Session 14

[Friday 3rd period 1.5 hours - Main Hall]

Sustainable wood supply: the key to success

Speakers

Speaker:
T S Rathore

Topic:
Status of Wood Consumption in the Handicraft Industries of Jodhpur

Speaker:
Aimi Lee Abdullah

Topic:
Changes in EU Timber Consumption

Speaker:
E V Anoop

Topic:
Kerala's Withering Wood Security – The Way Forward

Speaker:
K S Shashidhar

Topic:
Changing Trends in Timber Usage in Nagaland, India

Status of Wood Consumption in the Handicraft Industries of Jodhpur

T S Rathore[1], Ranjana Arya, Hemant Kumar and Nirmal Bhandari

Abstract

The desert state of Rajasthan is well known for its woodwork. Furniture making is an integral part of wood work, and reached a creative peak in the havelis and palaces of the medieval period. Rajasthan is the only state where the lattice-work on wood is to be found. Jodhpur and Kishangarh are known for their painted furniture that consists of screens, doors, caskets and chairs. Jodhpur's handicraft industry has eclipsed the others in recent years. Wooden furniture made in Jodhpur has always been in great demand not only throughout India, but also abroad. Furniture export alone accounts for more than Rs 1000 crore (2009-10) in Jodhpur's economy. The Jodhpur Handicraft Exporter's Association (JHEA) was founded in 1998 to strengthen the network of exporters in order to achieve a sustained higher growth in exports in handicrafts to various global destinations. Exports experienced a sharp climb from zero to Rs. 1500 crore in two and a half decades, employing 3 lakhs persons comprising artisans, craftsperson, skilled/ semi-skilled workers or unskilled labour, most of them belonging to weaker sections of the society. JHEA provided list of 226 members, 95 of whom are regular members, with the remaining 131 being associate members. A representative survey was conducted through questionnaires in which 15% of industries were visited randomly.

The data analysis revealed that the wood types commonly used by the industry were Mango (Mangifera indica) 94%, Shisham (Dalbergia sissoo) 67.6%, Babool (Acacia nilotica) 62%, Teak (Tectona grandis) 15.0%, and Jamun, Neem and Eucalyptus with 3% each. Only 21% of members have their own seasoning, preservation and treatment plants while others are dependent on others. However, 100% new wood is used after seasoning and treatment. Wood is mostly obtained from Gujarat, UP, MP, Punjab, Haryana and Ganganagar in Rajasthan. The end products are exported to Europe (100%), USA (~60%), Australia & New Zealand (~10%), South America, Japan & S. Africa (~8.5%) and Gulf countries. Growing demand for manufactured products and preference for all types of handicrafts has resulted in consumption of more wood by the industry and 76.5% are also using recycled wood such as beams, unused household items, windows and doors from old havelies and old railway sleepers, broken ships and rafters. The old wood does not require seasoning or preservative treatments, which makes it environmentally safe. The annual wood consumption of wood industries range is >5000 cft (16%), 5000-1,00,000 cft (74%), < 1,00,000 cft(10%).

Most of the Industry complains about non- availability of quality wood material and trained labor. They also complain about not-availability of any state of the art wood testing laboratory, where identification and certification of wood can be carried out. There is a need for quality planting materials, improvements in plantation forests and searches for alternative wood species. There is a widespread willingness to raise plantations with support from Research Institute and State Forest Department. The Arid Forest Research Institute has done seasoning and treatment work on Prosopis juliflora, P. cineraia and Acacia tortilis, lesser

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known timber species, with encouraging results. The combination of preservative chemicals, Copper Chrome Arsenic (CCA) and chloropyriphos were found effective against insect pest attack on furniture and other prepared articles which showed resistance after six years and have potential for utilization in the handicraft industry.

STATUS OF WOOD CONSUMPTION IN HANDICRAFT INDUSTRIES OF JODHPUR

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(Indian Council of Forestry Research and Education, Dheradun)
Jodhpur, India

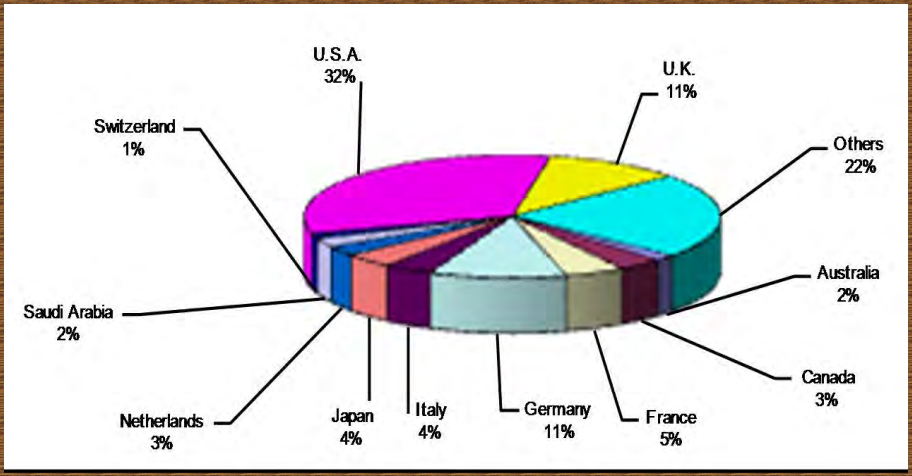
Indian Wood Handicraft Industry

- India is one of the important suppliers of wood handicrafts to the world market.
- The Indian handicrafts industry is highly labour intensive cottage industry and decentralized, being spread all over the country in rural and urban areas.
- The industry provides employment to over six million artisans, which include a large number of people belonging to the weaker sections of the society.

Wood-based Industry

Wooden articles in India range from the ornately carved to the simple. This include toys, furniture, decorative articles, etc. bearing the art and individuality of the craftsman.

Major Destinations of Indian Handicraft



Jodhpur Handicraft Industry

- The desert state of Rajasthan is well known for its woodwork.
- Furniture making is an integral part of wood work, and found its pride in the havelis and palaces of the medieval period.
- Rajasthan is the state, where the lattice work on wood is carried out.
- Jodhpur and Kishangarh are known for the painted furniture that consists of screens, doors, caskets and chairs.
- The Handicrafts industry has in recent years eclipsed all other industries in the city
- Wooden furniture made in Jodhpur has always been in great demand not only in India, but abroad, too.

Jodhpur Handicraft Industry

- The Jodhpur Handicraft Exporter's Association (JHEA) was registered in 1998 to strengthen the network of exporter's to achieve a sustained higher growth in export in handicraft to various global destinations.
- The export witness a sharp climb from zero to Rs. 1500 crore in two and a half decades employing 3 lakhs persons comprising artisans, craftsperson, skilled/ semi-skilled workers or unskilled labour, most of them belonging to weaker section of the society **(JHEA, 2010)**.
- JHEA has 226 members of which regular member are 95 and associate member are 131.
- **Jodhpur handicraft industry has exported wooden handicraft worth Rs.1000 crores in 2010, even during recession period (JHEA, 2010)**

Small Scale Handicraft Manufacturing Unit





WOOD CRAFTING
WOOD CARVING
WOOD BURNING
WOOD TURNING


PRE-FINISHED EXPORT ITEMS

PRODUCTS (Furniture)

Dressers & Cupboards

Almirah

Designer Shelves

Chairs

PRODUCTS (Decoration Items)

Decorative Utility Items

Decorative Hanging Items

Suitcases and Briefcases

Wooden Photo frames

Fine Traditional Artistry

A master craftsman at work

PRODUCTS (Traditional Art)

An antique-looking wardrobe

An antique-looking dresser

Fine Traditional Artistry

Finishing a ethnic photo frame

PRODUCTS (Toys and Gift Items)

FINISHING & PACKAGING




Preference of tree species in handicraft industries

Dalbergia sissoo

Mangifera indica

Acacia nilotica

Tecomella undulata

Use of re-cycled wood

- Beams
- House holds items
- Windows and door frames of old Havellis
- Railway Sleeper
- Broken ships and raft

The re-cycled wood needs no seasoning and preservative treatments (Environmentally safe)

Reduce pressure on Forest / plantations

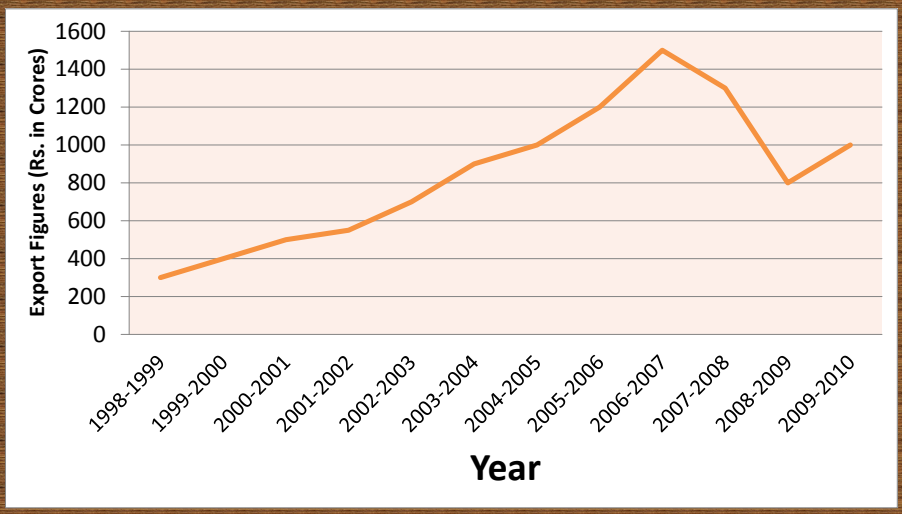
Annual wood consumption of handicraft industries

- < 5000 cft by 16% industries
- 5000-1,00,000 cft by 74% industries
- > 1,00,000 cft by 10% industries

Export of handicraft items

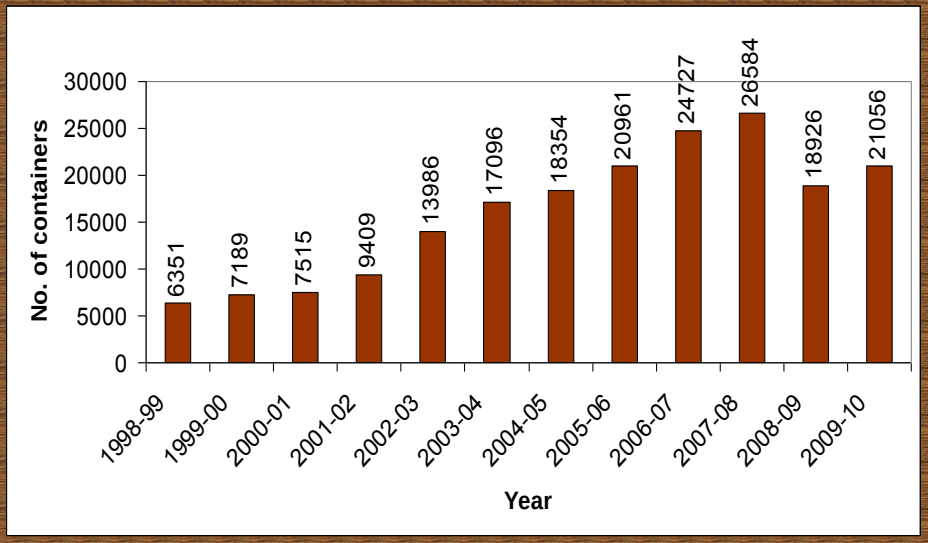
- Europe
- Australia
- New Zealand
- South America
- Japan
- South Africa
- Gulf countires

Year wise export of handicraft from Jodhpur



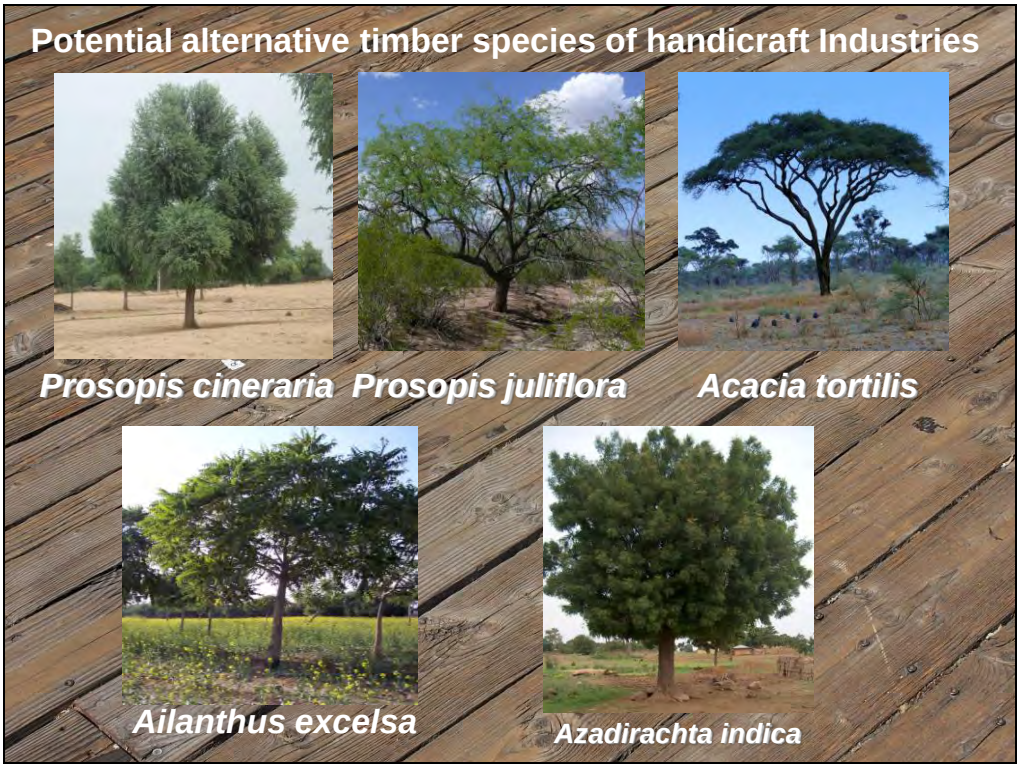
Source: JHEA

Year-wise export of handicrafts from Jodhpur in terms of containers



Wood seasoning and preservative treatment

- Wood is mostly obtained from Gujarat, UP, MP, Punjab, Haryana and Rajasthan.
- 100% new wood is used after seasoning and preservative treatments.
- Only 21% of industries have their own seasoning, and preservation treatment plants.
- Remaining 79% industries depends on other industries for seasoning and preservation treatments.



Wood seasoning and preservation of alternative timber species

- Arid Forest Research Institute with handicraft industries have done seasoning and preservatives treatment on *Prosopis juliflora, P. cineraia,* and *Acacia tortilis,* the lesser known timber species.

- A study was conducted to enhance shelf life of wood of *Prosopis juliflora* and *P. cineraria* and *Acaia tortatils* by treatment with CCA, CCB and Chloropyriphos for resistance to insect, pests, termites and fungi.

- Sawn wood of these species have been treated with 2% solution of Copper, Chrome, Arsenic (CCA) and 2% Chloropyriphos in pressure treatment plant at 80 psi and moisture brought down to 10-12% in steam generated seasoning kiln, further seasoned under natural condition for 2 months.
- The combination of preservative chemicals, Copper Chrome Arsenic (CCA) and chloropyriphos were found effective against insect pest attack on furniture and other articles prepared which showed resistance after six years and have potential for utilization in handicraft industry.

Deterioration of wood logs due to infection of pests/insects and wood rotting fungi

P. cineraria

P. juliflora

Untreated sawn wood

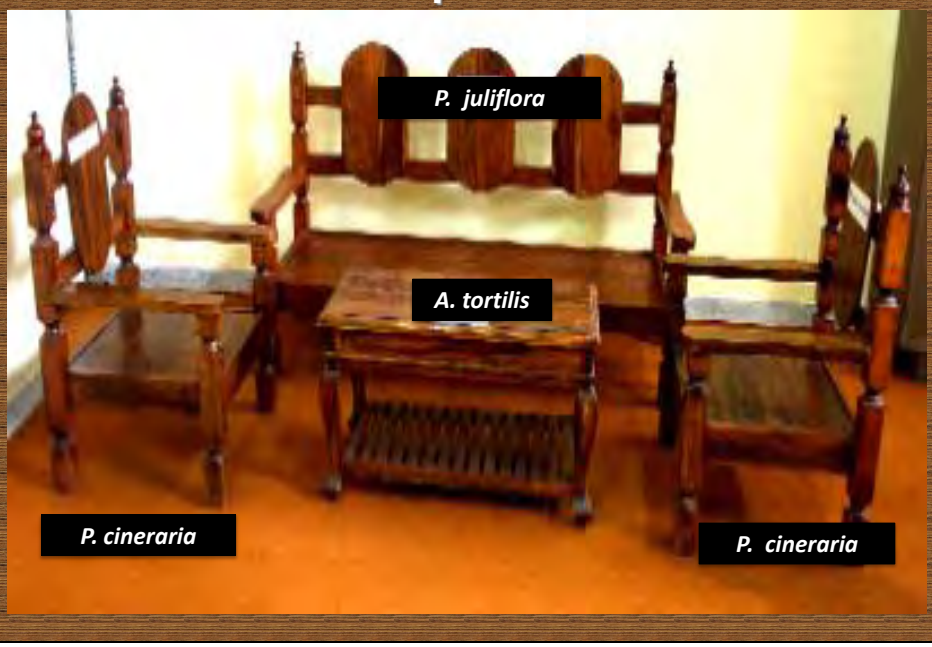
- Untreated sawn wood of ***P. cineraria*** is found to be attacked by insect/pests and wood rotting fungi within 2 months.
- ***P. juliflora wood*** is resistant to insect/fungus

Seasoning and preservative treatments has made the wood to resist the attack by insects and wood rotting fungi and improved the shelf life.

Seasoned and treated wood samples

- Value added products like sofaset and utility box have been made from treated wood.
- Wood of *P. juliflora* exhibited very good turning, carving, finishing and polishing properties. Moderate appearance exhibited in *P.cineraria wood.*

Furniture made from plantation grown timber species



Furniture made from plantation grown timber species

P. juliflora

P. cineraria

Utility Box

Wood products from *P. juliflora* and *P. cineraria*




- **Preliminary work on preservation with combination of CCA and Chloropyriphos on *P. cineraria and P. juliflora* have shown promising results.**

- **Further observations in this study and different combination of eco- friendly preservatives can be tried to consolidate the schedule of treatment and longevity of shelf life of these woods.**


- The deterioration of wood commenced within 2 months of felling and deteriorated to the extent of 50% with in a year.
- Untreated wood of *P. juliflora* was not influenced with any decaying agent for four years after which decaying was observed in the sap wood while, damage was extensive in *P. cineraria.*
- Treated wood is showing resistance till six years of observations, indicating their potential to use in handicraft industry.



- Treatment and seasoning costs Rs. 40/- per cft. on commercial scale.
- Value addition by preservative treatment to make them suitable for use in wood industry will reduces pressure on consumption of traditional wood.
- Also fulfill the needs like furniture and building material of rural sector.



Strengths, Weaknesses and Threats of the Handicraft Industries

Strengths

- Aesthetic and functional qualities
- Wrapped in mist of antiquity
- Cheap labour hence can compete on price
- Low capital investment and high ratio of value addition.
- Hand made and hence has few competitors
- Variety of products which are unique
- Exporters willing to hand small orders
- Increasing emphasis on product development and design up gradation

Weaknesses

- Inconsistent quality
- Inadequate market study and marketing strategy
- Lack of adequate infrastructure and communication facilities
- Capacity to handle limited orders
- Untimely delivery schedule
- Unawareness of international standards by many players in the market

Threats

- Better quality products produced by competitors from Europe, South Africa, South Asia etc.
- Better terms of trade by competing countries
- Consistent quality and increasing focus on R&D by competing countries
- Better packaging
- Stricter international standards

Constraints Faced by Jodhpur Handicraft Industry

- **Most of the Industry complains about non- availability of quality wood material and trained labor.**
- **Lack of state of art wood testing facilities, identification and certification of wood.**
- **Lack of quality planting material and alternative wood species.**
- **Lack of government land for plantation of trees by the wood based industries.**

Changes in EU Timber Consumption

Aimi Lee Abdullah[2]

Abstract

Since the major event of the June 1992 United Nations Conference on Environment & Development (UNCED), or Earth Summit (Rio Summit), discussions and debates on legal international regimes that have impacts on forests have continued at various multilateral fora.

The EU's Forest Law Enforcement, Governance & Trade (FLEGT) Action Plan was launched in 2003. The centerpiece of the Plan is a Voluntary Partnership Agreement (VPA) to be agreed bilaterally between the EU and a timber exporting partner country. Once signed, the VPA is legally-binding.

It was in October 2010 that the EU Timber Regulation to ban illegal timber and to require EU importers to exercise "due diligence" in determining and assuring legality of timber imports was politically agreed and adopted by the European Council, i.e. by the Governments of the 27 EU member States. The requirement to meet this Regulation will be EU-wide, affecting all companies importing timber and timber products into EU Member States. After going through all the formalities of the European and national institutions, the legislation would come into force, after adoption by EU member state governments, by March 2013. This Regulation is a very strong market instrument to improve forest governance and the legal and regulatory framework in timber exporting countries.

India has a strong economic outlook and with the predicted continued rise in per capita income and the growth of the middle class, India will see significant increases in consumption, including that of timber. There is a global shift towards sustainable consumption and production. As home to some of the most rapidly expanding wood processing sector industries, will India be ready to go for responsible and sustainable timber consumption?

[2] EFI FLEGT Asia Regional Support Programme, 5th Floor, Wisma Chinese Chamber, 258 Jalan Ampang, 50450, Kuala Lumper, Malaysia (anne.anantom@efi.int)

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THE FOREST LAW ENFORCEMENT GOVERNANCE AND TRADE TEAM OF THE EUROPEAN FOREST INSTITUTE

Meeting market requirements for legal timber

by Aimi Lee Abdullah
European Forest Institute – FLEGT Asia
14 October 2011
Mumbai, India

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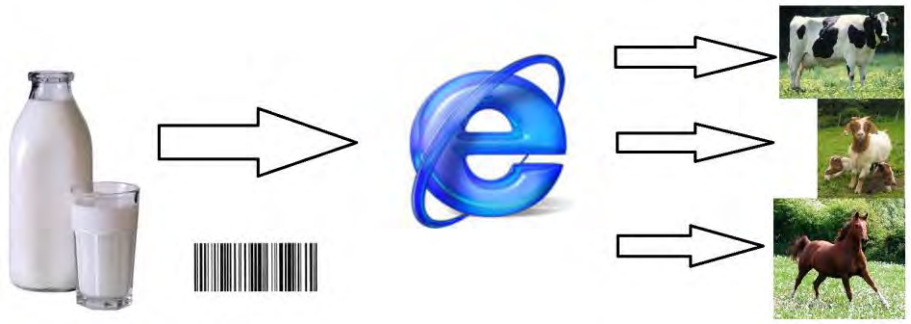

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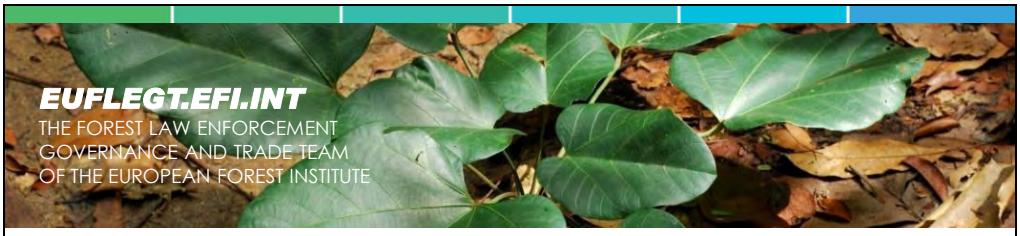
2003 EU FLEGT Action Plan

Towards Sustainable Forest Management, good governance & transparency

Mix of supply and demand sides activities:

- New Legislation
- Bilateral Trade Agreements
- Encouragement of public and private procurement policies

Aim to eliminate trade in illegal timber in the EU



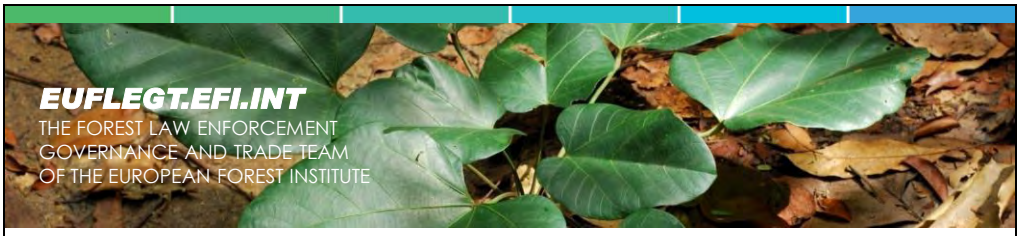
EU Timber Regulation – Main obligations

1. It prohibits the placing on the EU market of illegally harvested timber and products derived from such timber
2. It requires EU traders who place timber products on the EU market for the first time to exercise 'due diligence'
3. Other traders further down the supply chain must keep records of their suppliers and customers.

EU Timber Regulation

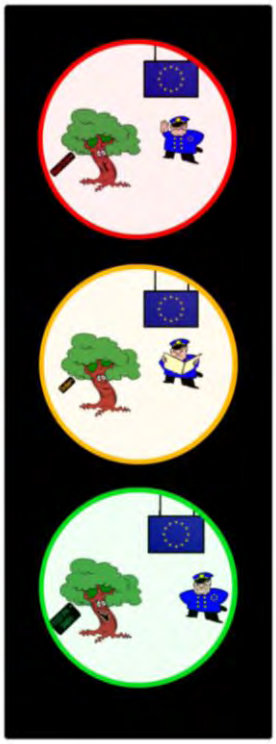
- What is Due Diligence?-

1. INFORMATION	2. RISK ASSESSMENT	3. RISK MITIGATION
Operator must have information describing the timber and timber products, country of harvest, quantity, details of the supplier and information on compliance with national legislation.	Operator to assess the risk of illegal timber in his supply chain, based on the information identified above and taking into account criteria set out in the regulation.	When there is a risk of illegal timber in the supply chain, mitigate that risk by requiring additional information and verification from the supplier.



EU timber operators will be looking for assurance that the timber is legally harvested:

1. **Negotiation** of FLEGT Voluntary Partnership Agreements between the EU and timber-exporting countries
2. **Private sector initiatives** (e.g. legality verification and forest certification)
3. Use other means of providing information on **legality**



Illegal Timber

With the EU Timber Regulation in place, the placing of illegal timber and timber products on the EU market will be prohibited.

This does not only apply to imported timber, but includes timber produced in the European Union itself as well.

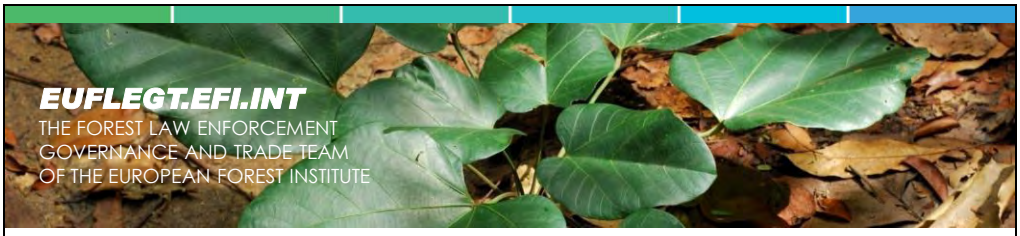
Good evidence of legality, documents to show risk mitigation/forest certification & chain-of-custody

Timber imported from countries that have not signed Voluntary Partnership Agreements can still enter the EU market, provided the operator can prove that the risk of illegal timber entering the EU market is minimal.

FLEGT Licensed Timber

Once a VPA has been signed and implemented the timber exporting country can produce FLEGT Licensed Timber.

This timber is considered to be automatically compliant with the new Regulation: it will have a "**green lane**" entering the EU market.



EU Timber Regulation – which products

- **Almost all timber products covered, including solid wood products, flooring, plywood, pulp and paper.**
- **Not included: recycled products, printed papers such as books, magazines and newspapers.**
- **The product scope can be amended.**
- **The Regulation applies to both imported and domestically produced timber and timber products.**

EU Due diligence regulation

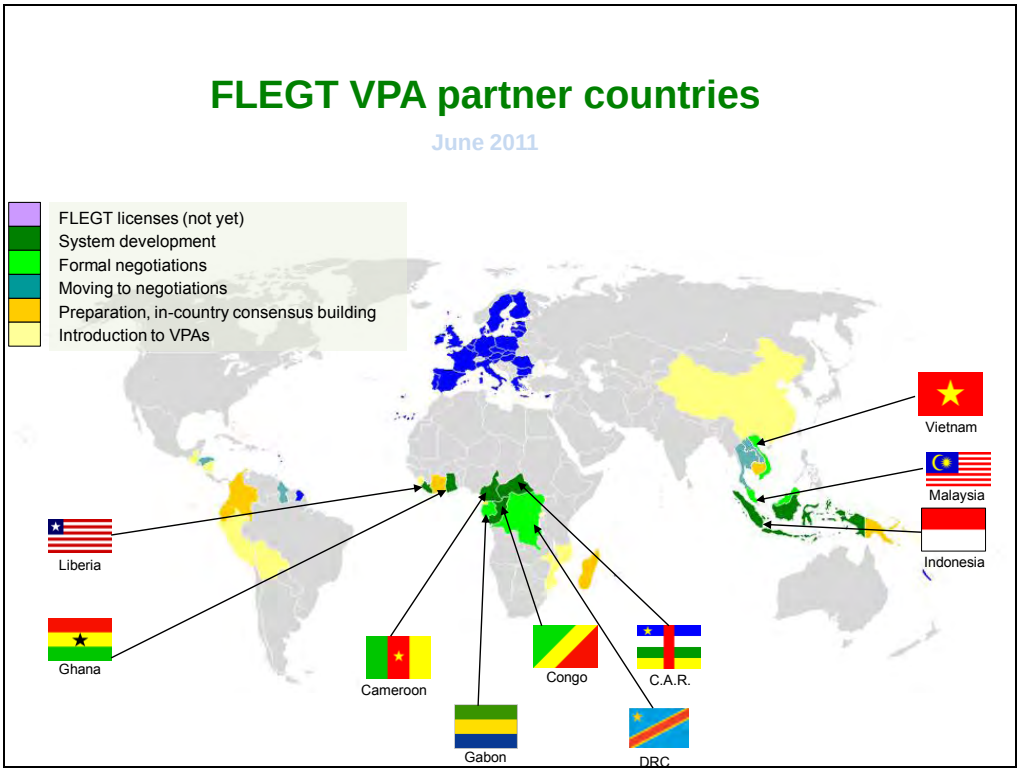
Products for regulation
4401*—Fuel wood
4403—Wood in the rough
4406—Railway or tramway sleepers
4407—Wood sawn or chipped lengthwise
4408—Sheets for veneering
4409—Wood continuously shaped
4410—Particle board
4411—Fibreboard
4412—Plywood, veneered panels
4413—Densified wood
4414—Wooden frames
4415— Packing cases, boxes, crates, drums
4416— Casks, barrels, vats, tubs
4418—Builders' joinery and carpentry of wood
47 & 48 chapters—Pulp and paper
9403—Wooden furniture (940330,40,50,60 & 90)
94060020—Prefabricated buildings

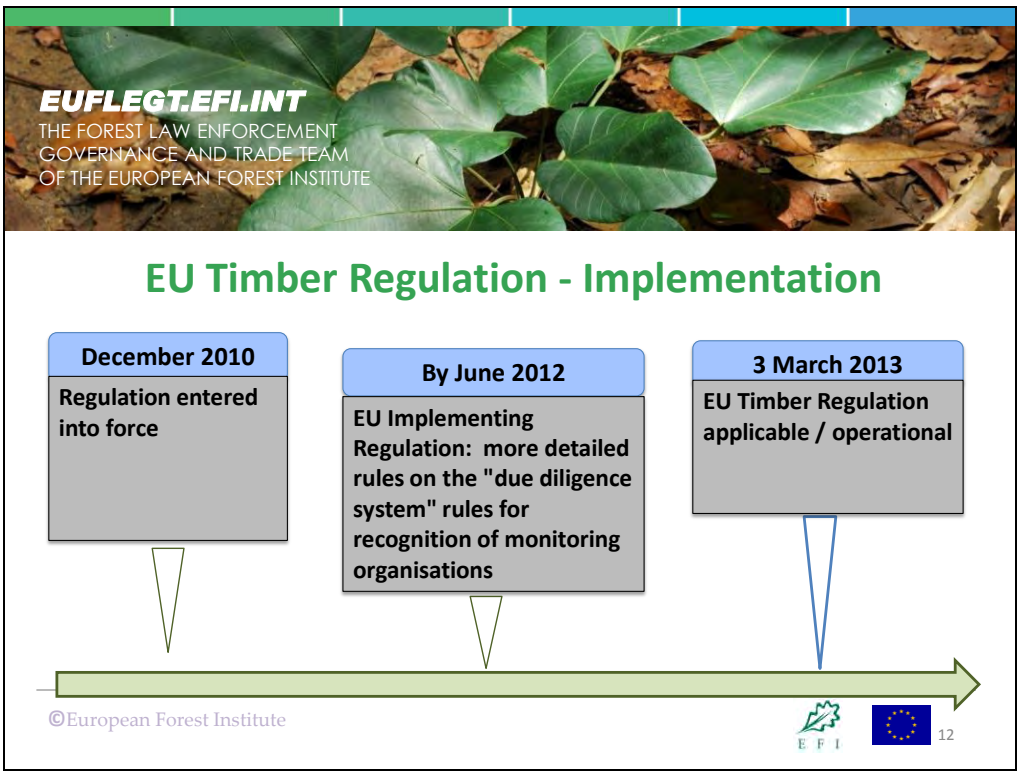
*Customs harmonised tariff codes

US Lacey Act (amendments)

Product requiring an import declaration
4401—Fuel wood
4402—Wood charcoal
4403—Wood in the rough
4404—Hoopwood; poles, piles, stakes
4406—Railway or tramway sleepers
4407—Wood sawn or chipped lengthwise
4408—Sheets for veneering
4409—Wood continuously shaped
4412—Plywood, veneered panels
4414—Wooden frames
4417—Tools, tool handles, broom handles
4418—Builders' joinery and carpentry of wood
4419—Tableware & kitchenware of wood
4420—Wood marquetry, caskets, statuettes
4421—Other articles of wood
6602—Walking sticks, whips, crops
8201—Hand tools
9201—Pianos
9202—Other stringed instruments
9302—Revolvers and pistols
93051020—Parts & accessories for revolvers & pistols
940169—Seats with wood frames
950420—Articles and accessories for billiards
9703—Sculptures

Do not yet require an import declaration
4405—Wood wool (excelsior)
4410—Particle board
4411—Fiberboard of wood
4413—Densified wood
4415—Packing cases, boxes, crates, drums
4416—Casks, barrels, vats, tubs
47 & 48 chapters—Pulp and paper


FLEGT VPA partner countries
June 2011
FLEGT licenses (not yet)
System development
Formal negotiations
Moving to negotiations
Preparation, in-country consensus building
Introduction to VPAs
Vietnam
Malaysia
Indonesia
Liberia
Ghana
Cameroon
Congo
C.A.R.
Gabon
DRC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EU Timber Regulation - Implementation
December 2010
Regulation entered into force
By June 2012
EU Implementing Regulation: more detailed rules on the "due diligence system" rules for recognition of monitoring organisations
3 March 2013
EU Timber Regulation applicable / operational
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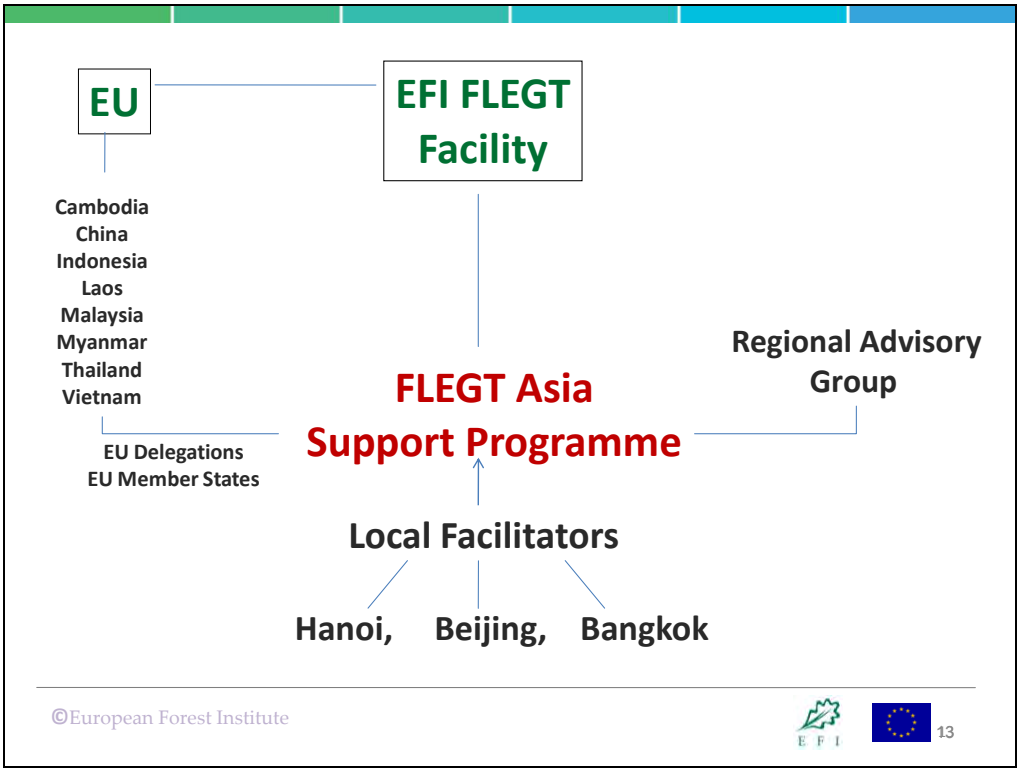
EU
EFI FLEGT Facility
Cambodia
China
Indonesia
Laos
Malaysia
Myanmar
Thailand
Vietnam
EU Delegations
EU Member States
FLEGT Asia Support Programme
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Local Facilitators
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http://ec.europa.eu/environment/forests/flegt.htm
http://ec.europa.eu/environment/cites/home_en.htm
http://ec.europa.eu/environment/forests/illegal_logging.htm
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14

Kerala's withering wood security - the way forward

E V Anoop[3], V Ajayghosh, T K Kunhamu and P Aruna

Abstract

Even though Kerala is one of the greenest states in India with roughly 44.58 per cent of the land area under forest cover (FSI, 2009), the state's forests, including plantations, account for only 9 per cent of industrial round wood supply, in contrast to 76 per cent from households and estates, with the rest coming from imports (Krishnankutty 1990, 1998, 2005). The state is heavily dependent on timber imports, particularly from Southeast Asia and Africa, and this trend is likely to rise many fold in the coming years. Many lesser known timbers are becoming increasingly present in the market supply, causing difficulties in identification, quality assessment and price fixation. While increased timber imports will be an opportunity for our forest products industries and trade allies, the sourcing of wood in either legal/illegal forms will put tremendous pressure on high value, ecologically important forests across the world. While encouraging sustainable consumption of tropical timbers, Forest Certification initiatives across the world will certainly put a stranglehold on imports from abroad in the years to come.

The timber market in Kerala is a sellers' market where wood is scarce and demand is high. Therefore, there is a pertinent need to strive hard and look for supplies elsewhere. Trees outside forests (TOF), particularly from homesteads, agroforestry and plantation resources hold tremendous promise to satisfy the state's ever increasing demand. Lesser Used Species (LUS) also needs to be explored as they are welcome substitutes to the higher priced but popular species for solid wood uses. However, there are several challenges in effectively utilizing these by assessing the quality and price fixation owing to the presence of small girth logs and significant proportion of juvenile wood in short rotation plantation grown timbers. Homestead/private estates grown timbers such as rubber wood, silver oak and even coconut wood are potential resources of the future. A relook at the planting programmes by the forest department by including trees that provide timber in addition to the other benefits is needed to save the state from an impending crisis affecting its 'Wood Security'.

Key words: Trees outside forests, Wood security, Forest Certification, Lesser Used Species

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INTRODUCTION

Kerala state in southern India, located between $8^0$18' to 12^0 48' N and $74^0$52' to $77^0$22' is a small but highly populated state located in peninsular India. It has a long history of agroforestry, especially homegardening (Randhawa,1980). Contemporary studies also highlight the importance of agroforestry in Kerala (Guillerme, 1999). Out of the total geographic area of Kerala, about 58% is used for agriculture (MoA, 2000). Trees and shrubs are present on most agricultural lands, except in the paddy (*Oryza sativa*) fields. Dominant agroforestry types of Kerala include shaded commercial crop production systems involving cacao (*Theobroma cacao*), coffee (*Coffea* spp.), tea (*Camellia sinensis*), spices etc., silvopastoral systems with fodder grasses in association with commercial trees, and homegardens. Such tree based systems generally encompass many disparate and intricate species-mixes, often specific to topographic, geomorphological, and edaphic niches (Kumar, 2007). The dominant agroforestry practice of Kerala, however, is the tropical homegarden, which represents an intimate, multistory combination of various trees and crops, sometimes in association with domestic animals, around the homestead (Kumar and Nair, 2004).

Table 1. Composition of forests of Kerala based on ownership and legal status.

Reserve Forest	Proposed Reserve	Vested forest	Total
9107.2066	364.4731	1837.7957	11309.4754
80.53%	3.22%	16.25%	100%

There are about 6.3 million predominantly small operational holdings in Kerala (average size 0.24 ha in 2000–01) covering a total area of 1.2 million ha (MoA, 2001). About 80% of these holdings are homegardens (Kumar, 2006), where both naturally occurring wild plants and deliberately introduced plants abound (Kumar et al, 1994). Despite their ecological and socioeconomic importance, traditional agroforestry systems including homegardens have been subject to conversion linked to socioeconomic changes (Guillerme, 1999; Peyre and others, 2006). The rapid increase in the state's population between 1941 and 1971 resulted in high pressure on land. Due to an acute scarcity of food grains during the 1950s, the state policy was oriented towards growing more food crops. With increasing emphasis on industrial models of agricultural development, fragmentation of land holdings due to demographic pressures driving land use intensification and systems declined (Jose and Shanmugaratnam, 1993; Kumar and Nair, 2004) and monocultures of commercial crops became dominant in Kerala.

Government policies play a vital role in providing incentives and disincentives to farmers to invest in tree farming and other agroforestry practices including homegardening. Case studies from Kerala regarding the impact of public policies on tree farming and agroforestry dynamics are, however, rare. Nevertheless, a plea was made in a 2001 Workshop on Cultivation of Bamboos, Rattans, and Timber Trees in Private and Community Lands to review and amend outdated or conflicting laws and harmonize them in view of the new

challenges of rising wood requirements of society and increasing pressures on remaining natural forests.

At present, 75 per cent of the state's demand for wood is satisfied by supplies from trees outside forests, the majority being from the homesteads. With the low availability of forest based raw materials, the potential of homesteads and private plantations to meet the short supply needs should be assessed and explored further. The Kerala Agricultural University and other leading departments need to step in and play a crucial role at this juncture to try and resolve the crisis by providing agro forestry and wood technological support services through research and extension to sustain wood based industries such as the match splints and veneer manufacturing which are mostly in the small scale sector and are facing an imminent threat of survival.

Forest tree species of Kerala produce timbers which are light to very light (<550 kg/m3), moderately heavy (550-750kg/m3) and very heavy (>750kg/m3). With the wide range of wood density values, these species have the potential to meet the wood requirements of major wood using industries, viz., saw milling, plywood, match wood, packing case, paper and other reconstituted products. However, most of these industries are in the small scale sector. With roughly 30 per cent of the land area under 'forest cover' (11,034 sq km), Kerala may be one of the greenest states in India. However, ironically the state forests, including plantations, account for only 9% of industrial round wood supply, in contrast to 76% by households and estates, with the rest coming from imports. The timber market is a sellers' market. Wood is scarce and demand is high.

Table 2. Annual outturn of major forest products of Kerala during 2006-2007 and 2007-2008.

Sl.No	Name of Products	Units	2006-2007	2007-2008
1	Timber in round logs	Cum	26774.360	48627.829
2	Sawn and Squared Timber	Cum	17.287	23.354
3	Poles (Teak)	Nos	296013	352896
4	Fire Wood	MT	12748.397	12676.413
5	Charcoal	MT	239.99	0
6	Bamboo	Nos	1237030	1551168
7	Reeds	Nos	21403530	15246981

8	Sandal Wood	Kg	3159.35	17537.1

The state is heavily dependent on timber imports, particularly from Southeast Asia and Africa. Imported timber was popularly called Malaysian wood. With the construction business booming, wood is scarce in the state although demand is getting higher and higher each year (no recent estimates are currently available). Many lesser known timbers are becoming increasingly significant in market supply such as violet (*Peltogyne* Sp.), iroko (*Chlorophora excelsa*), green heart (*Ocotea rodiaei),* Kusia (*Nauclea diderrichii*) etc. causing difficulties in identification, quality assessment and price fixation.

India which is one of the bourgeoning economies of the world and predicted to be a major economic power next only to the USA and China in coming decades, will very soon become the second largest importer of tropical timber in the world, next only to Japan. The country is already a net importer of timber. Coupled with this fact is the emergence of the green building movement, that advocates usage of higher quantity of wood in buildings as a means of capturing carbon for long periods of time (more than a lifetime) which otherwise would have been emitted to atmosphere had it been burnt or allowed to decompose in a natural forest situation. Alternatively, this 'locking' of carbon in buildings helps lower carbon emissions as equivalent substitute materials like steel and concrete are more energy intensive in production. Representatives of the Indian Green Building Society claim that the carbon foot print left by the various industries had led to the idea of a re-evaluation of the building industry. This has ultimately led to the mission to create buildings which are environment-friendly and use significant quantities of wood. In the United States, an official body that can issue a certification of buildings claimed using the concept. This institution, namely: U.S. Green Building Council has a certification system known as LEED (Leadership in Energy and Environmental Design) Certification.

In India, rating systems for green buildings were also developed by The Energy and Resources Institute (TERI), including the Indian codes, standards and best practices. The Indian Green Building Council (IGBC) is also very active in this sphere. Taking the green line vis-à-vis reducing carbon emissions will definitely increase the demand for timber supplies which under the present scenario can be met from imports. While increased timber imports will be an opportunity for our forest products industries and trade allies, the sourcing of wood either legally/illegally will put tremendous pressure on high value, ecologically important forests across the world. This will also increase the nation's forest footprint, particularly in South East Asia and Africa. In order to minimize the forest footprint, we need to encourage sustainable consumption of timber by promoting forest certification.

FOREST CERTIFICATION

Another interesting global development related to timber trade in recent years is the requirement, particularly by the richer Western nations, for certified wood either in round form or wood products. Forest Certification, particularly the COC (Chain of Custody) component, although essentially a voluntary, market driven system is becoming mandatory for Indian export houses trading in wood to the European and US market, not only for large enterprises but even for small and medium ones, who will be hit the most, thanks to the Lacey Act in the US and the FLEGHT in Europe.

Forest management certification is a process which verifies that an area of forest /plantations from where the wood, fiber and other non-timber forest products is extracted is managed to a defined standard. Forest certification refers to two separate processes viz., forest management unit certification (FMU) and chain of custody certification (COC). COC certification is a process of tracking forest products from the certified forest to the point of sale to ensure that product originated from a certified forest.

For buyers of forest products, the responsible sourcing is their adoption of policies and practices that reward suppliers using wood, fiber and other non wood forest products from well managed forests or from recycled products and discouraging suppliers using it from unknown, illegal or otherwise controversial sources. Forest certification is a mechanism for forest monitoring, tracing and labeling timber, wood and pulp products and non-timber forest products where the quality of management from environmental, social and economic perspectives is judged against a series of agreed standards. It is a process that leads to the issuing of a certificate by an independent party, which verifies that an area of forest is managed to a defined standard.

There is a pertinent need to prevent illegal felling in valuable forests and also to use the global market commitment to conserve it. While creating an environment conducive for strong B2B relationship of business houses supporting responsible sourcing of wood, it should also lead to reasonable economic and social benefits for businesses as well as to the people dependent on wood.

There are several certification schemes in operation of which Forest Stewardship Council (FSC) certification is one of the most popular and credible certification schemes globally. Other Certification Systems include Programme for Endorsement of Forest Certification Schemes (PEFC), American Tree Farm System (ATFS), Canadian Standards Association (CSA) Standard, Australian Forestry Standard (AFS), Certification Forestal en Chile (Certfor), Malaysian Timber Certification Council (MTCC), Sistema Brazileiro de Certificacao Florestal (CERFLOR).

The Forest Stewardship Council (FSC), resulting from an intergovernmental convention of nations to enforce the commitment of the signatories to adhere to a system of certification whereby the forest and the resutling products should be sustainably managed ensures that ecologically fragile and vulnerably forests are not exploited recklessly to satisfy the timber needs of countries elsewhere.

FOREST CERTIFICATION- THE INDIAN SCENARIO

India is located at the center point of global trade of forest produce. Furthermore, this nation can exert considerable influence on countries that produce and trade extensively in tropical timbers. As with Carbon trading, our country was also late to wake up to the Forest Certification movement happening elsewhere in the world. Dependence on imports for meeting the demand of wood for varied uses will be on the rise and more common in years to come. To conserve forests and at the same time provide adequate encouragement and support for wood based industries, forest dependent communities and artisans, it is necessary to have adequate areas under reliable and under forest certification.

In order to meet the growing demand for forest certification in the global market, the Indian industry has to look for certified forests/plantations to source their raw materials. The increased demand for forest certification is likely to affect the economic prospects of many farm forestry/agro-forestry areas in India unless these areas are certified. The MOEF recently established a committee to develop a National Forest Certification System. Forest certification in India is still in its infancy and therefore the nation has not been able to make use of the benefits of forest certification. So far, India has secured one FSC Forest management Unit Certificate (644 ha of rubber plantations in Tamil Nadu State) and a many COCs mainly by small and medium companies to meet export demand. While the number of COCs in the country is expanding, FMU certification has not largely taken off. The situation is likely to change due to the increased demand for forest certification in the global market and the high growth of the Indian economy.

The impact of such demand on forest based industries and growers, particularly those of small and medium scale in India will be severe unless they secure forest certification. To address this situation, there is a need to ensure adequate FMU certifications in the country. The export promotion council of handicrafts (EPCH) set up by the Ministry of Textiles is concerned about the adverse effects of increased demand for forest certification on export prospects of Indian wooden handicrafts industry and initiated several approaches to promote forest certification.

Very recently, in November 2010, the Forest Stewardship Council, in association with the Worldwide Fund For Nature - India (WWF) in New Delhi has set up a trust called the Forest Certification Council (FCCI) to give impetus to FSC certification programme in India. While COC Certification might increase and SME enterprises will definitely increase several folds in the coming years due to this welcome development, the more important and difficult FMU certification might not improve since a vast majority of our forests are government owned. While all government owned forests with definite working plan prescriptions are managed on a sustained yield principle which is cardinal to the process, thereby conforming to the strict regimens of the Criteria and Indicators (C&I) laid down by the FSC might still elude certification since national policy decisions might be hard to come by, more so because local level indicators are yet to be developed and partly due to the overall bureaucratic apathy towards certification. However, Certification of our forests holds manifold advantages while offering numerous challenges for its implementation.

MEETING THE TIMBER DEMAND OF KERALA- FUTURE RESOURCES

The state's forests including plantations account for only 9% of industrial round wood supply, in contrast to 76% by households and estates the rest is being satisfied by imports. Imports will rise significantly in the coming years. However, the increasing need and awareness for Forest Certification will certainly put a restriction on the supply of tropical timbers in the years to come. The State Forest Department mostly supplies teakwood which is sold through auctions. The cost of teakwood timber is on an average above Rs.2,500 per cubic foot and can go upto Rs.4,000 and even more. It has been 20 years since 'Malaysian wood' started reaching the Kerala coast, Mangalore and Tuticorin ports being the chief entry points for the wood to south India. Wood is arriving from all parts of the world, even from South America. However, the majority of the imported wood is sourced from the Indo-Malaysian region including Myanmar, Indonesia, Papua New Guinea (PNG) and more recently from the African countries, particularly the Congo basin countries, most of which are

poor and have have democratic governments to regulate exploitation. Pyinkodo (Xylia dolabriformis) wood constitutes the majority of the imports. The timber market is a sellers' market. Wood is scarce and demand is high.

Therefore there is a pertinent need to strive hard and look for supplies elsewhere. Trees outside forests (TOF), particularly from homesteads, agroforestry and plantation resources hold tremendous promise to satisfy our ever increasing demand for supplies. Lesser Used Species (LUS) also needs to be explored as they are welcome substitutes to the higher priced but popular species for solid wood uses. However, there are several challenges in effectively utilizing these by assessing the quality and price fixation owing to the presence of small girth logs and significant proportion of juvenile wood in short rotation plantation grown timbers. Homestead/private estates grown timbers such as rubber wood, silver oak and even coconut wood are potential resources of the future.

While the state forest department has implemented highly successful and large scale afforestation initiatives outside natural forest particularly in public lands, schools, colleges and homesteads through a plethora of programmes involving the masses such as 'Ente maram', 'Nammude maram', 'Haritha Keralam' and the like, little or no attention was paid in selecting species providing timber on a short rotation for the large scale planting activities. It is time the forest department takes another look at the planting programmes by including trees that provide timber in addition to the other benefits to satisfy the rising demand for industrial wood in the state.

POTENTIAL FOR CERTIFYING FORESTS, FOREST PRODUCTS AND TIMBER RESOURCES OUTSIDE FORESTS OF KERALA

While the government owned reserve forests (RF) of the state which are managed by definite working plan prescriptions on a sustained yield principle will be no doubt conforming to the Criteria and Indicators (C&I) laid down by the FSC, after suitable country specific modifications to it is made by the recently constituted Standards Development Group (SDG) for India by the FSC, homesteads and the timber supply there from has vast potential to be certified since, by their very nature, these are sustainably managed. Rubber plantations that supply rubber wood satisfy roughly 41 % of the current timber demand (Krishnankutty, 2005) has huge potential to get certified as the state currently enjoys a monopoly by holding 85% of the area occupied by the rubber plantation in the country. Once certified under FMU, even the rubber latex originating from it can carry the FSC logo on it, thereby enhancing the market value, particularly in the export and premium market segment. Since majority of the growers are small, barring a few coming under the corporate sector, there might be a need for formation of co-operative societies to secure FMU for the latter.

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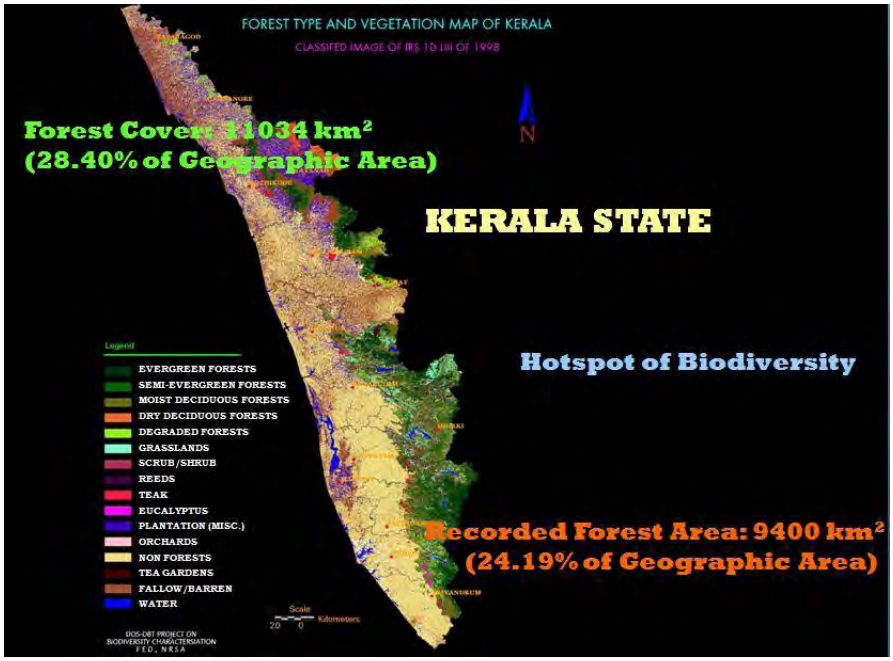

Plate 1. Forest cover map (True Colour Composite) of Kerala showing the diversity of forest types.

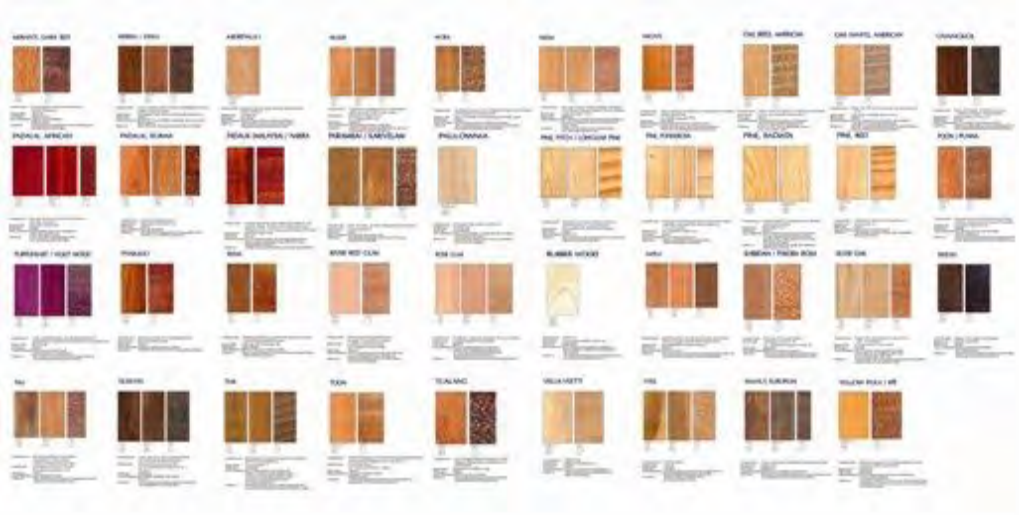

Plate 2. Many lesser known species are becoming increasingly significant in the market supply, causing difficulties in identification, assessing the quality and price fixation.

KERALA'S WITHERING WOOD SECURITY - THE WAY FORWARD

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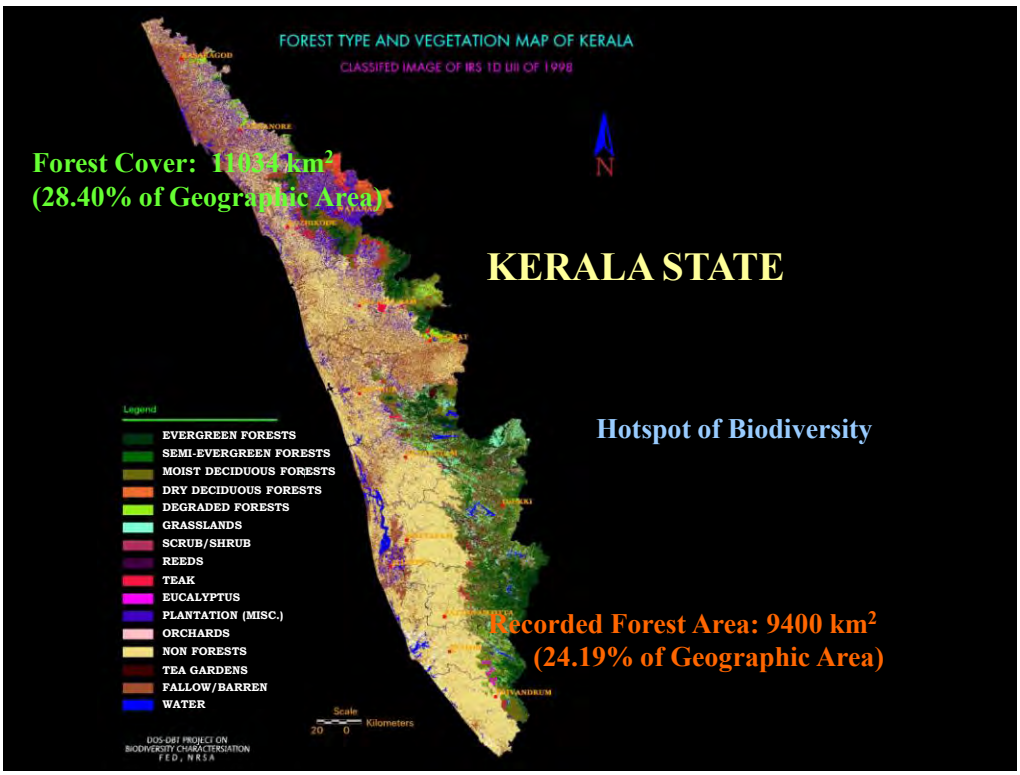

CLASSIFICATION OF FOREST AREA OF KERALA 2008 BY TYPE AND LEGAL STATUS		
I	Forest Type Wise	(Sq.Km.)
	(Effective Forest Area)	
1	Tropical Wet Evergreen and Semi Evergreen	3299.000
2	Tropical Moist deciduous	4100.000
3	Tropical Dry deciduous	100.000
4	Montane Sub-tropical Temperate sholas	70.000
5	Plantations	1809.424
6	Grass Lands	21.576
	TOTAL	9400.000
II	By Legal Status (Area as per Records)	(Sq.Km.)
1	Reserved Forests	9078.1595
2	Vested Forests	1838.5454
3	Land proposed for Reserve Forest	116.6827
	TOTAL	11033.3876

- The State Forest Department mostly supplies teakwood which is bought through auctions. The cost of teakwood timber is on an average above Rs.2,500 per cubic foot and can go upto Rs.4,000
- It has been 20 years since 'Malaysian wood' started reaching the Kerala coast, "Mangalore, Tuticorin and Chennai ports" being the chief entry points for the wood to south India
- Wood is arriving from all parts of the world, even from South America. However, majority of the imported wood is sourced from Myanmar. Pyinkado wood constitutes most of the import
- The timber market is a sellers' market. Wood is scarce and demand is high.

- Therefore, many lesser known timbers are increasingly become significant in the market supply, causing difficulties in identification, assessing the quality and price fixation.


Ghana Teak
Teak - Ivory Coast
Teak - Togo
Quarter sawn
Quarter sawn
Flat sawn
Benin Teak
Burma Teak
Malaysian Teak
Quarter sawn
Quarter sawn
Flat sawn
Columbian Teak
Teak - Costa Rica
Teak - Ecuador
Flat sawn
Flat sawn
Flat sawn
Home garden Teak - Dry site
Thailand Teak
Home garden Teak - Wet site
Cross cut
Quarter sawn
Flat sawn


PALM WOOD

Timber Qualities and Suitability for specific purposes

- Forest tree species of Kerala produce timbers which are light to very light (<550 kg/m^3), moderately heavy (550-750kg/m^3) and very heavy (>750kg/m^3) (*Timbers of Kerala CD ROM)*
- With the wide range of wood density values, these species have the potential to meet the wood requirements of major wood using industries, viz., saw milling, plywood, match wood, packing case, paper and other reconstituted products
- However, most of these industries are in the small scale sector

ANNUAL OUT TURN OF MAJOR FOREST PRODUCTS 2006-2007 & 2007-2008

Sl.No	Name of Products	Units	2006-2007	2007-2008
1	Timber in round logs	Cum	26774.360	48627.829
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7	Reeds	Nos	21403530	15246981
8	Sandal Wood	Kg	3159.35	17537.1

Source: http://www.keralaforest.org

SPECIES WISE OUT- TURN OF TIMBER
BY GOVERNMENT AGENCY 2007-08

Sl.No.	Name of Species	Quantity in CuM
I	INDUSTRIAL WOOD SPECIES	
1	Teak	21547.196
2	Rosewood	479.088
3	Mahagony	769.735
4	Anjily	37.602
5	Thembavu	158.503
6	Vengai	11.218
7	Venteak	202.66
8	Jack/Plavu	6.571
9	Manimaruthu	13.466
10	Marutha	2007.74
11	Irul	1548.971
12	Mulluvenngai	294.118
13	Unnam/Chadachi	877.618
14	Thanni	89.749
15	Karimthakara	2.464
16	Pathiri	9.187
17	Poovam	63.22
18	Kunnivaka	15.144
	TOTAL	28134.26
II	PLYWOOD SPECIES	
1	Vellapine	2.94
2	Kulamavu/Ooravu	42.955
3	Mavu	10816.161
4	Poon/Punna/Punnavu	19.453
5	Cheeni	4.619
6	Nechmar	8.258
7	Kumbil	3.792
8	Njaval	3.732
9	Chompine	5.208
	TOTAL	10907.118
III	MATCHWOOD SPECIES	
1	Elavu/Poola	11.946
2	Pala/Mukkampala	51.619
3	Vaka	250.41
	TOTAL	313.975
IV	BOBBINWOOD SPECIES	
1	Akil/Vellakil	7.172
2	Manjakadambu	6.452
	TOTAL	13.624
V	PENCIL WOOD SPECIES	
1	Venkotta	29.577
2	Poochakadambu	0.23
	TOTAL	29.807
VI	PACKING CASE WOOD SPECIES	
1	Malaveppu	28.995
2	Vatta	184.006
3	Uthi	3.754
	TOTAL	216.755
VII	PULPWOOD SPECIES	
1	Eucalyptus (MT)	17009.013
2	Bamboo (Numbers)	1551168
3	Reeds (Numbers)	14352181
VIII	MISCELENIOUS SPECIES	
1	Fire wood (MT)	12676.413
2	Teak pols (Nos)	352895

Species wise outturn of timber by the Kerala State Forest Department (http://www.keralaforest.org)

Why responsible sourcing ?

- While increased imports will be an opportunity for our forest products industries and trade allies, the sourcing of wood either legally/illegally will put tremendous pressure on high value, ecologically important forests across the world.
- This will also increase the nation's forest footprint, particularly in South East Asia and Africa. In order to minimize the forest footprint, we need to encourage sustainable consumption of timber by promoting forest certification.

Forest Certification

- Forest certification refers to two separate processes viz., forest management unit certification (FMU) and chain of custody certification (COC).
- Forest management unit certification (FMU) is a process which verifies that an area of forest /plantations from where the wood, fiber and other non-timber forest products is extracted is managed to a defined standard.
- COC certification is a process of tracking forest products from the certified forest to the point of sale to ensure that product originated from a certified forest.

Responsible sourcing !

- For buyers of forest products, the responsible sourcing is their *adoption of policies and practices that reward suppliers using wood, fiber and other non wood forest products from well managed forests or from recycled products and discouraging suppliers using it from unknown, illegal or otherwise controversial sources*.
- There are several certification schemes in operation of which Forest Stewardship Council (FSC) certification is one of the most popular and credible certification schemes globally.

FC – the Indian scenario

- In order to meet the growing demand for forest certification in the global market, the Indian industry has to look for certified forests/plantations to source their raw materials.
- The increased demand for forest certification is likely to affect the economic prospects of many farm forestry/agro-forestry areas in India unless these areas are certified.

Need for forest certification

- There is a pertinent need to prevent illegal felling in valuable forests and also to use the global market, commit to conserve it.
- While creating environment conducive for strong B2B relationship of business houses supporting responsible sourcing of wood, it should also lead to reasonable economic and social benefits for the them as well as to the people dependent on wood.

Solomon Islands (FSC certified) teak in India ?

Mberande (SI) teak plantation on alluvial soils - 35.5 cm in 4 years

At 9 years

9-11 year old teak freshly cut and ready for loading

Visiting indian buyers and discussing the measurement system

Conclusion

- Homegardens are fundamental features of the rural landscape of the Indian state of Kerala. Yet these mixed species systems are increasingly being replaced by monocultures.
- Public policies on land tenure, agriculture, forestry and tree growing on private lands have interacted with farmer preferences in shaping land use dynamics and agroforestry practices.
- Not only is there no specific policy for agroforestry in Kerala, but also that the existing sectoral policies of land tenure, agriculture, and forestry contributed to promoting plantation crops, even among marginal farmers.
- Forest policies, which impose restrictions on timber extraction from farmers' fields under the garb of protecting natural forests, have often acted as a disincentive to maintaining tree-based mixed production systems on farmlands.

Changing Trends in Timber Usage in Nagaland, India

K S Shashidhar[4], A N Kumar[5] and Sidramappa Chalkapure[6]

Abstract

The State of Nagaland in North East India is endowed with rich forest resources. With about 52.04 per cent of its geographical area under forests of which 88.30 per cent are owned by communities and individuals, the state is sustained mainly by a rural economy. Forests along with agriculture and animal husbandry are the main source of livelihood, impacting the economic and socio-cultural aspects of the people. The timber resources have three major end users, domestic consumers, wood based industries and market outside the state. Initially, the hardwood species like Phoebe goalparensis, Michelia champaca, Morus laevigata and later Terminalia myriocarpa, were preferred for durability and suitable sizes for construction. No gap existed between demand and supply with availability of timber in plenty. With the setting up of wood based industries and export outside the state, the demand far exceeded the supply resulting in escalation of prices. Species costing Rs. 50-100 per cubic feet during 1985-90s are now priced at Rs. 350-500. With gradual shrinkage of natural forests, scarcity of the preferred timber species resulted in shifts towards lesser known hardwood species such as Chukrasia tabularis, Artocarpus chaplasha, Albizzia lebbeck and Duabanga sonneratioides. The Jhuming cycle has been reduced to 4-5 years from 15 to 20 years. All these factors necessitated augmentation of the resource base through a people's initiative in the form of plantations of Terminalia myriocarpa, Gmelina arborea and Duabanga sonneratioides. Subsequently, plantations of Tectona grandis and Gmelina arborea were taken up on a large scale. In this scenario one can foresee a future for fast growing species like Teak and Gmelina. Emphasis on plantations of short rotation timber species with technological interventions to explore the potentials of engineered woods would augur well for the sustainable management of forest resources in the state.

Key words: Nagaland, timber, *Jhuming,* price, economy, industry,

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1. INTRODUCTION

Nagaland, a state with rich biodiversity, is located in the North Eastern part of India. To its East is Myanmar and Assam to the West. The states of Arunachal Pradesh and Manipur are located to the North and South of the Nagaland respectively. Nagaland, a part of the eastern Himalayas, is endowed with luxuriant vegetation. The rolling mountains, enchanting valleys and the perennial rivers present a magnificent picture. About 82 per cent of the state's population lives in villages, and more than 70 percent of the population depends on agriculture and forestry as their main occupation. Agricultural practice is mainly by shifting cultivation (*jhuming*) and in some places by terrace cultivation.

Physiographically Nagaland comes under the Eastern Himalayas and North East hills of Patkai – Naga Hills forming part of Indo – Burma (Eastern Himalayas) Biodiversity hotspot. The area is the confluence of Indo-Malayan, Indo – China and India Bio geographical realms with high level of endemism. Out of the State's geographical area of 16,579 sq.km, recorded forest area is 8629.38 sq.km (about 52.04 percent of the geographical area). As much as 88.3 per cent of the forests in the state are owned by private individuals or communities and the remaining 11.7 per cent is with the Government. The State with its bio-geographical identity supports a unique assemblage of communities of flora and fauna including threatened and endangered species. The region also has high level of endemism. The Forest types in the state ranges from, Northern Tropical Wet Evergreen Forests, Northern subtropical Pine Forests, Montane wet temperate forests and the alpine forests are some of the major types. The forests are rich with economically important tree species such as *Terminalia myriocarpa, Phoebe goalparensis*, *Dipterocarpus macrocarpus* and *Shorea assamica, Tetrameles nudiflora,* and *Pinus kesiya* along with host of secondary species and other Non Timber Forest Products.

Shifting cultivation or *Jhuming* has been the mainstay for people of Nagaland. The practice integrates their socio - cultural and economic activities. Increase in area under jhum along with intensity and reduction in jhum cycle have all resulted in degradation of quality and quantity of forest cover in the state. Consequently the availability of timber, its demand and prices are affected.

Natural resources, primarily the forests have been playing very important role in the sustenance and livelihood of the people of Nagaland. These resources have to be managed sustainably to support the livelihood of people emphasising the importance of economic dimension. Over a period of time several key factors have influenced the availability of forest produce including timber and resulted in steady increase of their prices. A thorough analysis of these factors highlights the need for a sustainable management of the diminishing forest resources from economic as well as environmental perspective. Further, an attempt has been made to suggest measures to achieve this objective with technological intervention and planned resource augmentation through plantation programmes with the people's involvement.

This paper discusses the role played by various important factors which have influenced the availability of timber and its price over a period of time in the state of Nagaland.

Timber dependent economy

With abundant forest resources, particularly timber, Nagas (people of Nagaland) dependency on timber and other forest products is well established. The utilisation of timber for

construction of houses, community halls and for other purposes has been a common practice and continues even now. The scenario in the earlier times did not show any gap between the demand and the supply of timber resources. This was because of availability of sufficient material and the usage was mainly for their own purposes with hardly any commercial dimension. One of the major factors which changed the scenario is increasing dependency of the people on timber as an economic source

Perusal of trends in timber utility since 1950s brings out two specific facts. First, the economically important species and secondly, the price. Species such as *Terminalia myriocarpa, Phoebe goalparensis*, *Gmelina arborea, Mesua ferrea*, *Morus laevigata* and *Mansonia dipikae* were available in plenty in Nagaland. They were used extensively for construction purposes. The preference for these species was because of their easy availability and durability. Subsequently, these were replaced by lesser known and sparingly used hardwoods such as *Amoora wallichii, Chukrasia tabularis, Albizzia procera,* and *Terminalia chebula, Cinnamomum cecidodaphne*, and *Adina cordifolia*. This shift in pattern was due to lesser availability of these preferred species and the need for quality hardwood species in terms of durability. This high demand for economically important hardwoods and its declining availability resulted in their replacement by lesser known species.

Several of the hardwood species of Terminalias, *Phoebe* spp, *Michelia chmpaca, Tetrameles nudiflora, Mansonia dipikae, Morus laevigata*, widely used in 1970s, are less available today indicating a change in the composition of the species in the timber resource pool of the natural forests (Table 1). Ever since, there has been an increased awareness to augment the timber resources, plantation drive was initiated in the state. The delay in taking up plantations of timber species has further put pressure on the natural forests of the state. The requirements for domestic use as well as for commercial purposes were on the increasing trend and it further prompted people to take up plantations of commercially important timber species such as Teak and *Gmelina.* Though the climate in Nagaland is ideally suited for cultivation of many timber species, Teak, a non-native species has occupied considerable space and attention owing to its commercial significance and relatively fast growing nature. There have been plantations of *Terminalia myriocarpa* and *Duabanga sonneratioides* (mainly for cultivating the betel vine) in some parts of the state. Plantations of *Pinus kesiya* was taken up in the districts of Zunhebhuto, Kiphire and Phek and these areas have naturally occurring *Pinus kesiya* along with *Quercus* spp.

Table 1. Change in the composition of top five tree species on the basis of estimated number of stems during 1985 and 2010

1985	2010
Schima wallichii	*Schima wallichii*
Quercus Spp	*Gmelina arborea*
Alnus nepalensis	*Tectona grandis*
Callicarpa arborea	*Albizzia procera*
Castanopsis indica	*Pinus kesiya*

(Source: Forest Survey of India, 1988)

From Table 1, it can be observed that the composition of species in the natural forests around 1985 was predominantly of *Schima wallichii* and *Quercus* spp, This composition has changed due to the impact of *jhuming* and unsustainable harvesting of the preferred species for both domestic and commercial use. *Quercus* spp. which is an associate of *Pinus kesiya* in many

areas, is on the decline. Native hardwood species such as *Callicarpa arborea* and *Castanopsis indica* had previously dominated the composition of species. However by 2010; these two species did not figure in the composition of the top five and have been replaced by Teak, *Albizzia procera* and *Pinus kesiya*. The occurrence of Teak is mainly due to the large scale plantations established in many parts of the state. Plantations of *Pinus kesiya* as well as its regeneration resulted in Pinus becoming established as one of the major species. This clearly indicates the shift in the population of species between 1985 and 2010. Factors such as unsustainable removal of preferred species for commercial purposes as well as *jhuming* practices are the main reasons. This has resulted in a rise in prices of all the timber species and especially the preferred species. These changes in the pattern of composition of species in forests have been occurring throughout the state and more so in areas where the forests are accessible and removal and transportation is made easier.

Table 2 List of top five tree species on the basis of estimated volume (in '000 cu. m.) during 1985 and 2010

1985	2010
Schima wallichii	*Schima wallichii*
Quercus Spp	*Castanopsis indica*
Castanopsis indica	*Gmelina arborea*
Stereospermum personatum	*Stereospermum personatum*
Duabanga grandiflora	*Albizzia procera*

(Source: Forest Survey of India draft report 2010)

Table 2 shows that the population of the top five species based on the total standing volume indicates that *Quercus* spp which had second largest volume in 1985 did not occur in the top five by 2010 indicating probable excess removal of the species. Similar observations are made in the case of *Duabanga grandiflora*. Unsustained removal of a particular species which has high standing volume has probably resulted in rise in prices due to scarce availability of the species. Similarly, from Table 1 and 2 can be seen the appearance of some of the plantation species such as *Tectona grandis, Gemlina arborea* and *Albizzia procera,* indicating the shift in the preference of the tree species. Some of the traditionally important species such as *Dipterocarpus, Terminalia* and *Duabanga* are found to be replaced by alternate species.

Dependence of land owners on timber resources as a source of economic gain has also influenced the price changes. Land ownership is predominantly private or community owned and the timber resources are treated as an economic entity. In the initial period the population was at low levels and the major portion of timber utilisation was for construction purposes, carving and other local uses. The pricing was also low. The mode of sale was mostly at the site either as a standing tree or felled. Important hardwood species such as Terminalias, *Duabanga*, *Phoebe, Michelia* etc were abundant. The availability of species used for peeling of veneers such as *Dipterocarpus macrocarpus* and *Shorea assamica* were plenty in districts of Mon, This indicates that the demand within the state was amply met by these resources and there was no gap between the demand and the supply. Currently, the hardwoods fetch as much as Rs.700 per cubic foot and Teak fetches Rs.1200 per cubic foot compared to price of standing trees for as low as Rs.20 per tree.

With the passage of time, the demand for the hardwood species increased due to preference for durable construction timber. This demand was mainly from outside the state, however,

even within the state the demand has always been for solid wood. Many of the hardwood species were preferred for their durability and quality without much need for seasoning or and treatment. These timbers found their way to the markets of metropolitan cities of New Delhi, Chennai, Kolkata and even far off places in North India. In addition to these superior qualities, the low prices resulted in high demand for timber. Different places in India preferred particular species either for their colour, decorative properties or for their durability in addition to the price factor. For instance, markets in Gujarat preferred *Amoora wallichii* and *Adina cordifolia*, Kolkata preferred *Gmelina arborea*, *Albizzia* spp, and *Phoebe goalparensis*. In North India preference was for *Phoebe*, *Terminalia* and *Michelia*. Parts of the South demonstrated a preference for *Adina cordifolia* and *Duabanga.* Some states had banned the extraction of Pine resulting in demand for *Pinus kesiya* from the state. Several forest based industries were established depending on timber from the forests. Initially the demand was specific for few species and eventually with the removal of these species a change in the species composition as well as price increase is observed. This also led to lesser availability of preferred species and the scene shifted to utilisation of hitherto lesser known species.

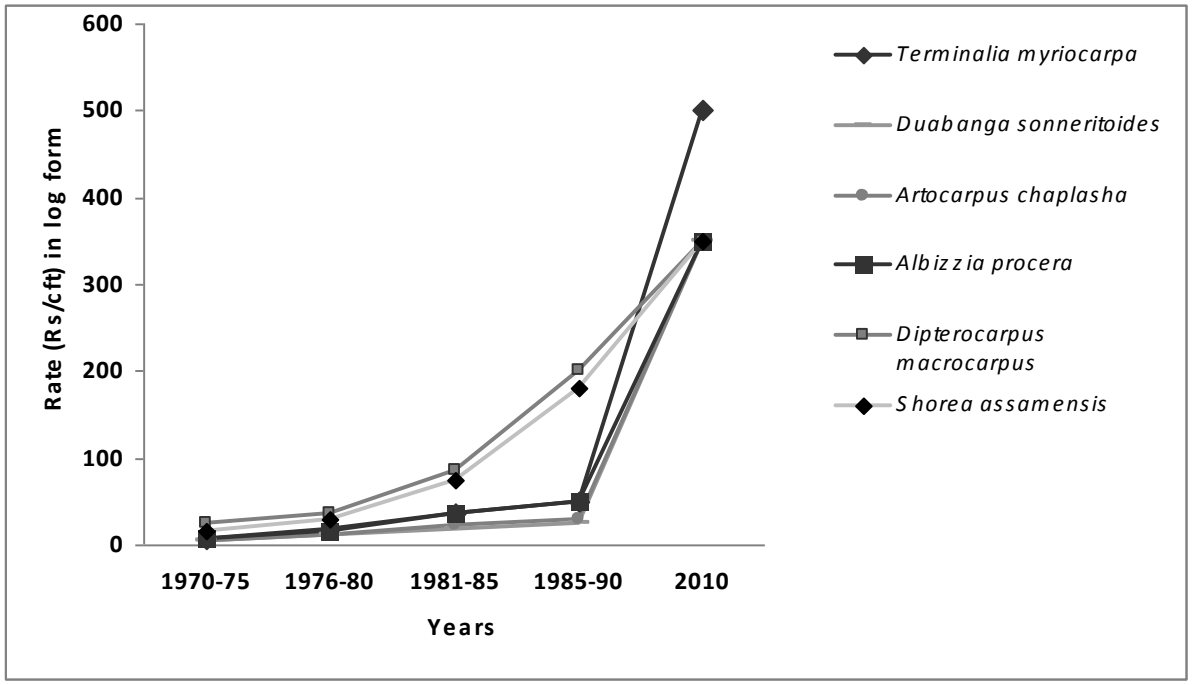

Figure1. Change in the prices of the timber yielding trees over the years

It is evident from Figure 1 that the price of some of the traditionally important species has increased over a period of time. In the case of *Dipterocarpus macrocarpus* which was as low as 25 rupees per cubic feet during 1990 has increased to Rs. 500 in a span of 20 years. This is partially due to the decline in the population evident from the species composition. Similarly, *Terminalia myrocarpa* has increased from Rs. 50 per cubic feet to Rs. 500. One of the main reasons for such a steep increase can also be attributed to the fact that the demand for such wood is far higher than the supply and at the same time its declining availability. The overall price factor almost remained flat between 1970-75 till 1985-1990, once the demand for timber started increasing and exported outside the state, prices showed steep increase. Although almost all the species showed an increase in price and some species such as

Dipterocarpus and *Shorea* showed a steep increase. Among the hardwoods, *Terminalia myriocarpa* is the most preferred wood and its price showed a steep increase.

Jhuming and its Impact on Trends in Timber Usage

Jhuming or shifting cultivation is an accepted agricultural practice and is the mainstay of Nagas. It is being practiced in areas where the land is sloping and difficult for any other type of cultivation. The Socio – Cultural and economic activities are centred around this practice. With many festivals, cultural and social occasions coinciding with various stages of *jhuming,* the main economic dependency is on the land based activities of Agriculture and Forestry. Almost all the tribal groups in the districts follow this practice and in some districts they also practice terrace farming.

The practice of *jhuming* involves several steps. It starts with the selection of an area for *jhuming,* which could be a new area with forest or tree cover or an area which has already been subjected to *jhum*. This selected area is cleared of any tree growth or vegetation (sometimes they retain stumps of grown up trees to allow them to regenerate) and the area is burnt and prepared for sowing of crops. The village community or the individual owner decides that the area is to be *jhumed* in advance in that particular year. After *jhuming* this particular area, in the next year, another patch of land is selected for *jhuming* and this goes on for subsequent years and finally returns to the area taken up in the first year. The time taken for returning to the fist plot is known as the *Jhum* cycle. This *Jhum* cycle was initially about 20 years and above and currently has come down to 4-5 years. As long as this period was 20 years and above it ensured sufficient tree re-growth and also maintained fertility status to some extent and reasonable crop yields are produced. But with the passage of time, and increase in population, the *jhum* cycle is reduced to 4-5 years resulting in low crop yields in the subsequent years due to loss of top fertile soil. Repeated *jhuming* has rendered many hills barren except few grasses colonising over a period of time.

Although it is difficult to make an exact assessment of the extent of area under *jhuming*, it is estimated to be around 900,000 ha in the state with an annual area of about 1, 31,000 ha (Anonymous, 2001). The area which is currently under *jhum* cultivation is known as current *jhum.*

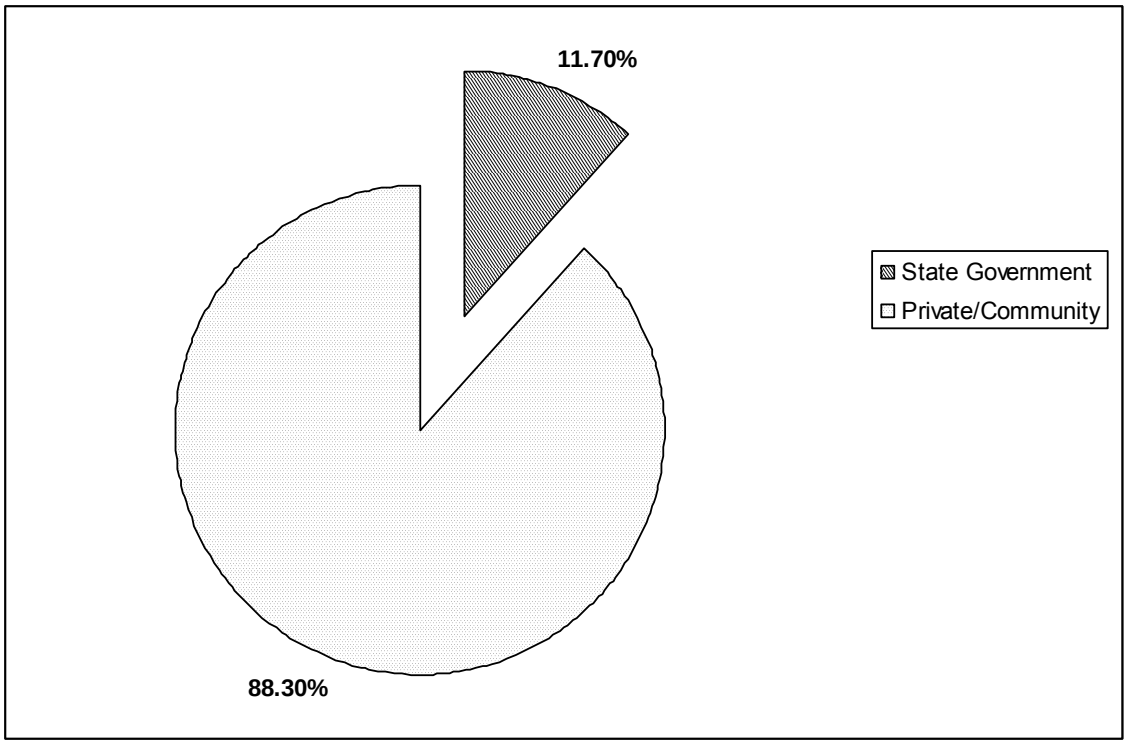

Figure 2. Forest ownership status (%) in Nagaland

With 88.3 percent of the forests are privately or community owned (Fig 2), the area selected for *jhuming* depends on the need and the decision of the community or the land owner as the case may be. *Jhuming* has been one of the important factors to affect the forest cover in the state. In the event that an area rich in timber resources is earmarked for *jhuming,* removal of forest produce including timber has a bearing on the forest cover. The impact of *jhuming* in forest areas has not only reduced the extent of forest and tree cover but also the quality as observed from the changes in the species composition. The decline in the availability of important species such as *Phoebe goalparensis, Terminalia myriocarpa, Morus laevigata, Artocarpus chaplasha* and *Michelia champaca,* has eventually given way for lesser known species such as *Chukrasia tabularis, Amoora wallichii, Terminalia chebula* and *Duabanga sonneratioides,* among others.

There have been several efforts to mitigate the adverse effects of *jhuming* by devising several methods of practising agriculture in combination with tree farming and stabilising the *jhum* cultivation with due attention to the socio – cultural dimension of the community.

Impact of wood usage by industries and other sectors

In the earlier period logs were allowed to be transported outside the state to the industrial units located in Assam. Subsequently the state had few wood based industries in the form of saw mills which mainly catered to the requirement of domestic market. Many of the sawn timbers used were hand sawn at the site of felling mainly for own use. With the passage of time, after the 1980s several saw mills and veneer units were established in the state. These units utilised the timber from private and community forests and eventually started exporting sawn timber and veneers outside the state. During 1980s about 35 saw mills were functioning in Mon district alone, indicating a spurt in timber utilisation on commercial scale.

Apart from these Saw and veneer mills, other units dealing with molding beats, furniture units also started subsequently. Although furniture units catered to the local demand to some extent, the main demand was from outside the state. Furniture demand within the state was on the rise from 1985 onwards coinciding with the migration of people from villages to urban areas. Of the different species, *Artocarpus chaplasha* and *Gmelina arborea (*mainly for cots and chairs) were initially used for furniture. Subsequently *Cinnamomum cecidodaphne, Morus laevigata, Michelia* and *Tetrameles* were also used. At present *Melia* spp is also being used. Teak furniture attained popularity in the market only from 1990 onwards. These changes in the species usage indicate that the preferred species is on the decline and a wider range of species is being used for furniture.

Few plywood and veneer units started utilising the species such as *Dipterocarpus macrocarpus* and *Shorea assamica* for peeling and as the utilisation and demand exceeded the availability. Decline in population and scarce availability of these species resulted in usage of other alternative species such as *Mangifera indica, Schima wallichii, Ailanthus grandis, Artocarpus chaplasha, Canarium* spp, *Anthocephalus cadamba*. Furthermore, there was preference for red colour veneers, and *Bombax malabaricum* was used.

During the late 70s and early 80s the state supplied huge quantities of railway sleepers to the Department of Railways. Two categories of sleepers were supplied, one from *Mesua ferrea* which is one of the hardest timbers available and the other category consisting of general hardwoods from different species such as *Artocarpus, Albizzia*, and *Altingia excelsa* etc. This major supply put tremendous pressure on the timber resources in the state resulting in unsustainable harvesting of these species. Eventually their availability declined and the prices increased very steeply. This has also resulted in less availability of many hardwoods for construction and other purposes. The preferred available species were at a premium price and the users were forced to shift their preference to alternate species instead of the main ones.

The art of wood carving is closely associated with the culture of Nagas. Carving in different forms and in various places such as community halls, houses and other places in the villages is a common feature exhibiting their talent and penchant for carving. These carvings depicted various cultural and traditional practices. Konyaks from Mon district are well known for their artisan skills. Some of the carvings done in front of the community halls and the front doors are beautiful and are in high demand. To encourage these skills, crafts villages are established. One such village is Diezephie in Dimapur district. A working shed financed by the government is used by the skilled workers from the villages and they practice craftsmanship. Species such as *Gmelina arborea*, *Artocarpus* spp. *Wrightia tinctoria* and bamboo are used. Some of the artefacts prepared by them are, Naga Thali (traditional dish for taking food), kitchen items, tea tray, key holders and chain, cloth hangers, walking sticks, mementos, decorative items, wall hangars, flower vases and traditional Naga bangles. The craftsmen get orders from individuals, shop owners, and firms/organizations from within the state as well as from outside. The craftsmen are comfortable working with Teak and *Gmelina* as it is easy to carve different shapes with it and the wood of these species is abundantly available locally at lower rates.

At present teak as well as several hardwood species continues to be transported outside the state which includes species such as *Phoebe goalparensis, Michelia champaca, Terminalia myriocarpa, Chukrasia tabularis, Amoora wallichii* and *Pinus kesiya*. It clearly indicates that there is a growing demand for timber outside the state. To augment the resources especially timber and to supplement the livelihood of people, plantations of economically important

species on one hand and sustainable management of natural forest on the other hand should be given due attention. Plantations of Teak, *Gmelina arborea* and to a limited extent that of *Terminalia myriocarpa* and *Duabanga sonneratioides* and *Pinus kesiya* are being established. Selection of species for plantations is an important parameter as the selected species have to be fast growing and of short rotation periods so that *jhuming* can be integrated with plantation programmes. With the intervention of technology, these short rotation timbers can be efficiently utilised.

Scarcity of preferred timber species due to population decline, increasing demand both from the domestic sector as well as outside the state and *jhuming* practices have all resulted in increases in the price of timber in the state. There appears to be tremendous potential for composite wood industry and it can cater to the demand from outside the state as well as for domestic usage. The combined approach of augmenting the resources on one hand and efficient utilisation of timber through intervention of technology will enable sustainable management of forest resources in Nagaland.

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Changing trends in timber usage in Nagaland, India

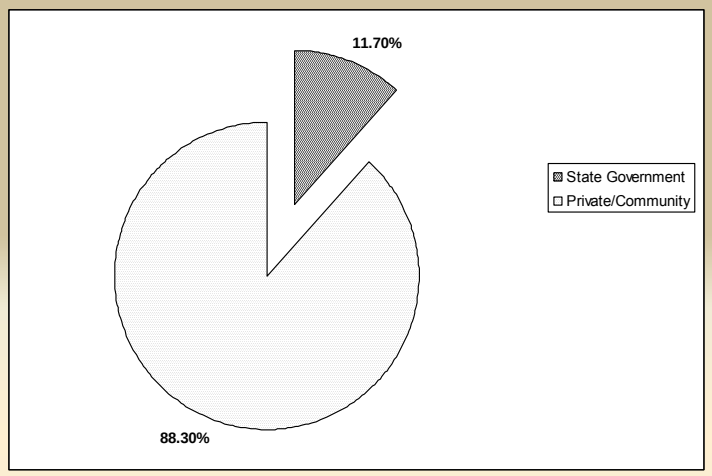
K. S. Shashidhar, A. N. Arunkumar & Sidramappa

Introduction

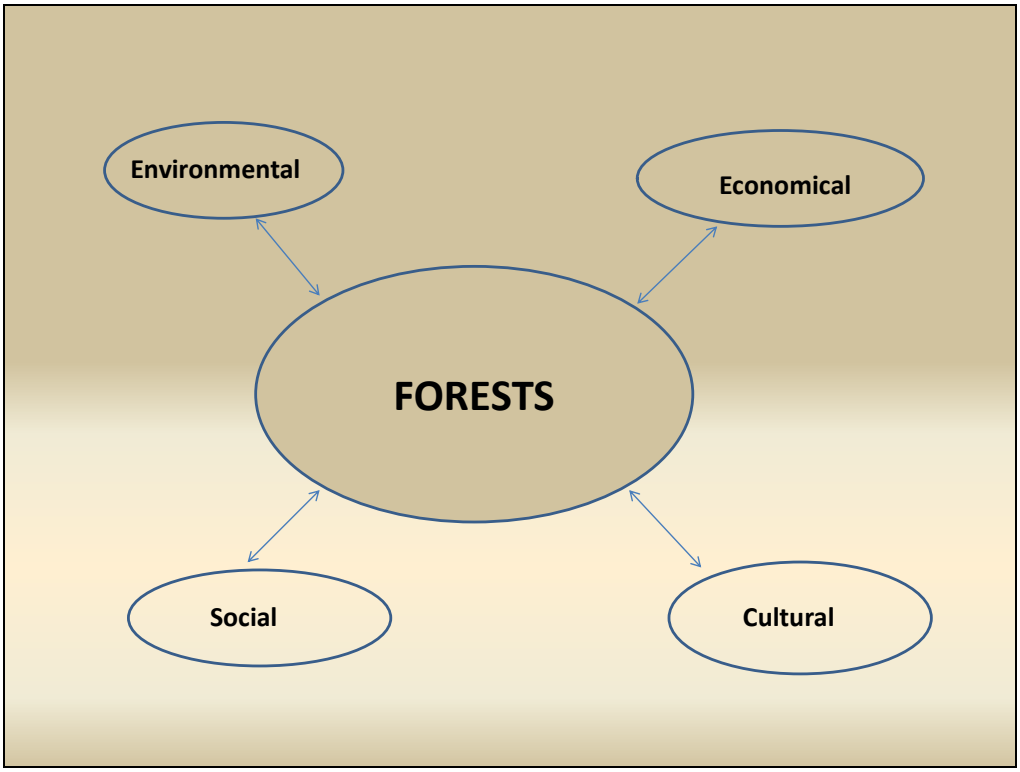
- Nagaland, a Bio diversity rich state located in North Eastern part of India
- It forms part of Indo-Burma (Eastern Himalayas) Biodiversity Hotspot with high level of endemism
- About 80 % of population lives in Villages and 70 % depends on agriculture animal husbandry and Forestry for livelihood
- Agriculture is mainly by shifting cultivation *(Jhuming)*
- 52.04 % of the geographical area is under forests
- 88.3 % of the Forests are owned by communities and individuals and the remaining 11.7 % is with Government

Forests……

- Forest types ranges from Tropical Wet evergreen forests , Sub tropical Pine forests to Montane wet temperate forests
- Economically important tree species include …..
  - *Terminalia myriocarpa*
  - *Phoebe goalparensis*
  - *Dipterocarpus macrocarpus*
  - *Shorea assamica*
  - *Tetrameles nudiflora*
  - *Morus laevigata*
  - *Michelia champaca*
  - *Pinus kesiya*
- Other important Non Timber Forest Products include host of aromatic and medicinal plants including Ginseng

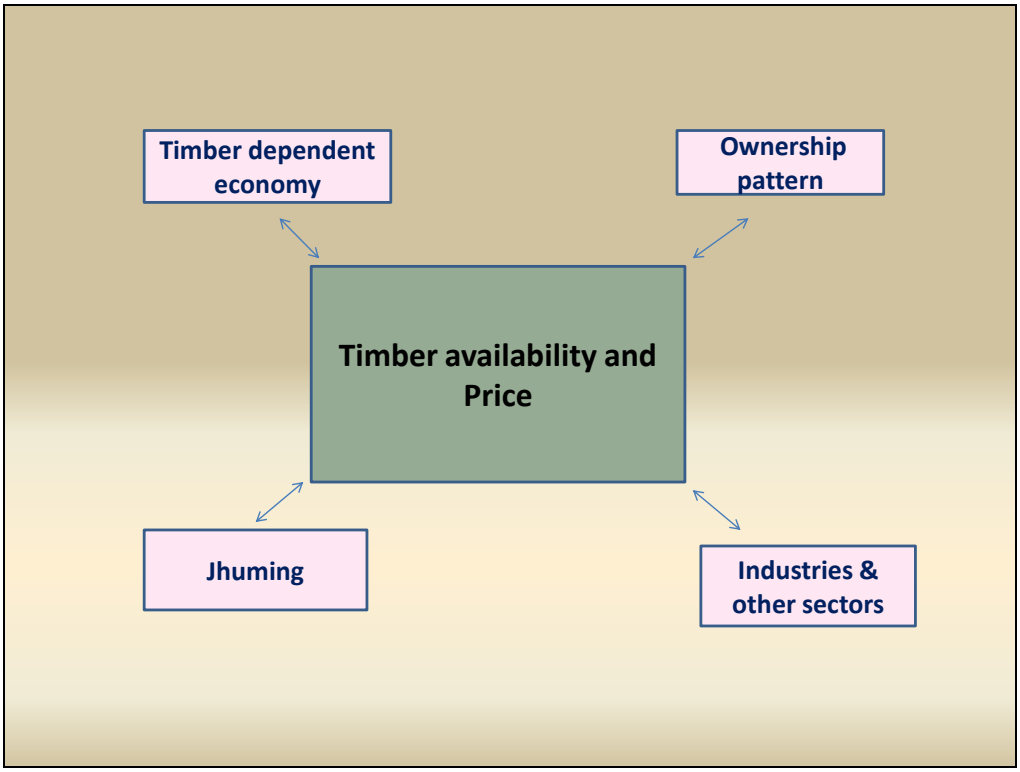


Forest ownership status (%) in Nagaland



Several factors influenced .....

- Availability of Timber
- Demand for preferred species
- Price variations



Timber dependent economy

Earlier (between 1950's and 1970's) ……

- Timber is mainly used for construction purposes, carving and handicrafts and mainly for bonafide use
- Little or no gap between demand and supply
- Timber species such as *Terminalia, Phoebe, Gmelina, Mesua, Morus* & *Mansonia* were available in plenty in the forests
- Preference for these species due to durability and availability
- Little commercial dimension

Later (1970's onwards) ……..

- Commercial outlook and demand for durable hardwood increased
- Lesser availability of preferred species
- Shift to lesser known species such as *Amoora, Chukrassia, Albizzia, Cinnamomum and Adina* as these were still quality hardwoods

Change in the composition of five tree species on the basis of estimated number Of stems between 1985 and 2010

(Source: Forest Survey of India, 1988)

1985	2010
Schima wallichii	*Schima wallichii*
Quercus spp	*Gmelina arborea*
Alnus nepalensis	*Tectona grandis*
Calliacarpa arborea	*Albizzia procera*
Castanopsis indica	*Pinus kesiya*

- Composition changed due to jhuming and excess removal of preferred species
- Plantations of Teak, *Gmelina, Terminalia, Pinus* and *Duabanga*
- Demand for commercially important species also resulted in price changes

Top five timber species on the basis of estimated volume (in '000 cu.m) between 1985 and 2010

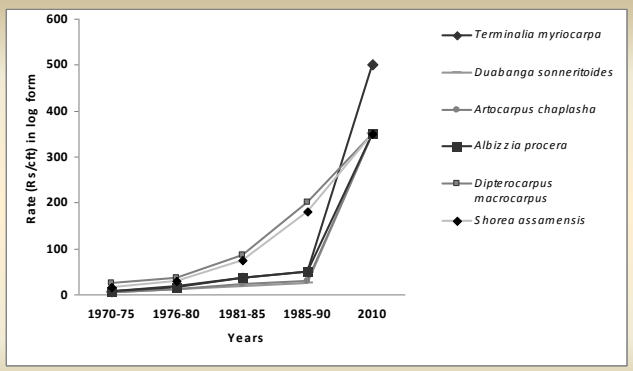
(Source: Forest Survey of India, 2010)

1985	2010
Schima wallichii	*Schima wallichii*
Quercus spp	*Castanopsis indica*
Castanopsis indica	*Gmelina arborea*
Stereospermum personatum	*Stereospermum personatum*
Duabanga grandiflora	*Albizzia procera*

- Unsustained removal of preferred species has resulted in lesser availability as well as increase in prices
- Traditional species such as Duabanga, Terminalia have been replaced by alternate species
- Increasing view of timber resources as an economic entity

Increase in price of timber is the result of ……..

- Demand for durable construction timber increased and gap in supply position
- As the prices of timber were reasonable compared to other places
- This increased demand was mainly from outside the state from major cities
- Establishment of forest based industries inside the state as well as in the adjoining states



Change in prices of timber yielding trees over the years

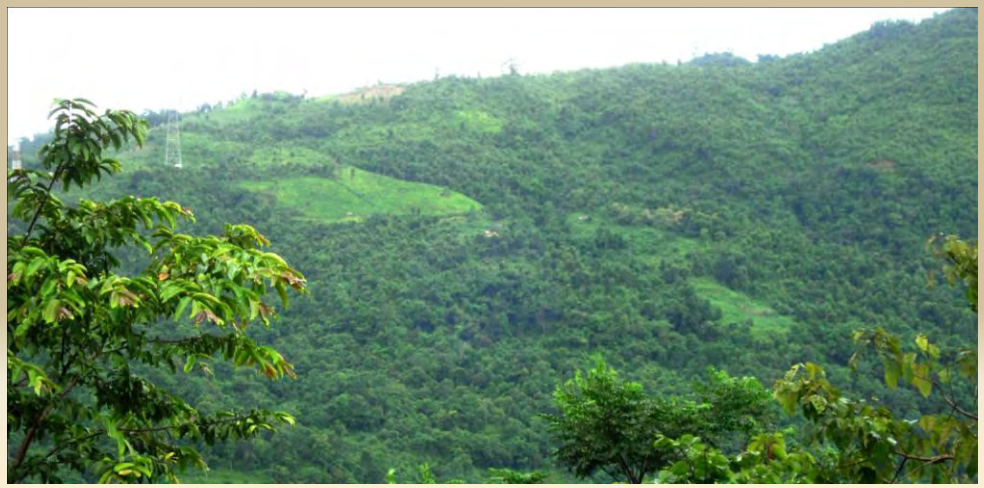
Effect of Jhuming on Price structure

- Estimated area of about 900,000 ha subjected to jhuming
- Annually about 1,31,000 ha area is jhumed
- Due to ownership pattern jhuming area is decided by community/individuals
- Reduction in jhum cycle from 20 years to 4-5 years

Consequences….

- Reduction in forest cover in the state
- Quality of forests is also affected as observed by the change in the composition
- Decline in the availability of preferred species such as *Phoebe, Terminalia and Morus*
- Scenario giving way for lesser known species such as *Chukrassia and Amoora,*

An overall view of current *jhum* area



Another view of current *jhum* area surrounded by forests

Closer view of current *jhum* area

Impact of Industries and Other sectors on Price rise

- Initially not many wood based industries were operating in the state
- By 1980's and onwards many saw mills and veneer units were established

Dipterocarpus and Shorea were used for peeling veneers, later it was alternative species such as Mangifera, Ailanthus, Anthocephalus

- Large scale supply of Railway sleepers had put pressure on resources an influenced the price
- Furniture industry by 1985 started picking up
- Species such as Artocarpus and Gmelina were popular for furniture making and later shifted to Cinnamomum, Michelia were used.
- 1990 onwards saw Teak in the market on a large scale
- Wood carving is associated with culture of the people of the state
- Carving in community halls, houses, front doors is very common
- Species such as Gmelina and Artocarpus were widely used for carving

Pochury tribe

SANGTAM TRIBE

CHAKESANG TRIBE

ANGAMI TRIBE

Decorative carving in front door for a community hall in the village

Handicrafts made at Deziphe crafts village

Another set of Handicrafts at Craft's village

Different types of wooden utensils, fruit bowls made at Crafts village

Bamboo and wooden handicrafts for sale

Huge *Phoebe* plank

A hut in a tourist village

Log Hut in a Community Reserve