to be in keeping with ecological imperatives, that harvests must take place after the productivity has reached optimum level and not when forests are degraded.

The employment potential in forestry sector is linked with the forest type and intensity of management. The employment potential of intensively managed agroforestry may be about five times that of short rotation plantation forestry, which in turn may be about 6-10 times of that in indigenous forests managed on long rotation with natural regeneration. Harvesting, transport and processing of wood generates more income than growing of trees. Agroforestry can contribute to income generation in rural areas very significantly. Intensive forest crop management does generate employment and alleviate poverty. However, intense management should not change the character of the forest whereby its ecological value and its contribution to ecological security, is in anyway reduced.

From the foregoing discussion, it becomes aptly clear that improving scientific understanding of forest processes entangling socio-economic considerations of humans, providing useful information for decision making on forest resource utilization and promoting the conservation of species diversity and of ecological values of forests, have been increasingly realized as an integral part of forest management.

6.2 Meeting Demand of Forest Products

Forest products include timber, bamboo, fuel wood, fodder and medicinal plants besides intangible goods and services. The requirement and supply of timber are illustrated in Table 6.1.

6.2.1 Timber

Table 6.1. Requirement of Timber and Source of Supply (million m^3)[32]

Year	Requirement of timber			Production source		
	Housing	Industrial	Total	Forests	Plantations	Non-forest areas
1996	54.4	10.0	64.4	23	10	31
2001	60.4	12.6	73.0	26	11	36
2006	66.6	15.2	81.8	29	13	40

[32] India. Ministry of Environment and Forests. 1999. *National Forestry Action Plan.* New Delhi. MoEF

The data reflects a consistent increase in demand of timber in future, which has to be met by growing trees outside forest areas. Since about two third of the total timber requirement in India is from the areas outside the forests, the planting on large areas outside forests has to be undertaken through agroforestry and farm forestry.

The large-scale import of timber is affecting its domestic pricing pattern. The Export Import (EXIM) policy has to be examined in order to rectify the pricing in the market so that it is economically viable to grow trees on farmlands. It is not only production of timber in adequate quantity, but also its price which needs serious attention. High prices of timber have already made timber out of reach of the common man. Timber prices increased at a much faster rate than the wholesale price index. Restrictions on natural fellings in some of the States and consequent reduction in availability of timber have also contributed to the increase in prices of timber.

6.2.2 Non -Timber Forest Products

The non-timber forest products (NTFPs) include fuel wood, grass, fodder, food and medicinal plants. These are being discussed in detail.

6.2.2.1 Fuelwood

It constitutes an important basic need for about 40% of the population in India. The fact remains that India may have sufficient food, but not sufficient fuelwood to cook it. Fuelwood demand in rural areas varies with the climate, availability of other fuels, proximity to the source of fuelwood, living standards, size of the family, food habits, etc. The annual per capita fuelwood consumption in the country is reported to vary from about 0.20 to about 0.90 tonnes from warm to cold regions, the average for the country being about 0.35 tonnes. Leaving out the population not dependent on fuelwood, the annual fuelwood requirement in the country is estimated to be about 200 million tonnes. Availability of fuelwood from forests on a sustainable basis is reported to be about 17 million tonnes. The population living in and around forests is estimated to be about 100 million and their fuelwood demand from forests cannot be fully met with. Thus, supply will have to be supplemented from other sources such as agroforestry, tree growing on wastelands, biogas, solar energy, etc.

Fuelwood extraction has been among the highlighted concerns of forest stakeholders before and since the comprehensive studies made vis-à-vis National Forestry Action Plan (NFAP) in 1999, which acknowledged "excessive" fuel wood extraction as among the chief causes of deforestation and forest degradation[33]. The Karnataka State Forest Department, in a memorandum submitted to the NFC, puts the statistics succinctly in perspective:

> The annual requirement of fuel wood at the turn of the century was around 200 million tons[34]. A comprehensive study by Forest Survey of India revealed that nearly 49% of the fuel wood and small timber requirement of the country comes from farm forestry sector and other 51% is from the forests. This 51%

[33] India. Ministry of Environment and Forests. 1999. *National Forestry Action Plan*. V. 1, p.30. New Delhi. MoEF.

[34] NFAP study, 1999, summarizing 1996 data from NCAER and FSI data quoted in *Forestry Statistics* of ICFRE.

> requirement itself causes nearly 4 to 5 times more removal from the forests, than what they are capable of producing on sustainable basis. It is reported that around 65% people in the rural areas and 35% people in the urban areas are dependent upon fuel wood as a source of domestic energy. A study by National Council of Applied Economic Research revealed that between 1978 to1992 dependence on fuel wood rose by 7% indicating that the rise in consumption of sources like LPG, Kerosene and Electricity were vastly absorbed by growth in urban centres. …The forests of India have at least 5 times more pressure on them for fuelwood and small timber than what they can withstand, as a matter of sustained productivity.

Other sections interacting with the NFC have felt that theft from forest areas is largely as fuelwood, partially organized by contractors and partially resorted to by villagers in large numbers in order to earn a livelihood. Enforcement of laws becomes difficult when dealing with large number of villagers, mostly women, who carry fuelwood by head loads to the towns. Dependence on fuel has to be reduced by providing alternative fuels and energy sources for cooking, heating, etc. These non-conventional alternative energy sources are dealt with by departments unconnected with the Forest Department, whereas the need to develop such sources is felt most by the forest department because foraging for fuelwood constitutes a major biotic pressure on the forests. Among the most obvious alternatives is biogas, of which cattle dung is the main feedstock. Another source of energy that could be tapped is solar energy, especially for cooking. Many have suggested the need for better coordination with the Ministry for Non-Conventional Sources of Energy and for cross-sectoral policies to cover household energy needs.

With regard to domestic energy supply and demand in rural India, the links between forest scarcity and household fuel collection have been studied[35]. The studies focus on substitution of non-commercial fuels from the commons and the private lands. Based on data from villages bordering a protected area, a study[36] found that households respond to forest scarcity and increased fuelwood collection time by substituting fuels from private sources for forest fuelwood. However, the magnitude of the response was found to be insufficient to prevent current fuelwood collection practices from reducing serious forest degradation.

The NFAP report also brought out clearly the paradox of a skewed forest produce situation: while as ecological production systems, forests produce about 30% of biomass as fuelwood and about 70% as timber, the Indian demand for woody biomass is 70% for fuelwood and 30% for uses in timber form[37]

With this somewhat simplified definition of the problem, we can take note of two broad directions that stakeholders have suggested to the Commission:

The development of alternative energy sources as a means of saving forests from the biotic pressure exerted by fuelwood gatherers, must become an integral part of forest policy.

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[35] Heltberg, R, Arndt, TC and Sekhar, NU. Fuelwood consumptionand forest degradation – A household model for domestic energy substitutionin rural India. *Land Economics* , 76(2),pp. 213-232.
[36] India. Ministry of Environment and Forests (1999). National Forestry Action Plan. pp. 127-141.
[37] Planning Commission's data put in 90% in 1999, NTFP Policy and poor in India.

The Fuelwood Crisis

- Lack of credible data on production and consumption of energy
- Lack of time bound targets of increasing production or reducing consumption
- Policies like subsidies on fuelwood that promotes wasteful use of fuelwood and discourages fuelwood plantation on private and marginal land
- Lack of coordination among forest, agriculture and non-conventional energy departments

- Supply side problems
  - Low production of fuelwood
  - Reduction in forest area
    a. development activity,
    b. encroachment
  - Low productivity
    a. Technological gap - lack of R & D, extension
    b. Degradation of site due to unsustainable use, over-extraction, overgrazing, fire
  - Inadequate implementation of management prescriptions
    a. Shortage of fund
    b. Inadequate extension
    c. Shortage of staff or motivated staff
    d. Problems associated with legal enforcement (rent seeking behavior, poverty and absence of functional local institutions), improper legal and administrative framework
  - Changes in agriculture sector
    a. Introduction of high yielding varieties has reduced agricultural waste used in chulhas
    b. Promotion of cash crops such as soybean, medicinal and aromatic plants that do not produce biomass that can be used as fuel
    c. Poverty reduction strategy such as distribution of goats and sheep that pose serious challenge to protection of forest biomass.

- Demand side problems
  - Increasing demand of fuelwood (increasing population)
  - Increasing demand of milk, meat, wool and hides due to economic growth that promotes rearing of cows and goats
  - Production of commodities like tobacco, tea, etc. which require heating by fuelwood.
  - High prices of POL and machines that discourages switching over to machines
  - Inefficient use of fuel wood - low conversion due to poor gadgets being used in the villages
  - Lack of user friendly alternative – R&D

Develop fuelwood plantation in the catchments of urban centres, which could meet large-scale fuel requirements of these towns and of the villages which lie within the catchments.

However, there are other aspects and opportunities to be considered. Though the mismatch may appear to spell the infeasibility of meeting demands and hence point to a policy direction in favour of substitution of fuelwood by mass produced options such as LPG, general agreement over the world is to promote renewable fuels, at least in rural areas, where they have been in traditional use. Among the renewable options, fuelwood has been described as the best. In view of this and the insufficiency of the substitution response cited above, plantations with fuelwood as one of the chief objectives appear to be inescapable policy alternative.

Multiple stakeholder partnership in raising forest plantations also offers effective opportunities for fuelwood production. Confederation of Indian Industries (CII) estimates that such plantations are capable of turning over 1.2 MT/ha of fuelwood annually[38]. Other opportunities occur in the form of investments by the energy sector in Annex-A countries of the Kyoto Protocol, towards meeting their emission reduction obligations, Deliberations on best agroforestry mixes have also been given special attention[39] to local fuelwood requirements. *Albizzia lebbek*, *Hardwikia binata*, *Azadiracta indica*, *Quercus leucotrichophora* and *Acacia nilotica* are among the species recommended as the forest crop component where fuelwood yield is of primary importance[40] to the farmer.

6.2.2.2 Grazing and Fodder

Forests meet about one-fourth of the fodder requirements in India. The importance of forests as a source of fodder supply increases during drought years when the crops fail and forests are the main source of fodder. Grazing results in forest degradation as regeneration is damaged due to trampling. A study conducted in the Udaipur Forest Division (Rajasthan) showed that biotic pressure reduces the forest productivity by half. The gain from grazing of poor quality livestock to owners is negligible. Study of the economics of hill cows in Himachal Pradesh showed that net profit was minuscule and which, in fact, was the cost of the cow dung. The loss to the society due to grazing thus far outweighs the gains for both tangible and intangible goods and services from forests.

The National Forest Policy (NFP), 1988 prescribed that stall-feeding of cattle should be encouraged. Stall-feeding, however, requires a much higher labour input as compared to free grazing. Feeding of 20 cattle, which can be taken out for grazing by one person, will require an input of about 6-10 person-days in cutting and carrying grass from the forest areas and feeding the livestock, depending upon the location of forests vis-à-vis habitation. A farmer may not invest labour in stall-feeding livestock that does not yield commensurate income.

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[38] Nugent, JB et al. *Public private partnership in regreening of degraded revenue/ private forest lands: cost benefit analysis.* New Delhi, Confederation of Indian Industries

[39] In the same, study, Kursten calls Agroforestry and Fuelwood 'two sides of a medal

[40]. Central Arid Zone Research Institute. 2003.*In* Asia-Pacific Regional Agroforestry Workshop at Bangalore. MoEF and UNCCD.

6.2.2.3 Food from Forests

Forests constitute an integral part of social life of tribals and others living in and around forest areas and contribute substantially to the food supply of tribal populations. In ancient times, the tribal population depended for their food supply mainly on the forests, However, as forests were cleared and degraded, the food supply from forests decreased. A study conducted by the Administrative Staff College of India, Hyderabad reported that about 60% of the tribal population living in the forests of Andhra Pradesh, Madhya Pradesh, Bihar and Orissa (where about half of the tribal population of the country lived), depends on forests for food in one way or the other. During droughts and in times of scarcity, the dependence on forests for food increases. The main food collected from forests includes fruits, flowers, tubers, leafy vegetables, bamboo shoots, honey, mushrooms, etc.

6.2.2.4 Medicinal Plants

Forests play a very important role in rural health care. Most of the people living in and around forests use medicinal plants collected from forests for medicinal value. Various ethnic communities in the country use about 8,000 plant species for medication purposes. Majority of the tribal populations living in forests depend on traditional medicines and do not have access to modern systems of medicine. Medicinal plants are now being increasingly used for providing health care to rural communities in the country and for sale in cities as well as for export. They have the potential of making a significant contribution to the economy of the country as demonstrated in China.

6.3 Arresting Forest Degradation and Rehabilitation of Degraded Forests

This should become a national and state priority and should be given support of political will and provided adequate financial and infrastructural support.

6.3.1 Checking Degradation of Non-Degraded Forests

Plantation forestry is important. But it must be in degraded forests, even if the output is low. It must add biomass not substitute it, even though its overall productivity per hectare may thereby be reduced.

Arresting further degradation of good forests and rehabilitation of degraded forests has to be an important goal of forest administration. The dense forests with a cover from 50-70% need to be protected and managed with appropriate silvicultural interventions. In most of the states, JFM is restricted to degraded forests due to an apprehension that dense forests will be degraded if community intervention enters its domain. In the State of Forest Report of FSI, any possible decline of forest density within the category of 40-100% (dense forests) is not reported and it is assumed that no further degradation is taking place in these forests, even when there is no check on the factors responsible for forest degradation, viz., frequent forest fires, excessive grazing, continuous and excessive fuelwood collection , etc. It needs to be ascertained as to whether or not the process of degradation has been arrested in these forests simply by reducing the level of harvesting. The criteria of assessing density of forests should be based on basal area and volume of growing stock, rather than crown density.

As expected, the decrease in canopy density results in the decrease of growing stock. The growing stock figures given for canopy densities of > 70%, 40 - 70% and 10 - < 40% for different types of forests (FSI, 1995) were analysed to give the average growing stock in forests of these canopy densities and the data have been used to find relationship between canopy density and the growing stock per hectare.

Forests with canopy densities of 40 - 70% and 10 - > 40% show the average growing stock as 74.4% and 28.6%, respectively of the growing stock in forests with a canopy density of > 70%. Reduction in the canopy density from >70% to canopy density of 40-70% results in reduction of growing stock to about three-fourth. Reduction in growing stock as a result of degradation is thus very substantial. In other words, degradation of a dense forest (canopy density 40 -70%) to an open forest will mean a decrease of about 2 m3/ha for every one per cent decrease in canopy density. The degradation of 2.5 million ha of forests would be losing the growing stock equivalent to the annual increment of one million ha of plantations with about 5 m^3/ha Mean Annual Increment (MAI). Therefore, the degradation of good forests is to be checked at all costs; otherwise all efforts in afforestation will be nullified. The growing stock lost from dense forests as a result of degradation will be in the form of big sized trees whose loss cannot be compensated by small sized trees of equal volume to be grown in plantations to be managed on short rotation. The decrease in growing stock as a result of degradation could be much more than the increase in growing stock as a result of reforestation or afforestation. Conservation of non-degraded forests must be given a very high priority.

Silvicultural management is to be reinforced in order to check further degradation of good forests. Working Plan preparation exercise needs to be more thorough and the prescriptions should be more exacting. Regular monitoring of the implementation of Working Plan prescriptions is necessary. Provision of adequate funds for intensive management of non-degraded forests is also essential.

6.3.2 Rehabilitation of Degraded Forests

The estimates of degraded forest areas vary widely in the absence of a clear definition of degraded forests. According to different approaches and definitions, the degraded forest area varies from about 19 to 32 million ha. The National Forestry Action Programme (MoEF, 1999) gives the area of degraded forests as 31 million ha under the following three categories: areas with natural root stock (15.5 million ha); areas with depleted natural root stock (9.5 million ha); totally degraded and treeless (6.0 million ha). Degraded forests of the first category can be regenerated through protection and tending of coppice regeneration. Excellent pole crop of sal in JFM areas of Orissa and West Bengal is a testimony to successful rehabilitation of such degraded forests under the JFM programme. Several degraded forests with rootstock of other species have also been successfully regenerated. Degraded forests of the second category can also be rehabilitated through protection and tending of rootstock, supplemented by assisted natural regeneration. It has already been demonstrated in different parts of the country that JFM is an appropriate approach for the rehabilitation of such forests. By March 2002, about 14 million ha area of degraded forests is reported to have been brought under JFM for rehabilitation. However, the cost involved in JFM should be kept viable and not excessive.

6.4 Increasing Forest/Tree Cover

The National Forest Policy, 1988 provides that one-third of the total land area of the country under forest or tree cover is to be maintained. The area designated as forestlands in the country is reported to be 76.5 million ha which accounts for 23.3% of the total geographical area. All the forest area, however, does not carry tree cover. The area under forest cover (area with canopy cover of density > 10%), including mangroves is reported to be 62.8 million ha accounting for 19.1% of the country's geographical area. This is only about 82% of the total forest area, the balance of about 18% of the forest area is with <10% crown density or without any tree growth. The forest area is very unevenly distributed in the country and in some parts there is hardly any forest. Out of 408 districts, 196 have forest cover of 0 - 10%, 107 have 10 - 33% and the remaining have > 33%. About 97% of forests are owned by the government (93.2% under FD and 3.8% under revenue department) and 3% by the community and private persons.

In order to meet the policy goal, an additional area of about 42 million ha will have to be brought under forests. Area available for afforestation as estimated in NFAP, is about 25 million ha of common lands. This assessment is based on the area of common lands being about 55 million ha, out of which about 44 million ha area is estimated to be in a degraded condition and about 60% of this 44 million ha will be available for planting. This assessment appears to be an over estimate in view of the following: i) about 8.5 million ha of treeless forest area is included in 55 million ha of common land, ii) pasture lands should not be planted as it will deprive the local communities from an important source of grass for their livestock, iii) part of cultivable land might have already been encroached upon or may be in small pieces making afforestation difficult, and iv) tree groves area included in this category may already be under tree cover. The common land area available for afforestation may thus be much less than the estimate of 25 million ha.

Thus, other areas available for increasing forest/tree cover and which could be the following need to be addressed: i) scrub forests included in recorded forest areas, ii) non-forest areas (revenue lands), iii) community/panchayat lands, iv) non-forest areas along roads, canals, and railway lines, and v) area under agriculture (agroforestry/farm forestry) and area under habitations (homesteads).

6.4.1 Afforestation of Scrub Forests and Revenue Lands

In view of the poor performance of plantations on common lands in the past, tree growing on highly degraded sites at a high cost (Rs 15,000 - 20,000/ha) and with low expected productivity (1.8 - 2.1 t/ha/yr) may not be the right approach. All degraded lands not under any specific use, which are taken to be available for afforestation, provide subsistence needs to the rural poor and any programme to afforest such lands without ensuring tangible benefits to the dependent communities, is likely to fail. Afforestation of small scattered and highly degraded areas of common lands is going to be difficult and very costly, as has been the experience of the wasteland development programme. It should suffice to protect these areas from further degradation and to clothe them with grass and bush cover which will be as effective as tree cover in soil and water conservation, besides augmenting supply of fodder and fuelwood very badly needed by village communities. Here natural processes of regeneration would be cost effective, productive and will also enable the people to develop a conservation ethic of sustained

management once they see the benefits of natural regeneration. These areas should be properly protected to prevent further degradation and all necessary measures like soil and water conservation (through improved vegetative cover and not through expensive engineering works) should be taken to improve the productivity of grass and bushes to be used to produce fodder and fuelwood at optimum levels.

6.4.2 Homestead Tree Planting

Growing trees in homesteads is a common practice in most parts of India. Taking advantage of this, tree growing in homesteads should be very attractive and practical. Trees grown in homesteads are retained for much a longer period than the rotation adopted under agroforestry and such trees are usually retained up to their physical rotation age. Taking the number of households in the country to be about 100 million and each household planting only one tree per year, the number of trees so planted will equal ½ million ha of forest planted every year (200 trees = 1 ha).

6.4.3 Planting along Roads, Canals and Railway Lines

With the emphasis on road infrastructure development, there is a big potential of growing trees along roads. Planting a single row on both sides of a road at a spacing of about 10 m for one km distance may amount to planting one ha of area, taking 200 trees/ha and trees with a broad canopy such as jamun, mango, imli, etc can be planted.

6.4.4 Urban Forestry

It is projected that 40% of the country's population would, in the future, be living in cities. It is, therefore, essential to develop urban forestry on a scientific basis to both provide shelterbelts and to improve the quality of urban life.

6.4.5 Forest on Lands owned by Armed Forces, Police, Educational Institutions and Public Enterprises

Huge tracts of lands are vested with the military, paramilitary and police forces by way of cantonments and residential areas, as well as firing ranges, ordnance depots, etc. In many instances, these areas retain the only surviving vestiges of natural vegetation in the region, some even holding population of wild animals and birds. It is essential that natural forest cover should be retained and if possible, augmented to the extent that it does not interfere with the functions assigned to these areas.

6.5 Wildlife Conservation

The people have begun to appreciate the value of wildlife not only for recreation, but also for environmental conservation. Increasing number of tourists visiting national parks (NPs) and wild life sanctuaries (WLSs) is a testimony to the increasing public interest in wildlife. People living in and around forests have apathy towards wildlife conservation because of the damage by wildlife to their agricultural crops and such apprehension and apathy will have to be addressed.

6.5.1 Preservation of Identified Areas for Gene Pool Conservation in the Wild

Gene pool conservation is necessary for human welfare. Several species have become extinct and some others are already threatened and may become extinct if appropriate measures for their conservation are not taken. India is bestowed with very rich and diverse flora and fauna. Proper utilization of biodiversity can very substantially contribute to the economic progress of the nation. Areas of rich and diverse biodiversity need to be identified and conserved. Areas with rare endemic species with very limited distribution need to be conserved on priority, before these are lost.

The factors, which contribute to biodiversity depletion or loss need to be overcome. Forest fires and grazing destroy biodiversity and their control in forest areas is essential. Fragmentation of ecosystems as a result of degradation and expansion of agriculture or grazing also contributes to loss of biodiversity. In some areas invasion of exotic weeds like Lantana is also resulting in biodiversity loss. Selective felling of superior genotypes in the forests leads to loss of genetic diversity. Appropriate approaches for management of forests for biodiversity conservation will have to be evolved and followed and be reflected in the management or Working Plans. The present day silvicultural practices were developed to favour species of economic importance without much regard for biodiversity conservation.

Biodiversity conservation is possible with active participation of the local population. In forests where JFM is being practised, the participating community is compensated through supply of forest products. However, areas required to be preserved for biodiversity conservation become inaccessible to the local community and they are denied the right of collection of even those products. Medicinal plants conservation areas established for gene pool conservation are examples of this approach of conservation. People should be motivated through viable economic benefits derived from the conservation of biodiversity.

6.6 Watershed Management for Sustainable Supply of Water

Water retention and regulation is emerging as an important objective of watershed management. In many areas, the local communities are taking interest and participating in watershed development, mainly to get additional water supply for drinking and irrigation. In dry regions of Maharashtra and Gujarat, additional water supply from watershed turned out to be the most important output, followed by increased production of grass for the livestock. Management of natural resources may be undertaken on watershed basis resulting in holistic management instead of a sectoral approach. The organizational and institutional structures of different departments will have to be modified to make a watershed management approach possible.

6.7 Supporting Sustainable Agriculture

The tropical climate in India can sustain agricultural production with conservation and sustainable management of forests. The National Forest Policy, 1952, therefore, rightly stated that forests should be treated as an indispensable ally and foster mother of agriculture. Forests help in a sustained supply of water for irrigation, moderate and ameliorate climate for the benefit of agricultural crops, supply organic manure in certain

areas and supplement supply of fodder and fuelwood and thus lessen the burden on agriculture areas for meeting these demands. The beneficial effect of forests, however, depends on their size, location with respect to agricultural fields, composition, structure, etc. Forests reduce air temperature and wind velocity and increase relative humidity that helps in reducing evaporation and in improving moisture balance in adjoining agricultural fields, creating a favorable climate for better production.

The addition of organic manure is of special significance for rain-fed agriculture under a tropical climate, as in India. Large livestock population maintained by farmers provides organic manure and depends largely on forests for fodder. The poor farmers cannot afford to purchase fertilizers and have to depend on forests for organic manure supply. Organic manure is drawn from forests through the removal of leaf-litter and humus, lopping of leaves for composting or to be used as green manure, addition of wood ash, etc. Leaf manure requirement for arecanut, coconut and paddy in the lateritic region of Karnataka is estimated to be about 10, 5 and 3 tonnes per hectare, respectively. About 30% and 44% of the households in Dakshina Kannada and Uttar Kannada districts of Karnataka, respectively, depend on leaf manure collected from forest areas. The quantity of leaf manure collected annually from forests in these districts is estimated to be about 0.45 million tonnes valued at Rs 135 million, taking the price to be equal to the cost of collection only. The market price is expected to be much higher. Based on the average production of 1.7 tonne leaf manure per hectare of forests, each hectare of arecanut, coconut and paddy requires 6, 3, and 1.8 ha of forest area, respectively for leaf manure supply. In the western Himalayan region (Jammu and Kashmir, Himachal Pradesh, and Uttar Pradesh), organic manure for application in fields is partly collected from forests. Dry leaves of sal and oak are collected for application in fields for ginger cultivation; and about 10 tonnes of dry leaves are added for each hectare of ginger. The practice of rabi cultivation of paddy, practiced in areas of high rainfall in Maharashtra and other similar areas depends on organic matter supply from forests. About 10 tonnes of lopped material is needed to produce paddy seedlings required to plant one hectare. There exists a direct and reciprocal relationship between degradation of forests and the decline of hill agriculture. The transfer of leaf manure from forests to agricultural fields results in forest degradation. The cumulative pressure of increasing demands of rural population in the hills leads to impoverishment of the ecosystem and the hill agriculture productivity declines.

In order to produce fodder for the livestock that depends on grazing and lopped fodder from forests, sizeable areas of agricultural land should have been set aside for fodder production, resulting in a corresponding decrease in food production. Fuelwood collection to the extent of about two tonnes per household per year in case of forest-rich areas where forests constitute the only source of fuelwood, is a significant contribution of forestry to agriculture in such areas. Every household is harvesting the productivity of about 0.5 ha forestland to meet its fuelwood requirement.

6.8 Recognition of Tenural Rights

In the British era when the forests of the nation were being consolidated, the rights of zamindars/princely states were settled but the tribal rights could not be settled since records did not exist.

The Forest (Conservation) Act was enacted in 1980. It is a regulatory Act, not prohibitory one. This Act paved the way for legal solutions to long pending settlement of rights of the tribals living on the forestlands since time immemorial. To achieve the maximum advantage of the changed scenario brought about by the application of the Forest (Conservation) Act, 1980 and to strengthen the concept of Sustainable Forest Management through participatory approach, the new National Forest Policy, 1988 was formulated. This policy gives due regard to the traditional rights of the tribal people on forestland. It recognizes the relationship between the forest dwelling people and forests. It also emphasizes the need for undertaking integrated area development programmes to strengthen tribal economy.

To fulfill the commitments as enshrined in the National Forest Policy, 1988, in respect of settlement of people's rights, especially tribals' rights over forestlands in a regulated manner, the Central Government on 18 September, 1990 had issued the following guidelines after obtaining the approval of the Union Cabinet, for a one time settlement of the people's rights under the Forest (Conservation) Act,1980:

- Guidelines for regularization of encroachments on forestlands.
- Guidelines for review of disputed claims over forestlands arising out of forest settlement.
- Guidelines for settlement of disputes regarding pattas/leases/grants involving forestland.
- Guidelines for conversion of forest villages into revenue villages and settlement of other old habitations on forestland.

These guidelines were reiterated on 30-10-2002 with the Central Government requesting States and Union Territories to set up Commissions/Committees at the district level involving the Revenue, Forest and Tribal Welfare Departments, for the settlement of disputed claims of tribals provided other conditions mentioned in the guidelines are fulfilled.

The Central Government issued fresh guidelines for the settlement of tribal rights on 5th February 2004. These do not relate to encroachers, but aim to remedy an omission or injustice[41]. Additionally, taking cognizance of the aggravation caused in terms of soil erosion and depletion of natural resources due to jhum, the Government of India constituted a Task Force in June 2001. So far, seven projects at a cost of Rs. 17.67 crore to restore productivity of 9300 ha of jhum land have been sanctioned in the States of Mizoram and Nagaland.

6.9 Multi-stakeholder Partnership

Almost 29 million ha of afforestation would need to be undertaken to bring one-third of India's land under forest cover. Due to manifold constraints, the private sector has to be a

[41] These guidelines have been stayed by Supreme Court vide their order dated;23-2-2004 on the basis of an application filed by Sh. Harish Salve, The Amicus Curiae. Ministry of Environment and Forests has given an affidavit for vacation of the stay order in this regard to Sh. A.D.N. Rao, Advocate, Supreme Court, for filing in consultation with Solicitor General of India.

key partner in realizing this policy goal. Private sector's stake is that the forest-based industries are starved for raw material. This provides an opportunity for a partnership of mutual gain between the public and the private sectors.

The issue is receiving considerable attention from the MoEF. There have been workshops and consultations jointly arranged by the MoEF with the CII, with representatives from the connected industries and farmer associations sharing their concerns. Deliberations towards finalizing the guidelines that will govern such partnerships, are underway.

Yet there are constraints in the way of motivating the private sector for collaboration. The current transit regulations act as a disincentive to farmers and business interests. The land ceiling provisions also pose a hindrance to active investment in plantation projects. The following concerns emerge:

- To identify issues related to general agreements facilitating participation of the public sector and private sector organizations in afforestation of degraded land with adequate safeguards for local peoples' interests.
- To sort out roles and responsibilities of stakeholders such as the Forest Departments, FDCs, communities and private parties.
- To develop socially acceptable and conservation oriented guidelines.

At the time of writing, the Indian Institute of Forest Management, under a MoEF consultancy, is finalizing guidelines for implementation of this scheme.

6.10 Conflict among Village Institutions

Through the 73rd amendment to the Constitution, the Government of India makes it mandatory for all States to decentralize governance through a three-tier structure. Among the 29 functions recommended for decentralization, three relate to forestry viz. social forestry, fuelwood plantations and NTFP. This handed immense power to the Panchayats at the village level and to the three-tier local government structure. The Panchayat (Extension and Schedule Area) Act (PESA Act) grants ownership of minor forest produce (MFP) to the tribal and indigenous communities living in the vicinity of forests. Most states have laid down rules and guidelines for the sharing of benefit from forest produce under various JFM mechanisms. Expectedly, the PESA provisions and JFM rules have led to conflicts at the village level with regard the benefit and control of MFP. A permanent standoff exists between the Gram Panchayat and the VFCs or EDCs. A clear manifestation of the problem is the recent Punjab High Court case in which 13 Gram Panchayats have jointly questioned the legality of the JFM resolution and the funds disbursed to the VFCs under it.

This dichotomy needs to be resolved at the policy level itself so that conflicts do not arise out of multiple authorities at the local level.

6.11 Forest Certification

Forest management certification is a formal, voluntary procedure, under which a certifier –a third-party inspector – makes a written assurance that the quality of forest management practiced by a defined manager or group conforms to specified standards[42].

Globally, over the past couple of decades, the pressure on governments to demonstrate that forests are being managed in a more sustainable manner and delivering more social benefits, has been steadily growing. Forest certification was originally designed and promoted as a market-based instrument to encourage Sustainable Forest Management by forest producers selling into a more differentiated and demanding marketplace. However, as certification has developed, it has had a number of effects on government policies and regulations for sustainable forestry. It has also been promoted to a varying extent by governments as a means to achieve government's policy and enforcement objectives.

The following effects have been seen over the globe:

- Forest certification has provided a credible set of standards on which a few countries have based their own forestry reform principles and agendas;
- The participation of a diverse range of stakeholders in the certification process for specific producers or chains of custody have increased civil society participation in the sector, enabling some governments to draw upon these relationships for a broader forest sector dialogue;
- Some governments have successfully provided incentives for forest certification in the form of tax breaks, waivers of regulatory approval processes, or financial incentives.

Many governments and international organizations such as FAO and ITTO, who were initially reluctant to accept certification due to its threat as a non-tariff barrier to international trade and to its challenges to the sovereignty of governments forest policies and local priorities, have started to change their position and are now more actively involved in local and regional certification strategies. Analyses of the interaction between local and international processes suggest that the behavior of the involved parties at national levels can be positively influenced by international norms and policies. Possibilities of the use of Forest Certification as a "soft policy instrument" .· have been explored, as opposed to viewing it as yet another regulatory tool[43].

India is well poised to join the certification league, having already arrived at a national set of Criteria and Indicators under its very own Bhopal-India (Dry Zone) Process. All that remains desirable is the institution of a nodal accreditation agency under any of the recognized certification schemes[44]

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[42] European Forest Institute defined Certification for the European Commission in IIED's discussion paper – Bass (1999).

[43] Part of a Forest Trends series that discusses influences of Certification on regulatory frameworks and forest policies in Gerado Segura (2004).

[44] At the international level, two applicable standards exist –FSC and ISO EMS. At a smaller level, the European Commission has devised a certification scheme applicable to Eastern European nations, called the PEFC. Some regional schemes include LEI (Lembaga Ekolabel Indonesia) – Indonesian Ecolabelling

6.12 Economic Valuation of Ecosystem Services

Around the world, it is now held by common consensus that the natural environment as we know it, is difficult to sustain unless it is mainstreamed as just another provider of services. Ecosystem services have long gone without payment due for their expenditure and the time has come when the heavy costs of natural maintenance of areas, ecosystems and biomes cannot be met without every form of use being compensated.

Efforts are on to evolve markets for ecosystem services and ways of maturing them. The IIED in UK, IEG in India, are some of the front-running institutions researching the topic. Forest Trends, a US-based NGO, which also submitted before this Commission, has a number of publications highlighting examples of established and trial markets from around the world. The key Indian issue is not merely to develop native expertise in the area, but also to assess the extent to which Indian minds are ready for the idea and to educate the people and the decision makers with regard to the contribution of forests. It should be MoEF's and the forest machinery's additional onus to extend this trend even among the literary Indian elite, so that when the time comes and global marketplaces for eco-services open up, India is not found still struggling with the concept. (vide Box 2 - Within India).

Methods and mechanisms to value natural services and evolving markets where payments for them can be exchanged will go a long way in raising funds to finance conservation and to correct losses.

6.12.1 Compensation for Ecological Services Claimed by Forest- rich States

Some Indian States are blessed with a forest area well in excess of the 33% aimed at nationally. Almost all land available in these States is under forest cover of some variety and as such attracts provisions of the FCA. Any small activity, be it laying of a road or raising a school building, suffers prolonged hindrances under the centrally enforced Act. And yet these States are required to maintain a level of forest cover much higher than the rest of India, directly implying a greater direct cost of conservation. Economically better-off states with less forest cover get away with spending far less. So, on one hand is the opportunity cost of development foregone and on the other is a higher conservation burden. A clear lose-lose situation, for a heavily forested Indian State.

The argument does not end there. There are cases of such a State being juxtaposed to another with very scanty forest cover, but with flourishing agriculture nurtured by water - surface or underground – emanating from a forest-rich state upstream. So, as Himachal remains underdeveloped in the shadow of the FCA, Punjab reaps three crops enabled by the water that those hills catch. It has been argued that the tilt should be balanced by equitable budgets in the light of considerations outlined above. The crucial question is how the parameters on which measurements, comparisons and allocations will be made.

Institute, SFI – Sustainable Forestry Initiative, UKWAS – United Kingdom Woodland Assurance Scheme, and NTCC – National Timber Certification Council, Malaysia.

Box 3

Within India

Indian studies have themselves been pointing out the benefits that flow from a forest-rich state like Himachal to a cash rich state like the Punjab. Himachal faces many hindrances in its development as large areas are deemed forestlands. With development impeded and having to bear a higher cost of conservation than richer states, Himachal remains perennially poorer than Punjab. The two states are distinct budget entities. Flows, of any nature, from one to the other must all be accounted for. Unless a part of state budgets is apportioned not by linguistic state boundaries, but by geographical landscape contours, payments have to be exchanged to balance the cost.

6.13 Ecotourism

Tourism, which was earlier thought to be adversary to conservation goals, is now recognized not only to be compatible but facilitative to the same. The average tourist is now better informed about the environmental impact of his travel and behavior. Such awareness is expected to persuade people to pay more and generate a fund stream to finance conservation as well as the development of local communities. Ecotourism, as it is called, is the *mantra* of the new age travel industry.

As ecotourism has mostly to do with nature and wilderness, the Forest Department becomes a key actor in the activity centred on ecotourism. The Department's capacity needs to be augmented, infrastructure raised and mechanisms of inter-department and inter-sectoral collaboration worked out.

6.14 Areas not Under the Control of the Forest Departments

Keeping in view the thrust of the NFP of having one-third of the geographical area of the country under forests and tree cover and that the recorded forest area is only 23.38%, the management of forests and tree cover outside forests gains added importance. Outside the land available with SFDs, the forests and trees are available on private estates, panchayat lands, revenue lands, community lands, sacred groves, road sides, railway tracks and canal sides, etc. These various agencies should have freedom to plant trees of various species as per their choice and fell them for their use whenever they want.

6.15 Conclusion

The above discussion implies that various degrees of deliberate human intervention, ranging from actions aimed at safeguarding and maintaining the forest ecosystem and its functions, to favouring specific socially or economically valuable species or groups of species for the improved production of goods and services, are required to achieve the goals for the forestry sector.

6.16 Recommendations

[25] In order to ensure that forests meet the emerging and increasing needs of society, their conservation and management on scientific principles to enhance their ecological contribution and to increase their productivity, is necessary. A well-conserved and managed forest is very efficient in ensuring ecological security. For

intensively and sustainably conserving and managing forests and improving their productivity, required resources, both physical and financial, should be made available in accordance with the provisions of the approved Working Plans.

[26] Perhaps the most important contributions that the Central and State Governments can make to achieve the above objective, is to give forest conservation unstinted political support, without which financial and infrastructural support, crucial though they are, will not achieve the objective.

[27] The future challenge to the forestry sector in India is to create an enabling environment to facilitate assessment, monitoring and reporting on national level criteria and indicators. These should be assessed periodically, through a set of simple formats to assess changes. Sustainable forest management (SFM) and its threshold also need to be defined.

[28] There should be appropriate rural development and animal husbandry policies and projects to address issues of grazing and fodder for cattle. The grazing requirements of livestock of villages located in and around forests (within five kilometers), should be addressed within the carrying capacity of forest areas. The practice of unregulated grazing should gradually be replaced by stall-feeding.

[29] The medicinal plants growing in forest areas play a very important role in primary health care of neighboring communities who do not have access to hospitals or cannot afford to buy costly medicines. Besides, the knowledge of these medicinal plants is an intellectual property right of the forest dwellers, which must not be allowed to be lost. Special programmes should be undertaken by the State Forest Departments to conserve, manage, scientifically harvest and sustainably utilize medicinal plants found in forest areas. This endeavor, however, should not involve the removal of any forest cover, nor put at risk forests or forest ecology, either in propagation of medicinal plants or in their harvesting or removal.

[30] Forests must play an important role in the sustenance of forest-dependent communities, especially the tribals, living in and around forests. While assessing the results of past systems of forest management in the Working Plans, the contribution of forests in sustenance of forest-dependent communities should also be assessed and recorded while revising the plans. The Working Plan prescriptions should clearly prescribe measures to enhance the contribution of forests in the sustenance of such communities.

[31] For about two-third of the country's rural population living in areas where there are no forests, fuelwood demand should be met from agroforestry and farm forestry supplemented by agricultural 'wastes', biogas, liquid petroleum gas, solar energy, etc. There needs to be a very clear policy that each land owning family in rural areas should grow sufficient number of trees on its land to meet its fuelwood requirement. It can be dovetailed with the agriculture policy in India wherein emphasis should be given to raising fuelwood for domestic needs, on private, communal and wastelands.

[32] Approximately 1.73 lakh forest fringe villages/habitations, which are within and on the forest fringe, should be given special attention to provide substitution to wean

them away from dependence on fuelwood. In this context a special programme could be developed to provide alternate energy, such as liquid petroleum gas, solar energy, biogas, etc.

[33] The sale of fuelwood by individuals must be stopped. Persons requiring the fuelwood could obtain their requirement as per the norms of Joint Forest Management (JFM) /Gram Van based on sustainable use, but only the Forest Department (FD) should be permitted to extract fuelwood from the forest for sale, which should be on no loss no profit basis. Wherever FD is unable to provide this facility, it could be entrusted to the concerned JFM institution / Gram Van.

[34] Attainment of self-sufficiency in forest products should be an important goal at state and national levels. For assessing country's self-sufficiency in forest products, database of demand and supply should be created and regularly updated at the state and national levels. At the time of formulation of five-year plans, strategies to meet forest product demands should be critically analyzed and appropriate programmes prepared and implemented to achieve this goal.

[35] Joint Forest Management / Gram Van, particularly that which concerns areas undergoing significant demographic impact, involves a special approach and mindset. This presages specializations and training where sociological issues would be as important as the technological requirement for tree propagation. Such specialization and training, therefore, needs to be adopted

[36] The objectives of management for Joint Forest Management (JFM) /Gram Van need to be revised and clearly stated to broadly include restoration and development of degraded forest areas in order to meet demands for fuelwood, fodder and small timber and also to contribute towards poverty alleviation. It must also be clearly understood by all parties that JFM is a social contract and that benefits and rights would only accrue if the people fulfil their obligations and duties.

[37] The assistance of appropriate non-government organisations and Gram Sabhas/ Panchayats, etc., should be taken in the afforestation activity.

[38] Tree planting in open areas along railway lines, canals and roads, must be undertaken and adequate funds for both tree planting and their maintenance be provided for by the departments concerned. Assistance in tree planting may be acquired from the concerned State Forest Departments wherever required.

[39] Urban population needs to have access to areas of nature and wilderness. Towns and cities may be encouraged to adopt suitable areas available near by, where forest exist or can be regenerated, so that city population could have access to areas where they can have communion with nature and at the same time forest and wilderness in the proximity of urban habitation could be nurtured and preserved.

[40] The concerned municipal authorities need to prepare master plans for parks and green belts, selecting site-specific plant species for propagation. Cooperation of the State Forest Departments may be required in this regard.

[41] Appropriate flowering and shade tree seedlings should also be made available to private house owners.

[42] Management plans need to be prepared for tracts holding substantial natural vegetation and vested with the military, paramilitary and police and the overall authority in charge of management assigned. The effort should be to both preserve as well as propagate natural vegetation and wildlife in so far as these do not affect the functions of the area.

[43] If any forest / habitat linkages with other natural vegetation growth/forest area exist outside of these properties of the army, paramilitary and police, that continuity should be maintained by the authority in charge of that area.

[44] If any harvesting of forest produce is to be done from the areas with the army, etc, any surplus should not be sold in the open market, but first offered to the neighboring people to cut and carry away, under the supervision of the officer in charge.

[45] The State Forest Departments should cooperate with the officers in charge of these areas to both preserve and augment their natural resources.

[46] A number of forest areas have been declared protected areas as wild life sanctuaries and national parks to conserve endangered wild animals, but not much thought has been given to identify and declare forest areas as protected areas, which are rich in plant diversity. Areas having populations of endemic and endangered plant species should also be declared as protected areas and all the forest sub-types of India should be covered in the network of such protected areas.

[47] Water is one of the most important factors in increasing productivity and forests play an important role in maintaining sustained supply of water in the rivers and streams for irrigation, drinking, industrial and various other uses. Hence special emphasis should be given on water conservation and water harvesting, which can improve productivity substantially and will help in making more water available to mitigate the water crisis. Water conservation in forests, therefore, deserves special attention and should be an important objective of forest and grassland management and adequate financial resources should be provided and should form an integral part of every forest working / management plan.

[48] The Ministry of Environment and Forests should evolve a detailed mechanism for multi-stakeholder partnership comprising communities, governments and private bodies for funding increase in forest cover.

[49] There should be some code for management of areas under forest/tree cover not under the control of the State Forest Departments and incentives should be provided for retaining tree growth for ecological security. The Government has an obligation and must play an important role in extending technical advice to them for increasing both tree-cover and productivity.

[50] Unclassed forests should be covered under working schemes/working plans which should incorporate recorded rights and concessions of the people, and portray the genuine bona fide personal and other needs of the local people.

Chapter 7

Constraints and Threats

7.1 Demographic Changes

From about 30 crores in the late 1940s, when India gained independence, the human population now stands over one billion, which implies a 3.5 times increase of human to land and human to forests ratios. This reality has induced large-scale land use changes reducing the extent of natural areas of all types, and has also caused degradation of the residual area from the overuse.

7.2 Mega-Development

Major development projects of all hues have affected forests and wildlife in two ways. One was by diverting both natural areas as well as village commons, the latter with little compensation or alternatives to villagers. Left with no alternatives, rural population mount further pressures on the residual natural areas leading to accelerated degradation. Another was by the diversion and export of local resources, e.g. water, without meeting the genuine demand of the communities.

7.3 Rural Development Imbalances

Rural development inputs in natural-area dominated landscapes have been and continue to be much lower as compared to those in other areas. Not only is this true, but such inputs also do not accord with the basic premise that rural ecosystems in these regions depend directly upon the well-being of natural ecosystems. This has led to a vicious cycle of community impoverishment, fuelling degradation of natural areas.

7.4 Market Pressures

Market pressures have led to aberrations in practices of collection and removal of both timber and non-timber forest produce, even where state trading has 'eliminated' the contractor system. Village communities due to lack of viable livelihood alternatives are forced into excessive and even abusive exploitation, leading to decline in productivity of the resource as well as attrition in the productivity parameters.

Degradation of natural and rural ecosystems and the concomitant impoverishment of rural communities in the 'natural landscapes and seascapes' have been the inevitable consequences of such combined adverse causes. Even where steadfast effort has held the fort thus far, the scene is one of an 'island syndrome', such as in places like Kanha, Kalakaad-Mundanthurai, Great Himalayan National Park and Periyar, where visionary managers took to 'eco-development' and participatory forestry in permissible use zones as a combined strategy to provide supplemental livelihoods and meet the demand of bio-resources.

7.5 Lack of Political Will

Conservation leadership and direction in India have traditionally flowed from the "top". Though there have been individuals and communities who have made significant

contribution to conservation and the religious sentiments, ethics and vegetarian food habits of the majority populace have also helped, there has been no systematized "green" movement in India. Thus, the political will for conservation has been linked with the convictions and commitment – or the lack of it – of the rulers. It would not be incorrect to say that in the previous two decades this interest in, and thus, commitment to environmental conservation, has been lacking in the country's leadership, whatever may be the 'lip-service' given to its importance. With coalition governance likely to continue as the order of the day, there appears to be little likelihood of any up-gradation in the priority accorded to nature and the environment. There is no denying also that enforcement has also been weakened by political expediency.

7.6 Lax Implementation

Legislation and policy already in place can significantly improve the situation, if effectively implemented. But not only is the already lax implementation likely to become more lax, but there is already a move afoot to both change the policies and then the laws to suit populist political objectives under the guise of equity, sustainability, progress and poverty alleviation. All the while a facade is being maintained of the importance accorded to forest and the environment. This paradox of the prevalent situation, which may get even more aggravated in the future for political reasons is, perhaps, the single greatest threat to forests, wildlife, wilderness and the environment.

7.7 Encroachment and Degradation

The Forest (Conservation) Act, 1980 (FC Act) became operative on 25 October 1980. This can be stated as one of the most important Central legislations, which has been responsible for halting the process of deforestation owing to the diversion of forestlands for non-forestry purposes. The FC Act ensures that no diversion of forestland is possible without the prior approval of the Government of India . The National Forest Policy, 1988, also stipulates that there would be no regularisation of existing encroachments.

In 1990, the Government of India issued guidelines to deal with cases on which commitments have been made by State Governments before 25 October 1980. All such cases were to be reviewed by a joint team of Revenue, Forest and Tribal Welfare Departments. It was also decided that all post-1980 encroachments would not be regularised.

It is extremely important to appreciate the fact that the ever-growing demand for regularisation of encroachments is one of the most important reasons for decimation of forests. Encroachments on forestland are an ongoing process. Most of the States adopt a rather passive attitude towards containing this problem, and have been inactive towards evicting the post-1980 encroachments. Thus, by and large, it would not be an overstatement to surmise that States are fostering encroachment on forestland, perhaps to avoid any adverse political response. The Honorable Supreme Court of India on 23 November 2001 passed an interim order restraining the Government of India from regularisation of encroachments.

During the period from 1950 to 1983, 43 lakhs hectares of forestland were diverted for non–forestry purposes, and the bulk of such diversion were for agriculture. Needless to add, this further fostered encroachment in forest areas.

The National Forest Policy, 1988, clearly indicated that encroachments on forestland should not be regularized. However, the Ministry of Environment and Forests, under pressure from States (that the States stand committed on regularization of past encroachments that occurred before 1980), evolved a national consensus on the issue and issued guidelines on 18th September 1990 on regularization of pre-1980 encroachments, based on certain eligibility criteria (like having proof that the State Governments have taken a decision to regularize such encroachments before 1980). Another guideline was also issued on 18 September 1990 regarding settlement of disputed claims of the tribals on forestland.

The Central Government had already regularized till 2001 encroachments of over 3.66 lakh hectares of forestland in Madhya Pradesh, Gujarat, Kerala, Arunachal Pradesh, Karnataka, Andaman and Nicobar Islands, Orissa and Tripura. The disputed settlement claims could not be resolved because the States could not come up with even a single proposal before the Central government during the last 15 years

At present, around 13.43 lakh ha of forestland is under encroachment. An area of 3.66 lakh ha of encroached forestland has been regularised in eight States and Union Territories, while 1.52 lakh ha of encroachment has been evicted since May 2002. There are around 2,690 forest villages in the country (19 States), out of which as many as 384 have been converted into revenue villages (Madhya Pradesh and Maharashtra). Time and again, the Union Government has been issuing guidelines for eviction of ineligible encroachers and settling claims of tribals, which are disputed to redress the tribal-forest interface problems.

On 5 February 2004, the Ministry of Environment and Forests issued revised guidelines for recognition of tribal rights on forestland, which states that the rights of tribals, continuously in possession of forestland since 31 January 1993, should be recognised. However, the Honorable Apex Court has stayed these guidelines along with those issued in 1990 for settlement of disputed claims of tribals. It is noteworthy that the Apex Court has ordered to consider 'Forest' in its dictionary meaning. Thus, the FC Act shall be applicable on all such areas, which appear as forests, irrespective of ownership.

Many NGOs and some of the tribal activists raised a hue and cry about tribal rights and blamed the Forest (Conservation) Act, 1980, for the ills of the tribal people. Nothing can be farther from the truth. It is a verifiable fact that the Act has in fact helped the tribal livelihood at many places by preventing the reckless diversion of forestlands.

A case in point is the utter failure of the Government of Kerala in enforcing an Act which was created by the State Assembly for restoration of alienated tribal lands. The land, which previously belonged to the tribal people was usurped by the land mafia. This has forced the State Government to again request the Central Government in the year 2001 to allow 'vested forest' lands to be allotted to the tribal people in the State. On the other hand, there is a case in Tripura, where the tribal people living inside the forests were rendered encroachers in the eyes of law, as their rights were not heard when the process of declaration of reserve forest was going on. As they were living inside the forests and eking out a livelihood in forestry activities and shifting cultivation, it never occurred to the government that they were legally encroachers. But when the issue of their regularization came after the 1990 guidelines, they were not considered as they did not

fulfill the condition that requires proof of the Government decision to allow them settlement rights. Both these cases were considered by the Central Government in the year 2003, but the attempts fell through due to the Supreme Court staying the orders. The problem in most other States falls in between these two scenarios. The solution therefore, has to be found out in consonance with the ethos of forest conservation. Anything done to the contrary will harm both the interests of tribals as well the ecology and biodiversity of the country. The issue should therefore, be decided purely on its merit, devoid of emotional rhetoric and intense lobbying for and against.

It would be an act of self-delusion to believe that forest dwellers including tribals never over-exploit forests. In some cases forest dwellers have not destroyed the forests; in others they have. Bastar and the North-East are some examples of tribals owning the forests or having total usage and rights over them, having seriously damaged them nonetheless. There can, thus be no one universal formula.

Some statistics of loss of dense forest cover in tribal districts just over a two-year period, make compelling reading (Table 7.1).

Table 7.1 – Over-exploitation of Forests by Tribals[45]

State (number of tribal districts)	As per 2001 FSI Report	As per 2003 FSI Report	Loss in dense forest cover and (% loss)
All States/UTs (187)	257048	246858	10190 (4%)
Assam (16)	7233	5302	1931 (26.7%)
Madhya Pradesh .(18)	27883	24372	3511 (12.6%)
Jharkhand (8)	7826	7368	458 (5.8%)
Andhra Pradesh (8)	17062	16370	692 (4%)

Note: The total forest cover in the country is 6.78 lakh sq km (20.64% of the geographical area). In 187 tribal districts it is 4.07 lakh sq km (36.91% of the concerned geographical area). Very dense forest is only 1.56% of the country's geographical area. The dense forest cover has thus decreased by 26.2 thousand sq km between 2001-2003 from the figures provided by the FSI above.

The premise on which the Scheduled Tribes (Recognition of Forest Rights) Bill, 2005 is based is the assumed symbiosis between forests and forest dwellers, in this case the tribals. Such harmony does exist in the case of hunter-gatherer communities as in the Andamans, where subsistence level forest dwellers collect forest produce only for their personal use. It would never be the policy of any government to retain the forest dwellers at that socio-economic level and indeed, the Bill makes specific provisions for the commercial utilization of forest resources by these communities.

The following points need to be considered as a prelude to solving the problem: It must be recognized that the tribal people have a right to develop and get assimilated as part of the mainstream society and to enjoy the fruits of development and modern democracy. This requires respecting their genuine traditional rights on forests as well as their indigenous knowledge and culture which will not only benefit them but also the society at

[45] *State of Forest Report 2001; State of Forest Report 2003.* Dehradun, FSI.

large. The Kani tribe of Kerala has shown this by modernizing their knowledge of herbal medicines for the benefit of society through use of science. It also implies that the tribals have a right to change their traditional vocations and place of residence.

The biggest lacuna in the development process in rural areas has been the lack of fund flow to the interior tribal areas. Whatever fund has come has been spent on activities with no durable asset creation, due to poor planning and execution. Tribal people have been exploited, among others, by forest mafias, selfish leaders and smugglers as also by other tribals. As the forest continued to deteriorate due to lack of regeneration and increase in population, the problem of livelihood has become more grim for the tribal people.

7.8 Habitat Loss and Fragmentation

Fragmentation of wildlife habitats owing to loss of forest connectivity is a serious limiting factor for wildlife. The main causative factors for this are diversification of forest areas for developmental activities and loss of forest cover due to illicit felling, excessive fires and grazing. There is an elaborate time bound process of according clearance to projects seeking forestland, under the FC Act. Such clearances are based on detailed environmental impact assessments and other studies relating to their impact on wildlife, apart from payment of the 'Net Present Value' for the area. Guidelines under the FC Act permit those people who are relocated from Protected Areas to be given alternate forestland, which should be degraded forests along the periphery of forests and where the people concerned would choose to go in order to obtain better access to market, roads, school, hospitals, etc. Therefore, the Net Present Value need not apply to areas where alternate land is to be given. The Honorable Supreme Court of India has issued directives prohibiting diversion of any area contained within a Protected Area without its prior approval, which would be based on the recommendation of the National Board of Wildlife. Despite such regulations, the demand for forest areas is not diminishing, which once again highlights the need for a regional land–use policy, sensitive to environmental and wildlife concerns.

Another important factor for decimation of forest cover is the illicit felling of forest trees. As far as legal provision to deal with such offences are concerned, provisions for penalty exist under the Indian Forest Act, 1927 and also under the legislations of various States. Several administrative measures have also been taken to contain the problem, viz. patrolling, creation of check-posts, confiscations, resorting to joint management of forests (JFM), strengthening of communication infrastructure like roads, wireless, vehicles, apart from providing arms to forest staff. However, despite these initiatives and provisions, the problem continues. On an average, almost 90,000 cubic metre of timber is lost due to nearly two lakh cases of illicit felling annually. Seized with the problem, the Government of India provides considerable funding support to States through its schemes like 'Integrated Forest Protection', apart from other schemes of wildlife conservation. Also, to increase the forest cover with the active cooperation of the local people, almost 61,300 forest fringe villages have been covered under JFM, and more than 527 Forest Development Agencies have been constituted with funding support to States from the Government of India.

Over the last six decades, there has been a decline in the extent and quality of our wildlife habitats. For example, in the 1970s the dozen or so Tiger reserves had only a small

percentage of the total tiger population, whereas now the majority of tigers are in Tiger Reserves and parks which show on the one hand the efficacy of the PA concept and on the other, the degradation of the habitats. Some of the causes of such degradation are detailed below:

7.9 Delayed Settlement of Rights in Protected Areas

There has been an inordinate delay in the settlement of rights within protected areas. Section 20 of the Wild Life (Protection) Act, 1972 bars the accrual of rights on or over the land comprised within the limits of the area specified in the notification issued for declaration of a national park or a sanctuary, except by succession, testamentary or intestate. Further, Section 24 of the said legislation provides for acquisition of rights, and Section 25 provides acquisition proceedings. In a National Park, which has the highest degree of protection, no rights can exist, whereas some amount of rights can continue to exist in a wildlife sanctuary as permitted by the Chief Wildlife Warden. Despite initial notification, in most of the protected areas in the majority of States the process of settlement of rights has been delayed.

The amendments of 2002 have clarified that in those PAs or parts thereof where rights have already been acquired and further acquisition proceedings are not necessary, these PAs would be deemed to be finally constituted. Yet, the States still continue to treat some of the PAs as not fully constituted to continue the exploitation thereof.

The Government of India constituted Regional Committees for rationalising the boundaries of protected areas. The objective was that whenever it was possible on the periphery of the PAs, human habitations within them should be excised and in lieu other areas where there may not be human habitation, could be added to the concerned PA or another one. The reports of these committees are with the MoEF and the implementation of the recommendations contained in these reports need to be strongly pursued with the respective State Governments.

The Honorable Supreme Court of India in WP (C) 337/1995 has directed the States to complete the process of determination of rights and their acquisition along with providing necessary infrastructure for wildlife conservation. The States have been showing their inability in this regard for want of necessary funds. The Government of India has made provisions for funding support in the ongoing Centrally Sponsored Schemes, and though the process in underway in some States, the situation leaves a lot to be desired.

As per one estimate, more than 4 million people are residing in our protected areas. Despite directives from the Apex Court, the States have shown their reluctance to settle the rights and relocate the villages residing in protected areas. Under the present state of affairs, justice is neither being done to the people residing in areas not finally notified as a National Park or a Sanctuary, nor to the Wild Life (Protection) Act, which calls for a time-bound concerted action. Subsequent to the amendment of the Wild Life (Protection) Act, 1972 in 1991, any reserve forest or part of the territorial waters comprised within a sanctuary declared under Section 18 to be a sanctuary before the date of commencement of the amendment, shall be deemed to be a sanctuary. Further, the amendment of the said Act in 2002 prescribes a time limit of two years for completion of the acquisition proceedings. Relocation of villages from a protected area to an outside forest area should

also be exempted from payment of the ' Net Present Value', as mandated by the Apex Court recently in diversification cases.

7.10 Poaching and Illegal Trade

Threats to wild flora and fauna in India can be broadly divided into those caused by habitat degradation and those involving extraction of wildlife. The latter can be for subsistence use locally or for trade, both domestically and internationally. Habitat degradation is a serious threat to species conservation but generally a long term and a slow process, whereas unsustainable extraction of wild resources impact the immediate survival of species that would lead to a higher category of threat including extinction, local, or total.

The threat by extraction can be broadly divided into two main categories. The first is, unauthorized extraction of high value timber species, unsustainable extraction of firewood and the unauthorized and unsustainable extraction of non timber forest produce (NTFP) which was earlier called minor forest produce (MFP) and over grazing. This second kind of extraction, which this section of the report deals with, is the illegal extraction of such wild flora and fauna protected under the Wild Life (Protection) Act, 1972.

The body parts and derivatives of many wildlife species – both animals and plants –

like rhino horn, tiger parts, ivory, shahtoosh, agar wood, sandalwood, musk, bear-bile and the like have great value in the international market. Wildlife contraband is popularly touted to be the second largest illegal global trade after drugs and demand for wildlife products in international markets is still very high. Tiger skins and bones, ivory, rhino horn, musk, bear bile still command high prices and poachers lure local communities. Rampant illegal trade, continues unabated and communities traditionally living on wildlife still continue their practice

Personnel posted in high biodiversity regions whether included in the PA network or outside it, should receive substantially higher resources and training so that field enforcement of poaching is brought under control. In the last nine years, to quote only one example, 680 tiger skins were seized in India. The number of tiger and leopard skin seizures has increased in frequency and volume in recent years, with the year 2003 being particularly dismal, when a seizure of 32 tiger skins and 579 leopard skins were seized in Tibet wrapped in a New Delhi newspaper. Seizures obviously represent incidents of poaching, and point to insufficient field enforcement.

7.11 Insurgency

The forest is a happy hunting ground for insurrectionists and terrorists. Over the years some critical habitats have been affected by insurgency and some seriously affected areas include Manas (Assam), Palamau (Jharkhand), Simlipal (Orissa), Indravati (Chhattisgarh) and Nagarjunasagar (Andhra Pradesh). The forest and wildlife staff are not able to exercise full control over these areas and poaching and habitat destruction has been rampant. Though some of these PAs like Manas and Palamau are showing improvement, they have still a long way to go and the situation in the others continues to remain grave.

7.12 Others

While some of the major threats to India's forests and wildlife have been outlined above, some other threats are listed below:

a. Insufficient and inappropriate manpower, inadequately equipped

b. Inadequate financial resources

c. Diversion of habitats for development projects, especially for dams, power plants and roads.

d. Damage from mining

e. Habitat degradation caused by overuse and abuse by man and livestock

f. Degradation and diversion of water bodies and wetlands

g. Fire, man-caused and repeated a number of times each year, causing damage to nests of ground-laying birds, death to reptiles, soil compaction, damage to plant regeneration and impoverishment of water regions. Fire in an evergreen forest permanently changes the biome to semi-evergreen.

h. Exponential growth of weeds and exotics, particularly *Eupatorium odoratum*, *Mikania scandens*, *Lantana camara*, *Strobilanthus* and others

i. Grazing, carrying with it concomitant fire and the danger of bovine disease contagion

j. The Protected Areas (PAs) are very small and usually ecologically incomplete biomes and biotopes not encompassing the food and seasonal movement requirements of most species of birds and large mammals. To compound matters, the linkages with habitats is being lost and the PAs have become islands surrounded by seas of humanity, most of which are not favourably disposed towards the PAs.

k. Man-animal conflict, especially in respect of the elephant, tiger, leopard, nilgai, wild boar and blackbuck. The planting of favourable food plants close to herbivore populations has further aggravated the conflict.

l. Adverse impact of tourism, and the tendency of the Government to give preference to tourism against the conservation imperatives.

m. Tardy fund flow to field units from States despite Central assistance

n. Field staff vacancies

o. Need for Management Plans in Protected Areas.

p. The presence of a large part of the nation's biodiversity outside the PA system, in reserves and protected forests etc where the Working Plans are largely based on the needs of production forestry.

q. Lack of inventory of the biodiversity of the country

Chapter 8

Forest Conservation

8.1 Variety of Forest Types

Classification of forest types was done by Champion and Seth[46] in 1968 and is based on the ecosystem concept. They first divided the forest vegetation of the country into four major groups corresponding to temperature based climatic zones, namely tropical, sub-tropical, temperate and alpine, the further division was into 16 types/ groups on the basis of rainfall and physiognomy of vegetation; groups were divided into sub-groups, and finally, 221 ecologically stable vegetation types were identified. The authors defined a forest type as a "unit of vegetation, which possesses (broad) characteristics in physiognomy and structure sufficiently pronounced to permit its differentiation from other such units". The details of the forest types and the area is summarized in Table 8.1[47].

Table 8.1 Forest Types and Area

S.No.	Forest type	Area in sq km	%	Occurrence
1.	Tropical Wet Evergreen Forest	51,249	8.0	Arunachal Pradesh, Assam, Karnataka, Kerala, Manipur, Nagaland, Tamil Nadu, Andaman and Nicobar Islands, and Goa
2.	Tropical Semi-Evergreen Forest	26,424	4.1	Assam, Gujarat, Karnataka, Kerala, Maharashtra, Nagaland, Orissa, Tamil Nadu, Andaman and Nicobar Islands, and Goa
3.	Tropical Moist Deciduous Forest	236,794	37.0	Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Tripura, Nagaland, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal, Andaman and Nicobar Islands, Goa, and Dadra and Nagar Haveli
4.	Littoral and Swamp Forest	4,046	0.6	Andhra Pradesh, Gujarat, Maharashtra, Orissa, Tamil Nadu, West Bengal, and Andaman and Nicobar Islands
5.	Tropical Dry Deciduous Forest	186,620	28.6	Andhra Pradesh, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Jammu and Kashmir, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal
6.	Tropical Thorn Forest	16,491	2.6	Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh

[46] Champion, H. G. and Seth, S. K. 1968. *A revised survey of the forest types of India.*
[47] Lal, J. B. 1992. *Forest ecology*. Dehradun, Natraj Publisher.

7.	Tropical Dry Evergreen Forest	1,404	0.2	Andhra Pradesh and Tamil Nadu
8.	Sub-Tropical Broad Leaved Hill Forest	2,781	0.4	Assam, Maharashtra, Meghalaya, West Bengal, Tamil Nadu and Kerala
9.	Sub-Tropical Pine Forest	42,377	6.6	Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Sikkim and Uttar Pradesh
10.	Sub-Tropical Dry Evergreen Forest	12,538	2.5	Himachal Pradesh, Jammu and Kashmir and Mizoram
11.	Montane Wet Temperate Forest	23,365	3.6	Arunachal Pradesh, Karnataka, Manipur, Nagaland, Sikkim and Tamil Nadu
12.	Himalayan Moist Temperate Forest	22,012	3.4	Himachal Pradesh, Jammu and Kashmir and Uttar Pradesh
13.	Himalayan Dry Temperate Forest	312		Himachal Pradesh and Jammu and Kashmir
14. 15. 16.	Sub-Alpine and Alpine Forest	18,628	2.9	Arunachal Pradesh, Jammu and Kashmir, Nagaland, Sikkim and Uttar Pradesh

8.2 Estimation of Forest Productivity

Efforts have been made at various levels by different organizations to estimate the productivity of our forestland. But most of the efforts have been at local level only. A more realistic attempt to estimate the productivity of aboveground woody biomass in the Indian forest was made by Forest Survey of India (FSI) and published in its *State of Forest Report, 1987*. This estimate of productivity of aboveground woody biomass in the various regions of the country is given in Table 8.2.

Table 8.2 Aboveground Productivity of Forests in India[48]

S.No	Region	Productivity M^3/ha/yr
1	Western Himalaya	2.21
2	Eastern Himalaya	2.03
3	North-East	1.66
4	Western Coast, Andaman and Nicobar Islands	3.85
5	Deccan	1.35
6	Central India	1.05
7	Gangetic Plan	0.80
8	Dry Forests of Indus Plain	0.41

Multiplying these figures with the respective figures for actual forest cover estimated by FSI total productivity of Indian forest has been worked out as 90.63 million m^3 for an area of 60.70 million ha, which gives an average productivity of 1.5 million m^3 per ha per year. Table 8.3 provides the total forest cover and productivity in different regions.

i) [48] Lal, J, B. *Op cit*

Table 8.3 Total Forest Cover and Productivity in Different Regions

S.No.	Region	Forest Cover (million ha)	Total Productivity (million m^3 yr^1)
1.	Western Himalaya	5.38	11.89
2	Eastern Himalaya	6.46	14.85
3	North-East	7.33	12.17
4	Western Coast, Andaman and Nicobar Islands	1.95	7.51
5	Deccan	15.90	21.46
6	Central India	17.49	18.36
7	Gangetic Plain	4.75	3.80
8	Dry Forests of Indus Plain	1.44	0.59
	Total	60.70	90.63

8.3 Scientific Management through Working Plans

Working Plans, for most of the areas were prepared in a phased manner all over the country. These Working Plans were based on the knowledge and technique acquired in European countries. In fact, over a period of time the Working Plans have been developed as excellent documents. These documents, while on one hand give the required details of the area, the best system of management along with an inventory of the stock, they also prescribe the silviculture system to be adopted for different types of forest and the yield that can be harvested annually keeping in view the type of vegetation and productivity of the particular site.

A need was felt to draft a uniform Working Plan Code, which could be followed by all the States. A Committee under Sh. A. R. Maslekar, PCCF (Retd.), Maharashtra was constituted in 1998. The recommendations of this Committee have been discussed in Chapter 3. Subsequently after detailed discussion with States, Government of India issued a Working Plan Code (vide letter No. F.No.1-1.2004-RO(HQ) dated 12.08.2004) to all the State Governments. However, a tendency of either not revising the Working Plans or allowing felling more than the prescribed yield, is evident, which resulted in degradation of forest areas. Fortunately, the Supreme Court has intervened in the matter and as of now no felling can be done by the SFDs until and unless a Working Plan approved by the Government of India is in operation. The Supreme Court also lays emphasis on regenerating the area and prohibits any felling even under the prescription of the approved Working Plan until sufficient funds have been made available by the State Governments for regenerating the area.

8.4 Forest Degradation

It is believed that the continuous degradation is taking place in most of our forests. FSI estimate indicates that India's 40% forests are degraded. This is mostly based on the canopy classification and it is true that the area under dense forest cover is decreasing and area under open forest is increasing. However, forest degradation rate has not been

estimated scientifically, since, only canopy classification cannot give the true picture of the degradation taking place. Degradation encompasses forests in their totality, including soil condition, moisture regime, nutrient availability, micro organisms, crop composition, biomass production, capacity to regenerate, etc., it is necessary that scientific studies are carried out to assess the various kinds of degradation of our forests, so that remedial measures could be taken. Some of the causes of degradation are mentioned below.

8.4.1 Collection of Fuelwood

Consumption of wood (timber and fuelwood) in India is considerably (4 to 5 times) higher than what can sustainably be removed from the forests. Fuelwood collection for household energy significantly contributes to pressure on forests. In 1990, estimated excess (mostly unrecorded) removal of fuelwood was about 250 million cu. m with an expected increase to 310 million cu. m by 2000. Even though, some fuelwood may come from household plots and non-forest sources, a substantial quantity of fuelwood is obtained by unrecorded over-cut.

8.4.2 Grazing

India's livestock population at the 1987 livestock census was 445 million, and is estimated to have increased to about 500 million by 2000. Most livestock farming is of low productivity. Forests have been an important source of grazing in the absence of a viable policy for fodder development. It is estimated that over half the livestock population of India, some 270 million, graze in forests. These include village livestock and migratory animals herded by ethnic graziers. Additionally, graziers collect an estimated 175 to 200 million tonnes of green fodder annually. This results in forest degradation, damages to regeneration and compaction of soil. A sample survey by FSI further estimates that the impact of grazing occurs in approximately 78 per cent of India's forests, of which some 18 per cent suffers high incidence and 31 per cent medium. Grazing occurs even in Protected Areas. In another survey, 67 per cent of national parks and 83 per cent of wildlife sanctuaries surveyed reported grazing.

Forest grazing is an issue about which much has been written; but little has been done. Management of forest pastures, controlled grazing, fodder development and other measures are yet to be implemented. Appropriate management methods such as rotational grazing and prevention of grazing during the growth period of the rainy season are very important.

8.4.3 Forest Fire

Crown fires in coniferous forests and ground fires in the rest, which annually affect some 35 million ha of forest area, are mostly man-caused. Fires are purposely set to promote new flush of grass or tendu leaves, to facilitate collection of honey, sal seeds, mahua and chiraunji or to prepare land for shifting cultivation. An FSI sample survey conducted in 1995 found that annually fires affect some 53 to 54 per cent of forest areas. 51 per cent of forest area in Assam, 93 per cent in Arunachal Pradesh, 67 per cent in Bihar, 51 per cent in Gujarat, 46 per cent in Jammu and Kashmir, 45 per cent in Karnataka, 76 per cent in Madhya Pradesh, 37 per cent in Sikkim, 58 per cent in Uttar Pradesh, and 33 per cent in West Bengal are affected by fire.

Forest fires have a wide-ranging environmental impact. The nature and severity of damage depends on the type of forest, availability of fuel and climatic factors. However

the damage to the forest ecosystem due to fire has not been scientifically studied. In most cases, fire protection is based on a system of fire lines, which is inadequate and ineffective. A centrally sponsored scheme of 'Modern Forest Fire Control Methods' for prevention, detection, suppression and hazard reduction of forest fires, as well as for fire suppression, mopping up, is under implementation in eleven States. Extension of these methods to the whole country and establishment of a comprehensive forest fire plan are delayed due to lack of funds.

8.4.4 Shifting Cultivation

Different estimates for the area involved under shifting cultivation in India range from 5 million ha to 11.5 million ha. The estimate of 10 million ha reported by World Bank appears more reasonable. There is also no consensus on the number of people involved in shifting cultivation. Estimates range from 3 to 26 million. Shifting cultivation is practised at least in 16 States and is seen predominantly in the North-Eastern States where shifting cultivation accounts for most of the deforestation.

According to archaeological evidence, the practice of shifting cultivation can be traced as far back as 7000 BC. Shifting cultivation has been practised throughout the world. This method was adopted when societies progressed from food gathering to food-production. Even now this form of cultivation is practised in most tropical countries in Africa, South America, Oceania and Southeast Asia. Shifting cultivation is characterised by a rotation of fields rather than crops.

Shifting cultivation thus refers to a farming or agricultural system in which a short but variable cultivation phase (on slash-and-burn cleared land) alternates with a long and equally variable fallow period. The clearing of forest, secondary bush, and woodland or grassland vegetation for cultivation is accomplished with simple hand tools. Shifting cultivation is regarded by some as a menace to the environment, a harmful practice. Others view shifting cultivation as a benign and productive utilisation of poor soils, given the socio-economic circumstances of the shifting cultivators.

Today, shifting cultivation is not a single, uniform system of land use, neither it is static. A number of rural people without secure access to land are also becoming shifting cultivators. The communities practising shifting cultivation in India depend on forests at different levels for food, shelter and income. In most cases, they practice subsistence farming and utilise several NWFPs in their daily life. Some of them also engage in (semi-) commercial cultivation and/or harvesting of NWFPs, for trade and earning income.

With increasing pressure on forestlands, and shortening of the fallow period, this practice of farming which was, once, in balance with nature has become disorderly, causing considerable change to farming practices. The fallow cycle has decreased from about 20 years to about three years in most cases. For lack of proper inputs in most cases, the system is becoming unsustainable. Its deleterious effects include deforestation, spread of poor grassland, soil erosion, and loss of productivity of forest and agricultural land. Shifting cultivators are becoming increasingly marginalised.

The communities practicing shifting cultivation find that the means of their livelihood is severely threatened and they face an uncertain future. There is need for immediate action

to rationalize the system and situation. Rationalisation of shifting cultivation should be approached in a holistic manner, covering the socio-cultural and economic aspects and issues relating to land tenure.

8.4.5 Encroachment

No figures are available for the cumulative deforested area resulting from past forest encroachments. Illegal occupation in forest still continues. Currently, people illegally occupy about 1.5 million ha of forest area for agriculture and other uses. Due to their illegal status, they are unable to receive extension services and improve their farming system, further accelerating land degradation . It may be relevant to note that encroachment of forestlands, and socio-political pressure to regularize them, continue to be the most pernicious problem of forest protection. To compound matters further, MoEF has recently issued instructions to SFDs not to remove any encroachments. The problem of encroachments in discussed is greater detail in Chapter 7.

8.4.6 Mining and Quarrying

Mining in forest areas is another cause of forest degradation. As per the Indian Bureau of Mines, Nagpur, on 31 March 2004, 6941 mines over an area of 0.454 million ha were in operation. So far as the mining in forest area is concerned, out of the total area of 77.474 million ha of forest area in India, 0.096 million ha for 1248 cases has been cleared under FCA from 25 October 1980 to 08 February 2006, detail of which is given in Table 8.4.

Table 8.4 Approved Cases of Mining for Forestry Clearance under FCA

State/UT	Number of Cases	Total Land Diverted (ha)	Important Minerals
Orissa	123	15,082.63	Coal, Iron, Manganese, Bauxite, Chromite
Chhattisgarh	82	14,668.27	Iron, Bauxite, Coal
Andhra Pradesh	131	14,008.55	Granite, Iron, Limestone, Uranium
Madhya Pradesh	127	10,213.98	Coal, Manganese, Limestone, Diamond
Gujarat	53	9,694.98	Limestone, Salt, Stone
Jharkhand	95	9,083.26	Coal, Copper, Iron, Uranium, Gold
Karnataka	118	8,225.32	Granite, Iron, Manganese, Gold
Rajasthan	219	5,045.49	Granite, Marble, Pyrite, Stone
Maharashtra	117	3,438.51	Coal Manganese, Stone
Uttar Pradesh	07	2,110.27	Sand, Coal
Himachal Pradesh	37	1,642.32	Limestone, sand Stone
Goa	41	1,262.97	Iron, Manganese
Tamil Nadu	26	436.27	Granite, Limestone, Manganese, Stone
Bihar	08	414.008	Limestone, Pyrite, Stone
West Bengal	05	276.91	China Clay, Coal

Uttaranchal	12	246.828	Stone, Pyrite, Manganese
Arunachal Pradesh	04	141.67	Coal, Sand
Assam	33	109.122	Granite, Sand, Stone, Aluminium
Kerala	01	29.196	Stone
Andaman and Nicobar Islands	08	19.591	Stone
Sikkim	1	0..046	Sand
Total	1248	96,150.17	

Though the total area under mining in forestland is less then 1%, the degradation is mostly because of open cast mining, which results in a huge quantity of overburden and debris to be managed scientifically so that the other areas are not degraded. Special care will have to be taken in this regard to prevent degradation due to dumping of debris, which must be managed scientifically.

8.4.7 Faulty Road Construction in Hills

Roads are the lifelines of any development process. The fruits of development cannot reach the deprived and population residing away from the mainstream till there exists a well developed network of roads, which is eco-friendly as well. However, road construction in hilly areas is quite different from constructing roads in plains, and often results in degradation of adjoining forest areas. The situation in these areas is such that in most cases the road has to pass through the forest area. Since the resources are always scarce, effort on the part of the Public Works Department is to construct the roads at minimum cost so that the maximum area is covered. In doing so, the basic principle of two-third cutting and one-third filling is forgotten and the debris are rolled down the hill slope, which results in destruction of natural regeneration, covering the forest floor with debris making it hostile to any vegetative growth and siltation of dams down stream. Rolling down of debris also inflicts wounds to the trees, which mostly result in the drying up of a number of trees. In view of this, care has to be taken to see that the construction of roads on the hilly areas be done on scientific principles, with proper management of dumping of debris and its rehabilitation subsequently. While issuing clearance under the FCA, the MoEF must ensure that effective conditions to prevent degradation of forests because of rolling down of debris are laid down and, still important, is the fact that the conditions laid down are effectively enforced by the State Governments and regional offices of the MoEF.

8.4.8 Pesticides

The indiscriminate use of pesticides and rodenticides is threatening many species of wildlife. The scenario such as described by Rachel Carson in the *Silent Spring of the Americas* in the seventies is coming true in India today. Seed eating birds like the familiar sparrow is disappearing from urban cities and even the national bird peafowl had hundreds of fatalities connected with the use of pesticide-coated seeds. This factor may also cause the decline of the sand grouse species. Issues like the mass flowering of bamboos in the North-East gives rise to the fear of increase in rodents and the use of rodenticides. Although this may control some of the prolific rodent species, it may also

impact dozens of highly endangered and little known rodents, ground birds and herpetofauna of the area and, of course, pollute the drinking water of the people.

8.4.9 Developmental Projects

As India is poised in the 21st century as an economic, IT and even nuclear superpower, a host of developmental needs and ambitions of its human population is on the planning board of several Ministries and Departments. These would include roads, rail lines, air ports, sea ports, dams, thermal and nuclear power stations, mines, heavy industry, oil and natural gas exploration projects, etc. One such example is the Sethu Samudra Project. All these may require heavy infrastructure to be built in areas, which are forests or wetlands or wildlife habitats. Utmost care should be taken that such projects do not impact the natural heritage of India in an adverse manner.

8.4.10 Invasive Species

Habitat destruction is usually considered as the most important reason for the rarity and extinction of species. Not many people know that spread of invasive species and their direct and indirect impact are the second most important reason for biodiversity loss in the world. Scant attention is being paid to this problem and there is hardly any research in the field. Invasive are those species that have been introduced by man in new areas and where they have become rampant exotics. Not all introduced species are aggressively invasive. For example, Eucalyptus has been introduced in India from Australia and now it is widely grown as a timber and avenue tree, but it cannot survive without man's intervention, while *Prosopis chilensis* (=*juliflora*), water hyacinth, lantana, mimosa, mikania, etc., are very destructive and spread unchecked. Some of our best forests have been suffering from the infestation of lantana and huge tracts of grasslands are under severe threat from *Prosopis*. Similarly, the bane of tropical wetlands is the pernicious weed called water hyacinth. Scotch broom, *Cytisus scoparius,* is destroying very large patches of prime shola grasslands of the Nilgiris. Where forest canopy is opened, exotic weeds like *Mikania scandens, Eupatorium odoratum* and *Strobilanthus* are taking over. The recently introduced *Mimosa invisa* is choking the grasslands in the northeast. Another example is the cheetal in the Andaman Islands, where the British introduced it. The plants of the Andaman Islands have evolved without grazing pressure of herbivores, and cheetal is a cause of habitat deterioration on some islands of the Andamans. There are numerous examples of invasive species, covering all taxa from large mammals to the smallest insects, fungi and microbes, playing havoc on natural ecosystems in India.

8.4.11 Sal for Fences

The sal (*Shorea robusta*) is a species in regression in many areas. It is a largely monogamous species and makes one of the most important biomes in the country. In some parts, notably Bastar, young sal trees are hacked each year in tens of thousands simply to make fencing around fields, to be replaced every few years as they rot away. Tribals and others must be persuaded to give up this highly destructive practice and other modes of fencing be adopted, an endeavour in which the governments must take active support from NGOs, institutions and local bodies.

8.5 Plantation

Forest plantations are becoming a more and more intensive land-management activity, with the introduction of fast-growing species, genetically improved seeds and planting stocks, and sophisticated nursery and planting operations. Forest plantations are established under a system of clear felling followed by artificial regeneration or by afforesting bare lands, scrublands, and other degraded lands. They are a reliable source of industrial raw material and forest products for local use. Plantations can help to conserve the natural forests by providing an alternative source for forest products.

8.5.1 Policy of Afforestation and Social Forestry

The National Forest Policy, 1988 envisages a massive need-based and time bound programme of afforestation and tree planting with particular emphasis on fuelwood and fodder development, on all degraded and denuded lands, whether forest or non-forest. The Policy also encourages planting of trees alongside of roads, railway lines, rivers, streams and canals, and on other unutilized lands under village and community or private ownership. It also provides for green belts and woodlots to be raised in urban/industrial areas as well as in arid tracts to check erosion and desertification and to improve the microclimate.

8.5.2 Current Situation

There is some variation in the total area of forest plantations reported at different periods. One reason leading to interpretational differences is that people/ communities, with seedlings supplied free of cost, carried out part of the planting. In such cases (where about 9309 million seedlings were distributed till 1997-98) areas were computed by equating 2000 seedlings to one hectare, while certain other estimates were based on interpreting satellite images.

Seedling distribution and tree planting are undertaken through a large number of projects/programmes, under the control of SFDs and other agencies. These programmes are:

a. MoEF Programmes

- 20-point programme, NAEB/MoEF.
- Integrated afforestation and eco-development projects.
- Association of scheduled tribes and rural poor in regeneration of degraded forests on usufruct sharing basis.
- Area oriented fuelwood and fodder production scheme.
- Plantation of non-wood forest species including medicinal plants. Grants-in-aid to voluntary agencies
- Externally assisted social forestry projects

b. Other Programmes

- Integrated wasteland development scheme .Desert development programme
- Grants-in-aid scheme of Ministry of Rural Areas and Employment
- Programmes of the Department of Poverty Alleviation and Rural Employment.

- Soil conservation, watershed management and other integrated programmes of the Department of Agriculture and Cooperation.

Evaluation of a plantation programme, involves heavy investment and requires detailed information including species, age classes, industrial and non-industrial categories, multipurpose vs. single purpose, pure vs. mixed, production vs. protection, public vs. private and so on. Unfortunately, only some of this information is readily available.

An indicative information available is that plantations since 1980 are mostly of fast growing species, mainly for fuel, pulp, veneer and small timber. *Eucalyptus* spp. alone account for over 30 per cent and *Acacia nilotica* for about 16 per cent. The share of teak is only about 1.5 per cent. There are some States, however, where plantations of commercial species are important, e.g., Kerala, where around 55 per cent of the plantations are of teak. Information is lacking on growth and yield, cost involved per unit area and unit output, final and intermediate revenues, etc. The data of afforestation/plantation over the past plan periods are given in Table 8.5.

Table 8.5 Progress of Afforestation through Successive Plans[49]

S. No	Plan Period	Area Afforested in Plan Period (million ha)	Cumulative (million ha)
1	First (1951-56)	0.05	0.05
2	Second (1956-61)	0.31	0.36
3	Third (1961-66)	0.58	0.94
4	(1966-69)	0.45	1.39
5.	Fourth (1969-74)	0.71	2.10
6	Fifth (1974-79)	1.22	3.32
7	(1979-80)	0.22	3.54
8	Sixth(1980-85)	4.65	8.19
9	Seventh(1985-90)	8.86	17.05
10	(1990-91	0.75	17.80
11	(1991-92)	1.15	18.95
12	Eighth Plan	7.95	26.90
13	Ninth Plan (1997-98)	1.48	28.38

8.6 Sustainable Forest Management

It is now accepted all round that conservation and management of forests of the nation must emulate the general understanding of Sustainable Forest Management across the world. The topic has been briefly touched upon in other contexts in this report. A fuller treatment of the subject follows:

[49] India. Ministry of Environment and Forests. 1999. *National Forestry Action Programme.* New Delhi, the Ministry

The Criteria and Indicators (C&I) approach for Sustainable Forest Management (SFM) builds its premises from Earth Summit, 1992 at Rio de Janeiro in which SFM was recognized an integral part of sustainable development and has since then gained global consensus. The UN Conference on Environment and Development (UNCED) also encouraged and this resulted in international agreements in the form of Agenda 21 - a comprehensive programme for global action in all areas of sustainable development. At the earth summit, world leaders adopted the first global policy on SFM, known as the "Forest Principles". According to this policy, 'forest resources and lands should be managed sustainably to meet the social, economic, ecological, cultural and spiritual functions and for the maintenance and enhancement of biological diversity'.

Since then, over 160 countries have, in 9 different internationally recognized processes, developed Criteria and Indicators (C&I) of Sustainable Forest Management. Following this. various international, regional and national initiatives developed Criteria and Indicators (C&I) as tools to assess and monitor progress towards SFM. The United Nations also set up the U.N. Commission on Sustainable Development to monitor the progress of nation states relative to agreements made in the Earth summit. Many national governments have created their own National Councils for Sustainable Development to coordinate efforts between all sectors of society.

As also noted at the beginning of Chapter 6, Sustainable Forest Management has unfortunately become a cliché and means differently to different people and is often deployed to suit individual ideologies and agendas. The crucial question is what is “sustainable”. Most of our forests are degraded and the process is continuing. One can quite easily carry on harvesting these degraded forests and sustain the current degraded or highly degraded level. Should that be our aim? If not – and no rational sociologist, economist or ecologist would advocate this – then the objective should be to allow the forests to recover to an optimal, if not at least to a sub-optimal level, of biodiversity and productivity and then harvest it only to the extent that the desired optimal or sub-optimal level is constantly sustained. That should be the guiding principle of sustained harvest and sustainable management. Greater attention needs to be paid to prevent degradation instead of allowing degradation to take place and then to rehabilitate degraded forests. A tree saved is much more valuable than a tree planted.

8.6.1 The Indian Start

The Bhopal-India Process (B-I Process), in 1998, was the Indian initiative to synchronize India's SFM efforts with the rest of the world. It was conceptualized that development of C&I for SFM in India would provide an effective way to set the management targets, in harmony with the National Forest Policy,1988, and for providing a mechanism to monitor targets and by providing feedback for deciding on the direction of sustainable forest development. The Government of India constituted a National Task Force in November, 1999, which recognized eight criteria and forty-three indicators of B-I Process and recommended a two-pronged strategy for adoption and operationalising C&I for SFM.

India, though a late beginner on this front, has made substantial progress since 1998, in evolving a national level set of C&I, synchronizing her SFM efforts with the rest of the world. Later, in the year 1999, Government of India constituted a special National Task Force on SFM that gave its recommendations for the development of C&I for the

country. India, being a producer member country of International Tropical Timber Organization (ITTO), is committed to objective 2000, which states that "the total exports of the tropical timber products should come from sustainably managed forests by the year 2000". In order to achieve this objective, it was imperative to redefine forest management in the light of C&I and operationalise them at all levels, viz. local, state and national level.

A set of national level C & I was prepared in B- I process and was again refined in the year 2005. A detailed list includes 8 criteria and 43 indicators.

Similarly, a well-defined set of C&I system for SFM/SFD and a 10-year C&I plan for the States of Madhya Pradesh and Chhattisgarh and for each of the eight Forest Management Units (FMUs) were also prepared under the project. Manuals and guidelines prepared with active participation of the community have proven to be indispensable tools for implementation and extension of SFM in the entire country. Workshops organized at FMU, regional and national level, have not only created awareness and capacity for implementation and extension of SFM but have also propagated in both vertical and horizontal dimensions. National and regional level workshops were attended by international experts, senior officials, senior state forest officers, veteran forest officials, academicians (varied background), scientists, researchers, NGO personnel and consultants in different capacities. Similarly, FMU level workshops were attended by frontline staff of the Forest Department, village level workers and members of the JFMCs and from adjoining villages. Documentation in the form of research publications, proceedings of the workshops and quarterly newsletter has been an integral part of the project and has been instrumental in dissemination of information to the stakeholders. Similarly, web-based information dissemination system has been developed and regularly updated. Efforts have also been initiated to incorporate C & I in the course curriculum of Indian Forest Services and in the forestry course curriculum at graduate and postgraduate levels in educational institutions across the country.

8.6.2 Ground Covered

One of the milestones towards the objective of SFM has been the inclusion of C & I in the National Working Plan Code 2004. This will require monitoring and evaluation of implementation of the Working Plans. Another step has been the issuing of circulars to PCCFs all over the country by MoEF to identify nodal officers for SFM and for furthering the C & I approach for SFM in consultation with the Indian Institute of Forest Management.

Thus, at this juncture there is a need to build the capacity of the Forest Departments for operationalising C & I-based SFM approach. It also requires establishment of an SFM cell in the MoEF and at the State levels, to monitor and ensure the progress of capacity building of the State Forest Departments and the institutionalization of SFM, at the earliest.

The importance of C & I developed in the B-I Process as a tool for monitoring, measuring and assessing forest trends of the country, has been accepted across the country. Yet efforts appear inadequate or incoherent and wanting of a national level policy-commitment necessary towards its institutionalization. In the present scenario, there is an urgent need for developing, establishing and strengthening national, State and

other national forest related organizations and educational institutions for implementation of C & I approach for SFM. It also needs to make clear what sustainable management is in the light of the observations made above.

8.7 Saving Neglected Areas and Habitats

Three eco-regions, which are sorely in need of a landscape approach to save large terrains and their dependent species of fauna and flora, are the Himalayan and Western Ghat uplands, marine habitats and the severely decimated grasslands in the arid and semiarid tracts of western and southern India.

Grasslands are the most threatened and neglected ecosystems in India. There are not many grassland-protected areas, although some of the rarest species of wildlife and plants are found in the grasslands. We have a livestock population of nearly 500 million, which largely depends on grassland but unfortunately, no attention is being given to protect and increase natural grasslands. Many natural types of grasslands have been encroached upon or even destroyed by the Forest Departments by planting trees, generally exotic and invasive species.

India has nearly 8,000 km coastline, with two major groups of islands (Andaman and Nicobar Islands, and Lakshadweep) and the largest mangrove delta in the world (Sunderbans, shared with Bangladesh). This vast eco-region has fabulous biodiversity, varied ecosystems and livelihood systems for millions of traditional fishermen. The Forest Department due to its traditional and historical role of protecting the forests does not have the capacity, interest and funds for protecting marine ecosystems.

The devastation caused by tsunami on the southeastern coastline has once more brought to focus the importance of coastal conservation. There is at present no designated authority to plan and carry out this very important task. Ideally the State Forest Departments of the coastal States should be assigned the task, but then they must be given the training, finances and the support required to fulfill this task.

8.8 Communities Preserving Habitats and Species

India has been fortunate for its traditions of preserving nature and its animate beings, emanating from religious sentiments and beliefs. Unfortunately, conservation efforts in the country have not taken advantage of these factors, nor given adequate support or credit for them to the communities concerned.

People's participation and joint management are the catchwords of the day. But what about people who have saved for generations to this day endangered species, biotic communities, wetlands and biodiversity, often at a great cost to themselves and not with any help from the government or other communities, but despite them. Often, these people-protected areas constitute the only surviving natural climax vegetation or gene pool in the region – whether they are the Lyngdohs of Meghalaya or the sacred groves of the Western Ghats, the blackbuck of Kadi in Gujarat or the chinkaras and orans of the Bishnois of Rajasthan.

With the amendment of the Wild Life (Protection) Act, 1972, in 2001, there is now a specific category of PA - the community reserve, which can be established in the community conservation areas, the ownership and control of which will remain with the

community and they will become the official wardens of them. Thereafter, the wildlife authorities must extend technical, logistical, legal and financial support to these entities. People's participation in conservation must become a reality and not just a hyperbole.

8.9 Conservation Education, Awareness and Training

If we have to conserve our forests and biodiversity there is an urgent need to reach out to different sections of our society. Although government agencies and voluntary organizations have taken significant steps to develop support of people for forest conservation, the wider and greater involvement of several stakeholders who are closely linked with forest resources is vital to its success.

Conservation education is relevant to all the sections and sectors of the society. The biggest challenge is how to communicate the messages of forest conservation effectively. One of the ways to do this is to strengthen existing channels of communication and learn from good practices already in place. Amongst targets, which need immediate attention, are communities living in and around forest areas, urban communities, government agencies, local self-government, legislators, formal education systems, training institutes, industry, media, and NGOs.

The loss of traditional knowledge is associated with loss of forests. Therefore, documenting such information with the help of local communities and making it available for the present and future generations is an important task. The impact of overuse of forest resources as well as sustainable use of bio-resources, needs to be communicated to the communities, directly dependent on them.

The role of education, awareness and training as an effective management tool is yet to be recognized. It is important for policy makers and planners who are involved in developing strategies and action plans for forest conservation to integrate education, awareness and training with adequate resources. The need to orient national and State planning and executive agencies and legislators towards integrating forest conservation into development policies, is paramount. This should be done with regular workshops and briefings.

The role of formal education in forest conservation is also very important. However, the manner in which the forest conservation is dealt through the textbooks, does not provide a child an opportunity to relate to the real life issues in this regard.

8.10 Recommendations

[51] Fires extending over 20 km^2 of forest and grasslands should be declared as a disaster by the concerned State Government.

[52] Fire prevention and fire control deserve to be given a far greater importance than at present. Techniques need to evolve that are more appropriate and equipment provided, keeping in view the experience gained from a UNDP-assisted project of the Ministry of Environment and Forests in the 1980s. Entries in annual confidential reports of every field staff should reflect the work done or not done vis-à-vis fire control.

[53] Since fire cases are underreported, in terms of number of occurrences, the qualitative damage caused and the area affected, by the field functionaries, a mechanism should be developed for higher authorities to crosscheck these reports.

[54] Protection against insect pests and diseases is not given the attention it deserves. Consequently, the productive capacity of forests is reduced. The loss in nurseries and plantations is also sizeable. Strong research support is needed to provide protection against diseases and pests.

[55] The use of pesticides, insecticides and rodenticides be regulated so that applications are done in consultation with the local wildlife departments in areas where threatened species occur and species-specific test be conducted before application.

[56] Practices such as coating of seeds with pesticides be discontinued for less harmful measures or biological or organic pesticide methods be used.

[57] The Agriculture and Forest Departments, Ministries concerned and Commissions set up by the Government of India coordinate, so that a holistic management of pesticides and their application are carried out, which would prevent the long-term damage to the land, air, water and species including man.

[58] Environmental impact assessments that are mandated for every developmental project of a certain size must be carried out scientifically, in an un-biased manner and with enough autonomy. Such assessments must not only deal with pollution and deviation of forestland, but also with effects to water sources, species and local communities. Such clearances must necessarily be taken before the starting of any part of the project, so that a clearance is not redundant or a fait accomplii.

[59] Conditions made at the time of project clearance must be enforced. This would require periodic monitoring. If any significant condition is not fulfilled, the authority that has imposed the condition must have the power to bring the project to a halt till the deficiency or omission is rectified. There must not be any ex-post facto clearance or approval.

[60] Ecologists, environmental scientists and conservationists must be involved in developmental projects so that they may be conducted in as ecologically sound a manner as possible.

[61] Greater integration must take place at local and regional levels between government departments involved in developmental projects and those involved in forest and nature conservation.

[62] The Ministry of Environment and Forests, and State Forest Departments should create awareness and special cells to address the menace of invasive species. A policy document should be developed on the introduced and invasive species. Deliberate or misguided introduction of an invasive species should be considered as an offence.

[63] A cell or nodal point needs to be established in the Ministry of Environment and Forests to monitor the status and control of exotics, perhaps in collaboration with the Forest Survey of India and the Indian Council of Forestry Research and

Education, and to prepare and issue guidelines for restorative ecology to curb and remove exotics and regain indigenous biodiversity. The implementation of these guidelines and directives also needs to be monitored.

[64] Research to find safe, biological or other applications for the control and eradication of weeds without the use of pesticides needs to be urgently started under the aegis of the Indian Council of Forestry Research and Education. Very little if at all has been done in this regard so far.

[65] Attempts should be made to find commercial/consumptive use of exotic weeds so as to encourage their exploitation. The Indian Council of Forestry Research and Education and the Indian Institute of Forest Management should be involved in this expertise.

[66] It is essential to start special schemes by the Ministry of Environment and Forests and State Forest Departments (especially of Rajasthan, Gujarat, Uttar Pradesh, Maharashtra, Tamil Nadu, Andhra Pradesh etc) to protect their grasslands.

[67] A centrally sponsored long-term scheme called Project Marine Ecosystems is necessary to focus attention on this aspect. As millions of fishermen would be involved in protecting and sustainably harvesting biodiversity, it is necessary to involve the Fisheries Department, Navy, Coast Guards, etc.

[68] Establishment of a central coordination unit within the National Institute of Oceanography that will oversee coordination and implementation of the above-mentioned policies and maintain a resource database, is necessary.

[69] Review and assessment of the impact of priority lending in the fisheries sector (a five year action plan), is necessary.

[70] Special plans for the dugong, giant clams, sea horses and finless porpoises and their respective habitats, should be prepared.

[71] Corals are threatened everywhere for various reasons and would be more so with the impending climate change. A special conservation plan needs to be prepared, both for the conservation of corals and of biodiversity, as well as for coastal conservation. Marine protected areas need to be established for this purpose.

[72] Management plans for coastal and shelterbelt plantations, which include mapping of habitat utilization patterns including sea turtle and sea birds nesting beaches, should be prepared.

[73] There is an urgent need to establish trans-boundary protected areas and monitoring mechanism, specially for corals, sea turtles, dugongs, whale sharks and whales.

[74] Strengthening of the coastal regulation zone in the wake of the recent tsunami tragedy is vital.

**[75] Establishment of a dedicated IFS sub-cadre for conservation and a training centre for coastal and marine biodiversity conservation and management, are necessary.*

[76] An Institutional mechanism to empower Coast Guards to enforce the Wild Life (Protection) Act, 1972, must be considered.

*Some members have reservation on this recommendation (see Annexure-VI).

[77] Mangroves should be officially classified as forests and mangroves found anywhere should be placed under the control of State Forest Departments. The important mangrove areas need to be made Protected Areas if they are not so covered already.

[78] A concerted effort needs to be made to undertake plantation of mangroves wherever possible along the creeks, estuaries, deltas and shores, and of appropriate species of trees as wind brakers along the coastline and the dunes that back them.

[79] A National Wetland Conservation Act should be framed.

[80] Inclusion of all types of wetlands (freshwater, coastal, marshes, swamps, mangroves, waterlogged areas) in the land use classification in the country should be done.

[81] A National Wetland Biodiversity Register should be started.

[82] An inventory of 'user groups' also should be prepared while collecting information for the biodiversity register. It should also list out the priorities of the communities on particular wetland resources.

[83] To establish a National Wetland Inventory and Monitoring Programme and a National Wetland Information System and therefore, to develop a sustained and serious programme for monitoring wetlands

[84] The economic evaluation of wetlands must be computed and it must be integrated with National Resource Accounting.

[85] Wetland productivity studies on a long-term basis by identified organizations from different parts of the country need to be undertaken. This would bring out indisputable data on wetland productivity, which is many times more than that of other ecosystems. Moreover, it would be an excellent tool to check the wetland ecosystem health

[86] International links and cooperation involving trans-boundary water issues and conservation of shared wetlands are important.

[87] At the outset, the Government of India should take leadership and commission a state-wise survey of people-conserved areas which would be appropriate to be designated as community reserves, and have them notified by the respective State Governments and then have management plans prepared for them providing annual financial inputs for specific items in the manner that is given to national parks and sanctuaries. A special centrally sponsored scheme needs to be prepared by Ministry of Environment and Forests in this regard.

[88] The people of the communities concerned must be encouraged and actually involved in conservation efforts. Their pride in respect of the Reserve must be acknowledged and enhanced. They must be made honorary wardens of the community reserve under the provisions of the Wild Life (Protection) Act.

[89] Governments must exercise caution in theoretically accepting or advocating the involvement of local communities in the preservation of wild fauna, other than where the communities themselves are protecting fauna for religious sentiments.

While it may not be difficult to involve communities in the protection of forests and grasslands whereby they can derive economic and personal benefit, it is a totally different matter to get local support for the protection of animals and birds, especially those that threaten human life or property.

[90] Local communities living in and around forest areas be trained in eco-tourism activities, which will not only help ensure their livelihood security but could facilitate their involvement in forest conservation. The rickshaw pullers at Keoladeo National Park, Bharatpur, are an excellent example.

[91] Urban communities need to be made aware of the impact of their consumption on forest resources. The awareness should mainly focus on scientific, ecological, aesthetic, economic, and spiritual and several other values associated with forests.

[92] Decision makers should also be made aware about the important role of education, awareness and training as a management tool.

[93] The existing textbooks should be revised to incorporate aspects of forest, wildlife and ecosystem conservation with local and real life examples. Although efforts have been made by agencies such as National Council of Education Research and Training and State Councils of Education Research and Training of certain states to introduce new textbooks on environment, a project-based approach and hands-on experience is the key to effective learning. The involvement of non-government organisations in formal education should be enhanced, which can play an important role in providing practical experience in nature conservation. The teacher is an important ally in education for forest and nature conservation. Capacity enhancement programmes through existing training institutes such as the State Council of Education Research and Training and DIET should be held on priority, with the help of institutes involved in conservation education such as the CEE, Uttarkhand Seva Nidhi, Eklavya, Bombay Natural History Society, BVEERI and several other institutes.

[94] Efforts should be made to strengthen existing programmes such as Green Corps Programme initiated by the Ministry of Environment and Forests, by providing locale specific educational resources to the schools involved in this activity. Such programmes should involve local groups and non-government organizations in implementation and evaluation of the programmes.

[95] It is recommended that formal training institutes where civil servants and armed forces are trained, need to incorporate forest and wildlife conservation as an important aspect of their induction training programme, as well as in-service training programmes.

[96] State and Central Governments should convey the conservation message much more frequently and vigorously in state sponsored advertisements and Doordarshan-controlled channels.

[97] Industries, which consume forest resources and affect forest areas adversely, should be identified and a comprehensive training programme should be evolved. Industries such as paper, pharmaceutical, mining and tourism could be the focus of such training. Environment-friendly practices adopted by certain industries should

be documented and such information should be provided to other industries. The lending institutes, which provide financial support to large infrastructure development projects, should be made aware of potential damage to forest ecosystems. The professional auditors should also be oriented about forest conservation as an important part of auditing procedure.

[98] The role media could play in spreading awareness is very crucial. Forest conservation should be a part of journalism curricula and practicing journalists should regularly be oriented towards issues of nature conservation through workshops, field visits and briefing papers.

[99] Traditional communal hunts – Paradh in Bastar and Akhand Shikar in Simlipal, Orissa - are a bane of the two tiger reserves concerned. While preventing physically these extremely destructive practices, all efforts must be made for the awareness and education of the tribals concerned and by finding symbolic alternatives to these ritualistic hunts.

[100] The forest service should have well defined visions and goals. It is, therefore, strongly recommended that a statement 'Forestry Sector Vision 2020' should be prepared on priority. The National Forestry Action Programme cannot serve this purpose.

[101] Forests that lie outside the protected area network should be sustainably managed through clear working plan prescriptions rather than only having a complete moratorium on felling.

[102] A Forest Conservation Fund should be created to ensure adequate financial resources for forest and wildlife management through levy of a cess on sale of forest produce. Revenue generated from lease of mines in forest areas should be credited to the Forest Conservation Fund. Contributions to be made to the Forest Conservation Fund by corporate companies or individuals should be exempt from income tax.

[103] Corporate funding should be invited for revival of degraded forests. Mechanisms for the same may be worked out.

[104] Joint forest management should be a social contract, a quid pro quo, wherein the exercise of rights and benefits are subject to the fulfillment of specified duties and obligations, e.g. the yearlong protection of forest from fire, grazing, felling and degradation. If the beneficiaries do not fulfill their duties and obligations, they should not avail the benefits occurring from forests.

[105] Currently, a major part of the fund made available to forests is utilized for joint forest management (JFM) activities and inadequate funds are available for proper management of non-degraded forests. More funds need to be provided for the management of non-degraded forests. Half of the forest revenue may be made available for management of non-degraded forests on the pattern of JFM.

[106] For a meaningful partnership, both partners i.e. Forest Department and local communities should be equal partners in joint forest management (JFM). Villagers may provide inputs for protection and some forestry operations through their labour. This approach will lead to a low-cost model of JFM, which is

necessary for sustainability of the programme and for improving the benefits from JFM to village communities. Timber obtained by Joint Forest Management Committee members as their share should generate income for them. Sale by individual members and the related problem of illicit cutting in the garb of such sales must stop and such JFM societies need to be suspended.

[107] The objectives of management for joint forest management need to be revised and clearly stated to broadly include restoration and development of degraded forest areas in order to meet local village community (LVC)'s demands for fuelwood, fodder and small timber and also to contribute towards poverty reduction of LVC members.

[108] To give expression to the changed priorities of forests as contained in the Forest Policy of 1988, the working plans and working schemes of forests must give priority to conservation and to the enhancement of biodiversity, and thereby change the focus from the current continuing emphasis on production forestry.

[109] Each working plan should have one chapter on Biodiversity Conservation, selecting compartments, which should be managed to enhance biodiversity.

[110] The nation's biodiversity needs to be assessed and inventoried in detail.