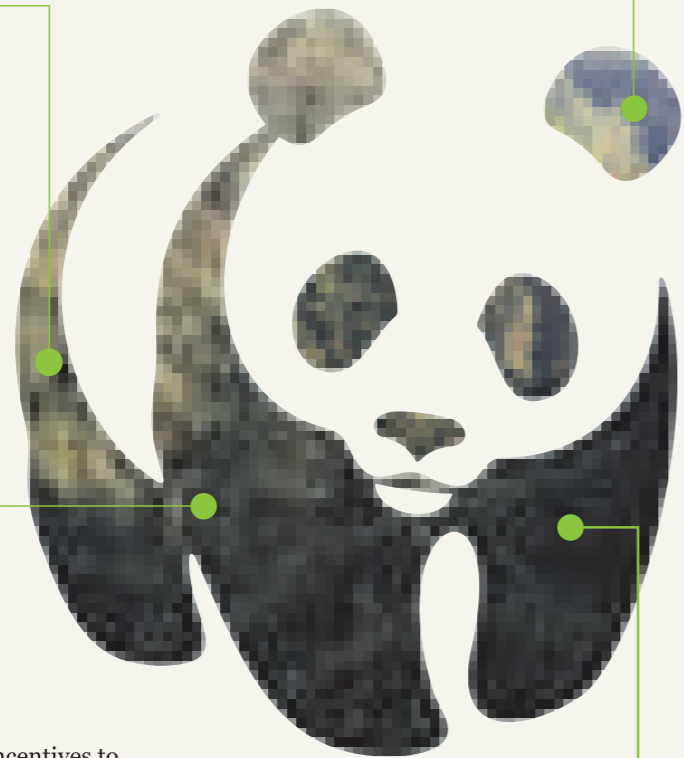


Promote agro-forestry and farm forestry systems; support tree growers.

Promote availability of wood from trees outside forest areas.



Provide fiscal incentives to business and industry to promote import of wood from certified forests.

Forest conservation measures are not the limiting factors in timber supply.



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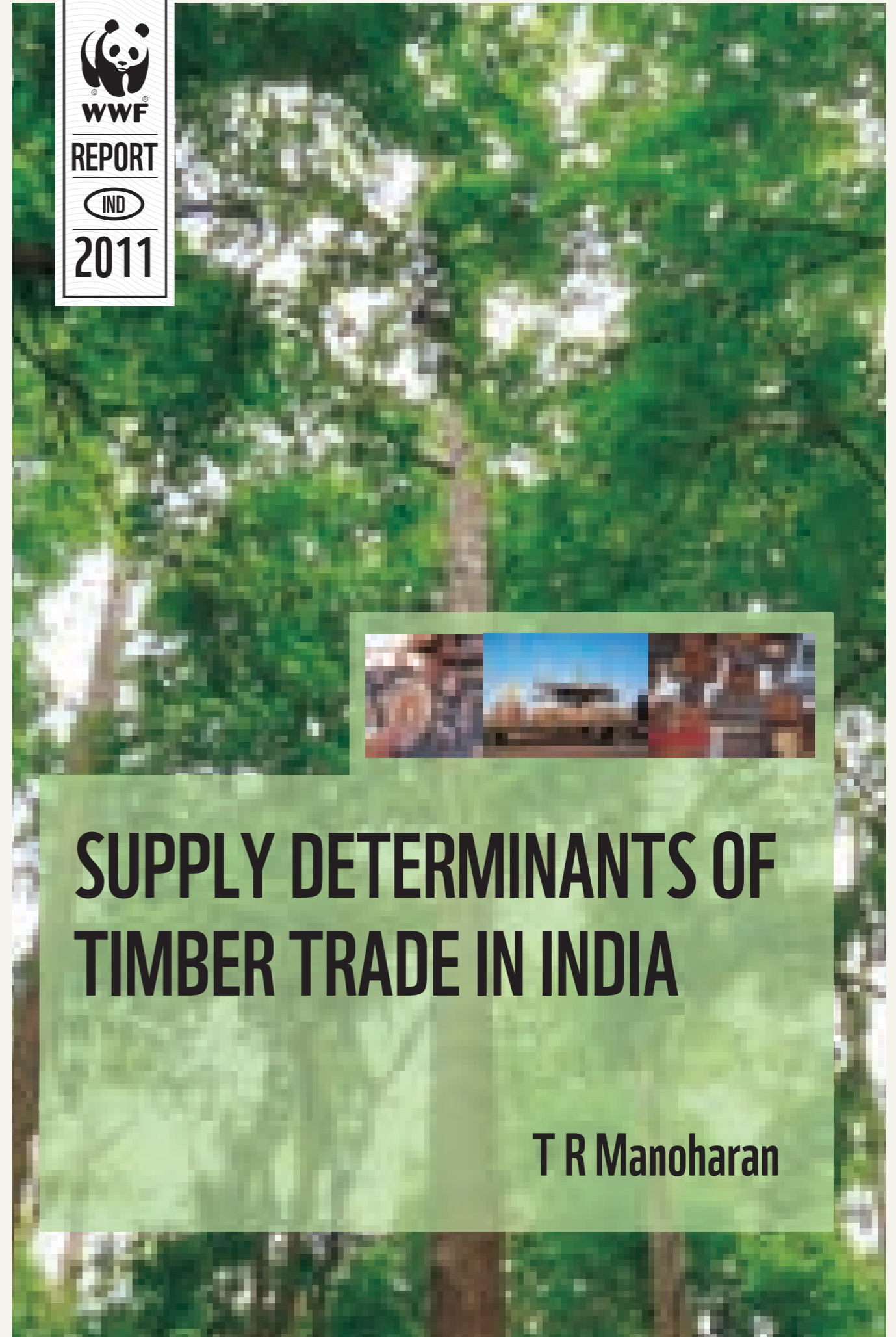


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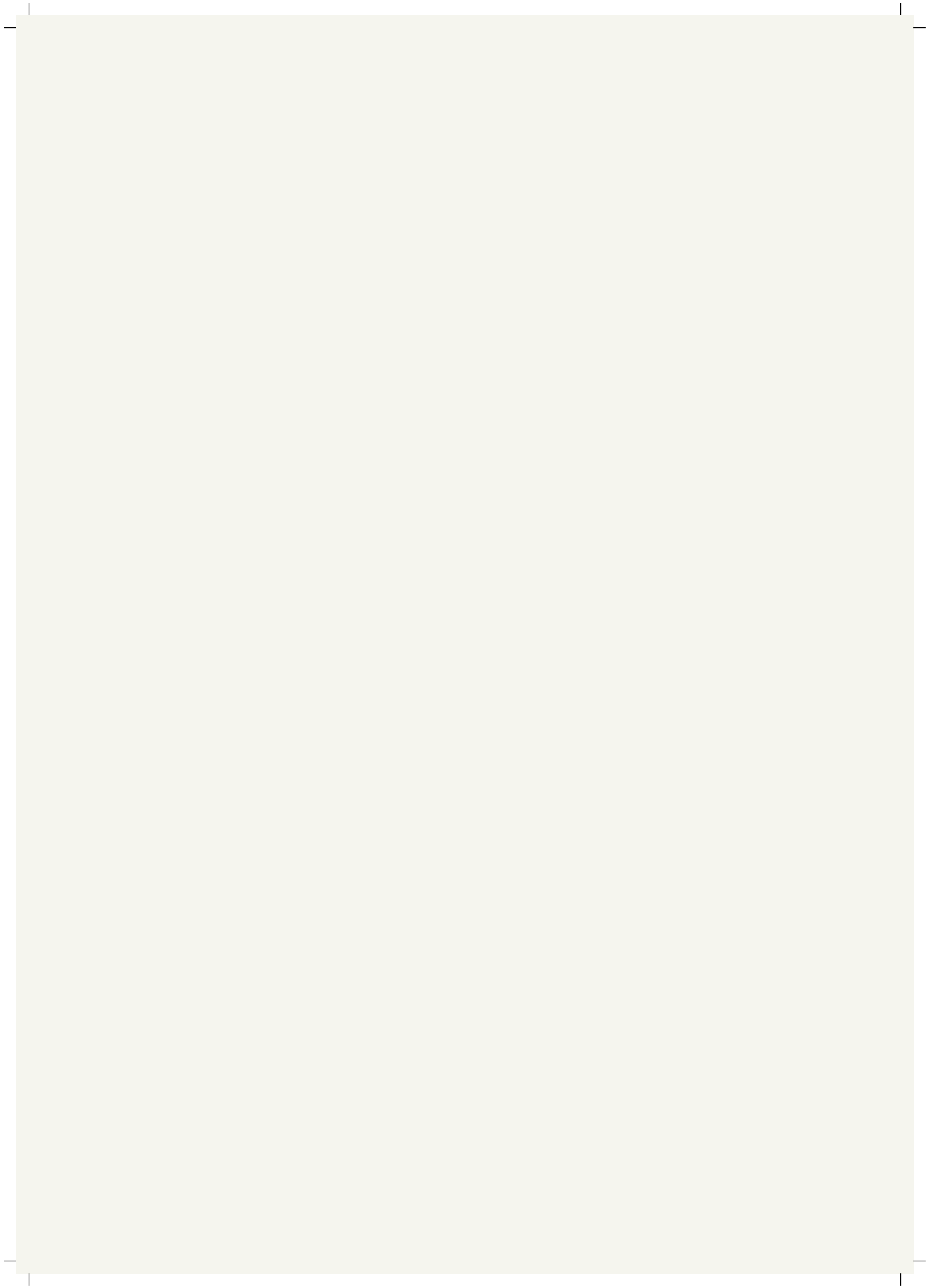
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# SUPPLY DETERMINANTS OF TIMBER TRADE IN INDIA

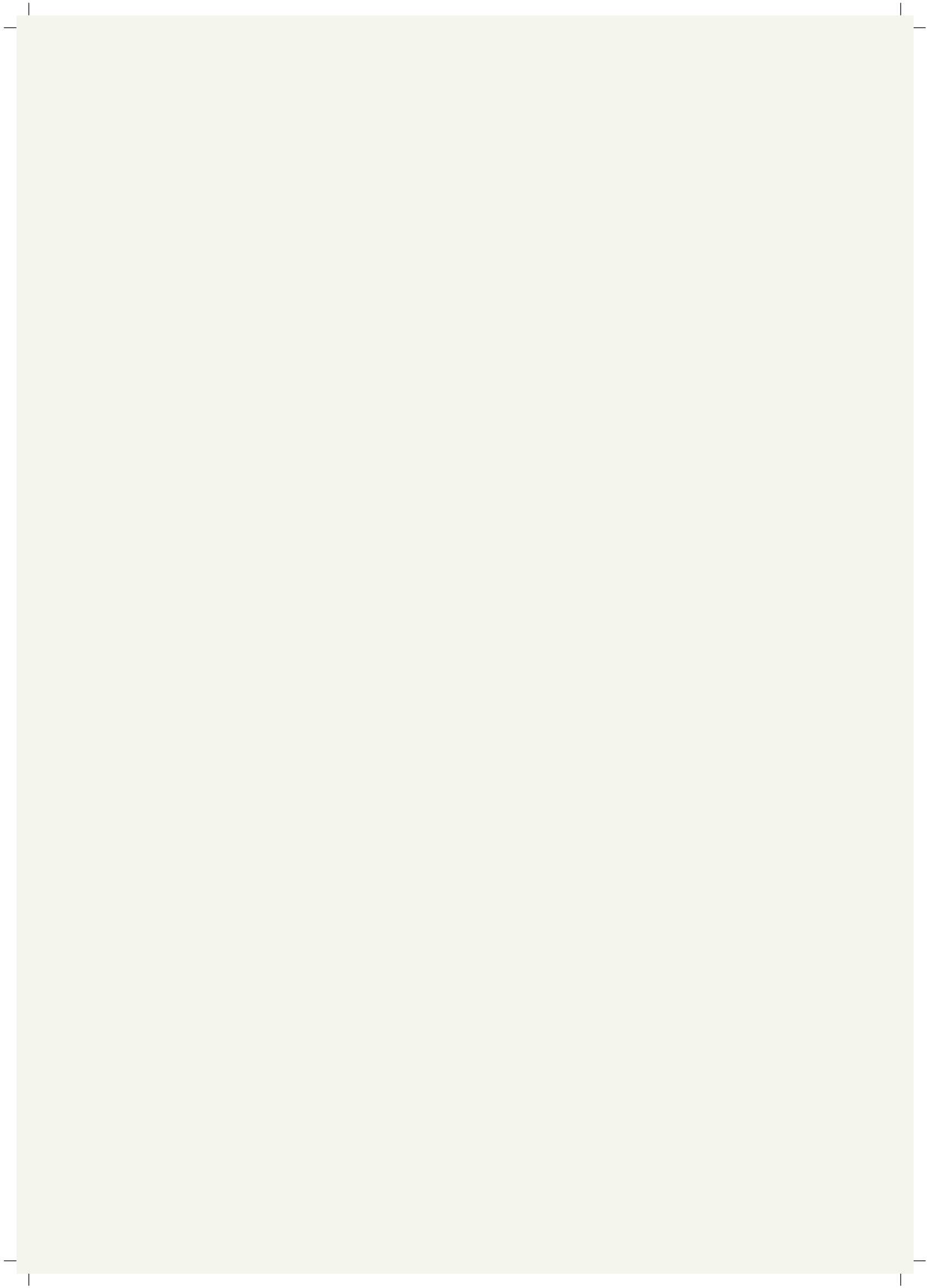
T R Manoharan



# **SUPPLY DETERMINANTS OF TIMBER TRADE IN INDIA**

(A study supported by the Planning Commission, Government of India)

T R Manoharan



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# FOREWORD

In a business as usual scenario, by 2020 India will face severe shortages of timber supplies from domestic sources. As a result, the country will have to increasingly depend on imported wood, which may originate from high conservation value forests globally, thus increasing India's external ecological footprint. There is, therefore, a need for India to improve and increase timber production outside forests that can also provide rural livelihoods through farm forestry and agro forestry.

This research study — *Supply Determinants of Timber Trade in India*, undertaken by WWF- India with the support of the Planning Commission, Government of India, has addressed the major determinants of timber supply in India and analysed the impact of selected forest conservation measures on the long term supply of timber. The results of the study show that the forest conservation measures in India are not the limiting factors in the supply of timber. The study has also come out with several useful recommendations to promote productivity and availability of timber within India.

I hope this report will be widely used in the planning and policy decisions at all levels to address the growing demand-supply gap for timber in India such that local livelihoods can be enhanced while reducing India's footprint on the world's important forest ecosystems.

Sejal Worah  
Programme Director

# PREFACE

India is one of the leading producers of tropical logs among the International Tropical Timber Organisation (ITTO) member countries. Yet, most of these logs are used within the country to meet the domestic demand. In the business as usual scenario, the nation is likely to face a severe shortage of timber supply from the domestic sources, and by year 2020 India's imports of timber may exceed the domestic production. As part of the forest conservation measures, timber exports from India are not allowed. However, this has not affected the exports of indigenous value added wood products, which have high demand in international markets.

Since the liberalization of timber imports, India is sourcing wood from all over the world, including from the high conservation value areas such as Borneo Forests, Amazon, and Green Heart of Africa.

The country's timber imports value is growing at 12 per cent per annum and is likely to increase in years ahead. This liberalization of imports has benefited the domestic timber market, particularly the wooden handicrafts sector and furniture, which otherwise faced paucity of the desired wood in the required quantity and quality.

India has set a target of 33 per cent forest and tree cover by 2012, and there is a potential to increase the domestic production of wood through tree planting, afforestation and reforestation programmes.

The major objective of this study was to examine whether the forest conservation measures implemented as part of the National Forest Policy are the limiting factors in the supply of timber in India. The study was undertaken by WWF-India as part of its Global Forest and Trade Network (GFTN) programme. The study was supported by the Planning Commission, Government of India.

The results of the study indicate that the forest conservation measures are not the limiting factors in the supply of timber in India. In fact, the domestic production of timber can be increased substantially if the opportunities and policy options are effectively utilized by the forest based industry in India.

In several states, forests contribute only a small proportion of timber supply; whereas the trees outside the forests (TOF), including farm forestry, agro-forestry, private estates fulfil timber requirements of both households and industry. To improve timber productivity for its sustained supply and encourage farmers in agro/farm forestry, research and development is needed in clonal plantations and silviculture to develop fast growing and short rotation trees for better economic return to the growers. There is also a need to promote responsible wood trade through certification of both domestic production as well as imports to ensure sustainability of timber harvesting.

The author is thankful to the guidance, support and cooperation from Mr Ravi Singh, Secretary General and CEO, WWF India, Dr Sejal Worah, Programme Director, WWF India, Mr George White, Head, Global Forest and Trade Network, Dr S K Khanduri, Former Director (Environment and Forests Unit), Planning Commission, Government of India. The study would not have been completed without the cooperation and valuable inputs from the Ministry of Environment and Forests, Government of India, the State Forest Departments, Customs and Port in Kandla. The support and guidance from the Socio Economic Research Division of Planning Commission is also greatly appreciated.

T R Manoharan

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- Uttar Pradesh Forest Department
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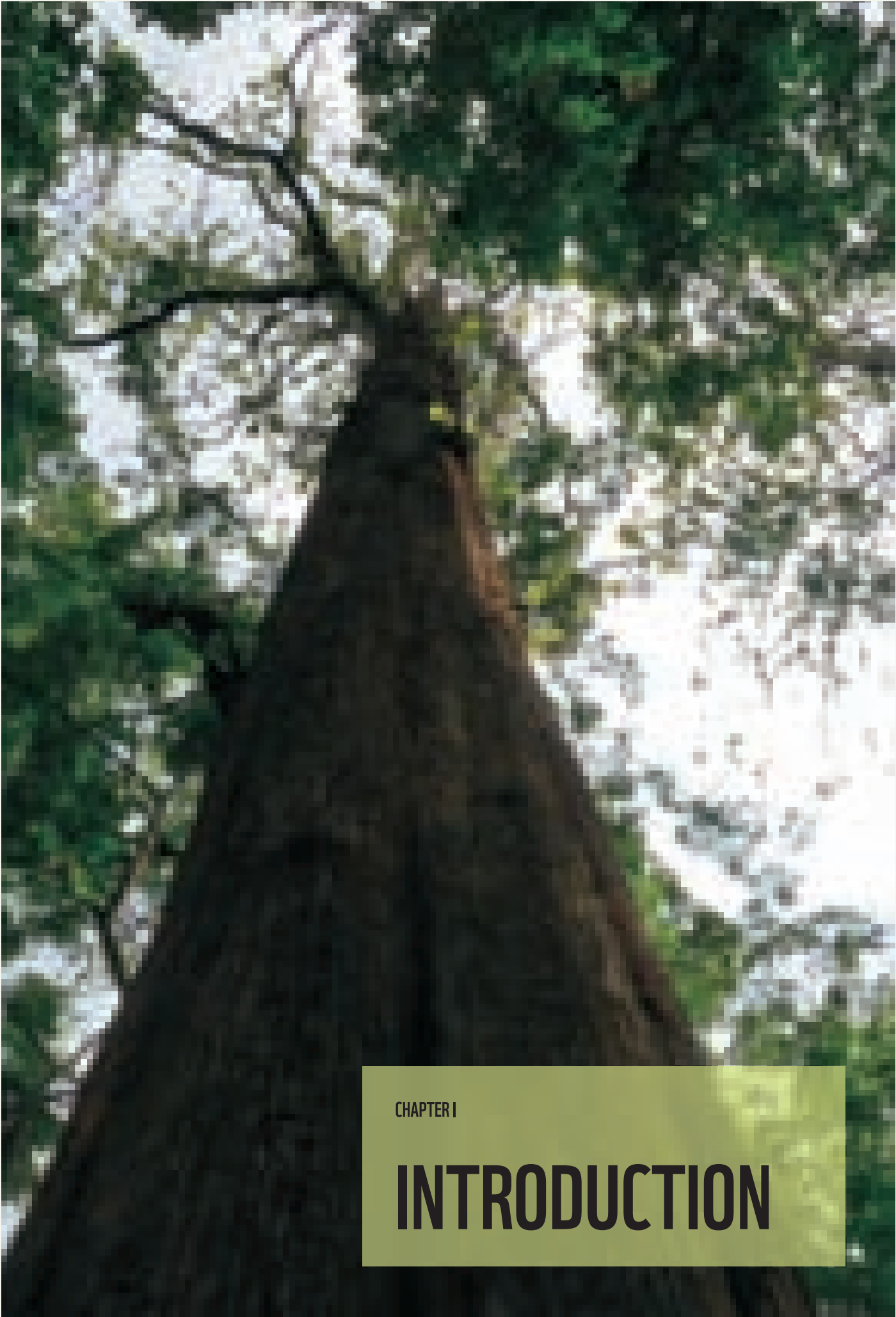
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CHAPTER I

# INTRODUCTION

## 1.1 INTRODUCTION

This study was carried out to understand the determinants of timber supply in India, and suggest suitable policy interventions for sustainable timber production, consumption and trade. The study also addresses India's growing "forest footprint"<sup>1</sup> and its effects on the world's high conservation value forests.

**Global Timber Market:** Employing more than 13 million people, the global timber market is among the largest industrial segments with annual sales of US\$900 billion and trade in forest products of US\$200 billion. Timber products are environmentally superior to other variants made from metals, plastics and cement as these are recyclable, energy efficient and reduce green house gases.

However, the unsustainable extraction and illegal trade in timber has resulted in the loss of forests and biodiversity in many countries. Presently, the world's forests are depleting at the rate of 16 million ha per annum. The rate is high in Latin America, Congo and South East Asia from where timber is extracted legally and illegally to meet the needs of global timber markets.

In order to address the irreversibility of forest ecosystems and uncertainty in supply of wood as well as non wood forest products and services, many countries have enforced conservation measures that regulate extraction and use of forest produce.

**India Scenario:** India is among the world's largest economies. Growing at more than 7 per cent since 2003, it is likely to touch 9 per cent rate of growth for 2007-12. The country recognizes the need for high growth rate in order to improve quality of life of its more than a billion population, a significant portion of which is still poor and marginalized.

Forestry in India is the second largest land use after agriculture. But its contribution to the national economy is underestimated, even though about 275 million poor people in India depend on forests to meet their livelihood as well as timber needs.

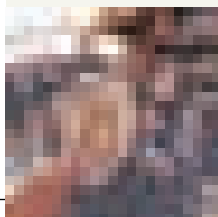
The recorded forest area of the country is 76.52 million ha. According to *The State of Forest Report, 2005* forest cover in the country is 67.71 million ha or 20.6 per cent of its geographical area (FSI, 2008). The report shows a loss of 728 sq. km of forest cover during 2002-04. However, it is the loss of dense forests over the last decade which is of more serious concern. The report also points out that about 41 per cent of India's forests are degraded.

Though India is one of the top producers of tropical logs among International Tropical Timber Organisation member countries (ITTO, 2008), it faces a severe shortage of timber supply from domestic sources to meet its growing demand. In 2006, India imported wood valued at US\$2.75 billion; in the preceding decade of 1996-97 to 2005-06 the country's timber imports registered average annual growth of 12 per cent (Midgley, 2007, Govt of India, 2008).

Food and Agriculture Organization has also noticed tremendous pressure on India's forests from its large population. Between 1951 and 1972, about 3.4 million ha of forests were cleared mainly for agriculture. During 1970s India's annual average rate of deforestation hit 1.3 million hectares. This was contained and reversed considerably in 1990s as a result of the changes in the national policies and programmes on forest conservation and management.

---

<sup>1</sup> Forest footprint, a component of ecological footprint, is the total amount of deforestation caused by an individual, organisation or product.



India is now one of the few countries with a net addition in forest cover during 1989 to 2002<sup>2</sup>. It has established 33 million ha of forest plantations, which is more than 50 per cent of the total forest area (FAO, 2004). About 10 million ha of these plantations are raised by the farmers, public and private agencies with seedlings distributed by the state forest departments (Pandey, 2000).

The situation improved primarily as a result of the recommendations of National Commission on Agriculture (NCA) to promote plantations to meet the shortfall of wood for industrial needs and as fuel. Several social forestry programmes supported by donor agencies promoted tree plantations in the country. The annual average rate of plantations touched 1.7 million ha during 1975 to 1990. The planting rates declined to 1.5 million ha per year after 1990. This was, perhaps, mainly due to the end of several externally aided social forestry projects in the country. The 1990s saw the emergence of Joint Forest Management (JFM) approach in raising the plantations through people's participation (Bahuguna, 2004).

**Supply Shortage:** In spite of significant gains from plantations, India is likely to face severe shortage of timber supply from both domestic and international sources (ITTO, 2004). The demand for timber is estimated to increase from 58 million cubic meters in 2005 to 153 million cubic meters in 2020; whereas, its supply is projected to increase from 29 million cubic meters in 2000 to 60 million cubic meters in 2020.

The productivity of timber in India is 0.7 cu. m/ha/year compared to the world average of 2.1 cu.m./ha/year.

According to FSI, sustainable timber extraction from the forests averages 0.5 cu.m. per hectare per year (FSI, 1995). The domestic supply of timber is mainly from the forest plantations. In the absence of required boost for suitable domestic production, the country heavily depends on imports.

The growing stock of forests in the country is 4.6 billion cu.m. and the growing stock of trees outside the forests is 1.6 billion cu.m. The land ceiling for private plantations, restrictions in transport and cutting permits and restrictive revenue laws are said to be the limiting factors for wood production in the country.

The proponents of timber trade argue for incentives under the existing forest conservation measures to encourage tree plantations in both forest and non-forest areas. Such incentives, they argue, should include the right to extract trees grown in homesteads and liberalization of policies on timber transport and trade. Kanduri and Mandal (2005) have pointed out that National Forest Policy 1988 in a way has missed the focus of the national need of wood production for domestic, infrastructure and industrial purposes.

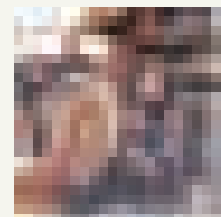
On the other hand, the conservationists demand effective implementation of the National Forest Policy in its true spirit, and suitable steps to bring one-third of the country's geographical area under forest/tree cover. According to them, forest conservation measures under the policy are not the factors limiting timber supply in India.

There is also an increasing demand on India from several countries to open its markets to foreign wood products. According to them liberalization and market access will increase the intrinsic value of forests and will foster long term planning focused on sustainability, providing substantial commercial, social and environmental benefits (WTO,2005)<sup>3</sup>. India being a leading producer and consumer of tropical timber products can play a major role in promoting sustainable production and trade in forest products.

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<sup>2</sup> Annexure -5. Source: Forest Survey of India

<sup>3</sup> WTO (2005), TN/MA/W/64, 18 October 2005, Negotiating Group on Market Access - Market access for Non Agricultural Products (NAMA)-Communication from Canada, Hong Kong China, New Zealand, Thailand and the United States circulated to the Members.



## 1.2 OBJECTIVES

The objectives of the study are to:

- (i) Identify and analyse major supply determinants of timber trade in India
- (ii) Analyse the impact of select forest conservation measures on the long term supply of timber in India
- (iii) Recommend measures for sustainable supply of timber without compromising the forest conservation measures

## 1.3 RESEARCH HYPOTHESIS

A strong argument from the proponents of trade liberalization is the adverse effects of forest conservation measures on timber supply (both production and imports) in India. According to them, these measures are major determinants in limiting the supply (both domestic production and imports) of timber, and act as non-tariff barriers in its trade. Conservationists, on the contrary, demand effective implementation of the conservation measures and regulated supply of timber to prevent further loss of forests and tree cover outside forests.

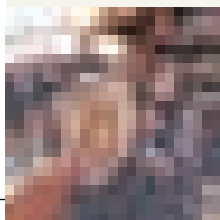
Considering this dichotomy of views, the following research hypothesis was formulated to test that it is not true: “Forest conservation measures implemented as part of National Forest Policy are the major factors limiting supply of timber in India.”

## 1.4 METHODOLOGY

The study is based on field visits, consultations with the stake holders, and analysis of long-term broad-based data on key variables using statistical methods. The data was collected from both primary and secondary sources. The primary data was collected through interviews and discussions, based on structured and unstructured questionnaires, with the key stake holders. These interactions also generated additional information on trade links and dynamics of unorganized timber market in the country.

### 1.4.1 MAJOR SOURCES OF DATA

- Ministry of Environment and Forests, Government of India
- Forest Research Institute, Dehradun
- Indian Council of Forestry Research and Education (ICFRE)
- Forest Survey of India, Dehradun
- Department of Commerce, Ministry of Commerce and Industry
- Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata
- Department of Land Resources, Ministry of Rural Development
- Planning Commission, Government of India
- Department of Statistics, Ministry of Planning and Programme Implementation
- State Forest Departments
- World Integrated Trade Solution (WITS Data base is managed by the World Bank, UNCTAD and WTO)
- Food and Agriculture Organisation (Forest Statistics)
- International Tropical Timber Organisation (ITTO)
- World Wildlife Fund (WWF)
- World Bank





## 1.4.2 FIELD VISITS, INTERVIEWS AND SURVEY

Field visits, surveys and consultations were conducted in the following regions: Jaipur, Jodhpur (Rajasthan), Sahranpur and Pilibhit (Uttar Pradesh), Yamuna Nagar (timber processing, manufacturing and trade centre in Haryana), Tanjavur (Tamil Nadu), Thiruvananthapuram, Munnar (high conservation value areas/biodiversity hotspots in Kerala) and Kandla (port and timber processing zone in Gujarat).

Inputs from the following key stake holders were used in the study:

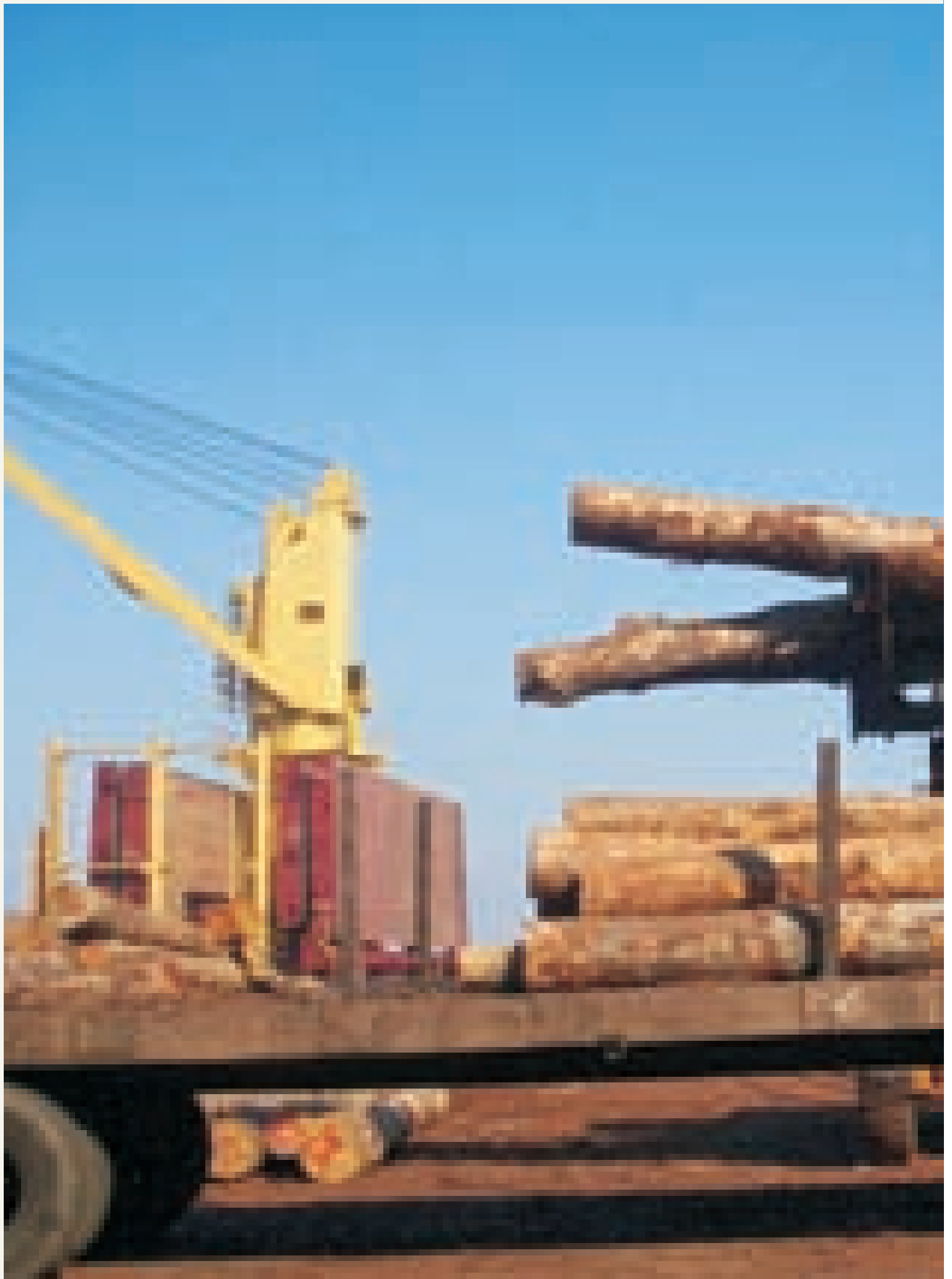
- Forest Department
- Wood processors and manufactures
- Timber traders (including exporters and importers of wood products)
- Plantation managers
- Growers (Agro forestry/farm forestry)
- Business and industry (including timber associations)
- Conservationists
- Research and academic institutions working on timber issues
- Financial institutions
- Certifying institutions
- Customs and port authorities
- Planners and developers

The determinants of timber supply were analysed with the help of the following explanatory model:  $Q_s = f(X_i, D) + U$ , where  $Q_s$  is the supply of timber,  $X_i$  is a set of variables that determines the supply,  $D$  is the dummy variable and  $U$  is the error term. The specification of the model is based on statistical methods.

## 1.5 LIMITATIONS OF THE STUDY

A major limitation of this study was the non availability of disaggregated time series data on several key variables of timber supply. Some of it might be available in the office records, files, annual administration reports of forest, agriculture and revenue departments, but its collection and compilation was constrained by several factors and also beyond the scope of this study. The field visits undertaken were limited to select locations only due to time and budget constraints. Species wise time series trade data was also not available. The assessment of timber supply from outside the forests (such as from farm forestry or agro-forestry) was based on certain assumptions. The study also does not address the extent of illegal timber trade in India.







CHAPTER II

# POLICY FRAMEWORK

## 2.1 FOREST POLICY AND LAW

In the Indian constitution forestry is a concurrent subject; thereby, both the central and state governments can legislate on the issue. However, in case of any conflict between the central and the state laws, the laws enacted by the central government override the laws enacted by the state government. All policies, programmes, strategies and action plans are based on legislation.

The Constitution of India recognizes the need for conservation of forests through several provisions:

**Article 48A:** *“The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.”*

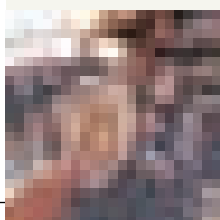
**Article 51A:** *“It shall be the duty of every citizen of India to protect and improve natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.”*

These provisions were made through the Constitution (Forty second Amendment) Act, 1976. The other provisions that relate to the conservation of forests and environment are Article 14 – Equity before Law, and Article 21 – Protection of Life and Personal Liberty.

The scientific management of forests in India began with the appointment of Dietrich Brandis, a German forester, as the first Inspector General of Forests in 1864. Early forest legislation had the focus on the production of commercial timber. The Indian Forest Act, 1927, which is the principal forest legislation, was first drafted in 1865, revised in 1878 and incorporated several amendments thereafter. As per Indian Forest Act, 1927, timber includes trees, when they have fallen or have been felled and all wood whether cut up or fashioned or hollowed out for any purpose.

The Forest (Conservation) Act, 1980, was enacted to address the unregulated diversion of forest land. The Act mandates prior approval of the central government for diversion of forest lands for non forest purposes. It ensures that equal area of land is afforested as a compensatory measure. The rate of forest diversion has decreased considerably since the enactment of this Act.

Estimates show that an extent of 4.328 million ha of forests was converted from 1951 to 1980, indicating forest loss at the rate of 150,000 ha per annum approximately for the duration. After the enactment of the Forest Conservation Act in 1980, the rate of forest loss decreased to 6500 ha per annum. The Act was amended in 1988. The National Forest Policy, 1988, formulated before the Earth Summit, incorporated the principles of sustainable forest management and recognized the forest as environmental and social resource. The policy stated its principal aim as: *“to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim”.*



The policy mandates 33 per cent of land area under forests / tree cover. The focus of National Forest Policy, 1952, the first forest policy of independent India, was on the management of forests for sustained production of timber. As per this policy, the management of national forests “on scientific and business lines is essential for maintaining a sustained supply of wood for industry and of large timber for defence, communications and other national purposes”.

In 1976, the National Commission on Agriculture (NCA) recommended a dynamic programme of production forestry. The National Forest Policy, 1988, addressed unauthorized exploitation of forest resources and loss of biodiversity in the country. It was a shift from the production oriented approaches of the earlier forest policies to conservation oriented participatory approaches.

In 1990, under the provisions of the National Forest Policy, the Government of India issued a notification for Joint Forest Management (JFM), providing a framework for people's participation through village committees in the protection, regeneration and development of degraded forest land in the vicinity of their villages. JFM is presently in operation in 27 states; 85,000 village committees cover over 18 million ha of forest land. The National Afforestation and Eco-development Board (NAEB) was also created for promoting afforestation, tree planting, ecological restoration and eco-development.

Judicial interventions in the implementation of the provisions of National Forest Policy, 1988, and forest laws, as part of a case between T N Godavarman Thirumulpad and others Vs Union of India and others at the Supreme Court of India (Civil writ petition 202/1995), have also contributed to strengthening forest conservation measures in the country.

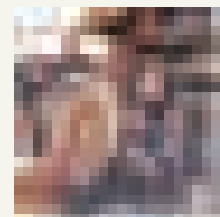
The Government of India had constituted the National Forest Commission in 2003 to review the forest policies and suggest suitable recommendations. The commission, in its report submitted in 2006, made several valuable suggestions and addressed the supply constraints of timber in India. Following are some excerpts:

*“Felling regulations on private lands may be restricted to 'highly restricted tree species', meaning such endangered and valuable tree species which are almost entirely focused in forest areas” ( e.g. sandalwood, red sanders, rose wood, khair, sal, deodar, bhojpatra, etc).*

*“... there should be no restrictions and regulations on the felling and removal of other trees planted on private holdings.”*

*“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.”*

*“Attainment of self-sufficiency in forest products should be an important goal at the state and national levels. For assessing the 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.” (No.34)*



## 2.2 NATIONAL FOREST POLICY 1988 AND TIMBER SUPPLY

The National Forest Policy, 1988, recognizes severe depletion of forests over the years. To address this, the policy placed several restrictions on the extraction of timber for industrial purposes, particularly on private forest based industries. The policy states:

*“No forest should be permitted to be worked without government having approved the management plan, which should be in a prescribed format and keeping with the National Forest Policy.”*

*“Tribes' domestic requirements of fuel wood, fodder, minor forest produce and construction timber should be the first charge on forest produce. These and substitute materials should be made available through conveniently located depots at reasonable prices. Similar consideration should be given to scheduled caste and other poor living near forests.”*

*“Wood is in short supply. The long term solution for meeting the existing gap lies in increasing the productivity of forests. But to relieve the existing pressure on forests for the demands of railway sleepers, construction industry (particularly in the public sector), furniture and panelling, mine-pit props, paper and paper board etc, substitution of wood needs to be taken recourse to.....”*

*“As far as possible, a forest based industry should raise the raw material needed for meeting its own requirements, preferably by establishment of a direct relationship between the factory and the individuals who can grow the raw material, by supporting the individuals with inputs including credit, constant technical advice, and finally harvesting and transport services.”*

*“No forest based enterprises, except that at the village or cottage level, should be permitted in the future unless it has been first cleared after a careful scrutiny with regard to assured availability of raw material. In any case, the fuel, fodder and timber requirements of the local populations should not be sacrificed for this purpose.”*

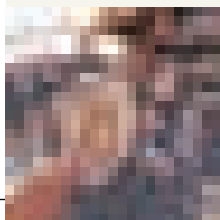
*“Forest based industries must not only provide employment to local people on priority but also involve them fully in raising trees and raw material.”*

*Natural forests serve as a gene pool resource and help to maintain ecological balance. “Such forests will not therefore to be made available to industries for undertaking plantation and for any other activities.”*

*“Farmers, particularly small and marginal farmers, would be encouraged to grow, on marginal/degraded lands available with them, wood species required for industries. These may also be grown along with fuel and fodder species on community lands not required for pasture purposes and by forest department/corporations on degraded forests, not embarked for natural regeneration.”*

*“The practice of supply of forest produce to industry at concessional prices should cease. Industry should be encouraged to use alternative raw materials. Import of wood and wood products should be liberalized.”*

*“.....forests should not be looked upon as a source of revenue. Forests are a renewable asset to be protected and enhanced for well being of the people and the nation.”*



## 2.3 OTHER POLICIES

Supply of timber is also influenced by several other policies including agriculture policy, land use policies, trade policy, investment policies, trade agreements including bilateral, regional and multilateral. India has substantially reduced the tariffs on wood products since 1994 as part of the trade liberalization policies and its ongoing commitment to the WTO. The applied rates for most wood products are between five to 15 per cent, which is below the WTO bound rate of 40 per cent. The additional charges on import of wood products make the effective customs duties higher than the basic customs duties.







A photograph of a dirt path leading through a forest. A large, dark tree trunk is prominent in the foreground on the right side. The path is reddish-brown and leads into the distance. The background is filled with lush green trees and foliage, with sunlight filtering through the leaves.

CHAPTER III

# REVIEW OF LITERATURE

### 3.1 KEY FACTORS AFFECTING TIMBER PRODUCTION AND TRADE

Forest law enforcement, governance and the implications for trade are the key issues affecting the entire wood sector from forests to markets (ITTO, 2004). Forests play a central role in the world's environmental and economic health, and yet they are not adequately protected. Demand for cheap timber promotes illegal and unsustainable logging on a large scale in many key areas.

Global rates of wood consumption may nearly double by 2050. Action is needed now to safeguard the forests to continue to drive their environmental and social benefits (WWF, 2004 & 2007). European Union's Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan provides for broader controls, licensing schemes and partnership agreements between importers and exporters in response to global problem of illegal logging and international trade in illegally harvested timber.

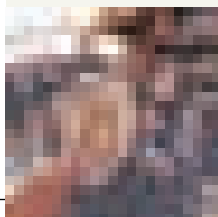
Khanduri & Mandal (2005) analysed the National Forest Policy in the context of wood production in India. In their paper they observe that though wood has always been the most important forest produce and contributes significantly to the national economy, production of timber has been given a low priority in the National Forest Policy.

The paper highlights wood shortage faced by the country, and says relying on imports alone may not be the right recourse. It emphasises priority for wood production to ensure green cover and sustainability of the forests. For example, the demand of raw wood for year 2000 was 58 million cu.m., and the supply available was 29 million cu.m. Compare this with the projected demand of 153 million cu.m. of raw wood in the year 2020 and the projected supply, in the business as usual scenario, of 60 million cu.m. It raises sustainability concern about the industry's complete dependence on imports for its growing timber requirements.

According to their analysis, the National Forest Policy, 1988, in a way missed the focus of the national need for wood production for domestic, infrastructure and industrial purposes. It argues that while the principal aim of the forest management rightly remained environment stability, economic benefit was subordinated to this principal aim and the national need of wood production was ignored. *“Essentials of forest management range from vegetal cover to fuel and fodder but do not mention realization of wood production to the potential of forests. Productivity is oriented towards community needs, which significantly do not indicate inclusion of commercial wood. States have been advised to work for production forestry to reduce the demand supply gap – but emphasis is on fuel wood.”*

Muthoo (2004) noticed growing gap between the increasing demand and an almost static supply of timber in India. The dynamic demand is attributed to resurgent economic growth, fast-expanding middle and upper income groups and intensive construction activity spurred by lucrative housing schemes and rapid urbanisation. Timber supply, on the other hand, is constrained by low per capita forest area, forest degradation, massive fuel wood requirements and restrictions on timber harvesting (ITTO, 2004).

Timber is needed to produce processed, value-added wood products in demand in domestic and international markets. Measures are needed to organize the timber industry, to build multi-stakeholder private-public partnerships and international alliances to raise awareness about the comparative advantages and environmental appropriateness of wood and wood products, and to draw upon the inherent competitiveness of such products in the market.



Midgley et.al (2007) conducted a study on the strategies for developing market opportunities for Australian forest products in India. The study suggested three major themes:

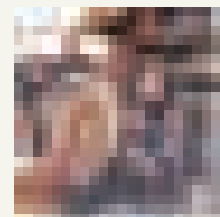
- i. Improved market intelligence, which recognises that reliable and readily available knowledge of India's wood demands are vital, if Australia is to capitalise on the opportunities offered by India's increasing demands for wood. Conversely, India needs to know what Australia has to offer
- ii. Tariff and other barriers need to be addressed. Government-to-government dialogue is vital, if issues fundamental to trade such as tariffs, quarantine, national standards and terminology are to be addressed to mutual satisfaction
- iii. Improved contacts and development of better relationships. Market success in India (as in the rest of Asia) is greatly helped by information and support gained through personal contacts, networks and relationships

The study noticed that India's capacity to expand its commercial plantation base (which is presently providing 76 per cent of round wood in the country) is limited, mainly because of the government policies. Among the constraints in forest plantation development in India are the small budget for reforestation and afforestation, use of seeds and planting stock of poor genetic quality, growing emphasis on the environmental and social aspects of forests at the expense of timber production, and competitive demand for land from the country's expanding population.

Singh (1991) noticed that the widening gap between timber demand and supply had adversely affected the development of forest-based industries in India. It pointed out that India's growing timber requirements cannot be met from imports alone owing to the high cost of scarce foreign exchange, and difficulties in timber transportation and distribution throughout the country. Besides, this can adversely affect timber availability in the source countries.

It pointed out that substitution of wood, as emphasized in the 1988 National Forest Policy, is sometimes confused with its optimum utilization such as replacement of wooden boxes by corrugated board boxes to pack apples and the use of card board in match box manufacture. Singh (1991) suggested that substitution of products like steel and aluminium might not be desirable as a long term policy. Wood is a renewable resource while steel and aluminium are non-renewable and energy intensive. Furthermore, the problems of overburden disposal, landscape damage and environmental degradation are quite serious in the mining of ore and production of steel and aluminium. On the other hand, timber production helps in ecological restoration and conservation. The approach should be to *"improve stocking and productivity to ensure environmental conservation" rather than to "ban felling and forget"*.

Analyzing China and global market, *Forest Trends* (2006) identified India as the next China in terms of consumption of logs. Around 2020, India's population would reach some 1.25 billion; nearly 70 per cent of this aged 16-75 years would be the world's largest working and consuming population. This combined with the economic growth and the growth of the middle class will make significant changes in the consumption levels. The industrial log consumption per annum would grow from 50 million cu.m. at present to 90-120 million cu.m. by 2020. Considering the available information on domestic supply of logs, by 2020 India would be faced with timber deficit of 20-70 million cu.m. (*Forest Trends*, 2006).



Chunquan et al. (2004), while analysing China's wood market, trade and environment, noticed that China's expanding demand for wood is intensifying forest enterprises in many diverse regions outside China. This, the study argued, can result in a larger ecological footprint in the form of migratory logging and indiscriminate forest clearing in the exporting countries. In 2003, China produced an estimated 79 million cu. m. of industrial round wood and imported an additional 94 million cu. m. (RWE). The logging ban and depleted stocks of standing timber have resulted in increasingly small proportion of domestic wood availability in China. The study showed a severe shortage of wood, particularly large diameter logs in China. It highlighted the need for China and its trading partners to reduce the logging of the world's forest resources. The study offers several insights for India.

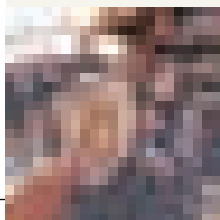
Khare et al. (2000) noticed that the thrust of forestry during the first four decades after independence was on the production of a uniform industrial cropping system, created after clear-felling and cutting back of all growth, except of preferred species.

TERI (2008) reported that India's forests could yield between 139 - 235 million cubic metre annually as compared to available yield of 87 million cu. m. According to the report, the state of soil degradation has severely affected the productivity of forests in India. Comparing the growing stock at the time of independence to the potential growing stock, it observed the need and enormous scope for enhancing the forest resource base over the years. Instead, the nation has depleted the forest resources during the 50 year period (1947-97), and enlarged the difference between the available and potential resource base, the report noted.

Ganguli (2000) noticed that the contribution of natural forests in timber production will continue to decline. Plantation forestry would be the main source for meeting the subsistence market and market wood production needs. About 4 million ha of forest was lost due to diversion of forest areas to non-forest use and encroachment and shifting cultivation between 1980 and 1990. Demand for wood forest product (WFP) in round wood equivalent (RWE) in 2000 was estimated at 55 million cu.m. There was a shortfall of about 26 million cu.m. in the recorded supply. He observed that this unsatisfied demand was probably being met through illicit and clandestine removal from the forests either through connivance or due to lack of enforcement measures.

The demand for wood, including the requirement of small timber for the rural household, is projected at 95 million cu. m. in 2010; 123 million cu.m. in 2015 and 153 million cu.m. in 2020. Ganguly points out that about 33 per cent of recorded forest area (i.e. 22 million ha) would not be available for timber production (15 million ha under sanctuaries and national parks, another 7 million ha under biodiversity rich mangroves, biological corridors, fragile areas in North Eastern Region and Andaman's and areas above 30 degree slopes in Himalayas and Western Ghats).

Krishnankutty et al., (2005) assessed wood balance situation in Kerala. The geographical area of the state is 3.89 million hectare, of which 1.08 million hectare (28per cent) is under forests. The estimates show that the effective demand for wood in the state during 2000-01 was 1.22 million cu.m. Of this, fuel wood accounted for 83 per cent and timber 17 per cent. Home gardens and private estates provided 87 per cent of fuel wood supply in the state. In the case of timber, contribution of forests in the state was only 4 per cent; about 15 per cent requirement was met from other states and imports.



Analysis of data for the period 1988-2001 showed decline in demand for timber in Kerala, particularly in the household sector. The study revealed Kerala as a net exporter of timber with a surplus of 263,000 cu.m. of wood. This is mainly due to the availability of wood from rubber plantations. Since the state's dependence on its forests for timber is negligible, the study suggested that the forests can be reserved exclusively for conservation purposes. Jack wood was the most important timber in both production and consumption in the state.

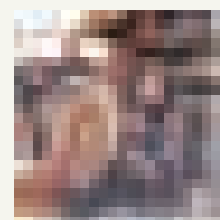
The demand for cheap timbers in the state was met from imported silver oak and eucalyptus wood. Interestingly, these varieties are replacing relatively abundant coconut wood. Export of teak wood products from Kerala to international market however has declined due to non-availability of teak wood in larger girth classes. The study recommended boost for growing timber trees in home gardens to avoid the depletion of the state's wood resources.

The National Forest Commission admits that a preliminary examination of the demand-supply situation of timber and fuel wood in the country presents a very alarming picture. The total timber demand in India was estimated at 64 million cu.m. in 1996, which rose to 73 and 82 million cu.m. in the years 2001 and 2006, respectively. The supplies from natural forests reduced following the directive of National Forest Policy, 1988, which discourages harvesting of natural stands for commercial use, and the 1996 order of the Supreme Court in Civil Writ Petition no. 202/ 1995 (T.N. Godavarman and others Vs the Union of India and others) requiring prior approval of the working plans for harvesting the forests.

The commission noted that only 12 million cu.m. of total demand of 64 million cu.m. timber was estimated to have been sourced from forests, while nearly 31 million cubic metre was estimated to have come from farm forestry and other sources, including imports. The remaining 21 million cu.m. was estimated to have come from unrecorded removal from plantations and natural forests. *“Given the fact that most forests and woodlots of the country are producing far below their potential, the situation calls not only for direct measures for enhancing forest productivity, but also an immediate re-look at the indirect measures (e.g. tariff structures) to protect the domestic growers both in forests and community woodlots. This is also necessary, in turn, for achieving the goal of one-third forest and tree cover in the country.”* (Government of India, 2006)

In the analysis of World Bank (2006), JFM model in India has evolved from an approach heavily oriented towards commercial timber managed by state forest departments (with communities labour) to an approach more supportive of forest conservation with communities sharing the benefits in return for assisting with limited management activities.

The World Bank report estimated that the total forest income from commercial timber, bamboo and non timber products in the JFM areas could rise from US\$ 222 million in 2004 to US\$ 2 billion in 2020. It however noted, *“India is facing serious imbalances between the supply of and demand for wood; and the over harvesting of fuel wood, about 139 million cu.m. above the sustainable supply from regulated sources. Much of the log supply deficit is being met through illegal harvesting, putting additional pressure on the remaining high quality dense forests. The supply demand situation underscores the national government's strong support for forest conservation, manifested through efforts to protect existing forests and grow new plantations under JFM.”*





A photograph showing a large stack of cut logs in a forest. The logs are stacked horizontally, with their circular ends facing the viewer. The background shows a dense forest of green trees. The lighting is natural, suggesting daylight. The logs are of varying diameters and are piled up in a neat stack.

CHAPTER IV

# **TIMBER PRODUCTION, TRADE AND FOREST FOOTPRINT**

## 4.1 TIMBER PRODUCTION

The major sources of domestic production of timber are (i) government owned forests and plantations (ii) farm forestry/agro forestry areas and (iii) private plantations. Of these, only timber produced from the government forests are reported in the official statistics. The production of timber from other sources is usually not accounted for or grossly underestimated. A recent wood balance study and market survey in Kerala, carried out by the Kerala Forest Research Institute (KFRI), shows that most wood in the state timber markets originates from non-forest areas (Krishnankutty et. al, 2005).

The working plans of forest divisions are prepared based on sound forest management principles and scientific silviculture practices. Timber production from the government forests and plantations are regularly reported by the respective State Forest Departments to its economic accounting system as well as at the national level (CSO, 1989; IEG 2001).

The national income accounting system adopts production function approach to estimate the gross value added from forestry and logging<sup>4</sup>. First, the value of output at factor cost is estimated for the selected economic activities and, thereafter, cost of various inputs at the purchasers' prices is deducted. The categories of forest products included in domestic accounts estimates are:

- i. Industrial round wood,
- ii. Firewood and
- iii. Minor forest produce.

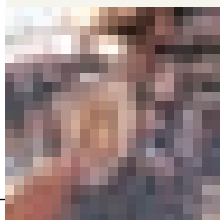
The State Forest Departments maintain records on various aspects of timber extraction, the stock in the depots and revenue generated. The Department of Economics and Statistics carries out collection, compilation and analysis of this information in a specified format for preparing annual reports and other reports. A statistical cell in the forest department head quarters of most states facilitates and strengthens the process of data collection and timely reporting to various agencies, particularly to the Office of State Planning Board or Commission.

Each year Central Statistical Organisation (CSO) also collects data on outturn and prices of identified categories of forest products directly from the state forest departments. In the case of timber, 10 per cent of the value of recorded production is used as estimate for unrecorded production. This estimate is based on a study in timber trends of 1957-58; its revision is recommended by several agencies (IEG, 2001). It is pointed out that the system of national accounting in India underestimates the contribution of forestry.

*Forestry Statistics* published periodically by Indian Council of Forestry Research and Education (ICFRE) records data on timber production from different states. There is a considerable time lag, however, in the production of these reports due to the non availability or non-reporting of data from different states. *Forestry Statistics-2003*, published in 2005, shows improved forestry statistics in many categories. However, data on timber production from several states remained unreported. ITTO has also noticed the poor response from India on providing reliable data on timber production and trade.

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<sup>4</sup> *National Income Accounts Statistics 1989 Sources and Methods*, Central Statistical Organisation (CSO), Government of India.





The Ministry of Environment and Forests (MOEF) is implementing a project to strengthen the reporting systems of forest statistics in the country with the support of ITTO.

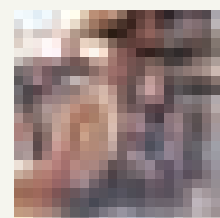
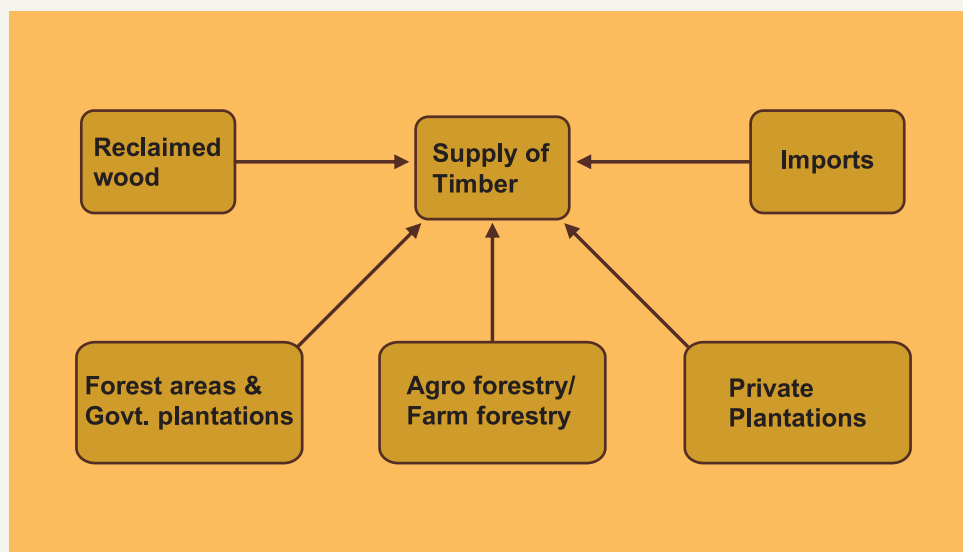


Teak Plantation in Nilambur Forest Division, Kerala

Sal Forests in Pilibhit, Uttar Pradesh

Aside from forest and government plantations, agro-forestry/farm forestry areas and private plantations, the demand shortfall of timber in the country is met through imports and reclaimed wood. Reclaimed wood is the wood extracted from the already used wooden items.

**Figure 4.1:** Major sources of timber supply in India



ITTO's annual review and assessment of the world timber situation estimates 23.19 million cu.m. timber production in India in 2007, which was not sufficient for the domestic requirement (table 4.1). As a result, the nation had to import 3.9 million cu. m. of logs from several countries.

**Table 4.1:** Quantity of production, trade and consumption of timber in India from 2003 to 2007 (units in 1000 cu.m.)

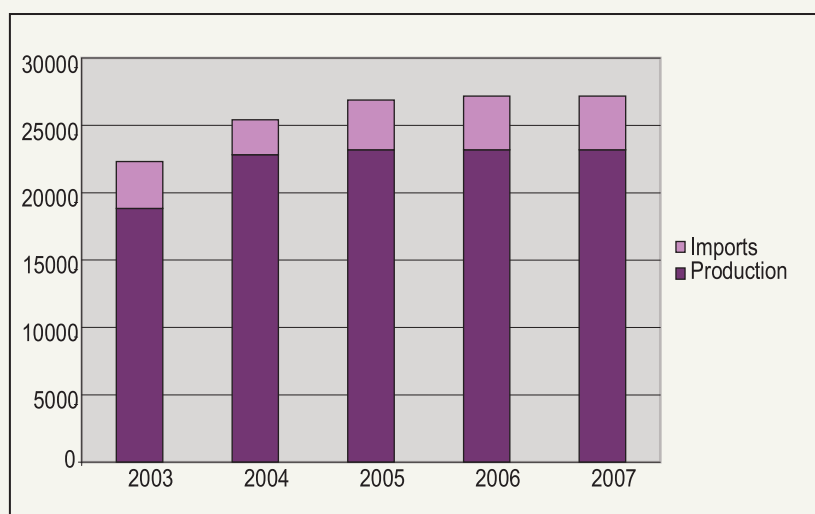
ITEM	2003	2004	2005	2006	2007
Production	18828	22810	23191	23192	23192
Imports	3482	2597	3685	3980	3980
Exports	6	4	7	3	3
Domestic consumption	22304	25403	26869	27169	27169

Source: ITTO(2008)

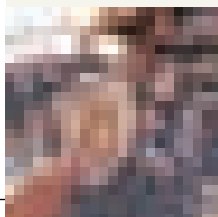
A significant share of these imports might have originated from high conservation value forests in Asia, Africa and Latin America. The exports of logs are negligible due to the restrictions and ban on exporting unprocessed logs. However, export of wooden handicrafts and furniture has increased many folds during the last decade. Table 4.1 shows the quantity of production, trade and consumption of logs in India during 2003 to 2007. The production statistics of timber obtained from various sources are analysed in detail in the following sections.

Forest statistics available from Food and Agriculture Organisation provide data on production of timber and other forest produce from many countries. This is available online and can be easily downloaded to spread sheets for analysis. The data shows that the production of timber (industrial round wood, ply wood, veneer logs and saw logs) in India has registered a fourfold increase from 1961 to 1991 (table 4.2). At the same time, the fuel wood production only grew by two folds, although the extraction of fuel wood was 10 to 15 times higher than that of timber (table 4.2).

**Figure 4.2:** Timber supply in India from 2003 to 2007 (in 1000 cu.m.)



Source: FAO



**Table 4.2:** Timber Production in India from 1961 to 2006 (units in million cu m)

Year	Timber	Fuelwood
1961	6.63	154.73
1971	13.21	192.51
1981	20.46	235.71
1991	24.50	281.73
2001	19.30	277.38
2006	23.19	306.25

Source: Ministry of Environment and Forest, Govt. of India

However, the growth rate of domestic production of timber since 1988 has either declined or is marginal (figure 4.3). In 1961, timber production was 6.63 million cu. m. and fuel wood production was 154.73 million cu.m. In 2006, timber production increased to 23.19 million cu.m. and the fuel wood production increased to 306.25 million cu.m. Timber production fell from 24.50 million cu.m. in 1991 to 19.30 in 2001.

The decrease in domestic production of timber after the introduction of National Forest Policy, 1988, was not unexpected as the policy placed several restrictions on timber extraction. Figure 4.3 shows quantity of timber production and imports from 1966 to 2006. It is evident that the shortage in the production is managed through imports. ICFRE Forest Statistics provides the production data on timber from various states. Table 4.3 gives production data from 1990-91 to 2000-01.

**Figure 4.3:** Timber production and imports in India from 1966-2006

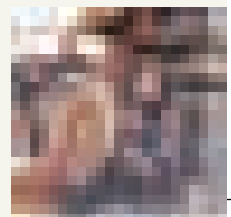
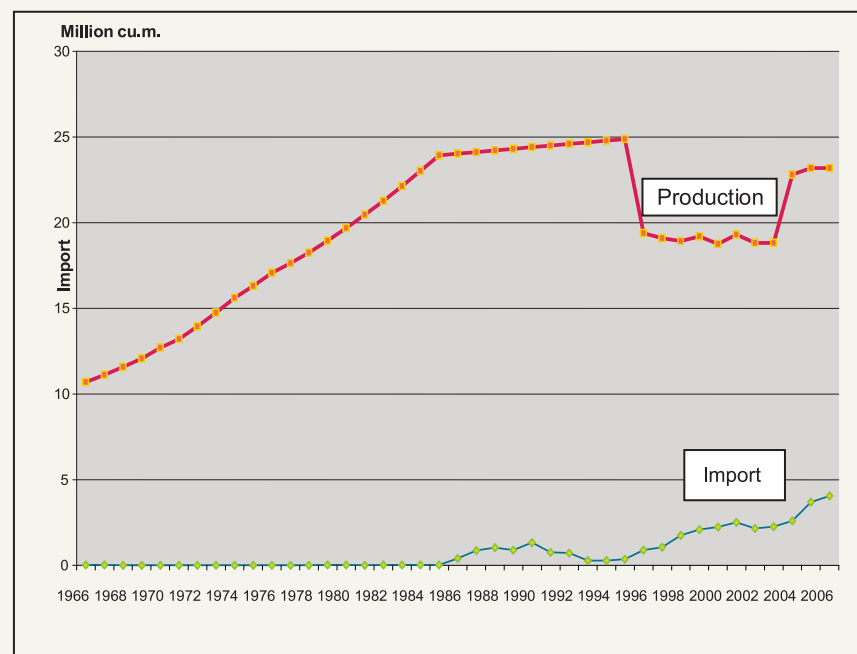


Table 4.3: State wise annual timber production from 1990-91 to 2001-02 (in cu.m.)

States*	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02
Andhra Pradesh	51639	45085	41633	32821	49931	22339	42228	44923	43663	42838	29491	18365
Arunachal Pradesh	212787	372497	345052	345052	345052	345052	31005.44	31005.44	61586	44705	2057	15546
Assam	21120	21120	45545	68329	47059	47059	47059	47059	0	0	47059	47059
Bihar	169545	112553	162505	147735	147735	147229	66000	41178	17008	8034	41178	41178
Goa, Daman and Diu	136	383	306	293	519	193	458	764	13.32	5.7	10144	13538
Gujarat	25125	53000	24250	37375	42500	3600	32800	37500	34402	22654	10129	9671
Haryana	612434	58697	55773	81082	53308	53006	47795	45706	0	0	125345	110937
Himachal Pradesh	312281	356379	390992	371246	449673	425784	451141	460683	411999	0	28219	33593
Jammu & Kashmir	154000	48000	37000	116000	34050	112880	63100	69274	217120	165030	152180	152180
Karnataka	148188	220687	220978	169335	89207	60192	86015	79166	65036	58705	39856	54056
Kerala	39000	42000	51554	51554	123501	61430	519972	19000	26664	44519.26	31299	38915
Madhya Pradesh	685114	732035	569176	51338	609245	517000	517000	674558	391517	159019	242012	564162
Chattisgarh	0	0	0	0	0	0	0	0	0	0	60092	115435
Maharashtra	99954	104434	90176	90006	645534	855534	784450	88880	0	75300	56	45
Manipur	25511	13373	13540	8817	12875	22366	0	0	3503.97	149.51	0	0
Meghalaya	2243	1606	1085	4041	483126	461748	2132	945	607.08	0	0	6
Mizoram	303404	79193	69789	62172	21800	128400	10486	24945	560.66	661.61	5	0
Nagaland	806603	687610	687610	687610	60467	62467	304546	24945	45924	20842	24945	24945
Nagaland	186000	106000	106000	106000	106000	106000	106000	52788	33134.48	0	33868	10423
Orissa	53681	65554	54724	76738	59431	79144	55711	103245	78592	164824	5051	143821
Punjab	931	931	931	931	931	1300	1720	2090	574.6	4874	25676	22541
Rajasthan	0	0	0	0	0	0	46	15	0	0	0	0
Sikkim	716	37863	1259	2840	7492	5385	0	0	0	0	230	142273
Tamil Nadu	52967	21473	21473	21473	5856	1506	1506	513	0	0	298	894
Tripura	486050	520974	410330	469962	337196	403203	185737	330089	476480	0	177182	171297
Uttar Pradesh	0	0	0	0	0	0	0	0	0	0	0	0
Uttara Khand	88252	94754	117164	84489	84903	8855	86363	88728	43487	76875	49097	226782
West Bengal	80581	85713	102143	101861	100653	97279	92465	92465	52342	42426	92465	92465
Andaman & Nicobar	0	43	0	0	0	0	0	0	0	0	0	0
Chandigarh	0	0	0	0	0	0	0	0	0	0	0	0
Dadra & Nagar	0	0	132	304	213	0	0	0	0	0	0	0
Haveli	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>4618262</b>	<b>3881957</b>	<b>3621120</b>	<b>3189404</b>	<b>3337278</b>	<b>4028951</b>	<b>3535735</b>	<b>2360464</b>	<b>1847542</b>	<b>813225.4</b>	<b>1423779</b>	<b>2078232</b>

\* Reported states

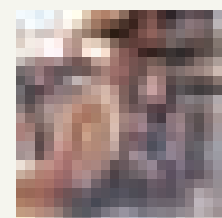
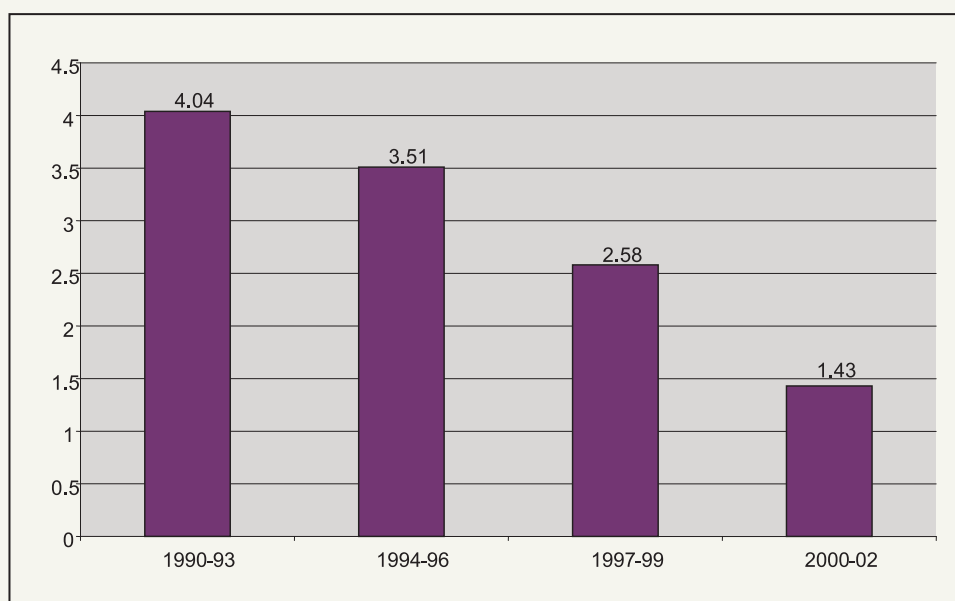
Source: ICFRE, Forest Statistics (Various issues)

It is evident from the data that most of the states show a reduction in timber production from forests and forest plantations. The triennial annual average for these estimates have been worked out for the period 1990-91 to 1992-93 (TA1); 1993-94 to 1995-96 (TA2); 1996-97 to 1998-99 (TA3) and 1999-00 to 2001-02 (TA4). The estimates show fall in the quantity of timber produced in most states.

The total timber production of the reported states declined by 12.92 per cent between the period TA1 and TA2. There was 26 per cent reduction between TA2 and TA3 and 44.27 per cent reduction between TA3 and TA4 (table 4.4). While most of the states show overall reduction in the quantity of timber production from the forests and forest plantations, some states such as Punjab and Rajasthan have shown an increasing trend. The wood based industry, particularly manufacturing and wooden handicrafts exports, have shown substantial progress in these states.

The triennial average of timber production from the forest areas of the reported states fell from 4.04 million cu.m. in 1990-93 to 1.42 million cu.m. in 2000-02 (figure 4.4).

**Figure.4.4:** India's triennial average of timber production from forests for data period 1990-93 to 2000-02 (units in million cu.m.)



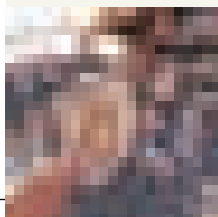
**Table 4.4:** State wise triennial average of timber production for data period 1990-91 to 2001-02 and percentage change

	Annual production of timber -quantity Triennial average (cu.m.)				Percentage Change		
	TA1	TA2	TA3	TA4			
States*	1990-91 to 1992-93	1993-94 to 1995-96	1996-97 to 1998-99	1999-00 to 2001-02	From TA1 to TA2	From TA2 to TA3	From TA3 to TA4
Andhra Pradesh	46119	35030.33	43604.67	30231.33	-24.04	24.48	-30.67
Arunachal Pradesh	310112	345052	41198.96	20769.33	11.27	-88.06	-49.59
Assam	29261.67	54149	31372.67	47059	85.05	-42.06	50.00
Bihar	148201	147566.3	41395.33	30130	-0.43	-71.95	-27.21
Goa, Daman and Diu	275	335	411.7733	7895.9	21.82	22.92	1817.54
Gujarat	34125	27825	34900.67	14151.33	-18.46	25.43	-59.45
Haryana	242301.3	62465.33	31167	78760.67	-74.22	-50.11	152.71
Himachal Pradesh	353217.3	415567.7	441274.3	20604	17.65	6.19	-95.33
Jammu & Kashmir	79666.67	87643.33	116498	156463.3	10.01	32.92	34.31
Karnataka	196617.7	106244.7	76739	50872.33	-45.96	-27.77	-33.71
Kerala	44184.67	78828.33	188545.3	38244.42	78.41	139.18	-79.72
Madhya Pradesh	662108.3	392527.7	527691.7	321731	-40.72	34.43	-39.03
Chattisgarh	-	-	-	58509	-	-	-
Maharashtra	98188	336698.3	291110	25133.67	242.91	-13.54	-91.37
Manipur	17474.67	14686	1167.99	49.83667	-15.96	-92.05	-95.73
Meghalaya	1644.667	316305	1228.027	2	19132.16	-99.61	-99.84
Mizoram	150795.3	70790.67	11997.22	222.2033	-53.06	-83.05	-98.15
Nagaland	727274.3	270181.3	125138.3	23577.33	-62.85	-53.68	-81.16
Orissa	132666.7	106000	63974.16	14763.67	-20.10	-39.65	-76.92
Punjab	57986.33	71771	79182.67	104565.3	23.77	10.33	32.06
Rajasthan	931	1054	1461.533	17697	13.21	38.67	1110.85
Sikkim	0	0	20.33333	0	-	-	-100.00
Tamil Nadu	13279.33	5239	0	47501	-60.55	-100.00	-
Tripura	31971	9611.667	673	397.3333	-69.94	-93.00	-40.96
Uttar Pradesh	472451.3	403453.7	330768.7	116159.7	-14.60	-18.02	-64.88
Uttara Khand	0	0	0	140875.7	-	-	-
West Bengal	100056.7	59415.67	72859.33	51359	-40.62	22.63	-29.51
Andaman & Nicobar	89479	99931	79090.67	75785.33	11.68	-20.85	-4.18
Chandigarh	14.33333	0	0	0	-100.00	-	-
Dadra & Nagar Haveli	44	172.3333	0	0	291.67	-100.00	-
<b>Total</b>	<b>4040446</b>	<b>3518544</b>	<b>2581247</b>	<b>1438412</b>	<b>-12.92</b>	<b>-26.64</b>	<b>-44.27</b>

## 4.2 TIMBER IMPORTS

The National Forest Policy, 1988, encourages liberalization of timber imports in order to meet the nation's timber needs and reduce pressure on its forests. This, supported by the country's policies of economic liberalization since 1991, has resulted in large scale imports of timber.

The analysis of FAO data on industrial round wood imports by India from 1990 to 2006 revealed that the quantity of imports declined in the early nineties but the same began to increase a few years later (table 4. 5).



The decline in imports in the early nineties (from 1.3 million cu.m. in 1990 to 0.28 million cu.m. in 1994) was associated with the economic crisis faced by the country during the period and the introduction of major economic liberalization.

The volume of imports increased from 0.28 million cu.m. in 1994 to 4.04 million cu.m. in 2006. The ITTO data showed that the imports of logs to India increased from 3.48 million cu.m. in 2003 to 3.98 million cu.m. in 2006.

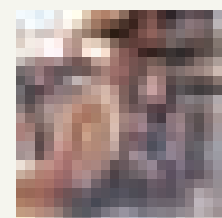
**Table 4.5:** Imports of industrial round wood from 1990 to2006

Year	Import (value in US \$)	Import -quantity (cu.m.)
1990	239281	1334608
1991	167533	765206
1992	210679	726419
1993	32563	272463
1994	40093	284651
1995	50749	355580
1996	110065	893600
1997	132228	1052400
1998	188358	1761300
1999	200639	2099000
2000	394077	2231900
2001	419246	2505200
2002	402156	2144000
2003	436687	2264806
2004	427086	2597252
2005	633892	3685407
2006	680802	4042514

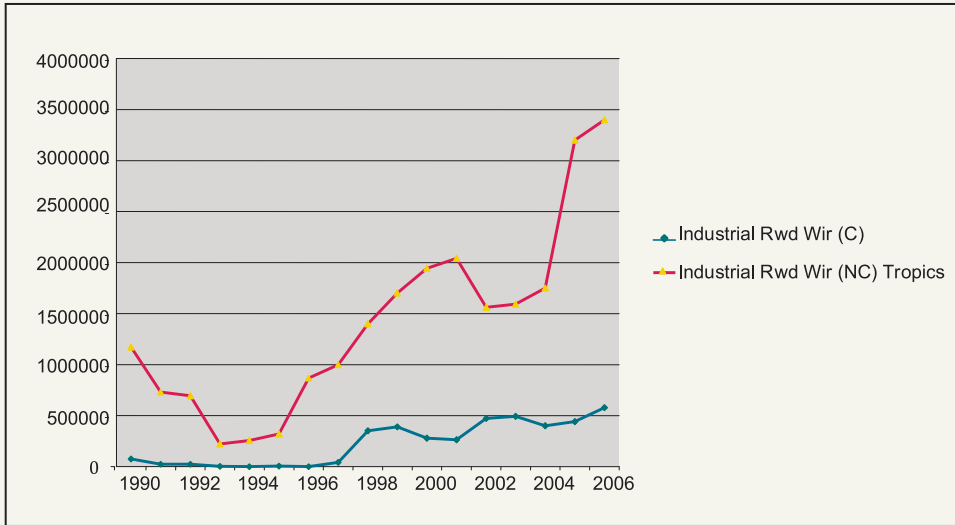
Source: FAO

The volume of timber imports is likely to grow much faster in the next two decades unless the domestic production is increased in the country through adequate policy interventions (figure 4.5). Since the production from the forest areas is unlikely to change or may even fall, there is a need to encourage timber production from other areas (such as farm forestry, agro forestry, private plantations, etc.).

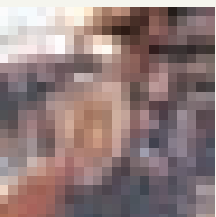
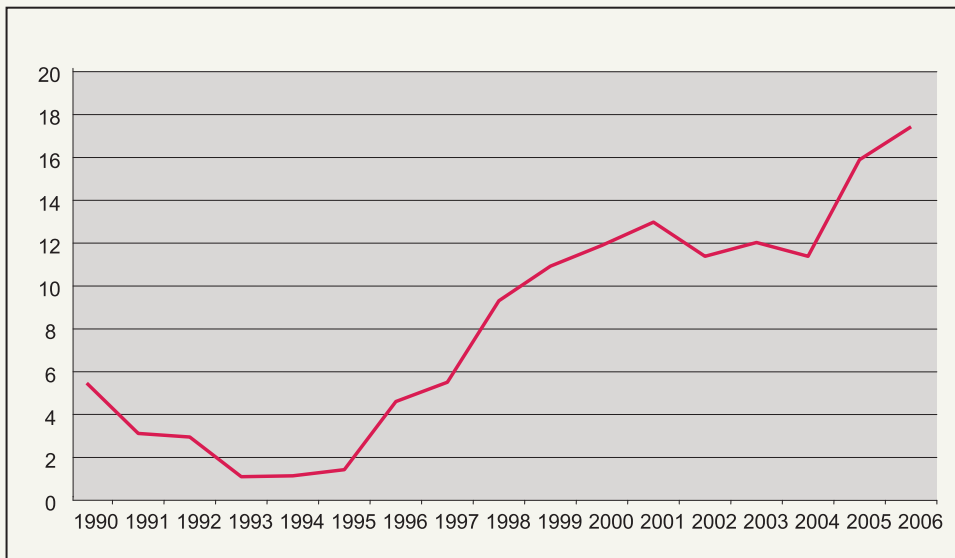
The share of imports to domestic production of timber (industrial wood) has increased from 2 per cent in 1994 to 17 per cent in 2006 (figure 4.6).



**Figure 4.5:** India's imports of industrial round wood from 1990 to 2006



**Figure 4.6:** Percentage share of imports in domestic timber production





India has reduced tariffs on wood products as part of trade liberalization policies and commitment to the WTO. Although the bound tariff rate for wood products is set at 40 per cent, the applied rates of most wood products range between 5 to 15 per cent. It is expected that the tariffs will be further reduced between 0 to 5 per cent by 2012.



Imported timber at Kandla port

It is pointed out that by using imported timber India can become a major producer of secondary, value added wood products that could be sold both domestically and internationally. This requires adequate measures to organize the timber industry and build multi-stake holder, public-private partnerships and international alliances to raise awareness about the comparative advantages and environmental appropriateness of such products in the market (ITTO, 2004).

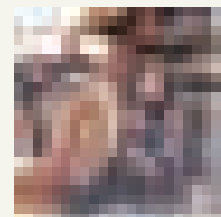
### 4.3 WOOD CARVING INDUSTRY AND EXPORTS

The wood carving industry in India is one of the finest cottage industries in the world. The major wood carving centres in the country are located in the states of Uttarakhand, Uttar Pradesh, Rajasthan, Gujarat, Arunachal Pradesh, Jammu & Kashmir, Madhya Pradesh and Kerala. There are approximately 90,089 carving centres and about 260,933 artisans<sup>5</sup>.

Key species used in wood carving include *Dalbergia sisso*, *Mangifera indica*, *Dalbergia latifolia*, *Tectona grandis*, *Acacia nilotica*, *Wrightia sp.*, *Shorea robusta*, *Cocus nucifera*, *Santalum album*, *Gmelina arborea*, *Juglans regia*, *Cedrus deodara*, *Toona ciliate*, *Juglans regia*, *Artocarpus heterophyllus* and coffee roots.

India is one of the largest producers of carved wood products in the world. The major export markets of these products are USA (about 26 per cent); the UK (about 12 per cent); Germany, the Netherlands, Japan, Italy, France, Canada, Australia, Saudi Arabia

<sup>5</sup> WWF (2003), *Relevance of certification to the wood carving industry in India*, WWF-India. New Delhi.



and Switzerland. The government of India provides several incentives to increase export of wooden handicrafts. As a result, the exports of wooden handicrafts have increased from Rs.6.1 crore in 1975-76 to more than Rs.600 crore in 2007-08<sup>6</sup>. The industry predominantly sources wood from domestic sources, largely from the state forest departments and the private growers.

### 4.3.1 SAW MILLS

There are about 23,000 saw mills in the country; about 98 per cent of these are small with annual log intake of approximately 3000 cu. m. The total production capacity is estimated at 27.12 million cu.m. per annum. However, their capacity utilization is below 50 per cent. The sawn wood produced by these mills is used for construction (28 per cent), joinery (27per cent), box making (18 per cent), furniture (11 per cent), sleepers (8 per cent) and others (8 per cent).

Other forest based industries include units making wooden panels, safety matches, pencils, sports goods, wood working, paper and pulp<sup>7</sup>.

### 4.3.2 PAPER AND PULP SECTOR

The paper industry is a high priority industry for the government of India. It comprises more than 600 mills and provides direct and indirect employment to 1.3 million people. The demand for paper in Indian market is growing at 7-8 per cent per annum and is likely to grow further.

Presently, the annual production of paper and paper boards in India is around 6 million tones, whereas the demand is more than 7 million tones. The balance is met through imports.

The industry is constrained by poor quality and uncertain availability of raw materials from domestic sources (particularly wood, bamboo and waste paper); low productivity due to the use of obsolete technology (mostly by the small and medium industries); high cost of production (in comparison to manufacturing elsewhere) and compliance with environmental regulations.

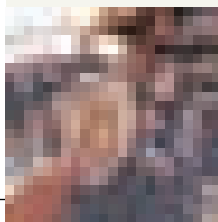
In order to capture the growing demand, the industry is investing heavily in plantations and manufacturing in India and abroad. Globally the Paper and Pulp industry is planning to establish 5 million ha of plantations per year over the next five years. The present annual per capita consumption of paper in India is 4.5 kg (as against 175 kg in developed countries) and this is likely to double by 2012.

## 4.4 SPECIFIC CASES

Western Ghats and Eastern Himalayas are the world's two biodiversity hotspots located in India. Therefore, the states of Kerala and Uttar Pradesh located in these areas were chosen to understand timber production and its associated effects on forest conservation and timber trade. In Uttar Pradesh special attention is given to Pilibhit district, which is a part of Terai Arc Landscape (TAL).

<sup>6</sup> "Export Promotion Council for Handicrafts (EPCH)" Ministry of Textiles, Government of India

<sup>7</sup> Saigal Sushil and Bose Sanghamitra, 2003, *Small and medium forest enterprises in India*, Winrock International, India, New Delhi and International Institute for Environment and Development, London, UK



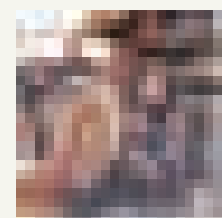
#### 4.4.1 TIMBER PRODUCTION IN KERALA

Kerala has a geographical area of 3.89 million ha of which 28 per cent (1.08million ha) is forest area. The extent of teak plantations in the state is around 78,000 ha. Kerala has the history of managing teak plantations since 1844. However, presently timber supply in the state is largely sourced from trees outside the forests (TOF), including rubber plantations and other agro-forestry systems. A recent study by KFRI estimated that forests contributed only 4 per cent of the total supply of wood ( around 2.065 million cu.m.) during 2000-01, whereas the rubber estates contributed 40 per cent and home gardens and other estates contributed 41 per cent (Krishnankutty et.al, 2006).

An analysis of timber extraction from different forest divisions of Kerala state during 1995 to 2005 showed that the production of most of the species, except teak, had declined (table 4.6).

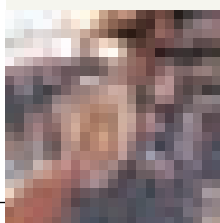
**Table 4.6:** Annual average of timber extraction from Kerala forests for 1995-2005 (units in cu.m.)

S.no.	Timber Species	Annual average	1995-2000	2001-05	Difference
	(common name)	1995-2005			
1	Teakwood	35050.75	28910.02	42419.62	13509.61
2	Rosewood	299.18	394.14	185.23	-208.91
3	Anjili	345.85	545.51	106.27	-439.24
4	Thembavu	179.68	316.22	15.84	-300.38
5	Venteak	511.42	842.22	114.47	-727.75
6	Venga	126.06	189.99	49.35	-140.64
7	Maruthu	1223.58	1972.49	324.88	-1647.62
8	Kambakam	158.91	284.78	7.87	-276.91
9	Karakil	13.95	25.58	0.00	-25.58
10	Nanku	22.51	41.27	0.00	-41.27
11	Poovam	58.31	78.58	33.99	-44.59
12	Kulamavu	147.70	206.66	76.94	-129.72
13	Plavu	25.88	40.95	7.81	-33.14
14	White Pine	23.26	41.11	1.85	-39.26
15	Elavu	361.36	539.51	147.57	-391.95
16	Irul	686.10	901.27	427.89	-473.38
17	Pala/ Mukkam Pala	75.44	100.63	45.21	-55.43
18	Thanni	192.02	299.55	62.99	-236.57
19	Manimaruthu	75.37	117.45	24.88	-92.57
20	Yellow Kadambu	20.48	35.93	1.95	-33.98
21	Myla	31.68	51.75	7.60	-44.15
22	Akil	195.16	314.53	51.91	-262.62
23	Paikadukka	4.47	7.39	0.96	-6.42



**Table 4.6 contd.:** Annual average of timber extraction from Kerala forests for 1995-2005  
(units in cu.m.)

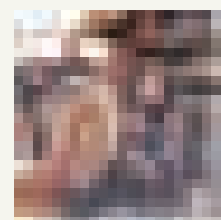
24	Venkotta	6.22	10.75	0.79	-9.97
25	Mango	8.73	13.81	2.63	-11.17
26	Charu	8.90	13.18	3.77	-9.41
27	Kalpine	0.00	0.00	0.00	0.00
28	Mulluvenga	90.90	136.31	36.41	-99.90
29	Unnam /Chadachi	68.88	104.83	25.73	-79.10
30	Kumbil	113.42	198.18	11.69	-186.49
31	Karanjili	10.41	17.34	2.09	-15.24
32	Vediplavu / Mullanpali	2.86	5.25	0.00	-5.25
33	Chandanaveppu / Redsidar	20.22	36.97	0.11	-36.86
34	Malaveppu	12.90	11.21	14.93	3.72
35	Kulavu	0.21	0.00	0.47	0.47
36	Kalmanikyam	3.85	7.05	0.00	-7.05
37	Mahagani	417.47	52.46	855.48	803.02
38	Theettaplavu	0.79	0.91	0.65	-0.26
39	Nasakam / Kanala	18.39	32.12	1.92	-30.20
40	Pali / Palvendijam	30.73	56.33	0.00	-56.33
41	Pathiri	5.78	7.50	3.72	-3.79
42	Karimthakara	12.88	18.17	6.55	-11.62
43	Malamkonna	0.39	0.59	0.15	-0.43
44	Ambazham	1.99	3.42	0.29	-3.13
45	Arayanjili	12.99	23.81	0.00	-23.81
46	Aattuteak	4.79	3.73	6.06	2.33
47	Kara / Rudraksham	3.20	5.30	0.68	-4.62
48	Vetti	8.83	16.18	0.00	-16.18
49	Nedunaru	29.57	45.31	10.69	-34.62
50	Uthi	7.06	10.53	2.90	-7.63
51	Vallabham	2.52	4.62	0.00	-4.62
52	Vatta	22.71	27.38	17.11	-10.26
53	Vellakil	14.69	26.49	0.53	-25.96
54	Thellipine	4.61	8.19	0.31	-7.88
55	Vellakadambu	4.66	7.92	0.75	-7.17
56	Vaka	37.36	35.92	39.10	3.18
57	Cheeni	92.56	145.18	29.41	-115.76
58	Kunnivaka	36.04	37.16	34.70	-2.46
59	Punna	37.39	62.43	7.33	-55.10
60	Mullilam	7.73	12.20	2.36	-9.85
61	Njaval	53.52	92.07	7.26	-84.81
62	Chorapine	3.30	6.04	0.00	-6.04



**Table 4.6 contd.:** Annual average of timber extraction from Kerala forests for 1995-2005 (units in cu.m.)

63	Poochakadambu	0.19	0.30	0.06	-0.24
64	Aval	26.14	45.02	3.49	-41.54
65	Manjiyam	230.36	0.00	506.80	506.80
66	Vellamaram	86.02	0.00	189.24	189.24
67	Other Hardwood	886.49	0.00	1950.27	1950.27
68	Albesia	130.47	0.00	287.04	287.04
69	Pullamaruthu	163.34	0.00	359.36	359.36
70	Mullampala	0.07	0.00	0.16	0.16
71	Karingazha	0.08	0.00	0.17	0.17
72	Kavala	0.86	0.00	1.90	1.90
73	Matti	0.47	0.00	1.03	1.03
74	Others	6887.87	9399.20	3874.27	-5524.93
75	Kanjiram	3.27	0.00	7.20	7.20
76	Kalayam	0.59	0.00	1.30	1.30
77	Kaini	0.45	0.00	1.00	1.00
78	Kadambu	0.00	0.00	0.00	0.00
79	Teak Poles	369593.18	390754.33	344199.80	-46554.53
80	Other Poles	6396.82	2226.50	11401.20	9174.70
81	Sandalwood	85050.21	141068.99	17827.67	-123241.32
82	Bamboo	1022393.46	1601101.50	327943.80	-1273157.70
83	Reeds	41575324.55	48363481.83	33429535.80	-14933946.03
84	Teakwood (Sawn)	10.06	3.03	18.51	15.48
85	Rosewood (Sawn)	7.43	3.26	12.44	9.18
86	Others (Sawn)	18.78	7.59	32.22	24.63
87	Teak Billet	4074.12	3483.73	4782.59	1298.86
88	Rosewood Billet	0.59	0.86	0.28	-0.58
89	Accacia	710.47	398.89	1084.38	685.49
90	Eucalyptus Billet	129.51	0.00	284.92	284.92
91	Eucalyptus	17069.83	22721.41	10287.93	-12433.48
92	Silver Oak	46.57	85.37	0.00	-85.37
93	Cane	5690.36	8666.67	2118.80	-6547.87

Source: Kerala Forest and Wildlife Department



**Figure 4.7:** Production of teak wood from forests and forest plantations managed by Kerala Forests and Wildlife Department (units in cu.m.)

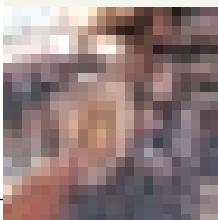


#### 4.4.2 TIMBER PRODUCTION IN PILIBHIT

Pilibhit district in Uttar Pradesh is a part of the Terai Arc Landscape (TAL). The landscape covers an area of 49,500 sq km in India and Nepal stretching from Bagmati river in the east to the Yamuna river in the west. In India, the landscape covers approximately an area of 30,000 sq km across the states of Uttaranchal, Uttar Pradesh and Bihar. Of this, 50 per cent area is under forest cover.

The district of Pilibhit has undergone considerable land use changes in the last 15 years. For a district with one-fourth of its geographical area under forest cover, anthropogenic activities changing the land use pattern are bound to have negative impact on the forests. The increase in population has resulted in a large scale human encroachments and conversion of land for human settlement, agriculture, plantations, infrastructural development, as well as legal and illegal logging, use of forest resources for fuel wood, grazing and extraction of non timber forest produce. Cattle grazing is often accompanied by extraction of unsustainable amounts of fuel wood. From 1993 to 2006, the area under forest cover in Pilibhit has significantly decreased.

The Pilibhit forest division is located in the central part of TAL and shares international border with Nepal. There are several timber routes (official and unofficial) and timber markets in the region. Timber is extracted mainly from the forest plantation areas managed by the forest division as per the approved working plan. The Forest Development Corporation manages these operations, which include transferring the wood to the forest depots, storing, conducting auction and maintaining the records. The Pilibhit Forest Corporation has six depots that supply specific species and grades of timber. Auction for each depot is held on predetermined dates and conducted as per the norms. The traders, agents and construction companies from the local and other markets participate in the process. For years 2002 to 2007 average annual production of timber in the area was about 30,000 cu.m. (table 4.7).



**Table 4.7:** Timber production in Pilibhit Forest Division from 2002-03 to 2006-07

Year	Quantity (cu. m)
2002-03	31545.0605
2003-04	34013.373
2004-05	26274.8977
2005-06	37937.6643
2006-07	29346.8738

Source: Pilibhit Forest Division

Timber from private plantations and agro forestry/ farm forestry sources is logged mostly by middlemen or agents in the timber market. Most of them are saw mill owners and source timber from both forest department and private plantations.

The number of cutting permits issued by the Forest Department in Pilibhit Division decreased from 4080 in 2003-04 to 3968 in 2007-08 (table 4.8).

**Table 4.8:** Number of cutting permits issued by Forest Department (Social Forestry) in Pilibhit Division

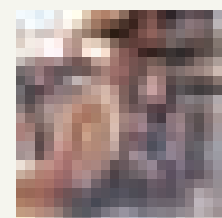
Tehsil	2003-04	2007-08	Change(per cent)
Pilibhit	1348	1915	42.06
Puranpur	1135	1195	5.29
Bisalpur	1597	858	-46.27
<b>Total</b>	<b>4080</b>	<b>3968</b>	<b>-2.75</b>

Source: Pilibhit Forest Division

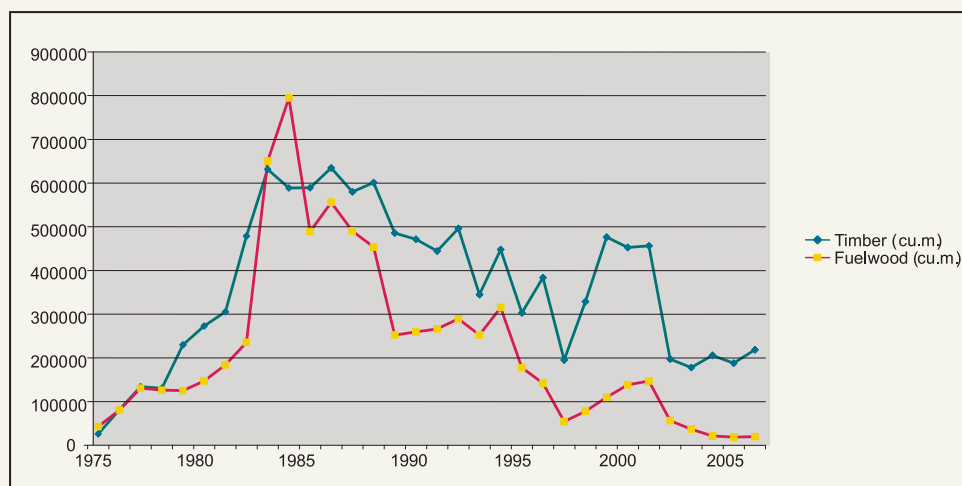
Most of these permits are given for cutting *mango*, *Jamun*, *semal* and *seesham* from private areas. Cutting permit is required for these species. However, in the case of eucalyptus and poplar cutting permit is not needed for their logging on private areas.

Production of timber and fuel wood in the Uttar Pradesh Forest Corporation areas increased substantially during 1974 to 1988 but there after decreased sharply (figure 4.8 and table 4.9).

The changes in the forest policy objectives is one of the reasons determining these changes in the reduction of supply from the forest plantations. However, these policy changes have encouraged farm forestry and agro-forestry activities with a view to address the supply of timber in the long run.



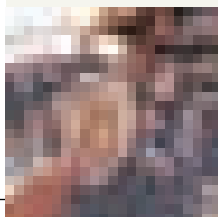
**Figure 4.8:** Annual production of timber and fuel wood by Uttar Pradesh Forest Corporation from 1974 to 2006



**Table 4.9:** Annual production of timber and fuel wood by Uttar Pradesh Forest Corporation from 1974-75 to 2005-06

Year	Timber (cu.m.)	Fuel wood (cu.m.)	Year	Timber (cu.m.)	Fuel wood (cu.m.)
1974-1975	25966	43000	1990-1991	444411	266365
1975-1976	81288	80794	1991-1992	496197	289576
1976-1977	134053	130818	1992-1993	344938	252553
1977-1978	130450	126406	1993-1994	447585	315097
1978-1979	229913	125332	1994-1995	303071	177716
1979-1980	272822	147337	1995-1996	383657	142139
1980-1981	305415	183916	1996-1997	195236	54464
1981-1982	478574	235394	1997-1998	328607	77865
1982-1983	631481	650287	1998-1999	476480	109905
1983-1984	588840	794787	1999-2000	452680	138444
1984-1985	589154	488791	2000-2001	456217	147119
1985-1986	634706	555965	2001-2002	196981	56369
1986-1987	579793	490311	2002-2003	178160	36945
1987-1988	601071	453611	2003-2004	205715	21299
1988-1989	485698	252112	2004-2005	188022	18948
1989-1990	471534	259432	2005-2006	218726	19816

Source: State Forest Department, Uttar Pradesh





## 4.5 FOREST FOOTPRINT: ANALYSIS OF IMPORTED TIMBER

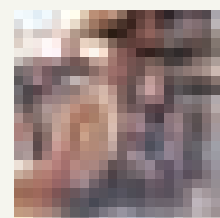
India imports wood from all over the world, including the critical ecoregions like Heart of Borneo, Congo and Amazon. Kandla port in Gujarat handles more than 50 per cent of timber imported in the country. This study analyses the species and the source of imported timber to assess India's forest footprint.

The Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata, keeps complete record of all timber imports made available to it by the customs department. The study utilizes this primary data to understand the origin of the imported timber, the species, the charges and the additional charges levied on the cost price of the imported timber.

State Forest Department issues transit permit for the imported wood and maintains species wise data on the quantity of timber transported. In addition to this, the Ministry of Agriculture, government of India, has established an office that verifies and issues a certificate of compliance under the Plant Quarantine Act to ensure that the imported wood is not bringing any pests or plant diseases to the country. This office also maintains species wise information on imported timber.

The quantity of timber imported through Kandla port during 2001-06 and the top 10 imported species are given in table 4.10.

Salangan batu makes 21.25 per cent of timber imported through Kandla port; its annual average of imports for 2001-06 was 339,135 cu.m. The share of New Zealand pine was 18.46 per cent (294,669 cu.m. per year), meranti was 14.66 per cent (234,059 cu.m. per year) and teak was 13.86 per cent (221,233 cu.m. per year) for the same period.



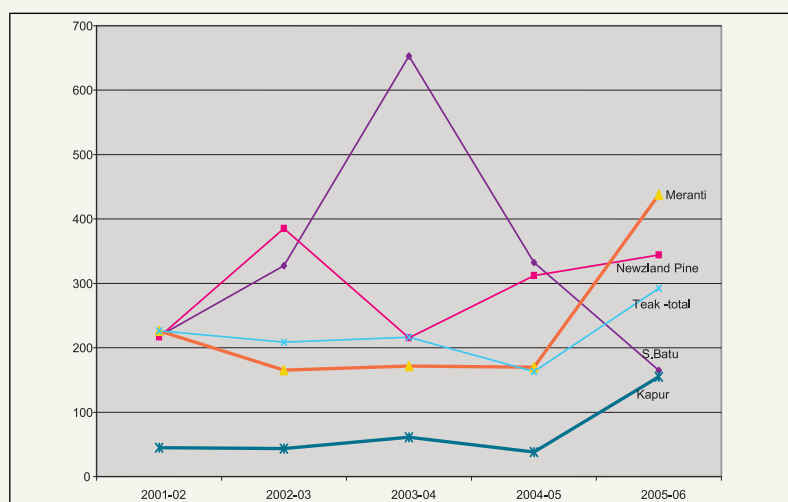
**Table 4.10:** Quantity of top 10 timber species imported from 2001 to 2006 through Kandla port (units in cu.m.)

Timber –Species	2001-02	2002-03	2003-04	2004-05	2005-06	Annual Average (2001-02 to 2005-06)	Share (per cent)
S. Batu	217963.70	327354.34	652807.49	332583.16	164964.65	339134.67	21.25
New zland Pine	216559.58	385321.99	215257.43	311967.22	344233.36	294667.92	18.46
Meranti	226243.14	165128.87	171579.33	169783.87	437561.19	234059.28	14.66
Teak	226304.51	208458.80	216494.12	162931.64	291977.09	221233.23	13.86
Keruing	59679.74	37073.67	40121.63	226822.73	90128.01	90765.16	5.69
Pine- Others	109032.89	59778.96	106235.26	89186.08	46686.98	82184.03	5.15
Kapur	44812.49	43552.05	60989.74	37734.03	155112.70	68440.20	4.29
Gurjal(Gurjan)	35557.11	38351.22	47731.10	70677.65	85590.96	55581.61	3.48
Rezak	30828.91	24199.51	28267.10	30652.14	76155.12	38020.55	2.38
Arau	28406.52	25659.43	37952.35	23309.07	73932.68	37852.01	2.37
Others	143771.22	97455.80	80260.04	228854.07	121391.14	134346.45	8.42
<b>Total</b>	<b>1339159.82</b>	<b>1412334.63</b>	<b>1657695.59</b>	<b>1684501.66</b>	<b>1887733.88</b>	<b>1596285.11</b>	<b>100.0</b>

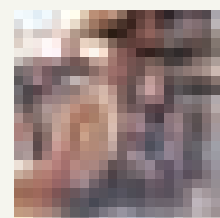
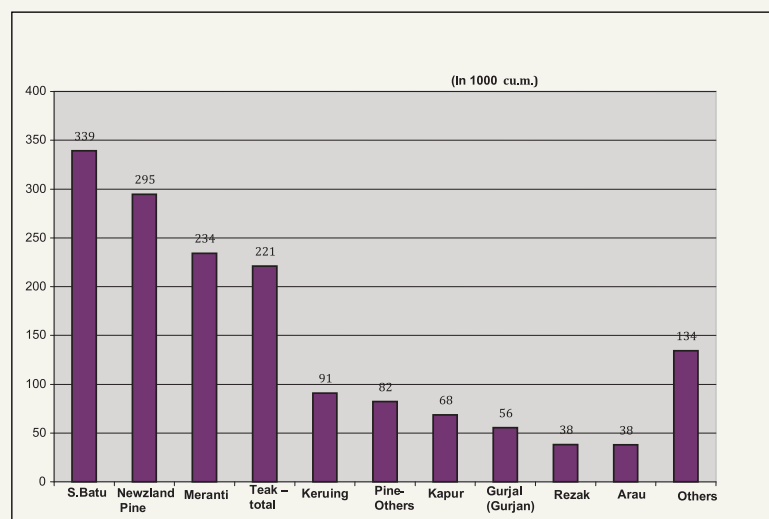
The top 10 timber species imported through Kandla port during 2001-06 were salangan batu, New Zealand pine, meranti, teak, keruing, pine- others, kapur, gujral, rezak, and aravu. These 10 species together share 91 per cent of the total imports in terms of volume.

Year-on-year change in the volume of imports of the selected timber species showed that the imports of merandi and kapur had increased substantially during 2001-06 (figure 4.9), whereas salangan batu imports showed steep increase during 2001-04 but decreased during 2004-06.

**Figure 4.9:** Imports of selected species of timber from 2001 to 2006 (units in 1000 cu.m.)

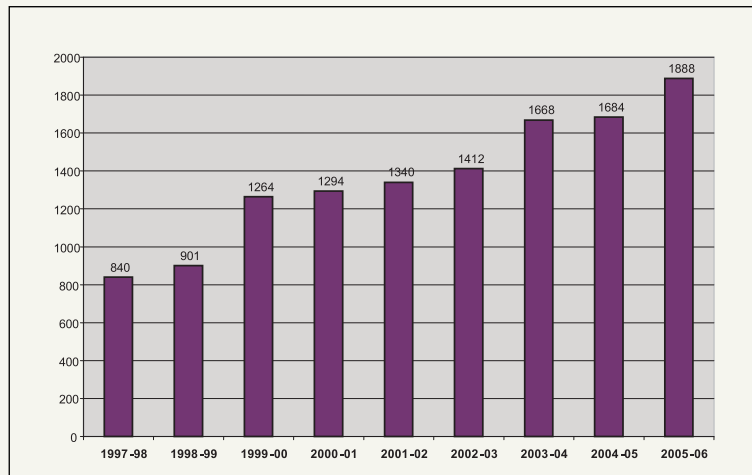


**Figure- 4.10:** Annual average of imports of major timber species for 2001-06 through Kandla port



The annual average of imports of top 10 timber species through Kandla port during 2001-06 is shown in figure 4.10. Of these, the share of four species, viz., salangan batu (3.39 million cu.m./year), New Zealand pine (2.95 million cu m/year), meranti (2.34 million cu m/year) and teak (2.21 million cu m/year) are substantial. The volume of timber imported through Kandla port has increased from 0.84 million cu.m. in 1997-98 to 18.88 million cu.m. in 2005-06 (figure 4.11).

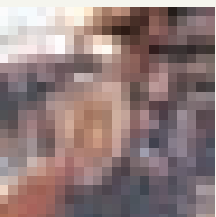
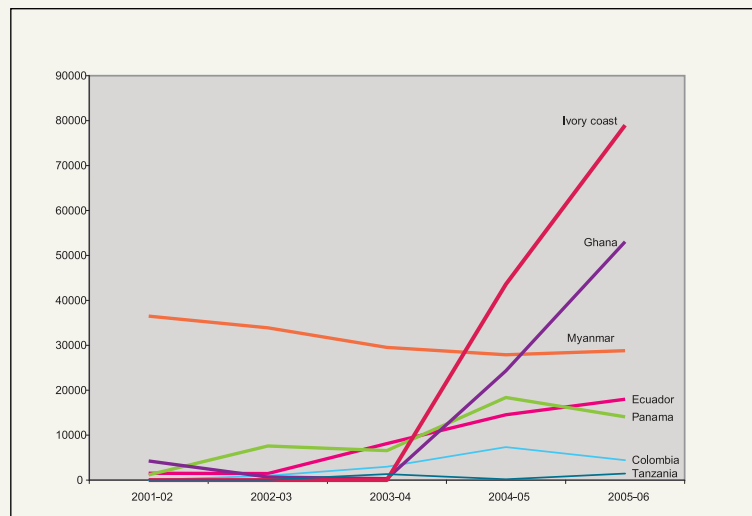
**Figure 4.11:** Quantity of timber imported from 1997-98 to 2005-06 through Kandla port (figures in 1000 cu.m.)



## 4.6 TEAK IMPORTS

India imports teak wood from several countries and the share of African countries and Latin America has substantially increased since 2003-04 (figure 4.12).

**Figure 4.12:** Trends in India's teak imports from different countries from 2001-02 to 2005-06 through Kandla port (units in cu.m.)



The teak imports from Myanmar had declined during 2001-06, whereas those from African countries such as Ivory Coast, Ghana had increased many folds (table 4.11). The imports of teak from Latin American countries had also shown substantial increase during the period.

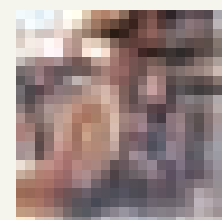
**Table 4.11:** Annual average of teak imports for 2001-02 to 2005-06 through Kandla port

Country of Origin	Quantity (cu.m.)	Share to total (per cent)	Country of Origin	Quantity (cu.m.)	Share to total (per cent)
Teak –African	93101.80	42.083	Teak - BURKINA	272.52	0.123
Teak – Myanmar	31305.86	14.151	Teak - Uganda	160.43	0.073
Teak -Ivory coast	24508.36	11.078	Teak - Madera	158.18	0.071
Teak –Ghana	16507.21	7.461	Teak - Hongkong	100.37	0.045
Teak-Panama	9527.11	4.306	Teak Plntn Teak	92.02	0.042
Teak-Ecuador	8743.60	3.952	Teak - Guwatimala	70.37	0.032
Teak (not mentioned)	7535.25	3.406	Teak- Canada	61.10	0.028
Teak - Cote D Ivore	4956.87	2.241	Teak (Suriname)	60.87	0.028
Teak -Togo	4739.29	2.142	Teak_Mali	52.75	0.024
Teak -Nigeria	4330.83	1.958	Teak -ROLLIZA	51.01	0.023
Teak - Costa Rica	3753.50	1.697	Teak - Boide	50.77	0.023
Teak - Colombia	3153.60	1.425	Teak (SIERRA LEONA)	39.10	0.018
Teak - Venezuela	2915.14	1.318	Teak(Mouritious)	17.52	0.008
Teak - Round logs	1176.41	0.532	Teak -Srilankan	16.66	0.008
Teak - Tanzania	627.51	0.284	Teak - Conakry	16.20	0.007
Teak -Sudan	548.97	0.248	Teak - European	13.50	0.006
Teak - Australian	523.67	0.237	Teak (Italy)	11.96	0.005
Teak - IVOIRE	469.77	0.212	Teak - Indonesian	11.20	0.005
Teak - Malasian	423.61	0.191	Teak - Belzum	8.59	0.004
Teak - Salvador	415.87	0.188	Teak -France	7.11	0.003
Teak - GUINEA	357.68	0.162	Teak - Germany Teak	6.44	0.003
Teak- American	327.81	0.148	Teak - Mombasa	4.84	0.002
			<b>Teak -total</b>	<b>221233.23</b>	<b>100</b>

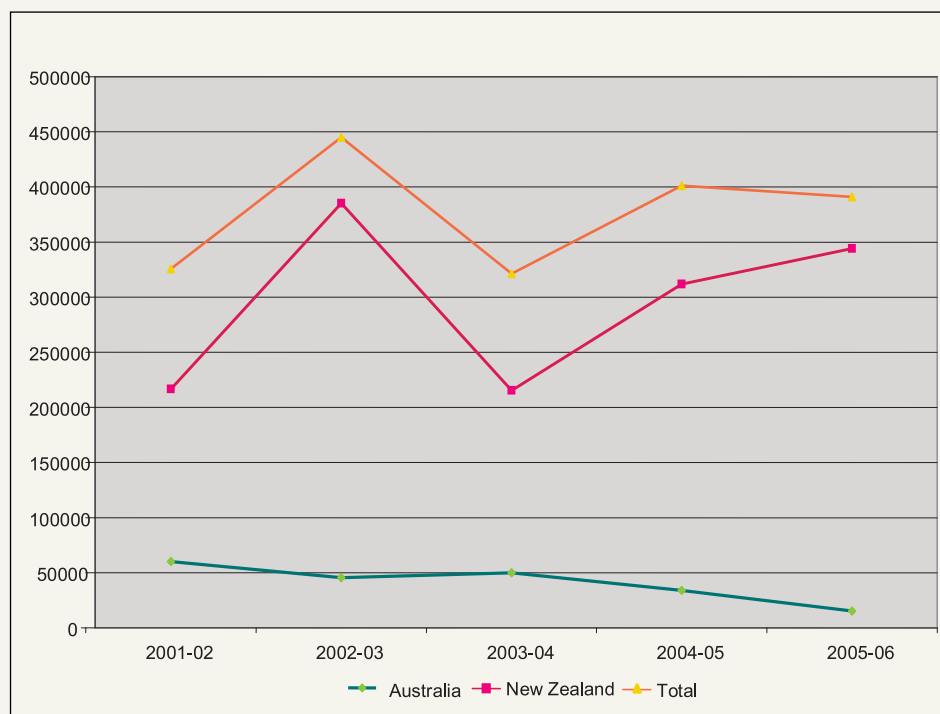
Source: Kandla Port Trust, Gujarat Forest Department, & Kandla Timber Association

## 4.7 PINE WOOD IMPORTS

India imports rough pine wood from New Zealand and Australia. This wood is mainly used in India by the packaging industry. Hospitality industry also has a high potential for its use in resorts construction.



**Figure 4.13:** Trends in India's pine imports from 2001 to 2006 (units in cu.m.)

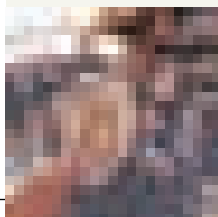


## 4.8 INDIA'S IMPORTS FROM MYANMAR AND MALAYSIA

India's timber imports from Myanmar have decreased, but the demand for Myanmar wood is very high owing to its quality. A comparative analysis of data compiled from Kandla port on the average unit cost of wood from Myanmar and Malaysia showed close to three times cost difference: average unit cost of Myanmar wood was Rs. 20,826 per cu. m., while the cost of wood from Malaysia was Rs.7637. (table 4.12 and 4.13).

**Table 4.12:** India's timber imports from Myanmar from Jan 2005 to Dec 2006 through Kandla port

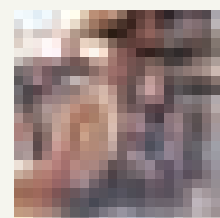
HS(ITC)	Quantity (cu.m.)	Value (INR)	Unit value (Rs/cu.m.)
44032090	472	6914102	14655
44034910	61224	1801396808	29423
44034990	29829	507112009	17001
44039913	2743	44618408	16268
44039929	71377	1092314892	15303
44089010	54	988265	18301
44089090	183	1677562	9167
44121490	59	947381	16017
<b>Grand Total</b>	<b>165941</b>	<b>3455969428</b>	<b>20826</b>



**Table 4.13:** India's timber imports from Malaysia from Jan 2005 to Dec 2006 through Kandla port

HS(ITC) Code	Quantity (cu.m.)	Value (Rs)	Unit value (Rs/cu.m.)
44032090	32141	265685606	8266
44034100	91374	701944804	7682
44034910	208903	1532138987	7334
44034990	285126	2255028652	7909
44039100	1317	13270506	10074
44039911	124	1577181	12696
44039921	30186	382161501	12660
44039923	633	3918170	6192
44039926	751	5704028	7591
44039929	1273166	9531037350	7486
44103110	284	1911767	6740
<b>Grand Total</b>	<b>1924005</b>	<b>14694378551</b>	<b>7637</b>

Source: Customs Office, Kandla port.







A photograph of a forest landscape. In the foreground, a large, dark green tree stands prominently on the right side. The background shows a valley with rolling hills and a forest of smaller trees, some with yellow and orange foliage, suggesting an autumn setting. The sky is bright and slightly hazy.

CHAPTER V

# DETERMINANTS OF TIMBER SUPPLY

## 5.1 DETERMINANTS OF TIMBER SUPPLY

The supply of timber is determined by several factors, including the forest conservation measures. The National Forest Policy, 1988, has influenced the method and systems in production, trade and consumption of timber in India. Some of the key policy measures that have determined timber trade and use are:

- i. liberalization of timber imports
- ii. Restriction on export of unprocessed wood
- iii. Community participation in forest management (JFM/VFM)
- iv. Promotion of tree plantations on private and community land (through strengthening agro-forestry and farm forestry systems)
- v. Forest management for ecosystem services and not for extracting timber and revenue generation
- vi. Forest based industries required to raise own plantations through farm forestry/ agro forestry
- vii. Restrictions on issuing licences for new forest based industries
- viii. Promotion of timber substitutes
- ix. Reuse and recycling of paper and timber products promoted

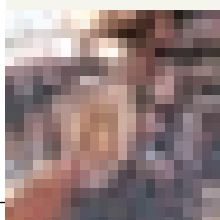
These measures are in addition to restrictions on logging and transit permits, measures under the Indian Forest Act, 1927 and other legislations and notifications by the central and state governments.

The interviews and consultations with the stakeholders revealed that timber supply was not affected as a result of forest conservation measures. On the contrary, domestic timber production can be increased substantially, if the opportunities offered by the policy are effectively used by the forest based industry in India.

**Preference for fast growing varieties:** The farmers are more interested in planting fast growing trees (such as eucalyptus and poplar) as against traditional trees (teak, mangium or sandalwood). In many states only a small proportion of timber is sourced from forests; the major supplies come from the trees outside the forests (TOF), including farm forestry, agro forestry and private estates, which meet timber requirements of both households and industry.

**R&D to Boost Forest Productivity:** Timber productivity, which is one of the key determinants of its sustained supply, is very low in India. Research and development in clonal plantations in agro-forestry/farm forestry and other technologies for high yielding plantations need to be promoted to improve timber productivity in the country.

Presently, no forests in India are certified for responsible scientific practices in forestry (such as Forest Stewardship Council certification). Such certification encourages tree planting in production forests and private and community areas. Timber from the certified forests finds greater acceptability in the world's leading timber markets, where the demand for certification is increasingly gaining ground. In order to achieve a credible certification, effective cooperation is required between the timber associations, the managers of forests and plantations.



**Constraints of Private Sector:** The unavailability of suitable land in large tracts is a constraint for private sector investment in large plantations in India. These constraints are largely due to the Land Ceiling Act and other restrictions on land use policies. The industry is of the view that this can be addressed in adherence with the objectives of the National Forest Policy, 1988, to enable the industry to raise its own timber and other forest-based resources.

In addition to the stakeholder analysis, the following explanatory model was used to analyse the determinants of timber supply in India:

$$Q_s = f(X_i) + U$$

Where

$Q_s$  = Supply of timber

$X_i$  = Explanatory variables determining the supply (i.e.  $X_1, X_2 \dots X_n$ )

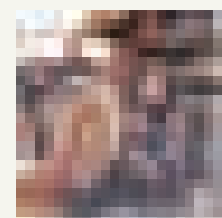
$U$  = Error term

Supply of timber ( $Q_s$ ) = Production of timber from domestic sources + imports - exports

The key variables used in the estimation of determinants in timber supply are given in the table 5.1.

**Table 5.1:** The key variables used in the model equations for the estimation of timber supply for data period from 1993 to 2005

<b>DP</b>	Domestic production roundwood (million cu. m.)
<b>IMP_RW</b>	Import roundwood (million cu. m.)
<b>EX_RW</b>	Export of roundwood (million cu. m.)
<b>FC</b>	Forest Cover (sq.km)
<b>GDP_GR</b>	GDP growth rate ( per cent)
<b>POP</b>	Population (million)
<b>WPI_all</b>	Wholesale price index -all commodities (1993=100)
<b>INPRO_all</b>	Index of industrial production of wood (1993=100)
<b>Qs</b>	Supply of timber (domestic production +import -export)(million cu.m.)



The first equation included GDP growth rate, industrial production of wood, whole sale price index of all commodities and production as exogenous variable. The dependent variable is the supply of timber (Qs), which is the sum of domestic production of timber and imports minus the exports of timber. The summary of estimation parameters is given in table 5.2.

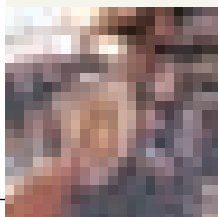
**Table 5.2:** The summary of estimation parameters and results of equation 1

Dependant variable	Qs	Method	Least Squares	Sample	1993-2005
		Coefficient	Std Error	t-statistic	Probability
C	C1	112.2556	55.4574	2.024178	0.0894
GDP_GR	C2	0.315131	0.291875	1.079678	0.3218
INPRO_W	C3	-0.047555	0.038385	-1.238869	0.2617
WPI_ALL	C4	0.219357	0.210325	1.042941	0.3372
POP	C5	-0.119765	0.084447	-1.418233	0.2059
R-squared		0.668066	Mean dependant var	22.0413	
Adjusted R-squared		0.446777	S.D dependant var	2.006516	
S.E. of regression		1.492426	Akaike info criterion	3.941638	
Sum squared resid		13.36401	Schwarz criterion	4.122499	
Log likelihood		-16.67901	Durbin-Watson stat	1.63402	

The second equation included imports of industrial round wood, GDP growth rate, population and index of industrial production of wood as exogenous variable. The dependant variable is domestic production of industrial timber. The summary of results is given in Table 5.3.

**Table 5.3:** The summary of estimation parameters and results of equation 2

Dependant variable	DP	Method	Least Squares	Sample	1993-2005
		Coefficient	Std Error	t-statistic	Probability
C	C1	42.10231	28.05069	1.500937	0.1771
IMP_RW	C2	-2.23304	1.967785	-1.1348	0.2938
GDP_GR	C3	0.269238	0.361281	0.745232	0.4804
POP	C4	-0.01089	0.029823	-0.36505	0.7259
INPRO_W	C5	-0.08501	0.037446	-2.27022	0.0575
R-squared		0.718306	Mean dependant var	20.79065	
Adjusted R-squared		0.557337	S.D dependant var	2.643621	
S.E. of regression		1.758878	Akaike info criterion	4.261566	
Sum squared resid		21.65555	Schwarz criterion	4.46361	
Log likelihood		-20.5694	Durbin-Watson stat		



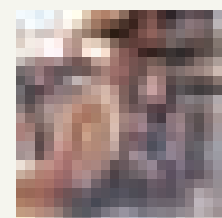
The third equation included forest cover area, GDP growth rate, index of industrial production of wood, population and wholesale price index of all commodities as exogenous variables (table 5.4). The dependant variable is the domestic production of industrial timber. The data set of selected variables used for estimating the equations is given in Table 5.5. The results show that the GDP growth rate, imports of timber, industrial production of wood and whole sale price index of all commodities are some of the key determinants of supply of timber in India.

**Table 5.4:** The summary of estimation parameters and results of equation 3

Equation - 3					
DP=C(1)+C(2)*(FC)+C(3)*GDP_GR+C(4)*INPRO_W+C(5)*POP+C(6)*WPI_ALL					
Dependant variable	DP	Method	Least Squares	Sample	1993-2005
		Coefficient	Std. Error	t-Statistic	Probability
C	C(1)	159.1254	60.60162	2.625761	0.0393
FC	C(2)	4.80E-05	5.40E-05	0.889825	0.4078
GDP_GR	C(3)	0.267294	0.299329	0.892979	0.4063
INPRO_W	C(4)	-0.098126	0.043141	-2.274529	0.0633
POP	C(5)	-0.223432	0.085322	-2.618693	0.0397
WPI_ALL	C(6)	0.418614	0.199916	2.093949	0.0812
R-squared	0.813574	Mean dependent var		20.79065	
Adjusted R-squared	0.658219	S.D. dependent var		2.643621	
S.E. of regression	1.545515	Akaike info criterion		4.015445	
Sum squared resid	14.33171	Schwarz criterion		4.257898	
Log likelihood	-18.0927	Durbin-Watson stat		2.690503	

**Table 5.5:** The data set of selected variables used for estimating the determinants in timber supply

Year	DP	IMP_RW	EX_RW	FC	GDP_GR	POP	WPI_all	INPRO_W	Qs
1993	24.691	0.272463	0.004307	639386	4.9	892	100	100	24.95916
1994	24.785	0.284651	0.007751	639386	7.5	910	112.8	99.3	25.0619
1995	24.879	0.35558	0.007862	638879	7.6	928	121.6	123.2	25.22672
1996	19.395	0.8936	0.019696	638879	7.4	946	127.3	131.9	20.2689
1997	19.089	1.0524	0.018697	633397	4.5	964	132.8	128.5	20.1227
1998	18.918	1.7613	0.002398	633397	6	983	140.8	121	20.6769
1999	19.208	2.099	0.002399	637293	7.1	1001	145.3	101.4	21.3046
2000	18.761	2.2319	0.0051	637293	3.9	1010	155.7	104.3	20.9878
2001	19.299	2.5052	0.004801	675538	5.1	1037	161.3	92.8	21.7994
2002	18.8247	2.144	0.007702	675538	4.1	1055	166.8	76.5	20.961
2003	18.8281	2.264806	0.0077	677816	8.9	1073	175.9	81.7	21.08521
2004	22.81	2.597252	0.006166	677816	7.1	1091	187.2	74.8	25.40109







CHAPTER VI

# CONCLUSION AND RECOMMENDATIONS

## CONCLUSION

The results of the study show that forest conservation measures are not the major limiting factors in timber supply in India. The key determinants of timber supply in the country include the GDP growth rate, timber imports, industrial production of wood, and the wholesale price index of all commodities.

However, the study also reveals that domestic timber production can be increased substantially, if the opportunities and policy options are effectively utilized by the forest based industry in India.

For sustained domestic supply of timber there is a need to strengthen research and development in clonal plantations, silviculture and other technologies for developing short rotation and high yielding plantations, as these varieties will not only meet the market timber needs, but will also be preferred by the farmers/growers for better economic returns. In several states only a small proportion of timber is sourced from forests; the trees outside the forests (TOF), including farm forestry, agro-forestry, private estates meet the timber needs of both households and industry.

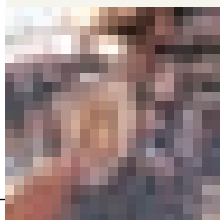
A significant proportion of wood currently used for packaging and as fuel can also be diverted for value added products with the support of appropriate technology. Further, forests in India need to be certified. Products made from credibly certified timber find greater access and acceptance in the leading markets of the world, where demand for forests' certification is high. Also, forest certification promotes tree planting in production forests, private land and community areas. In order to achieve this, effective cooperation between timber associations, communities and the managers of forests and plantations is required.

Unless India takes the required measures to boost its timber productivity, it will face a severe shortage in timber supply from domestic sources. In the business as usual scenario, by 2020 India's timber imports are likely to exceed its domestic production.

The species wise analysis of timber imports through Kandla port, which handles more than 50 per cent of India's timber imports, shows an increase in the volume of imports from several Latin American countries and Africa. The top four species imported through Kandla port during 2001 to 2006 were salangan batu (*Shorea spp*) (3.39 million cu.m./year), New Zealand pine (*Pinus radiate*)(2.95 million cu.m. per year), meranti (*Shorea spp*) (2.34 million cu.m. per year) and teak (*Tectona grandis*)(2.21 million cu.m. per year). The volume of timber imported through Kandla port has increased from 0.84 million cu.m. in 1997-98 to 18.88 million cu.m. in 2005-06.

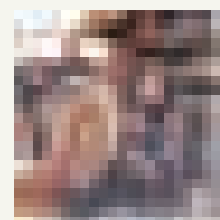
## RECOMMENDATIONS

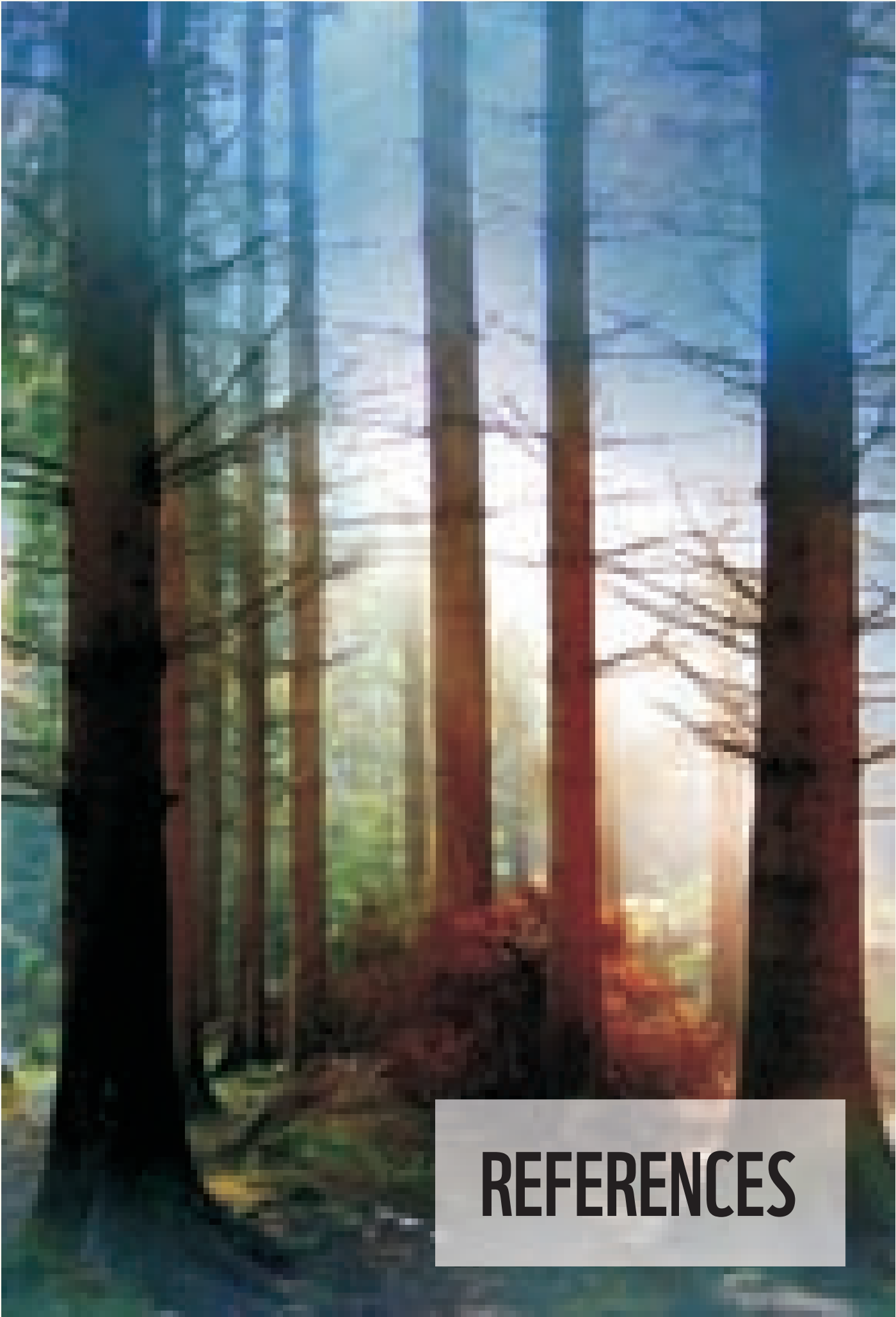
1. The availability of trees outside the forests for timber as well as for provisioning of ecosystem services should be promoted by strengthening agro-forestry and farm forestry systems and incentives to the growers.
2. Development of high yielding tree plantations should be supported, if they are appropriately located and well managed. Industry should be encouraged to initiate research and development in collaboration with the forest research institutions and relevant universities in India and abroad.





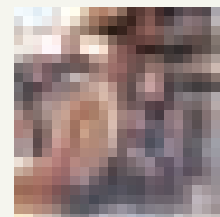
3. Promote the use of reclaimed wood in the manufacturing of handicrafts, furniture and other timber products; this can be achieved through fiscal incentives for developing suitable production processes.
4. Promote imports from certified forests through fiscal and other incentives to business and industry. This would reduce sourcing of timber from illegal or controversial sources, including from high conservation value forests of the world's critical eco-regions such as Borneo, Congo and Amazon.
5. Safeguard the interests of the growers in taking decisions on reduction or removal of tariffs and non-tariff restrictions on timber imports, as this can influence the decisions on tree planting, agro and farm forestry.
6. Ensure optimal use of wood for timber and value addition for maximizing social benefits. A significant share of wood that can be used for timber is currently used as fuel wood. The options for achieving this, without compromising the rural energy requirements and the livelihood needs of the local communities, need to be worked out by the concerned Ministries/Departments/Institutions.
7. Promote credible forest certification in India by providing suitable support (both technical and budgetary) to the state forest departments, communities and growers.



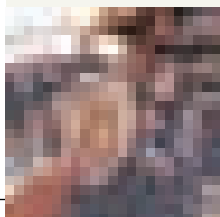


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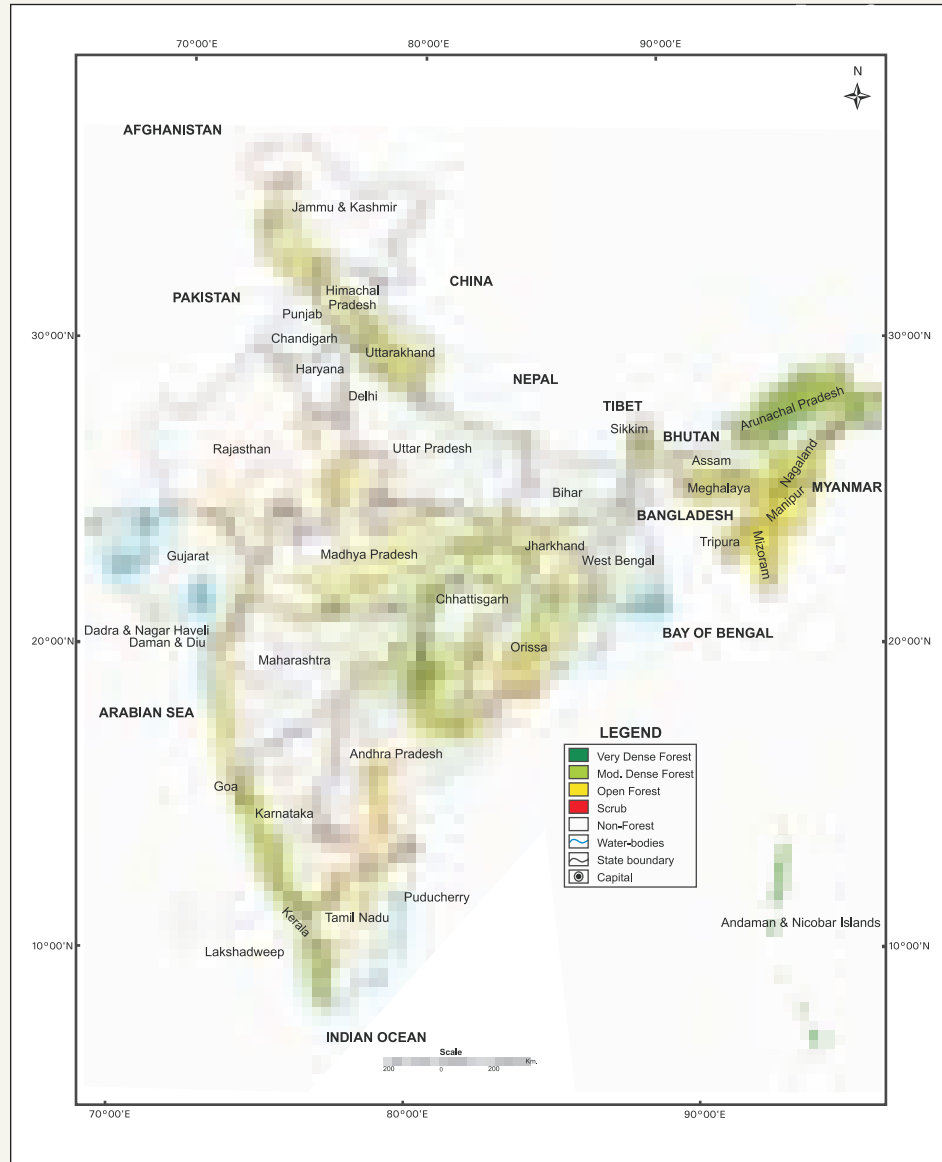




# ANNEXURES

# Annexure-1

India map of forest cover in 2007

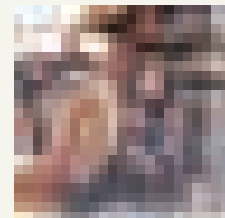


Source: State of Forest Report, 2009, Forest Survey of India, Ministry of Environment and Forests, Govt of India

## ANNEXURE-2

Species wise quantity of timber imports from 2001 to 2006 through Kandla port (units in cu.m.)

Category of timber species (common name used by the traders)	2001-02	2002-03	2003-04	2004-05	2005-06	Annual Average (2001-02 to 2005-06)	Share (per cent)
SalanganBatu	217963.70	327354.34	652807.49	332583.16	164964.65	339134.67	21.25
Newzland Pine	216559.58	385321.99	215257.43	311967.22	344233.36	294667.92	18.46
Meranti	226243.14	165128.87	171579.33	169783.87	437561.19	234059.28	14.66
Teak -total	226304.5133	208458.7987	216494.1183	162931.6384	291977.0891	221233.23	13.86
Keruing	59679.74	37073.67	40121.63	226822.73	90128.01	90765.16	5.69
Pine- Others	109032.89	59778.96	106235.26	89186.08	46686.98	82184.03	5.15
Kapur	44812.49	43552.05	60989.74	37734.03	155112.70	68440.20	4.29
Gurjal(Gurjan)	35557.11	38351.22	47731.10	70677.65	85590.96	55581.61	3.48
Rezak	30828.91	24199.51	28267.10	30652.14	76155.12	38020.55	2.38
Arau	28406.52	25659.43	37952.35	23309.07	73932.68	37852.01	2.37
Billina (N. Teak)	0.00	0.00	161.52	83585.85	0.00	16749.47	1.05
Benin	534.89	11188.13	12958.81	22518.68	29564.27	15352.96	0.96
Beli (HW)	22208.91	15495.27	7693.76	2252.18	19304.98	13391.02	0.84
Bangkirai	63196.47	3196.49	0.00	0.00	0.00	13278.59	0.83
Solomon Logs	14086.17	22939.15	14677.03	860.64	0.00	10512.60	0.66
Hickory	0.00	84.00	0.00	45507.00	3093.64	9736.93	0.61
Merbau	3393.33	111.91	4362.86	31227.51	492.16	7917.55	0.50



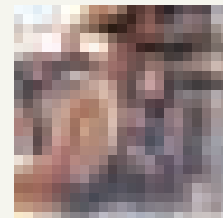
Annexure 2 contd.: Species wise quantity of timber imports from 2001 to 2006 through Kandla port (units in cu.m.)

Mersawa	1882.83	3391.06	3846.26	3433.52	19335.44	6377.82	0.40
Gebon	0.00	8078.05	14712.52	171.98	0.00	4592.51	0.29
Beach logs	505.28	2181.60	3004.38	8541.58	7851.03	4416.77	0.28
T0019	0.00	0.00	0.00	0.00	21781.02	4356.20	0.27
Spruce	0.00	11945.82	0.00	1545.22	7910.30	4280.27	0.27
Tali	8259.69	1780.96	3755.28	900.83	1375.02	3214.36	0.20
Awoura	4433.01	3393.02	5490.54	2104.04	0.00	3084.12	0.19
T. Brassi	10819.28	0.00	0.00	0.00	0.00	2163.86	0.14
Rengas	8214.96	861.11	0.00	1076.81	0.00	2030.58	0.13
Penyau	1682.54	3769.85	2081.06	368.64	0.00	1580.42	0.10
Padouk	242.90	0.00	0.00	6859.80	286.39	1477.82	0.09
Ash- New York	0.00	0.00	0.00	7170.00	0.00	1434.00	0.09
Maple	61.13	465.04	968.13	1802.76	1960.76	1051.56	0.07
White ash	0.00	86.97	441.46	561.81	4164.86	1051.02	0.07
Cherry	0.00	46.92	0.00	4238.00	91.92	875.37	0.05
Sangva	476.19	0.00	1156.88	1100.59	0.00	546.73	0.03
Mengaris	260.69	1633.77	0.00	0.00	0.00	378.89	0.02
Sycamore	0.00	22.89	465.27	182.03	1024.03	338.84	0.02
S.Batu - African	0.00	1613.10	0.00	0.00	0.00	322.62	0.02
Okome	0.00	1500.85	0.00	0.00	0.00	300.17	0.02
Ebiara	749.42	574.89	105.04	0.00	0.00	285.87	0.02
Beach logs Ger-many	0.00	0.00	141.32	1269.18	0.00	282.10	0.02
Niove(Noiva)	588.73	185.82	0.00	447.77	0.00	244.46	0.02
Ubah	0.00	1175.35	0.00	0.00	0.00	235.07	0.01
Billinga	1135.49	0.00	0.00	0.00	0.00	227.10	0.01



Annexure 2 contd.: Species wise quantity of timber imports from 2001 to 2006 through Kandla port (units in cu.m.)

D. Ivoire(Africa)	0.00	0.00	939.49	0.00	0.00	187.90	0.01
Ash (BELGIUM)	0.00	0.00	0.00	0.00	720.41	144.08	0.01
Kossipo(Kussia)	194.78	484.16	0.00	0.00	0.00	135.79	0.01
Andoug	0.00	0.00	633.30	0.00	0.00	126.66	0.01
Paduka	0.00	201.10	416.43	0.00	0.00	123.51	0.01
Ash(Germany)	0.00	0.00	78.12	0.00	492.49	114.12	0.01
Brajil	534.38	0.00	0.00	0.00	0.00	106.88	0.01
Milina	0.00	0.00	464.59	0.00	0.00	92.92	0.01
Boisde	228.78	0.00	0.00	171.77	0.00	80.11	0.01
Italian	0.00	0.00	326.37	17.00	0.00	68.67	0.00
Rubber wood	0.00	0.00	0.00	271.75	40.27	62.40	0.00
Walnut logs	0.00	0.00	0.00	0.00	286.55	57.31	0.00
White Oak	0.00	21.33	0.00	263.62	0.00	56.99	0.00
Pinus	0.00	0.00	0.00	279.51	0.00	55.90	0.00
Fir wood (Germany)	0.00	0.00	0.00	0.00	269.67	53.93	0.00
African white wood	0.00	0.00	0.00	0.00	267.64	53.53	0.00
Hard wood	0.00	260.91	0.00	0.00	0.00	52.18	0.00
Sapelli	0.00	0.00	0.00	0.00	256.15	51.23	0.00
Maple (Germany)	0.00	0.00	0.00	0.00	251.58	50.32	0.00
Balau	0.00	224.45	0.00	0.00	0.00	44.89	0.00
Red Oak	0.00	0.00	0.00	0.00	221.19	44.24	0.00
Billets	0.00	0.00	216.79	0.00	0.00	43.36	0.00
Wenge (Belgium)	0.00	0.00	0.00	0.00	176.71	35.34	0.00
France H W	0.00	53.25	121.34	0.00	0.00	34.92	0.00
Sandalwood (T)	0.00	0.00	50.00	124.00	0.00	34.80	0.00



Annexure 2 contd.: Species wise quantity of timber imports from 2001 to 2006 through Kandla port (units in cu.m.)

Oak	0.00	51.09	28.59	0.00	93.27	34.59	0.00
Guine fitches	0.00	0.00	149.93	0.00	0.00	29.99	0.00
Acajous(africa)	0.00	0.00	148.89	0.00	0.00	29.78	0.00
Kevazingo	0.00	89.32	56.73	0.00	0.00	29.21	0.00
Iroko(africa)	0.00	0.00	145.11	0.00	0.00	29.02	0.00
Gamari	0.00	140.12	0.00	0.00	0.00	28.02	0.00
Joloton	0.00	100.14	0.00	0.00	0.00	20.03	0.00
Beach logs - Belgium	0.00	0.00	98.20	0.00	0.00	19.64	0.00
Willow Logs	15.49	0.00	48.33	0.00	0.00	12.76	0.00
Gmellina	0.00	0.00	63.77	0.00	0.00	12.75	0.00
German lumbers	0.00	0.00	58.59	0.00	0.00	11.72	0.00
Guina Hard Wood	0.00	0.00	55.30	0.00	0.00	11.06	0.00
Ash	0.00	55.13	0.00	0.00	0.00	11.03	0.00
France Grde	0.00	0.00	53.66	0.00	0.00	10.73	0.00
Pyinkado	0.00	0.00	0.00	0.00	52.82	10.56	0.00
Hornbeam	23.43	24.31	0.00	0.00	0.00	9.55	0.00
German Swan TIM	0.00	0.00	38.13	0.00	0.00	7.63	0.00
Sippo	0.00	28.46	0.00	0.00	0.00	5.69	0.00
Nyatton	28.45	0.00	0.00	0.00	0.00	5.69	0.00
Makore(France)	0.00	0.00	26.66	0.00	0.00	5.33	0.00
Thuyas	0.00	0.00	0.00	0.00	26.59	5.32	0.00
Mahogany	0.00	0.00	19.57	0.00	0.00	3.91	0.00
Veneer	14.00	0.00	0.00	0.00	0.00	2.80	0.00
<b>Total</b>	<b>1339159.82</b>	<b>1412334.63</b>	<b>1657695.59</b>	<b>1684501.66</b>	<b>1887733.88</b>	<b>1596285.11</b>	<b>100.00</b>

Source: Compiled from the documents of Kandla Timber Association documents.

## Annexure-3

Area under different forest types in India

Type of forests	Area
Tropical wet evergreen	4.5
tropical semi evergreen	1.9
Tropical moist deciduous	23.3
Littoral & swamp	0.7
Tropical dry deciduous	29.4
Tropical thorn	5.2
Tropical dry evergreen	0.1
Sub tropical broad leaved hill	0.3
Sub tropical pine	3.7
Sub tropical dry evergreen	0.2
Montane wet temperate	1.6
Himalayan dry temperate	2.6
Himalayan dry temperate	0.2
Sub alpine & alpine	3.3
<b>Total</b>	<b>77</b>

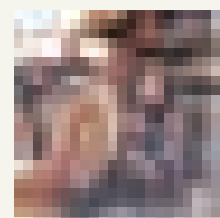
Source: ICFRE -Forestry statistics

## Annexure -4

Wood demand in round wood equivalent (RWE)

Year	Quantity (In Million cu.m.)
Current (1998)	55
2000	58
2005	74
2010	95
2015	123
2020	153

Source: Ganguly, B (2000)



## Annexure-5

Area under forest cover from 1987 to 2005

Assessment	State of Forest Report (SFR) Year	Data Period	Forest cover (sq.km)	per cent of Geographical area
I	1987	1981-83	640,819	19.49
II	1989	1985-87	638,804	19.43
III	1991	1987-89	639,364	19.45
IV	1993	1989-91	639,386	19.45
V	1995	1991-93	638,879	19.44
VI	1997	1993-95	633,397	19.27
VII	1999	1996-98	637,293	19.39
VIII	2001	2000	653,898	19.89
IX	2003	2002	677,816	20.62
X	2005	2004	677,088	20.60

Source: FSI (2008), State of Forest Report-2005

## Annexure-6

Classification of land use in India

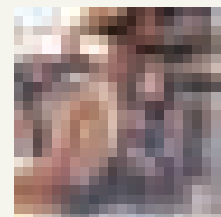
Category	Area (Million Ha)	(per cent share)
1 Geographical Area	328.73	
2 Reporting Area	304.92	100.00
(i) Forests	68.86	22.60
(ii) Not available for cultivation(a+b)	41.56	13.63
(a) Non-agricultural uses	22.53	7.40
(b) Barren and uncultivable	19.03	6.20
(iii) Other cultivated land (excluding fallow land) (a+b+c)	28.36	
(a) permanent pastures and other grazing land	10.91	3.60
(b) Miscellaneous Tree Crops and groves	3.57	1.20
(c) Cultivable waste land	13.88	4.57
(iv) Fallow land (a+b)	24.12	
(a) Fallow land other than current fallows	9.76	3.20
(b) current fallows	14.36	4.70
(v) Net Area Sown	142.02	46.60
(vi) Gross cropped area	190.76	
(vii) Area sown more than once	48.74	
(viii) Net irrigated area	54.57	
(ix) Gross irrigated area	72.78	

Source: Government of India

# Annexure-7

India's teak imports from various parts of the world from 2001 to 2006 through Kandla port (units in cu.m.)

Sources/Category of timber	2001-02	2002-03	2003-04	2004-05	2005-06	Annual Average (2001-02 to 2005-06)
Teak	13341.03	11771.15	8290.43	2451.99	1821.65	7535.25
Teak - Burkina	0.00	0.00	0.00	0.00	1362.62	272.52
Teak - Ivoire	0.00	0.00	0.00	0.00	2348.84	469.77
Teak - Australian	2618.33	0.00	0.00	0.00	0.00	523.67
Teak - Belzum	23.03	19.92	0.00	0.00	0.00	8.59
Teak - Boisdé	0.00	0.00	253.86	0.00	0.00	50.77
Teak - Colombia	0.00	984.89	2984.32	7348.63	4450.16	3153.60
Teak - Conakry	0.00	80.99	0.00	0.00	0.00	16.20
Teak - Costa Rica	0.00	0.00	374.07	10957.64	7435.78	3753.50
Teak - Cote D Ivoire	0.00	0.00	0.00	3580.18	21204.17	4956.87
Teak - European	0.00	0.00	67.48	0.00	0.00	13.50
Teak - France	0.00	0.00	0.00	0.00	35.57	7.11
Teak - Germany Teak	0.00	0.00	32.22	0.00	0.00	6.44
Teak - Guiana	0.00	0.00	0.00	0.00	1788.39	357.68
Teak - Guwatimala	0.00	0.00	351.86	0.00	0.00	70.37
Teak - Hongkong	0.00	406.67	0.00	0.00	95.16	100.37
Teak - Indonesian	0.00	55.98	0.00	0.00	0.00	11.20
Teak - Madera	0.00	0.00	639.96	150.92	0.00	158.18
Teak - Malasian	0.00	0.00	1614.25	0.00	503.82	423.61
Teak - Mombasa	0.00	0.00	0.00	24.19	0.00	4.84
Teak - Myanmar	36459.86	33893.73	29538.73	27874.43	28762.57	31305.86
Teak - Round logs	0.00	0.00	0.00	0.00	5882.04	1176.41
Teak - Salvador	0.00	0.00	277.26	1517.95	284.13	415.87
Teak - Tanzania	75.79	86.65	1331.09	165.37	1478.66	627.51
Teak - Uganda	0.00	0.00	270.74	0.00	531.40	160.43
Teak - Venezuela	771.53	2083.14	3653.15	3876.32	4191.58	2915.14
Teak (Canada)	0.00	0.00	0.00	0.00	305.49	61.10
Teak (Italy)	0.00	0.00	0.00	0.00	59.81	11.96
Teak (Sierra Leona)	0.00	0.00	0.00	0.00	195.50	39.10
Teak (Suriname)	0.00	0.00	0.00	304.37	0.00	60.87
Teak - African	165100.70	148809.11	151599.20	0.00	0.00	93101.80
Teak- American	618.27	439.27	0.00	581.49	0.00	327.81
Teak - Ghana	4262.80	684.70	272.75	24313.16	53002.64	16507.21
Teak - Ivory coast	0.00	0.00	0.00	43546.25	78995.57	24508.36
Teak - Nigeria	0.00	0.00	0.00	0.00	21654.16	4330.83



Annexure 7 contd.: India's teak imports from various parts of the world from 2001 to 2006 through Kandla port (units in cu.m.)

Teak Plntn Teak	368.79	0.00	0.00	91.29	0.00	92.02
Teak –Rolliza	0.00	0.00	0.00	0.00	255.06	51.01
Teak –Srilankan	0.00	0.00	83.30	0.00	0.00	16.66
Teak –Sudan	0.00	0.00	0.00	0.00	2744.83	548.97
Teak –Togo	0.00	0.00	0.00	3160.58	20535.89	4739.29
Teak(Mouritious)	0.00	0.00	0.00	87.60	0.00	17.52
Teak-Ecuador	1508.84	1483.70	8150.21	14562.28	18013.00	8743.60
Teak-Panama	1155.55	7569.62	6534.77	18337.02	14038.58	9527.11
Teak_Mali	0.00	89.27	174.47	0.00	0.00	52.75
<b>Teak –total</b>	<b>226304.51</b>	<b>208458.80</b>	<b>216494.12</b>	<b>162931.64</b>	<b>291977.09</b>	<b>221233.23</b>

Sources: State Forest Department, Gujrat; Kandla Port Trust ; Customs Office, Kandla.

## Annexure-8

India's imports of pine through Kandla port (units in cu.m.)

	2001-02	2002-03	2003-04	2004-05	2005-06	Total	Annual Average	share (per cent)
Australia	60288.47	45417.97	49950.05	33831.22	15182.24	204670	40933.99	10.86
Belgium	0	0	0	7346.497	8000.175	15346.67	3069.334	0.81
Columbia	0	0	0	1352.55	0	1352.55	270.51	0.07
France	26655.03	0	34.485	0	0	26689.52	5337.904	1.42
Germany	0	0	339.89	4027.012	7584.788	11951.69	2390.338	0.63
Romanian	0	0	0	0	276.5	276.5	55.3	0.01
Russia	5926.13	0	0	0	8354.407	14280.54	2856.107	0.76
Sweden	0	0	0	0	85.56	85.56	17.112	0.00
African	16163.26	14360.98	55318.21	42628.8	1067.809	129539.1	25907.81	6.87
Srilankan	0	0	592.626	0	6135.497	6728.123	1345.625	0.36
Newseland	216559.6	385322	215257.4	311967.2	344233.4	1473340	294667.9	78.19
<b>Total</b>	<b>325592.5</b>	<b>445100.9</b>	<b>321492.7</b>	<b>401153.3</b>	<b>390920.3</b>	<b>1884260</b>	<b>376852</b>	<b>100</b>

Source: Kandla Timber Association

## Annexure-9A

Projected demand for wood in India in 2020 (units in million cu.m.)

Industry Category	1999	2000	2005	2010	2015	2020
Pulpwood-Based	8.41	8.76	14.32	21.92	34.67	45.86
Panel Wood-Based	11.03	11.55	14.69	18.82	23.96	30.53
Durable wood – Based	35.56	37.69	44.99	54.26	64.37	76.61
<b>Total</b>	<b>55.00</b>	<b>58.00</b>	<b>74.00</b>	<b>95.00</b>	<b>123.00</b>	<b>153.00</b>

## Annexure-9B

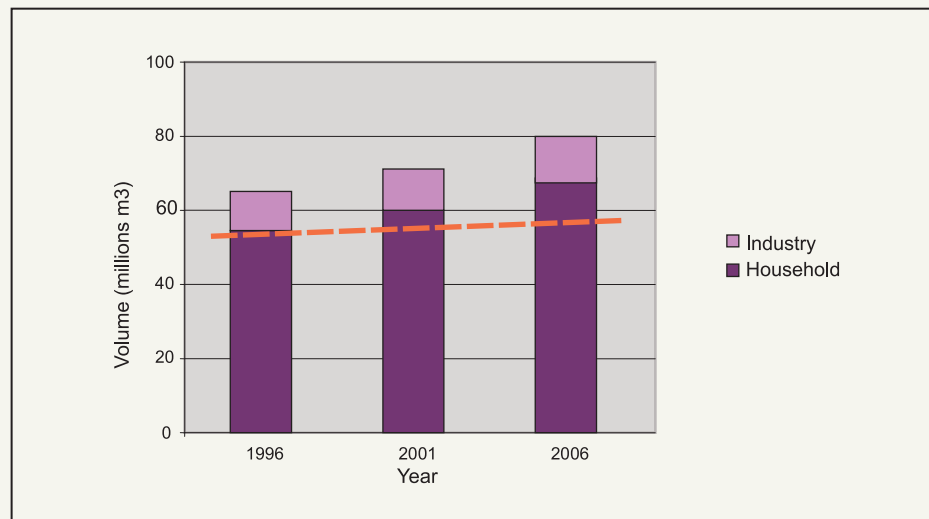
Projected supply of wood in India in 2020 (units in million cu.m.)

Source	Year 2000		Year 2010		Year 2020	
	Wood	Fuel wood	Wood	Fuel wood	Wood	Fuel wood
Natural Forest	14	37	14	37	14	37
Government Plantations	9.24	3.96	22.16	9.50	32.16	13.95
Social Forestry	5.80	3.10	13.80	8.44	13.80	8.44
<b>Total (Rounded off)</b>	<b>29</b>	<b>44</b>	<b>50</b>	<b>54</b>	<b>60</b>	

Source: Khanduri and Mandal, 2005; MOEF, 2006

## Annexure-10

The demand and supply of timber in India

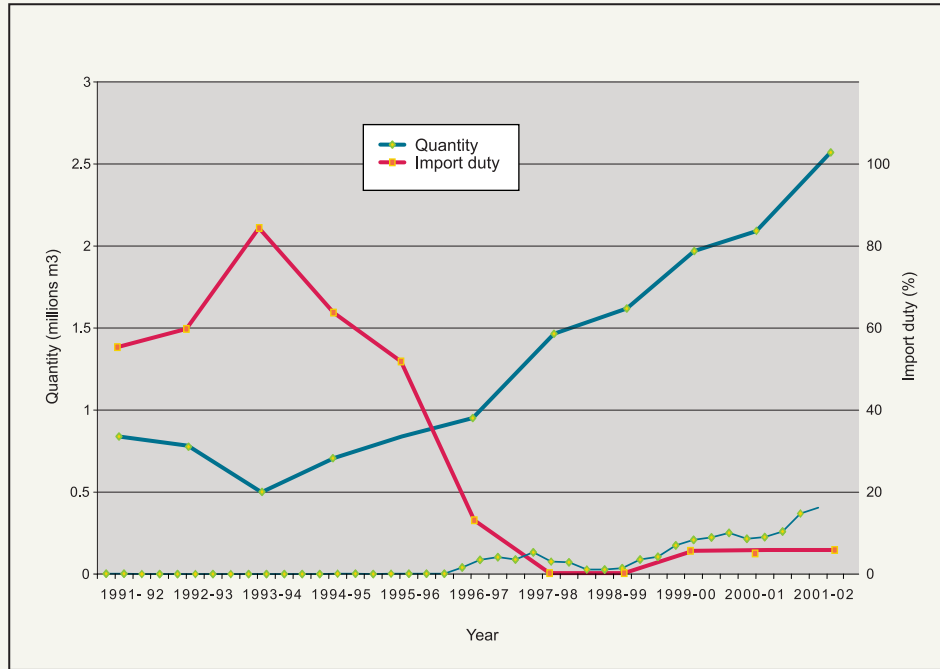


Source: World Bank (2006)

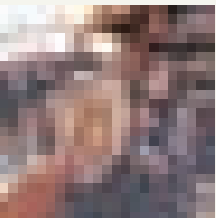


# Annexure-11

Changes in tariff and quantity of timber imports



Source: ITTO (2004)





# Annexure-12

## Report of National Forest Commission, Govt. of India Chapter 6. Emerging Needs and Goals of Forestry Sector

### 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. 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<sup>2</sup>.

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<sup>3</sup>

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European Forest Institute defined Certification for the European Commission in IIED's discussion paper - Bass (1999).

<sup>2</sup> Part of a Forest Trends series that discusses influences of Certification on regulatory frameworks and forest policies in Gerado Segura (2004).

<sup>3</sup> 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

Source: Report of the National Forest Commission, Ministry of Environment and Forests, Government of India. Available at [www.envfor.nic.in](http://www.envfor.nic.in)



# ABOUT WWF- INDIA:

WWF-India is a leading conservation organization with programmes and projects spread across the country. The organization works towards the conservation of biodiversity, natural habitats and the reduction of humanity's ecological footprint. The mission of WWF-India is to stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with nature.

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## **About GFTN**

GFTN is WWF's initiative to eliminate illegal logging and transform the global marketplace into a force for saving the world's valuable and threatened forests. By facilitating trade links between companies committed to achieving and supporting responsible forestry, the GFTN creates market conditions that help conserve the world's forests while providing economic and social benefits for the businesses and people that depend on them. The GFTN considers independent, multi-stakeholder based forest certification as a vital tool in this progression and helps infuse the principles of responsible forest management and trade practices throughout the supply chain. [www.gftn.panda.org](http://www.gftn.panda.org)

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