National Report to the Third Session of the United Nations Forum on Forests

INDIA

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II. Progress and issues related to implementation of IPF/IFF proposals for action

General:

The **Ministry of Environment and Forests** is the coordinating agency and works in cooperation with the State Governments and other concerned Ministries such as the Ministry of Rural Development, Ministry of Agriculture and the Planning Commission. India is having only 2.5 per cent of World's graphical area and 1.8 per cent of World's forests and **supports 16% of Planet's human population** and 18% of livestock population. Forests play a pivotal role in the rural poverty eradication programmes. and generate employment to the rural poor and provides support to development of agriculture

India's policies and programmes in forestry, particularly over the last fifteen years, have been largely in consonance with the Forest Principles adopted during the United Nations Conference on Environment and Development (UNCED). The **National Forest Policy, 1988** formulated four years before the Earth Summit embodies the direction emphasized in the Rio Principles and initiated a process by which India's forests were treated as an environmental and social resource rather than as a revenue or commercial resource. The **Indian Forest Act 1927** is the main act, which regulates the management of forests by the States and together with the **Wildlife Protection Act, 1972** provide the main legal framework. The Forest Conservation Act, 1980 have placed strict controls on the diversion of forestland to other uses. In the rare cases when this is permitted for developmental purposes, compensatory afforestation is a prior requirement. Biodiversity conservation has been made an integral part of forest conservation. Various conservation measures have been taken to strengthen legislation and eco-development efforts. **The Biological Diversity Act, 2002** aims to protect the biological resources of the country and thus, it addresses forest ecology in its totality. Realizing the role of forests in controlling soil erosion, moderation of floods, recharging of ground aquifers, as habitat for wildlife, conservation of bio-diversity and gene pool, etc., several programmes have been launched from as early as the Second Five Year Plan in the national developmental plans. A two-pronged strategy to increase forest cover has been adopted which essentially comprises of: 1) To protect and improve existing forest resources; and 2) To undertake afforestation in non-forest and degraded lands preferably contiguous to forest blocks to increase the forest /tree cover 33% of the total geographical area as mandated in the National Forest Policy, 1988. The Government of India has constituted **National Forest Commission** to look into restructuring reforms and strengthening of the entire forest set up of and affiliated institutions in the country." The Commission is expected to submit its report within two years.

National Forestry Action Programme (NFAP):

In consonance with the recommendation of IPF, India has prepared the National Forest Action Programme (NFAP) in the year 1999 in consultation with FAO, which incorporates the agreed commitments by India. The Ministry of Environment &Forests, Government of India, have formulated NFAP which is a comprehensive work plan for the next twenty years to achieve the goal of sustainable development of forests and also to increase the forest/tree cover in the country to the desired 33 per cent as mandated in the National Forest Policy, 1998. This document has been formulated through consultative process involving various stakeholders and is a compilation of the State Forest Action Programmes prepared by the States and also incorporates the recommendations of the Regional and National Workshops on NFAP. **The NFAP aims at sustainable development of 76.5 million ha. of forests covering 16 major forest types extending over 26 States and Union Territories**. The cross-sectoral issues like rural employment, water and soil conservation, fodder production, firewood production to meet energy requirements of 80% of the rural population, etc. has been taken care of in the National Forestry Action Programme.

The implementation of NFAP requires huge financial resources and it is estimated that Rs.1339 billions would be required in the next twenty years. The programme will be implemented by States. Consultations have already been initiated with donor agencies to secure funding for implementation of NFAP. The Government has already organised the First Conference of International Donor Agencies jointly with FAO and the UNDP on 27th September, 1999 in New Delhi and another Conference is scheduled to be organised later this year.

India's economic and trade policies which have a bearing on forest and forest products are being progressively fine-tuned to facilitate the conservation and sustainable use of forests. This is reflected in **liberal imports of forest products to relieve pressures on forests**, **nationalization** of trade of certain forest products, **incentives** for wood substitution, **subsidies** for the use of fuel-saving devices and **alternative sources of energy** supply such as biogas and solar energy, and financial incentives to supply seedlings free of cost or at subsidized rates.

Participatory Forest Management:

The Government's commitment to the management of forests through the participatory process is reflected in the active involvement of tribal and village communities (especially women and persons belonging to the weaker sections of society) and voluntary agencies. This strengthens the activities of State Forest Departments in forest protection and regeneration initiatives. Participatory Forest Management (PFM)/Joint Forest Management(JFM) as an effective means of regenerating degraded forests has been increasingly gaining ground in India. In **1990, the Government issued guidelines** to State Governments highlighting the need and the procedure for the involvement of village communities and voluntary agencies in the protection and development of degraded forests. In response to these guidelines, 27 States have issued resolutions for enabling mechanisms for public participation in the management of degraded forests. The participatory forest management approach promotes active participation and involvement of the people in forest conservation and development, including the development of micro-level plans and their implementation. At present, approximately **14 million ha of forest area** is being maintained through more than **65,000 Village Forest Protection Committees**. Although many States have accepted the initiative in principle, effective implementation of the new approach at the field level has taken root only in a few States. In future years, more emphasis will be given to field level implementation of this new concept.

One of the important elements of the Participatory Forest Management relates to the **use of indigenous capacity and local knowledge** regarding various aspects of conservation, development, and use of forests. The rural people, particularly women, have an intimate knowledge about various species, growth characteristics, utility, and medicinal value. They are also well informed about the species to be planted in a given locality to satisfy the specific requirements of fuel, fodder, timber, and other non-wood forest products. In participatory forest management, planning and implementation of most of the activities related to regeneration and protection are completed with the active involvement of rural people. Thus, the traditional knowledge base of the people is fully used for the benefit of the community. There is a symbiotic relationship between tribal people and forests. In 1991, various issues related to **forest-tribal interface** were examined and detailed guidelines issued by the Government of India to the State Governments in order to ameliorate the socioeconomic conditions of tribal people. These guidelines cover a number of subjects including addressing old encroachments of forest lands, disputed claims over forest land, elimination of intermediaries to stop exploitation, conversion of forest villages to revenue villages, and payment of compensation for loss of life and property due to depredation by wild animals. Various problems and conflicts arising out of the tribal forest interface are resolved through administrative measures including the creation of village-based Forest Protection Committees, an experiment, which has met with remarkable success in some parts of the country. **Forest Development Agencies (FDAs)** have been conceptualised to provide an institutional mechanism for decentralisation of power to the Village

Forest Protection Committees and also ensure speedy flow of funds to the Village Communities for afforestation and other activities.

National Afforestation and Eco-Development Board (NAEB) has been created for promoting afforestation, tree planting, ecological restoration, and eco-development. The NAEB pays special attention to the regeneration of degraded forests. Tree planting is the main focus, particularly through the National Afforestation Scheme and Greening India programme. Efforts are being made to ensure that weaker sections of society and women emerge as the major beneficiaries of the activities of NAEB. Mechanisms are in place to monitor and evaluate the plantations.

A review of social forestry programme launched during the 1980s resulted in a consolidation of gains and a strengthening of the weaker links. The conservation of the existing natural forests with emphasis on natural regeneration is given increasing focus. The current approach towards afforestation and forest conservation is to integrate the activities and expertise of different sectors so that various pressures responsible for forest degradation are adequately addressed. Introduction of the **Eco-Development Programme** has been one of the recent developments in the field of wildlife management. The objective is economic development for the people residing in and around sanctuaries and National parks, in order to reduce their dependence on forest products and improve the ecological health of the protected areas. The scheme aims to increase land and forest resource productivity so that alternative avenue of employment and income are made available in the immediate neighborhood of people. The Eco-Development Programme proposes a package of activities including developing agriculture, improving land productivity and developing minor irrigation, raising fodder and fuel plantations, providing livestock care and improvement, introducing fuel saving devices, providing medical care including family planning, and creating environmental awareness. It is increasingly thought that the eco-development concept should not be limited to protected areas. It is believed that the scope and content of such schemes should be extended to cover other villages lying in the immediate vicinity of forests. The comprehensive State Forestry Projects, which have been recently launched by a number of States, incorporate elements of eco-development as a means of ensuring sustained development of forests.

Under the provisions of the **Forest (Conservation) Act, 1980**, prior approval of the Central government is required for diversion of forestlands for non-forest purposes. Since the enactment of the Act, the rate of diversion of forest land has come down to around 25,000 hectares per annum from 0.143 million hectares per annum prior to 1980. Analysis of changes in forest cover indicate that India has shown an increase in forest cover as estimated in the report of the Forest Survey of India published in 1999.

Wildlife Conservation:

Despite its rich traditions, India has witnessed serious depletion of its biological resources because of over-use for meeting the developmental needs and livelihood requirement of people. To arrest this trend, **a network of protected areas comprising 504 sanctuaries and 89 national parks covering 4.89% of the country's geographical area** representing all major ecosystems found in our country has been established. Management of these protected areas is done on the basis of scientifically drawn management plans. The main emphasis of management is on regulating the human activities and giving the genius of nature a chance to rejuvenate the fauna and flora of the protected areas.

India's best known conservation programme **"Project Tiger"** was launched in 1973 which has received international attention for its success in saving this rare and highly endangered species from extinction. With 23 Tiger Reserves across various habitat types throughout the country, this project has crossed its twentyfifth year successfully. Due to the concerted efforts, the population of tigers has increased from 1827 in 1972 to over 3000 in 1997.

The shrinkage and fragmentation of the elephant habitat and the increasing man-animal conflict has led to launching of the the **Project Elephant** in 1991 for preserving the gene pool of this unique species and its natural habitats. The population of elephants has increased from 18960 in 1985 to 25571 in 1993.

There has been significant **increase in the population of lions** also and their numbers have increased from 177 in 1968 to 304 in 1995. The population of leopards has also increased from 4744 in 1984 to 6828 in 1993. Rhino population has remained stable during the period from 1989 to 1997 at around 1600. India has taken effective steps to control poaching and illegal trade in wildlife

Indian Board for Wildlife (IBWL) under the Chairmanship of Prime Minister of India provides the policy direction for wildlife conservation in the country. The Government has formulated **National Wildlife Conservation** Plan for conservation of wildlife. Wildlife conservation has assumed new dimensions under the Eco-Development Scheme in and around National parks and sanctuaries. The Wild Life (Protection) Act provides the main legal framework for achieving the objectives mentioned above. The Wildlife (Protection) Act, 1972 and its **amendments in 1991 and 2002** provide the legal framework for conservation of wildlife in the country. The amendment of 1991 is significant as it provides protection not only to wild animals and birds, but also to plant species. The amendment made in 2002 provides for enhancement of punishment. India is a **signatory to international conventions** like "Convention on International Trade in Endangered Species of Fauna and Flora", Convention of Migratory Species, International Whaling Commission etc.

The Wildlife Institute of India has been established as a National Institute for Wildlife Training and Research at Dehradun to train the protected area managers and for conducting applied wildlife research. It has turned out a large number of competent wildlife managers and research scientists. The Institute has also been conducting short capsule courses and workshops for senior Forest Officers and other agencies like Army, Paramilitary Forces, customs etc.

Capacity-Building, Education, Training and Awareness-Raising:

The network of Indian Council of Forestry Research and Education (ICFRE), Indian Institute of Forest Management, Indira Gandhi National Forest Academy, Forest Survey of India, Directorate of Forest Education and many other institutes are engaged in the capacity building exercise. The National Forestry Action programme includes various aspects of capacity building as its objectives. The ICFRE is the focal point for forestry research, education and extension in the country. The Indira Gandhi National Forest Academy, Dehra Dun, imparts in-service professional training to Indian Forest Service (IFS) professionals. Directorate of Forest Education provide training to the officers of the State Forest Service (SFS) and subordinate forest staff. The Indian Plywood Industries Research and Training Institute, Bangalore, organizes short-term courses in the area of wood science. The Indian Institute of Forest Management, Bhopal, also provides training in forest management and allied subjects to persons from the Indian Forest Service, forest development corporations, and forest-related industries to develop forestry programmes. The Wildlife Institute of India, Dehradun, provides in-service training to forest officers, wildlife ecologists and other professionals for conservation and management of the wildlife resources of the country.

Research and Technologies:

The forestry management in the country is being practiced on the basis of sustainable management for more than a century. However efforts are being made to ensure that the management plans of the forest areas are prepared taking advantage of the latest technology like GIS, etc. and so as to reduce the period of preparation of management plans in the country. Accordingly a comprehensive working plan code is being prepared for the whole country. The Indian Council for Forestry Research and Education has formulated **National Forest Research Plan** which identified and prioritised research

activities for the next twenty years. The **Forest Survey of India** at Dehradun assess and monitor the forest cover of the country at periodic intervals. The assessments of forest cover in the first three cycles (1987, 1989 and 1991) were based only on visual interpretation of satellite imagery, while the fourth cycle (1993) it is based on satellite imagery and has been subjected to computer analysis. As a result, it has become possible to systematically interpret the data in a more scientific and objective manner. The Government has taken initiatives to identify the criteria and indicators for sustainable forest management which is called India Bhopal process and is coordinated by the Indian Institute of Forest Management, Bhopal.

Financing:

The Ministry of Environment and Forests, Department of Land Resources and the Department of Agriculture and Cooperation finance various forestry related activities. There is a need to infuse private capital on a large scale in forest related activities.

The main problem area of most developing countries including India is of financial resources or funding. Financial resources have been identified only as a supporting function under the principle function of policy implementation. This needs reconsideration. It is suggested that one of the IAMs must be assigned this exclusive function. It should perhaps be mandatory for this IAM to ensure that funding is based on the National Forest Action Plan prepared by the country and not on other parameters.

International Cooperation:

India has been actively participating in the Intergovernmental Panel on Forests/Intergovernmental Forum on Forests (IPF/IFF)/United Nations Forum on Forests (UNFF) meetings and India agrees with the overall action relating to National Forest Programme, forest assessment, criteria and indicators, traditional forest related causes and underline causes of deforestation. However, India has taken a view that there has to be an instrument to coordinate the efforts of various international instruments and institutions. Accordingly, India has moved for creation of a permanent forum like **Global Forest Facility** on the lines of the Global Environmental Facility (GEF), to further carry out the dialogue and discussions on the contentious and unresolved issues. India has also taken a view that financial resources/funding is one of the major problem areas and therefore, it is necessary to assign this exclusive function to one of the International Arrangements and Mechanisms (IAMs).

Information: Information on sustainable forest management is available to potential users via: http://envfor.nic.in/nfap.The National Forest Policy, NFAP, Project profiles for implementation of NFAP, India Country Report and other reports and information have been placed on this website for downloading by the interested individuals and organisations.

Economic aspects of forests, including trade

Importance of Forest Resources:

Forests form a natural resource base which provides timber, fuelwood, pulpwood, fodder and fibre grasses, an non-wood forest produce and support industrial and commercial activities but also maintain the ecological balance and life-support systems essential for food production, health, and all-round human development. The wide range of economic and environmental services and products that forests provide can be classified as follows.

- Service of consumptive direct-use-value, e.g., timber, fuelwood, fodder and fibre grasses, and wide range of non-timber products derived from plants and animals.

- Services of option values, e.g., a natural habitat for biodiversity and a repository of genetic wealth

- Services of non-consumptive direct-use values, e.g., recreation and eco-tourism.

- Services of local indirect-use values, e.g., carbon sequestration

As demand for forest products increase with population and with increasingly consumptive lifestyles, it is no longer possible to meet them out of the annual incremental growth. Supplies are also affected because of the diversion of forestlands to other uses.

The pressures on India's forests:

- Sustainably extractable quantity of fuelwood from India's forests is far below the requirement of the population.

- Livestock population in India is greater than that can be sustainably supported by the available land and forest resources.

- The demand for industrial wood and other wood, part of which is currently being met by imports, will continue to rise with industrial and economic growth.

- Unregulated and increased harvesting of non-wood forest produce will result in loss of biodiversity and gene wealth.

- Expansion of protected area networks will result in increasing pressures on existing productive forests.

Multiple Uses of Forest Resources:

The Indian population has crossed the one billion mark and its livestock population shall be reaching half a billion. A significant proportion of human and livestock population is dependent on forests of subsistence. Most of the forest produce moves through informal non-market mechanisms. Further systematically collected date on biomass removals and supplies are not available. The high ratio of requirement to sustainable supply of fuelwood (5.8:1) indicates severe pressure on growing stock, and suggests that the deficit is being met by unsustainable levels of extraction. In the case of industrial timber, the ration is 2.4:1, which, though considerably narrower than that for fuelwood, nevertheless indicates how large the deficit is. Due to heavy dependence of communities on forest resources, the sector is subject to severe pressure. Various economic uses and their pressures on forests are listed below.

Fuelwood extraction:

India, usually characterized as an agrarian economy, is in transition, moving towards industrialization and commercialization. It supports one-sixth of the world's total population with barely 1% of the world's conventional energy resources with which of fulfil the growing needs of its ever-increasing population. A UN estimate of 1992 puts the share of biomass in India's total energy consumption at 33% and that in the domestic sector at 78% (Wood Energy News 1996). Data on fuelwood are notoriously inadequate and unreliable for several reasons. Wood is collected, utilized, and traded on highly localized basis: most of it does not pass through a market.

Industrial Wood:

Of the 27.6 million cubic meters of industrial wood required in 1987, the packaging industry was the single largest consumer with a demand of 6.81 million cubic meters (24.7%), followed closely by paper and pulp industry, with a demand of 6.57 million cubic meters (23.8%). The paper, paperboard and pulpwood industry together account for 30.8% of the total industrial ;wood requirement. Other important consumers include agriculture and housing. All other uses together constitute 15.6% of the total wood requirement (Forest Survey of India 1988).

Livestock Grazing:

Though India account for more than 13% of the world's livestock population, identified and managed pastures are virtually non-existent. The extent of non-forest area used for grazing cattle, includes (1) permanent pastures and other grazing lands, (2) land under miscellaneous trees crops and groves not included in net sown area, and (3) culturable waste. Livestock population increased from 292 million to 445 million between 1950/51 and 1987. Cattle population alone grew by 28.6%, from 155 million in 1951 to 200 million in 1991. Goat population also increased phenomenally, from 47 million in 1951 to 110 million in 1991 (Indian Council of Forestry Research and Education 1995) in spite of the fact that 36% of the goat population in slaughtered annually.

Impact of degradation of Forests:

On Rural Population

To achieve food security, maintenance of good forest cover is essential. Forests protect soil, conserve water, and improve the; microclimate. In general, forests are renewable source of materials, energy, and other services (Tewari 1991). The declining forest resources have put extreme pressure on common property resources with adverse effects on the standard of living of the poorer sections. A study by Jodha (1990) of 82 common property holdings in 7 states reveals the contrasting situation between 1950 and 1980 during which the number of people dependent on 1 hectare of common property resources land increased from 4.9 to 137. The study also recorded that poor families derived 21% of their income and 77% of their fuel and fodder from such lands whereas the corresponding figures are 2% and 23% for the upper income groups. The number of different kinds of forest products collected declined from 34 to 13, while the density of trees and shrubs declined from 582 to 139 per hectare.

On Natural Environment

Deforestation directly contributes to the build up of carbon dioxide. It has been estimated that every hectare of woodlands absorbs 3.7 tonnes of carbon dioxide and produces 2.5 tonnes of oxygen (Pokhriyal and Natiyal 1991).

On Biodiversity

Biological divesity, discribed as "wealth of life on earth", the millions of plants, animals and micro-organisims, the genes the contain and the intricate ecosystem they help build into the living environment' is under a constant threat of extinction from exploitation of forest ecosystem and destruction of habitat, imposing incalculable risks to the future humanity.

On Climate Change and Desertification

Forests are veritable sinks of carbon, and continue to sequester atmospheric carbon until maturity, after which the rate of sequestration declines. The estimates of annual carbon emissions due to deforestation for India are 41-42 million tonnes. Carbon emissions from combustion of wood alone, in 1986, were estimated to be about 32 million tonnes (Ravindranath and other 1992). Clearing of forests also exposes the soil to direct sun, wind, and water-induced erosion.

Need to understand Inter-linkage of Forests and Total Economic Valuation of forests:

The interlinkages between these cross-cutting sectoral issues need to be understood and analysed carefully for farming effective inter-sectroal policies, particularly policies with repsect to rural energy, livestock rearing, and timber logging. A world Bank policy paper (1994) maintains that market and policy failures combine in the forest sector to undervalue the resource base severely, leading to excessive rates of depletion and inadequate investment in tree planting. Distortions in pricing and valuation of forest resources are reflected in the low allocations made for the development and management of the forestry sector. Since most of the harvesting and extractions are through non-market mechanisms, the contribution of the forestry sector remains outside the ambit of national planning, growth and development. Our planning process and the National accounting system give testimony to this fact. The plan allocation to Forestry sector has been in the range of 1-25 of the total allocation and the contribution showed against the forestry sector has also been in almost the same range. The reason being gross underestimation of forestry sector values and non use of proper valuation and accounting process.

Inadequate forest management leads to many social costs such as loss of employment, less return on capital investment in forest based industries, siltation of reservoirs, dams, loss in crop production due to insufficiency of irrigation and land degradation, loss of productivity etc.

Total Economic Value:

As mentioned earlier, intangible benefits like ecological, biological, aesthetic values from forests are totally ignored in the physical accounting. The economic valuation of intangible benefits is found to be very difficult & in certain cases like biological diversity is abstract and difficult to express in monetary terms, but is widely accepted as being extremely important. Other benefits are less abstract and sometimes concrete, but still difficult to measure due to data collection problems such as forest products used for self consumption by local communities & not traded in the market, or the down stream benefits of water regulation & water quality secured by sectors input in maintenance of forest cover in the catchments/watershed area or the scenic value on account of forest landscape.

Economic valuation of Forests in India Context - An Overview:

Few attempts have been made in India recently to estimate economic value of intangible benefits of forests like eco-tourism, recreation, water supply, watershed value, carbon & biodiversity. An overview of such studies is given in the following table:

Table: Economic values of intangible benefits of forests derived from India case studies:

Intangible benefit	Annual value	Location	Methodology used	Source
Recreation/ Eco-tourism	Rs. 427.04 per Indian visitor Rs. 432.04 per foreign visitor (Rs. 16197 per ha)	Keoladeo National Park, Bharatput	Travel Cost Method	Chopra (1998)
Recreation/ Eco-tourism	Rs. 516 per Indian visitor and Rs. 495 per foreign visitor (Rs. 20944 per ha)	Keoladeo National Park	Contingent Valuation Method	Murthy & Menkhuas (1994)
Recreation/ Eco-tourism & other benefits	Rs. 90 per household per year (Rs. 23300 per ha)	Boriveli National Park, Mumbai	Contingent Valuation Method	Hadker et. Al (1995)
Eco-tourism	Rs. 9.5 per local (Kerala) visitor Rs. 676 per ha	Periyar Tiger Reserve	Contingent Valuation Method,	Manoharan (1996)

			Travel cost method	
Water supply	Annual rental= Rs. 4745 per ha	Almore forests	Indirect methods	Chathurvedi 1992
Soil conservation	Cost of soil erosion Rs. 21583 per ha	Doon Valley	Replacement cost approach	Kumar P (forthcoming)
Ecological functions (use value) for local residents	Rs. 624 per hectare	Yamuna Basin	Contingent valuation method	Chopra and Kadekodi 1997
Carbon store	Rs. 1292 billion (total forests) Rs. 20125 per ha	Indian Forests	Species wise forest inventory data	Haripriya (1999)
Carbon store	1.2 lakh per ha	All India	Indirect estimates	Kadekodi & Ravindranath (1997)
Total Economic value of Forest	Rs. 2.89	Himachal Forest	Multiple valuation Techniques	Verma Madhu (2000)
Watershed values (soil conservation)	Rs. 2.0 lakh per ha meter soil	Lower Siwalikh (Yamuna Basin)	Indirect method (reduced cost of alternate technology)	Chopra and Kadekodi 1997

Source : Amended table from Manoharan, 2000

Table: Annual values of selected benefits of forests in India

S. No.	Economic benefit	Nature of benefit	Value of annual flow of goods & Services per hectare (Rs.)	
			Minimum	Maximum
1	Timber	Tangible	2701	9270
2	Non timber forest products	Tangible	538	2957
3	Ecological functions (watershed)	Intangible	624	2.0 lakh
4	Eco tourism	Intangible	676	20,444
5	Carbon store	Intangible	20125	1.2 lakh

Source : Manoharan, 2000.

Table : Economic values of various kinds of land in India

S. No.	Nature of Forest land	Selected economic benefit	Value of annual flow of goods & Services per hectare (Rs.)		Present value* of goods & Services per hectare (Rs.)	
			Mini.	Max.	Mini.	Max.
1.	Plantation/Single species forest 9teak, sal forests, etc.) (Crown density<40%)	Timber	2701	9270	33660	115525

2	Multi-species plantation/open forests (crown density 10-40%)	Timber+NTFP	3239	12227	40365	152375
3	Dense forests (crown density>40%)	NTFP+ Ecological functions+ Carbon store	21287	322957	265283	4024758
4	Protected Areas	Eco tourism+ ecological functions+carbon store	21425	340444	267003	4242685

*** At 5% rate for a period of 20 years**

Source : Manoharan, 2000.

The following study shows the magnitude of under-estimation and under-reporting of forest benefits in India, by providing approximate minimum values for the benefits.

Box: Distortion of Forests-Case of India

The magnitude of under-estimation and under-reporting of forest benefits, is illustrated by taking India as a case, by providing approximate minimum values for the benefits.

	Rs. (million)
Forest grazing: some 270 million cattle are estimated to Use forest grazing Grounds.Grazing value is estimated Putting a minimal value of Rs. 1512 per Year for providing alternate source per animal	408240
Green fodder: an average annual collection of 400 million Tons is estimated. Fodder value is estimated at US$ 5 per Ton of fodder Rs. 210	84,000
Medicinal plants: nearly 70% of the people use indigenous Herbal medicine. As a means of primary health, bulk of it Orginating in forests. Value of Medicinal plants estimated At 10 per person for 630 million	264600
Non-wood construction materials (thatching materials, Bamboo, grass, fibres, etc.): it is assumed that 250 million People living below the poverty Line only use non-wood Construction materials from forest, valued at Rs. 420 per Year	105000
Food : 67.8 million tribal people who depend on forest for their Livelihood a food value of Rs. 4200 per year for food derived From forest is assumed	284760
Wood product, fuelwood and charcoal: estimated figure reported	

By FAO	694806
TOTAL	18,14,406

The above estimation does not consider the values of products such as gums, resins, essential oils, flavours, edible nuts, dyes, colorants, fibers, flosses, plaiting materials and a host of others, nor of the benefits from biodiversity conservation, wildlife and nature tourism, watershed protection, sequestration of carbon and other use and non-use values.

Rs. 12,1800 million (6.6%)

Against these the amount of reported GNP share of forestry for 1993 was equivalent to 1.3% of the GNP of India and Government allocation of funds under the country's Five Year Plans for the forest sector was only 0.80% of total plan allocation.

FOREST HEALTH & PRODUCTIVITY

Introduction:

The forests in India are characterized by low productivity and acute degradation. The average annual forest productivity of India is 0.7 cubic meter per ha as against world average of 2.1 cubic meter per ha. Satellitically analysed forest covers 6, 39, 600 sq. km. (14.47%) and only 3, 85, 756 sq. km (11.73%) has good forest cover of over 40% crown density. Nearly 60,000 sq km is blank area without any tree cover. The per capita availability of forest lands is one of the lowest in the world i.e. 0.08 ha against world's average of 0.64 ha. The natural forests are also depleting fast due to encroachments, over grazing, illegal felling, excessive fodder and fuelwood collection, land use changes, lack of adequate protection etc. The direct causes of degradation are poverty, landlessness, lack of land use planning, biotic interferences, inadequate institutional capacity etc. Social forestry activities and tree planting are not able to compensate fully the rate of degradation. The research support to issues of forest productivity, protection, and conservation, utilisation and substitution of forest products, ecosystem management and newer dimensions of forestry are therefore, urgently required to reverse the trend of degradation and to make available forest produce at affordable prices.

National Forest Policy & its Perspective Plan:

The National Forest Policy (1988) has laid stress on scientific forestry research, necessitating adequate strengthening of research base as well as priorities for action. An important constraint to the operation of forestry research system has been the lack of a method based on the systematic application of agreed criteria to translate the requirement of the National Forest Policy into detailed research Programmes or to allocate resources to such priorities. This indicated that the present research system is not responsive to the needs of the users. To over come these problems a perspective plan for the forestry research was prepared in 1993 to meet the requirements of National Forest Policy of 1988.

The perspective plan was based on the following priorities:

i. Improvement of productivity
ii. Conservation and Management of ecosystem
iii. Utilisation of timber and NWFP
iv. Socio-economic implication of policies

However, it was felt that this plan provided only an overview of research objectives without formal research proposals. There was no formal agreed criteria for deciding priorities. There was also no provision of regular reviews and updating, which were otherwise essential for a dynamic sector like forestry. Therefore a need was felt for a detailed research programme based on participatory and transparent system with modified bottom-up approach.

In order to overcome the above cited shortcomings, a comprehensive National Forestry Research Plan 9NFRP) based on National priorities in problems and thematic perspective was conceived by ICFRE using participatory and transparent bottom up approach. Under this plan, the thrust is given to increasing productivity through genetic and silvicultural improvement, treatment of wastelands, conservation of forest eco-system, wood substituting, trial development and social forestry. The projects relevant to the priorities established by ICFRE are in complimentary with the past and ongoing researches in India & abroad.

Forestry in India critically needs research support to improve forest productivity, reduce losses & wastage, maximize utilization, improve conservation of genetic resources and wildlife, increase country's forest cover etc. The research planning on the basis of prioritised problems will help to achieve the aforesaid target.

The research on the forest production must include social, economic and institutional aspects to secure adequate finance on a long-term basis. All these considerations indicate the need for multi-disciplinary team of researchers working in one or more institutions.

ICFRE Technologies developed for improving forest productivity:

- Macropropagation of bamboo seedling in nurseries.
- Cost effective structure for planting stock propagation.
- Bio fertilizer application for growth enhancement in nurseries.
- Bio fertilizer culture preparation and field application.
- Improved tools for nursery practices.
- Tissue culture of Bamboo.
- Seed collection, processing, storage and pre-treatment for effective germination.
- Pest resistant clones of teak.
- Vermiculture
- Effective rain usater harvesting in arid region
- Integrated pest management practices in Acacia nilotica and Albizia lebbck.

Extension Strategies for technologies for Improving Forest Productivity:

The target group is village communities and agencies viz. Agriculture extension network, forest departments and M. Sc. Forestry students etc. The extension approaches to be followed will be:-

i. PRA exercise leading to creation of village level action group or cooperative beside using mass media.
ii. Training for one week to the "Contact person" of "village master trainers" through the agency (agriculture extension network, SFDs, NCC and NSS cadets, NGOs) involved on the particular technology by the Scientists using method demonstrations. Training material will be provided.
iii. Training and visit system will be brought into practice.

iv. A scheduled programme of Monitoring and Evaluation will be followed.

A World Bank review of India's forest sector endorses the need to improve forest protection and management as the most important forest policy goal for the next decades. The report highlights the need to improve the productivity of the sector, through improved planting materials and practices, a strengthened research system and an effective forestry extension service.

Planting Stock Improvement Programme (PSIP):

Recognizing that the poor quality of planting stock is the main contributing factor for poor and sporadic survival of about 1.5 billion tree planted annually in the country; production of high quality planting stock both seed as well as vegetative part has been taken up for SFDs for afforestation and reduction-afforestation purposes. ICFRE has taken up projects on Tree Improvement and Planting Stock Improvement under World Bank to ensure production of quality planting stock.The activities, which constitute the planting stock improvement programme are :

Seed Production Area (SPA):

ICFRE has evolved a process which involves laying out samples plots and they are evaluated quantitatively and qualitatively to identify best pockets within the species distribution for a given area and then trees were thinned out by removal of all such trees which falls below the average of sample plot for a given set of traits. This task will make the basis for future selection and further improvement in selection of new stands if required until each state establish their own seed orchards. Guidelines were framed and circulated to states for demarcating SPA's under the guidance of ICFRE Scientists based in different institutes. As against the target of 1290 ha, for the creation of SPA, 1225.62 ha have been achieved. The species used were : *Populus deltoides*, *Pinus roxburghii*, *Dalbergia sissoo*, *Pinus patula*, *Cassia siamia*, *Bombax ceiba*, *Alnus nepalensis*, *Michelia champaca,* Eucalyptus, teak, casuarina, and Acacia spp.

Clonal Seed Orchards (CSO):

Seed orchards are specially designed plantations raised through grafted ramets of selected CPTs. Planning of oseed orchards depends mostly on the floral biology of species, design used and number of clones to minimise inbreeding and finally management. All these aspects were fully kept in mind and established Ist generation clonal seed orchards.

This exercise has created awareness among states having such programme. Most of these activities were carried out in states in close collaboration of SFDs. ICFRE institute established CSOs cum Seed Collection Orchards of some priority species which will be used as demonstration orchards. The target for creation of CSO was 156 ha which was not only achieved but over achieved as 166.45 ha have been created. The species used were : *Gmelina arborea*, *Albizia procera*, *Dalbergia sissoo*, *Pinus roxburghii*, Eucalyptus, teak, *casuarina,* and Santalum.

Seedling Seed Orchards (SSO):

Seedling Seed Production Areas (SSPA) are specialized areas raised using seedlings of selected promising provenances or CPT's belonging to same agro climatic region or suitable to that area. Seeds of *Eucalyptus tereticornis* of known provenances have been procured from Australia to broaden the genetic base and to be used as infusion populations in future programme. *Eucalyptus tereticornis* as such is an exotic and grown in India for various industrial uses and has been taken up for afforestation in many states using seed/clonal material from existing sources of very narrow genetic base. A systematic programme of multilocational trials has been taken up to evaluate the promising provenances for the test sites. As against the total target of 320 ha of SSO; 344.40 ha have been achieved. *Gmelina arborea*, *Dalbergia sissoo,* Eucalyptus, teak, pine, Acacia, Sandal, *casuarina*, *Dipterocarpus* spp. were used for

raising the SSOs.

Vegetative Multiplication Garden (VMG)

This is new activity initiated by ICFRE institute under W.B., FREE Project to develop protocol for mass multiplication of priority species which involves establishment of hedge gardens with clonal material , experimenting on hedging, production of multiple shoots, rooting and finallly planting. Methods of rejuvenating the mature tissue (Plants) have been standardized for number of species undertaken in World Bank Project and in some cases consultancies have also been provided by Coimbatore Institutes. Some of the important species used were : *Gmelina arborea*, *Paulownia fortuni*, *Albizia procera*, *Dalbergia sissoo*, *Populus deltoides*, *Pinus roxburghii,* Eucalyptus, *casuarina*, teak and Bamboo spp. In case of *D. sissoo* technology for rooting juvenile shoots emanating from hedge garden has been perfected, while for pine it is underway. In case of *Pinus roxburghii* shoots emanating from 8 years old plants have been successfully rooted using vermiculite as rooting medium. This technique of rooting cuttings of various species is becoming useful in forestry and many States have shown interest in this activity. Now many states have already established vegetative multiplication gardens with misting facilities and have started clonal propagation.

Modern Nurseries:

Eight modern nurseries have been established at FRI, Dehradun; TFRI Jabalpur, AFRI Jodhpur, IWST Bangalore, IFP Ranchi, IFGTB Coimbatore, HFRI, Shimla and RFRI, Jorhat. They are fully operational and catering the regional needs, thus contributing towards production of quality planting stock.

The beginning has been made, but there is a need to sustain the assets, created with a serious follow up programme. The coordination at ICFRE level has to be maintained diligently, if the actual benefits are to be derived in the long run. Genetic gain and the productivity enhancement of the PSIP components is to be assessed. A common format has to be developed for collection of field data at national level. Periodical data has to be collected from ICFRE Institutes, which need to be computed and analysed.

Since all the PSIP assets established under the World Bank Project (FREEP) are only 1st generation there is dire need to plan 2nd generation PSIP and Advance PSIP programme to produce the more superior quality seeds. PSIP is a LONG-TERM strategy and should be continued in future, otherwise the very purpose of creating PSIP by spending such a huge amount shall be defeated and all the efforts will go waste.

Maintaining forest cover to meet present and future needs

Resource management and maintaining forest cover in a country like India is beset with problems of population explosion, poverty, divisive social trends and resultant conflicts for resource use. Unfortunately, in the past many groups in the society exploited forest resources by snatching away the interests of weaker sections. The 'common property resource psychology' of people built over years of free use, however, never allowed enforcement of laws enacted to protect and preserve the forests. In this process a few powerful groups of industries, local timber merchants, contractors, rural landlords and feudal classes pocketed the benefits. Undeniably, however, a larger share also went to local people who could meet their and their cattle's energy needs from the adjoining forest areas through uncontrolled fuelwood collection and overgrazing. In this process, the forests became victim of both human greed and need. The regeneration suffered and forests became degraded. The poor people of rural areas had to bear the maximum brunt of forest loss.

As is evident, the root cause of environmental problems is poverty and to overcome poverty, two things are essential. First, the development must continue which means judicious and equitable exploitation of, natural resources. Secondly, there must be a check in human and cattle population in order to prevent collapse of life support system. Both require pragmatic approaches in thinking and calls for sustainable consumption so that the exploitation by the present generation does not jeopardise the future of generations yet unborn. Wisdom demands, that the resources should be handed over to the next generation in enhanced and improved conditions by taking advantage of modern scientific technology and by resorting to sound resource management principles.

The Ministry of Environment and Forests along with State Forest Departments (SFDs)are responsible for development, control and delivery of forest policy and sustainable forest management.

Forest Policy:

During the early five-year Plan periods, priority was given to survey and demarcation, preparation of working plans, plantation establishment and forest utilization. Subsequently, the policy was to maximize timber production and enforce forest protection. In 1972, the National Commission on Agriculture recommended that "there should be a change over from conservation oriented forestry to more dynamic program of production forestry". By the Sixth five-year Plan period (1980-85) ecological balance, economic stability for the poor and greater forest protection were being given emphasis. The failure to control unauthorized exploitation and a growing realization of forests as a biological necessity and major part of the nation's natural resource heritage led to the formulation of the National Forest Policy in 1988.

The National Forestry Policy of 1988 defines the primary goals of forest management as first, to conserve the natural environment, second, to meet the requirements of local people (particularly tribal population and the poor), for forest produce, and third, as a source of wood and other products for industries and other non-local users. The policy envisages participation of communities in the management of forest resources as a means of achieving these objectives.

The National Forest Policy, 1988 stipulates to have a minimum of 1/3 of the land area of the country under forest/tree cover. It also envisages a need based and time bound massive afforestation programme on all denuded, degraded and unproductive lands. Though a cumulative area of 23.96 million ha has been planted since 1950, yet much of this is unproductive and the rate of afforestation is not adequate due to insufficient outlays for the forestry sector. At the present rate of afforestation, it may take more than 30 years to bring all degraded forest areas under adequate tree cover, even if the present well stocked forests are fully protected.

In the recent past efforts were concentrated mostly on social forestry activities neglecting the natural forests. Immediate action is needed for rehabilitation and intensive protection of natural forests. Periodic inventory of forest resources to establish bench marks and treatment regimes, implementation of working plans, scientific management needs are being given special emphasis.

Forest area to the tune of 43.28 lakh ha was diverted for non-forestry purposes during the period 1951 to 1980, which works out to 1.5 lakh ha per year. However, the pace of diversion has been checked with the enactment of the Forest (Conservation) Act, 1980 and reduced to 6,500 ha per annum with State Governments providing equivalent non forest area for compensatory afforestation in most of the cases. Though with conservation efforts and afforestation programmes, the extent of forest cover could be stabilized around 64 million hectare, the forest areas still continue to degrade in extent and quality. Intense and unsustainable biotic pressure is mounting on the balance 38 million ha. of relatively well stocked forest area. The absence of policies for land use, non commercial energy and grazing have brought the country to the brink of an ecological disaster, with half of its land area categorized as

wastelands. It is estimated that 6000 million tones of soil is being lost every year. The situation is alarming and calls for urgent pragmatic measures for conservation and development of forests.

The alarming rate at which degradation of natural resources has been occurring in India is responsible for the recent paradigm shift in the management of natural resources, towards a more decentralized and community based system of management. Past experiences have shown that centralized management of natural resources, based on a culture of exclusion and rules, has not contributed to the sustainable management of natural resources. This important realization has led to a series of policy changes in the recent past that provides an ever-widening democratic space to the local communities for articulating their needs and managing natural resources.

The country has begun to appreciate the need for integrating development initiatives with conservation efforts. Against this backdrop of decentralized and multi-objective natural resource management, conflicts between governments, their agencies, civil society organizations, private sectors and local communities as well as within and among communities are likely to increase in number and severity without adequate institutional strengthening. Whereas traditional systems of management have tremendous value in community based natural resource management, these systems have been eroded over time. Strengthening these systems while ensuring that they meet the development and conservation needs of their communities is an important part of resolving the conflicts that are rampant within this sector. Similarly, as the authoritative role of government agencies responsible for natural resource management changes, they too must learn new skills of participating, communication and should become open for an increased level of dialogue and accountability.

Need for State Forest Policy (SFP):

For a country as large and diverse as India having diverse forestry situations, there cannot be a unified single development strategy for forestry sector development. NFAP process and analysis have demonstrated the need for careful selection of mixture of strategies at both national and state levels appropriate for specific economic, political, social and resource conditions. It is therefore, necessary that state Govts. promulgate state forest policies to properly translate the broad policy objectives and measure contained in the NFP as relevant to their state specific situation and reorder priorities to meet the specific needs of the states.

Forest Legislation:

India has a long tradition of professional forestry with a history of forest legislation since 1865 when most of the forests became State property. Indian Forest Act, drafted first in 1865, was revised in 1878 and was consolidated again in 1927 to regulate laws relating to forests managed for production. Subsequently, several amendments of the Act were made and some of the States have promulgated their own Forest Acts. After the adoption of the National Forest Policy, 1988, it was proposed to update and consolidate all forest laws and amendments made by the States from time to time to bring about a uniform law throughout the country in conformity with the provisions of the new forest policy.

Forest (Conservation) Act, 1980 is another forest legislation amended in 1988. It stipulates concurrence of the Union Government for diversion of forest lands for non-forestry purposes with provisions of compensatory afforestation. Other related legislations are the Wildlife (Protection) Act, 1972 amended in 1991 and the Environment (Protection) Act, 1986.

MoEF, in conjunction with SFDs and ICFRE & other research organisations, has been active in research and monitoring of threats from pests and diseases in forests and plantations. In view of the major issues concerning the role of fire in the maintenance of particular species and ecosystems, and its widespread use for hazard reduction, considerably more effort is needed in this area. The limiting factor at present appears to be resources rather than recognition or willingness to address issues.

The Moef and SFDs have the statutory responsibility to manage the State's forests. Mechanisms are in place to identify particular places and conserve them as Sites of Special Significance.

Other information and emerging issues

Please provide any additional relevant information on the implementation of proposals for action or emerging issues[1] related to: i) economic aspects of forests, ii) forest health and productivity, or iii) maintaining forest cover to meet present and future needs.

III. Preparation of the Report

The Report has been formulated through consultative process involving various government agencies and stakeholder groups who provided inputs.

[1] "Emerging issues" refer to issues that have not been addressed by UNFF but that are related to UNFF "elements". For example, some countries may consider forest fires and forest pests and diseases as important emerging issues for the UNFF to address under the UNFF element, forest health and productivity. Kindly limit the emerging issues to three per UNFF element addressed by this report.