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# TIMBER SUPPLY SITUATION IN KERALA: PROJECTION FOR THE YEAR 2010-11

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## ABSTRACT

This study was initiated to make an estimate of the timber supply situation in Kerala for the year 2010-11. The projected demand for timber during 2010-11 in Kerala is 22,28,000 $m^3$ roundwood. The households sector accounted for 24 per cent and industries sector 45 per cent of the total demand. Export of wooden packing cases and other timbers to the neighbouring States, accounted for around 31 per cent. The actual export to foreign countries from Kerala was negligible. When the export demand for packing case timber is considered along with the industrial demand, around 74 per cent of the total demand was from the industries sector. Export of packing cases was of the order of 6,40,000 $m^3$ during 2010-11. Rubber wood alone contributed 5,29,000 $m^3$ in this export. Sawmills serving the household and institutions sectors processed 5,41,000 $m^3$; while packing case units, which are also sawmills, processed 6,40,000 $m^3$.

Analysis of the timber supply situation in Kerala, revealed an export surplus of 3,17,000 $m^3$ during 2010-11. Contribution of forests was only 1.6 per cent and timber import represented 16.5 per cent of the total timber supply of 22,28,000 $m^3$ roundwood in Kerala. Rubber estates in Kerala produced 46.6 percent; home gardens and other estates, the remaining 35.3 per cent. Import from other States stood at 1,51,000 $m^3$, which included 83,000 $m^3$ of rubber wood. The actual import of timber from abroad was 2,16,000 $m^3$ during 2010-11. Timber imported from abroad was in the form of large dimension logs which have been severely depleted in the growing stock of timber in Kerala. Import of timber into Kerala has been growing and the trend is expected to continue in the future.

The study reveals a comfortable situation in the matter of timber availability in Kerala, due to the large volume of rubberwood production which is used by the packing case, plywood and even furniture industries. Construction timber is again plentiful from international sources. The sawmills in Kerala now depend mainly on timber imported from abroad. They also obtain timber from home gardens. The matchwood units continue to obtain their raw material mostly from home gardens around their production units. Some plywood units depend exclusively on imported timber.

Although production of timber from forests is negligible, there is no dearth of timber for timber-based industries in Kerala. They obtain their supplies from abroad and states like Karnataka, Gujarat and Maharashtra, apart from the home gardens and estates in Kerala. With the abundance of timber in the Kerala timber market and the availability of modern machinery to process the timber, new units are bound to replace the outdated and inefficient ones. This is a natural and welcome process for the economy and consumers. There is no relevance for imposing a number limit for wood based units in the context of changes in the scale of operations and market reach of particular units and the modernisation of the wood based industry in general. However, conservation of forests must be ensured by all means including restricting the location of sawmills near forest areas.

If the message in the 2001 Wood Balance Study in Kerala by KFRI was to conserve the remaining timber wealth in the forests of Kerala, the message in this study is to conserve the timber resources in the home gardens also, to enable self sufficiency in large dimension timber, in the event of decline in availability of imported old growth timber from abroad in the future.

## 1. INTRODUCTION

Timber supply assessment involves estimation of the production of timber from forests, areas outside forests such as home gardens and estates and also the import of timber from the neighbouring States as well as the true import from abroad. There are two wood-balance studies in Kerala by KFRI for the reference years 1987-88 and 2000-01, in which the sector-wise demand and source-wise supply were estimated (Krishnankutty, 1990; Krishnankutty *et al*., 2005; 2008). It has already been established by these studies that areas outside forests of Kerala produce bulk of the timber, that is consumed in Kerala and a large component of this production is rubberwood.

After 2001, drastic changes have taken place in the supply of timber and industrial wood. While production of rubber wood from estates is increasing, supply through import mainly from abroad is also on the increase. In this context, it is necessary to obtain a realistic picture of the present timber supply situation in Kerala for the Central Empowered Committee, appointed by the Hon'ble Supreme Court, to examine the feasibility of approving new wood-based industrial units in Kerala. The objective of this study is to make projection of supply of timber in Kerala from different sources for the reference year 2010-11, based on data from past studies and updated data on production from forests, rubber estates and timber import during the present study period.

## 2. METHODOLOGY

The studies for the years 1987-88 and 2000-01 looked at the Kerala wood economy in its entirety which means all timber, industrial wood, poles, fuelwood and charcoal were included under the definition of wood. The fuelwood component is many times larger in volume than that of timber. In this study, timber is defined to include all types of timber used in construction and other purposes; wood used in packing case, matchwood, plywood, pulpwood, furniture and all other timber-using industries. The present study focuses on timber and industrial wood and therefore fuelwood and charcoal were excluded. The use of coconut wood, which was an important component of timber during 1987-88, has substantially reduced during 2000-01 due to the switchover to concrete roof in buildings which in the earlier period consisted of tiled buildings and thatched huts. Now the use of coconut timber is minimal and the proportion of fuelwood is about 80% in coconut roundwood and therefore coconut wood is excluded in this study. Further, smaller teak poles and casuarina have also been excluded from the definition of timber. Pre-used dismantled joinery and other wood work even when used in current construction are excluded. Volume of timber is presented in cubic metre ($m^3$) roundwood. Volume of sawn timber in $m^3$ and weight of timber in metric tonne were converted to $m^3$ roundwood equivalent using appropriate conversion factors.

The relationship between consumption, production and trade of timber during a year is given by: consumption equals the sum of production and import less export. Import includes the quantity of timber coming to Kerala from other States in India

and from other countries. Export refers to the quantity of timber moved out of Kerala to other States in India and to other countries. Then, the sum of consumption and export is taken as the effective demand and sum of production and import, as the supply. The method of projecting the quantities of supply of timber for the year 2010-11 is described below:

**2.1 Projection of timber demand during 2010-11**: All timber-using entities have been classified into any one of the four sectors, namely households sector, industries sector, institutions sector and export sector. The institutions sector consists of public buildings, commercial establishments and all other timber using entities other than households and industries. All houses in the residential category were included under the households sector and all other buildings under the institutions sector. The sawn or sized timber from the sawmilling industry is used in the households and other sectors or exported. The entire output of the packing case industry, *viz* wooden packing cases, was exported from Kerala to other States and was included under the export sector. As the outputs from sawmilling and packing case industries are accounted in any one of the households, institutions and export sectors, it is not included in the industries sector to avoid double counting.

Consumption estimates of timber for the households, industries and institutions sectors for the years 1987-88 and 2000-01 were re-worked from the earlier studies after excluding coconutwood and poles. Then the sector-wise consumption estimates for 2010-11 were prepared by projecting the compound growth rate between the years 1987-88 and 2000-01. It was also supplemented with enquiries made with traders, sawmillers and importers regarding the subsequent trends in production, consumption and trade. The volume of timber exported from Kerala to other States in India and to other countries during 2010-11 was estimated from the data compiled from the timber movement registers maintained at all the inter-State border forest check-posts, sale-tax check-posts where there exists no forest check-posts, Railway Division Offices and Cochin Port. The total demand for timber for the year 2010-11 was estimated as the sum of the sector-wise consumption projected for 2010-11 and the actual volume of export of timber to other States in India and abroad during 2010-11.

**2.2 Projection of timber supply during 2010-11:** The total supply of timber during 2010-11 was projected as equal to the estimated total demand for timber during 2010-11. The contribution from different sources to the timber supply was assessed under four components: import, forests, rubber estates and home gardens including estates of cardamom, coffee and tea. The source-wise supply during 2010-11 were arrived at by segregating the total supply during 2010-11 into timber import, production from forests, production from rubber estates and production from home gardens and estates other than rubber, as follows: The volume of timber imported from other States in the country and abroad during 2010-11, was estimated from the data compiled from the registers maintained at all inter-State border forest check-posts, Railway Division Offices and Cochin Port. Data on

timber production from the forests of Kerala during 2010-11 was obtained from the files of the Kerala Forest Department. The estimate of rubberwood production from the rubber estates in Kerala during 2010-11 was obtained from the publication of the Rubber Board (Government of India, 2012). Timber production from home gardens and that from estates other than rubber during 2010-11, was estimated as the difference between the projected total demand during 2010-11 and the sum of forest timber production, rubber wood production and import during 2010-11.

## 3. TIMBER CONSUMPTION AND EXPORT

**3.1 Consumption and export during 1988 and 2001:** The estimates on sector-wise consumption of timber during two time points 1987-88 and 2000-01, have been re-worked from the previous studies by refining earlier estimates by excluding poles and also coconut wood which were substantial components in the earlier timber production estimates. Table 1 shows the demand for timber in Kerala during 1987-88 and 2000-01. The total demand is shown under four sectors: households sector, industries sector, institutions sector and export. The total demand for timber in Kerala increased from 1,769,000 $m^3$ roundwood in 1987-88 to 1,984,000 $m^3$ roundwood in 2000-01. Of the total export to other States in the country, wooden packing cases accounted for around 95% during 1987-88 and 98% during 2000-01. The remaining quantity in the total export was teakwood.

**Table 1. Consumption and export of timber[1] in Kerala during 1988 and 2001**

| Timber-using sectors | Volume ('000 $m^3$ roundwood) | |
|---|---|---|
| | 1987-88 | 2000-01 |
| Households sector | 543 | 541 |
| Industries sector | 742 | 865 |
| Institutions sector | 121 | 10 |
| Export: To other States[*] in the country | 361 | 565 |
| To other countries (Rosewood) | 2 | 3 |
| Total demand for timber and industrial wood | 1,769 | 1,984 |

[1]Excluding coconutwood & poles. [*]Predominantly rubber wood packing cases, including teakwood of 14,000 $m^3$ in 1987-88 and 8,000 $m^3$ in 2000-01.
Source: Re-worked from Krishnankutty (1990) and Krishnankutty *et al*. (2005).

**3.2 Projected consumption during 2010-11:** The projected consumption of timber in the households, industries and institutions sectors is given below:

***Households sector*:** The trend in timber-use in the households sector remained more or less the same during the period 1987-88 to 2000-01. The factors that affect timber use are (i) availability and price of timber, (2) substitution possibilities and the relative prices of alternatives and (3) changing fashion and preference. Old houses are replaced with modern designs, often in the same location and plot, with the increasing affluence of households, changing needs and fashion. Renovation

and replacement of old houses involve selling off the old wood work, including doors, windows, ceiling and fixtures, in an as-is-where-is condition. Often, such wood work contains good quality timbers and excellent craftsmanship. Now a successful business has developed for buying and selling such woodwork from old buildings. The buyers get this materials at very cheap rates in comparison with the hassle in buying logs of timber and sizing them in a sawmill in addition to the up and down transportation of such materials and the greater challenge of managing the carpentry work. Pre-used wooden doors and windows from old houses are being widely used in the new houses constructed by the poorer households. The quantity of such dismantled wood work in current house-building activities is significant enough to merit mention, not only among poor households, such a tendency is evident even in expensive fashionable buildings where dismantled wood work is brought from Karaikudy in Tamil Nadu, where palatial buildings with elaborate wood work are being dismantled. The most noticeable thing in the households sector is that wood for roof support in the form of rafters and beams have completely been replaced by concrete even in the government housing schemes for the poor, including that of the tribals in forests. Therefore in new buildings, not only is there substitution of wood work with other materials like concrete, steel, aluminium and fibre materials, there is also substitution with dismantled wood work without the need for new timber. Both these aspects together resulted in a steady state of timber consumption in the households sector, although the population has increased. Prior to the large scale import of timbers, construction and furniture timbers (jack, *anjily* and teak) used in Kerala were produced in home gardens. Although, there was a decline in the consumption of construction timbers in the households sector, mostly by substitution with other materials, the aggregate consumption in the households sector has remained more or less constant utilising the plentiful availability through imports. Construction timbers such as pyinkado, *purpleheart*, keruing, *greenheart*, *merbau*, billinga, sal, kusia, mora, babul, white *meranthi*, etc. are imported from abroad (Table 2). Almost all other construction timbers such as jack, *anjily*, etc are from the Kerala home gardens. The timber consumption in the households sector in Kerala has slightly declined from 543,000 $m^3$ roundwood in 1987-88 to 5,41,000 $m^3$ roundwood in 2000-01. The projected timber consumption in the households sector in Kerala during 2010-11 is 5,39,000 $m^3$ roundwood.

***Industries sector*:** One of the important wood processing industries in Kerala is the sawmilling industry which has thrived due to the increasing arrival of imported timber to Kerala in the form of round logs. The traditional production of home garden timber arrives in the local sawmills for custom sawing or as logs for sale in the sawmill cum depots in the rural areas. Sawmills in the urban areas are moving out of the city centres due to congestion in city roads and shifting to the peripheries for accommodating the larger dimension logs imported from abroad. The packing case units, which are essentially sawmills specialising in sawing rubberwood, cater to the large markets for wooden packing cases. Almost the entire output of the packing case industry in Kerala is exported to other States particularly to Tamil

Nadu, Karnataka, Andhra Pradesh and Maharashtra. Rubberwood is the most preferred species and accounts for about 77% of the raw-material used in the packing case industry (Appendix 1). The rest is the miscellaneous timber from home gardens and roadsides. The preference for rubberwood is due to the superior finish and a very low wastage during sawing. *Vatta*, *mavu*, *eucalypts*, silver oak, *pala*, *albizia*, cashew wood, nutmeg wood, cocoa wood, *chempakam*, mahogony, *murikku*, *elavu*, etc. are the other wood used in the packing case industry. A very high demand for wooden packing case has resulted in the import of silver oak, eucalypts, neem wood, karivelam, babul wood, etc. from outside Kerala to supplement the production of rubberwood in Kerala as raw material in the packing case industry to be re-exported to other States.

**Table 2. Species and sources of timber used during 2010-11**

| Timber | Species being used | Sources |
|---|---|---|
| Construction timbers (Sawmills) | Jack, *anjily*, teak, eucalypts, *paduak*, *pyinkado*, purpleheart, greenheart, *merbau*, *billinga*, sal, *kusia*, *mora*, *babul*, white meranthi. | Home gardens, import from abroad*, forests |
| Packing case | Rubberwood, *vatta*, *mavu*, *eucalypts*, silveroak, *pala*, *albizia*, cashew wood, *edana*, nutmeg wood, cocoa wood, *anjily*, jack, *chempakam*, mahogony, *murikku*, *elavu*. | Estates, home gardens, import from other States. |
| Matchwood | *Matty*, *vatta*, *pala*, elavu *and albizia.* | Home gardens, forests |
| Plywood | Rubberwood, v*atta*, *eucalypts*, silveroak, *kadukka*, *vellapine*, *kalpine*, mahogony, *plavu*, *anjily*, imported sp. | Estates, home gardens, imports from other States and abroad. |
| Pulpwood | Eucalypts, acacia sp. | Forests, import from neighbouring States. |
| Furniture | Teak, jack, rosewood, purpleheart, rubberwood. | Forests, home gardens, estates, imports from other States and abroad. |

*****Myanmar, Malaysia, Indonesia, Africa, Papua New Guinea, South-American Countries, etc.

In the match industry in Kerala, finished match boxes were initially produced in integrated units manufacturing boxes, splints and carrying out dipping activities. Over time, the dipping activities shifted out of Kerala to drier regions of Tamil Nadu, such as Sivakasi, where weather conditions permit year round operations. Presently there are very few units in Kerala producing finished match boxes. *Matty* (*Ailanthus tryphisa*) is the most preferred wood in the match industry. Other species like *vatta* (*Macaranga peltata*), *ezhilampala* (*Alstonia scholaris*), *elavu* (*Bombax ceiba*), albizia, etc. are also used in the matchwood industry (Table 2). Match outer boxes and inner boxes were traditionally made with veneers using species like *elavu*, *pala*, *vatta* and rubberwood. Of these, *pala* and *elavu* are the most preferred wood. Now, paper boxes have come into use and match boxes using

veneers have gone out of existence. A survey of match industries indicated that more than 90% of the splints are produced from *matty* grown in the home gardens. Kerala continues to have a near monopoly in the production of splints which are transported out to the match units in Tamil Nadu for carrying out dipping and further processing. A small quantity of splints are also exported to France, Italy and African countries. The matchwood units now produce splints exclusively. The neighbouring State of Tamil Nadu, which has a monopoly of dipping units, have now started splints manufacturing units also. They are sourcing their raw material of *matty* wood from the home gardens and albizia from forest plantations in Kerala. The assured demand for *matty* around the matchwood units in Kerala has promoted its cultivation in the home gardens. Rubber wood was also used as veneers for match boxes. Kerala produces match veneers for match boxes and splints for the whole of south India. It appears that there is a growing scope for expansion of the industry in Kerala. The plywood industry in Kerala has firmly established itself using the plentiful supply of rubber wood.

The traditional plywood units in Kerala depending on forest timber had either closed down or transformed into rubber wood based units. Western India Plywood Limited, one of the traditional units has survived and expanded by sourcing its raw material from a range of countries in several continents. The growing supply of rubberwood in Kerala was a reliable source of raw materials for this industry. *Vatta*, *eucalypts*, silveroak, *kadukka*, *vellapine*, *kalpine*, mahogony, *plavu*, *anjily* and imported logs are also used in plywood industry. The pulp industry uses eucalypts and acacia wood from forest plantations. It also obtains eucalypts wood from private areas within and outside Kerala.

The furniture scenario in Kerala has changed during the last decade. International designs and modular furniture is available in all towns either as imported furniture or produced from highly mechanised units. Rosewood furniture, made from rosewood imported from Karnataka, is also available. Furniture units are thriving in Kerala, although the more modern mechanised units are located in the neighbouring State of Tamil Nadu, where labour is cheaper. Old dismantled houses contain large quantities of timber in the form of doors, windows, frames, ceilings, attic, fixtures and furniture. There are traders who buy such woodwork and manage modern wood working units to refurbish or convert the old wood work and joinery into new furniture. Large beams are re-sized and each item of joinery is recycled for use in new timber products like furniture and fixtures. The units specialised in dismantled timber do not use any new timber in their workshop. The old timber is mainly teak, jack, *anjily*, *irul*, *venthekku*, *venga* and rosewood. Such units at Mezhathur near Pattambi, Mangalamkunnu near Ottappalam, Chittur, Koduvayoor, and several other places in Kerala, source their dismantled joinery from different parts of Kerala and from places like Karaikudy in Tamil Nadu. The projected consumption of timber in the industries sector in Kerala during 2010-11, excluding sawmilling and packing case industries, is 10,03,000 $m^3$.

***Institutions sector*:** Construction of commercial buildings and flats, has now accelerated. The plentiful availability of timber substitutes such as concrete, aluminium and plastics which are cheaply available for door frames and toilet doors, cupboard shutters, etc. has promoted its wide adoption. In the institutions sector also, wood for roof support in the form of rafters and beams have completely been replaced by concrete. New houses, with sloping roof with tiles seen in Kerala, are often laid over concrete slabs. Wooden ceilings have totally vanished. Between 1987 and 2001, a drastic shift in the pattern of timber consumption was noticed. The situation continues even in 2011 in new buildings in the institutions sector, using very nominal quantity of timber in their construction. The substitution there is almost complete. The projected consumption in the commercial buildings and public institutions sector in Kerala during 2010-11 is only 2,000 $m^3$.

**3.3 Export of timber during 2010-11:** The export of timber from Kerala to other States in India and other countries, is presented in Table 3. Almost all export was to places in other States in the country. The actual export to other countries was only 1,000 $m^3$, which was rosewood. There were marginal quantities of export of finished timber-products through Cochin Port (Appendix 2). Of the export of 6,83,000 $m^3$ of timber to other States, the volume of wooden packing cases was 6,40,000 $m^3$, accounting for about 94%. Rubberwood packing cases alone accounted for 77% (Appendix 1). The acacia wood from the forest plantations in Kerala was purchased by the Tamil Nadu Newsprint and Paper Limited, located at Karur. During 2010-11, the export of acacia was 13,000 $m^3$. Round logs of matchwood species like *matty, albizia*, etc. move to Sivakasi in Tamil Nadu for manufacturing match splints in the production units there. Other major timbers moving out of Kerala to different places in Tamil Nadu were *venga* (for boat building) accounting for about 6,000 $m^3$ and *anjily* (for boat building and body works of commercial vehicles) accounting for 1200 $m^3$ during 2010-11. The export of packing case increased from 3,42,000 $m^3$ in 1987-88 to 5,56,000 $m^3$ in 2000-01; it increased to 6,40,000 $m^3$ in 2010-11. The total volume of export of wooden packing cases and other timbers during 2010-11 was 6,84,000 $m^3$ roundwood.

**Table 3. Timber export from Kerala during 2010-11**

| Destination | Volume ('000 $m^3$ roundwood) | | | | | |
|---|---|---|---|---|---|---|
| | Packing case* | Teak | Rosewood | Match | Others | Total |
| Other States | 640 | 4 | 0 | 3 | 36 | 683 |
| Other Countries | 0 | 0 | 1 | 0 | 0 | 1 |
| Total Export | 640 | 4 | 1 | 3 | 36 | 684 |

*Predominantly sawn rubber wood. Also sawn timber of *mavu*, *vatta*, cashew wood, etc.

**3.4 Projected demand during 2010-11:** Table 4 presents the demand for timber during 2010-11. The total demand during 2010-11 is 2,228,000 $m^3$ roundwood. The industries sector accounted for the major share of 45% the total demand, showing a

rising trend due to larger volume being handled by the matchwood and plywood industries. The demand for construction timber in the households sector was 24.2% and that in the institutions sector was 0.1% of the total demand for timber. The export of timber consisted mainly of packing cases, accounting for 30.7% during 2010-11, is increasing spectacularly from the previous periods. The actual export to foreign countries was about 1,000 $m^3$ which was rosewood. When the export demand for packing case was also considered along with the industrial demand, around 74 per cent of the total demand was from the industries sector. Export of packing cases alone accounted for around 29 per cent and that of timber, excluding packing cases, was only two per cent of the total demand. Export of packing cases increased from 5,56,000 $m^3$ during 2000-01 to 6,40,000 $m^3$ during 2010-11, due to increased availability of rubber wood, which contributed an export of 5,29,000 $m^3$. Sawmill process the timber consumed in the household and institutions sectors. Therefore, the quantity of timber processed by sawmills in Kerala during 2010-11 is 5,41,000 $m^3$, representing the combined demand of the household and institutions sectors.

**Table 4. Projected demand for timber[1] in Kerala during 2010-11**

| Timber-using sectors | Volume ('000 $m^3$) | % to total |
|---|---|---|
| Households sector | 539 | 24.2 |
| Industries sector | 1,003 | 45.0 |
| Institutions sector | 2 | 0.1 |
| Export to other States in the country and abroad* | 684 | 30.7 |
| Total demand for timber and industrial wood | 2,228 | 100.0 |

[1]Excluding coconutwood & poles. * Export to other countries was about 1,000 $m^3$ of rosewood.

## 4. TIMBER PRODUCTION AND IMPORT

**4.1 Production and import during 1988 and 2001:** Table 5 shows the past trend in the supply of timber and industrial wood during 1987-88 and 2000-01. Among the different sources, home gardens produced the largest volume of timber and industrial wood during 1987-88. Forest timber production contributed about 9% of the total supply of timber during 1987-88. The production of rubberwood from the estate sector exceeded the production of timber from home gardens during 2000-01. The production of timber from forests represented just around 4% of the total supply of timber and industrial wood in Kerala in 2000-01 and was just one tenth of that from rubber plantations. Timber import was the third major component of supply, contributing to around 10% during 1987-88 and 15% during 2000-01. While the import from other States increased 83% during the period from 1987-88 to 2000-01, import from abroad increased 53% during the same period.

**Table 5. Production and import of timber[1] in Kerala during 1988 and 2001**

| Sources of supply of timber and industrial wood | Volume ('000 $m^3$ round) | |
|---|---|---|
| | 1987-88 | 2000-01 |
| Home gardens[*] | 830 | 790 |
| Rubber estates | 599 | 817 |
| Forests | 156 | 75 |
| Import: From other States[#] in the country<br>From other countries[$] | 78<br>106 | 143<br>159 |
| Total supply of timber and industrial wood | 1,769 | 1,984 |

[1]Excluding coconutwood & poles. [*]Include negligible quantities from private estates other than rubber. [#] Includes eucalypts, silveroak, etc. Also, rosewood of 2,000 $m^3$ in 1987-88 and 3,000 $m^3$ in 2000-01. [$]Include teakwood of 2,000 $m^3$ in 1987-88 and 14,000 $m^3$ in 2000-01.
Source: Re-worked from Krishnankutty (1990) and Krishnankutty *et al*. (2005).

**Table 6. Demand - supply situation for timber in Kerala during 1987-88**

| Timber and industrial wood | Volume ('000 $m^3$ roundwood) | | | |
|---|---|---|---|---|
| | Production | Import | Export | Net export[$] |
| Rubber and miscellaneous wood | 903 | 70 | 342 | (+) 272 |
| Pulpwood | 105 | 6 | 0 | (–) 6 |
| Teak timber | 62 | 2 | 19 | (+) 17 |
| Construction timbers | 515 | 106[*] | 2[#] | (–) 104 |
| Total timber and industrial wood | 1,585 | 184 | 363 | (+) 179 |

[*]Import of l04,000 $m^3$ of pyinkado, padauk, purpleheart, etc. from abroad and 2,000 $m^3$ of rosewood from Karnataka. [#]Rosewood exports to foreign countries. [$]Net export =Export – Import.
Source: Re-worked from Krishnankutty (1990).

**Table 7. Demand - supply situation for timber in Kerala during 2000-01**

| Timber and industrial wood | Volume ('000 $m^3$ roundwood) | | | |
|---|---|---|---|---|
| | Production | Import | Export | Net export[$] |
| Rubber and miscellaneous wood | 1,109 | 69 | 556 | (+) 487 |
| Pulpwood | 28 | 71 | 0 | (–) 71 |
| Teak timber | 76 | 14 | 8 | (–) 6 |
| Construction timbers | 325 | 148[*] | 4[#] | (–) 144 |
| Total timber and industrial wood | 1,682 | 302 | 568 | (+) 266 |

[*]Import of 145,000 $m^3$ from abroad and rosewood of 3,000 $m^3$ from Karnataka. [#]Export of 3,000$m^3$ of rosewood abroad and 1,000 $m^3$ of *anjily* to neighbouring States. [$]Net export = Export – Import.
Source: Re-worked from Krishnankutty (1990).

Tables 6 and 7, show the demand - supply situation in Kerala during 1987-88 and 2000-01 respectively. In both periods, the total export of timber exceeded import. While rubber wood accounted for the bulk of export, construction timber constituted the imported timber. It may be noted that the net export rose from 1,79,000 $m^3$ during 1987-88 to 2,66,000 $m^3$ during 2000-01, mainly due to growth in the production of rubber wood from the estate sector in Kerala.

**4.2 Timber import during 2010-11:** Table 8 presents the import of timber to Kerala during 2010-11 (see also Appendix 3). The total import was 3,67,000 $m^3$. This includes the volume equivalent of the quantities of timber imported through the Cochin Port. (For details, see Appendix 4). Of the total import, the actual import from abroad was 2,16,000 $m^3$, about 59% of the total supply. Private timber depots are overflowing with teak, *pyinkado* (*Xylia dolabriformis*) padauk (*P. indicus*), keruing (*Dipterocarpus* spp.), *kusia* (*Nauclea diderrichii*), purpleheart or violet wood (*Peltogyne* spp.), *mora* (*Mora excelsa*), beech wood (*Fagus sylvatica*), *taukkyan* wood (*Terminalia crenulata*) and several other locally less known timbers from all over the world (Botanical names are taken from Bhat *et al*., 2008). A quantity of 83,000 $m^3$ of rubberwood logs arrived to Kerala as import from the neighbouring Tamil Nadu and Karnataka States to feed the packing case industry. Other timbers of 60,000 $m^3$ coming to Kerala are rosewood, teak, *kambakam/uruppu* (*Hopea parviflora*), *ilampongu* (*H. wightiana*), silver oak (*Grevillea robusta*) from Karnataka; eucalypts (*Eucalyptus tereticornis*) and silver oak from Tamil Nadu; babul (*Acacia nilotica*), neemwood (*Azadirachta indica*), karivelam (*A. ferruginea*) from Gujarat and marginal quantity of teakwood from Maharashtra.

**Table 8. Timber import to Kerala during 2010-11**

| Origin of import | Volume ('000 $m^3$ roundwood) | | | | | |
|---|---|---|---|---|---|---|
| | Teak | Rosewood | Eucalypt | Silveroak | Others | Total |
| Other States | 1* | 1 | 4 | 2 | 143# | 151 |
| Other countries | 22 | 0 | 0 | 0 | 194 | 216 |
| Total import | 23 | 1 | 4 | 2 | 337 | 367 |

*The actual volume is 599 $m^3$. # Includes round logs of rubberwood, babul, neem, karivelam, etc.

**4.3 Timber production during 2010-11:** The timber production from the forests of Kerala has narrowed down to teak, eucalypts and acacia from plantations. Teak production has declined marginally from that during the period 2000-01 due to the declining productivity of plantations. Forests plantations, predominantly of eucalypts, are the source of raw material to pulpwood industry. Previously high quality teak logs from forest plantations were exported. However due to the decline in the availability of large dimension logs in Kerala and the plentiful supply of

teakwood from Myanmar, export of teakwood from Kerala has ended. Although selection felling in natural forests has been stopped in Kerala, some quantity of

timber from natural forests is still available as 'wind fallen trees'. The total timber production from the forests in Kerala during 2010-11 was 35,000 $m^3$.

Rubberwood is an incidental by-product of the rubber plantation sector. The area under rubber plantations in India is 6,87,000 ha, of which Kerala has nearly 77% as on 2009-10 (Government of India, 2011). The total rubberwood production during 2010-11 in India was estimated by the Rubber Board as 16,80,000 $m^3$ roundwood, consisting stemwood and fuelwood (Government of India, 2012). Based on the percentage area due for felling during the year 2010-11 in Kerala, the rubberwood production in Kerala during 2010-11 was estimated as 14,83,000 $m^3$, consisting stemwood and fuelwood. The percentage distribution of stemwood and fuelwood in the total rubberwood production was taken as 70% and 30%, based on the results of a field survey of contractors in rubber-tree felling business. The total rubberwood production during 2010-11 in Kerala was thus estimated as 10,38,000 $m^3$.

Jack, *anjily* and teak are the major timbers produced in home gardens. Due to the plentiful supply of imported timber with large dimensions and cylindrical boles, timber production from home gardens seems to have remained more or less unchanged. The home garden timbers, being in smaller dimensions with lot of sapwood do not command a very high price except for teak, mahogany, *anjily* etc. Miscellaneous timbers which used to arrive in the local market have considerably reduced. Jack timber, which accounted for the largest share (31%) of the production from home gardens in 2001, also seems to have declined in both production and consumption. Teak, which had the third place after *anjily* seem to have increased its share in the growing stock of wood in home gardens. Mahogany, an exotic species, has found favour in larger holdings for planting after teak. Much of the construction and furniture timbers used in Kerala were produced in home gardens prior to the large scale import of such timbers during the last two decades. The production of construction and miscellaneous timbers from the home gardens in Kerala during 2010-11 is projected as 7,88,000 $m^3$ roundwood.

**4.4 Timber supply situation during 2010-11:** Table 9 shows the projected supply of timber and industrial wood in Kerala for the year 2010-11. The total supply was 2,228,000 $m^3$. Rubber estates continue to dominate wood production in Kerala (46.6%), followed by home gardens (35.3%). Import of timber was 3,67,000 $m^3$ which is 16.5% of the total supply. A quantity of 2,16,000 $m^3$ of hardwood timber, including teak, is imported from Myanmar and other countries in South East Asia, Africa and South America. The remaining 1,51,000 $m^3$ of import represents timber from Karnataka, Tamil Nadu, and other States, for use mainly in packing case and plywood industries. Forests contributed only 1.6% of the total supply of timber and industrial wood in Kerala.

**Table 9. Supply of timber[1] in Kerala during 2010-11**

| Sources of timber supply | Volume ('000 $m^3$) | % to total |
|---|---|---|
| Rubber estates | 1,038 | 46.6 |
| Home gardens[*] | 788 | 35.3 |
| Forests | 35 | 1.6 |
| Import: From other States in the country<br>From other countries | 151[#]<br>216 | 6.8<br>9.7 |
| Total supply of timber and industrial wood | 2,228 | 100.0 |

[1]Excluding coconut wood & poles. [*]Includes small quantity of timber from estates other than rubber. [#]Includes 83,000 $m^3$ rubberwood round logs.

Table 10 shows the demand - supply situation of timber in Kerala during 2010-11. The production of timber was 18,61,000 $m^3$ roundwood. The net export of timber was 3,17,000 $m^3$, where the export and import 6,84,000 and 3,67,000 $m^3$ respectively. The source of this surplus was rubber wood that contributed to an export of 5,29,000 $m^3$. In the case of teak and other construction timbers, there was deficit of 1,89,000 $m^3$ of larger dimension timber, which was met through import from Myanmar, Indonesia and countries in the African and South American continents. The analysis of timber-supply situation in Kerala during 2010-11 revealed a comfortable position with an export surplus of 3,17,000 $m^3$. The deficit was in construction timbers.

**Table 10. Demand -supply situation for timber in Kerala during 2010-11**

| Timber and industrial wood | Volume ('000 $m^3$ roundwood) | | | |
|---|---|---|---|---|
| | Production | Import | Export | Net export |
| (0) | (1) | (2) | (3) | (4)=(3)–2) |
| Rubber and miscellaneous wood | 1,386 | 146 | 643 | (+) 497 |
| Pulpwood | 123 | 4 | 13 | (+) 9 |
| Teak timber | 63 | 23 | 4 | (–) 19 |
| Construction timbers | 289 | 194 | 24 | (–) 170 |
| Total timber and industrial wood | 1,861 | 367 | 684 | (+) 317 |

## 5. FURURE TRENDS IN TIMBER SUPPLY

**5.1 Past trends in timber demand and supply:** Table 11 show the past trends in the effective demand for timber for the period 1987-88 to 2010-11. The total demand has increased from 17,69,000 $m^3$ to 22,28,000 $m^3$ of which the industries sector utilised the highest share followed by the export sector. The household sector came third during the entire period. The highest growth was recorded by the export

sector accounting for 3,22,000 $m^3$ of mostly packing case wood, followed by the industries sector recording an increase of 2,61,000 $m^3$ of timber. The demand for timber in the household sector has been static, while that in the institutions sector, consisting of commercial buildings and government buildings, it has almost disappeared.

**Table 11. Trends in demand for timber[1] in Kerala during 1987 to 2011**

| Timber-using sectors | Volume ('000 $m^3$ roundwood) | | |
|---|---|---|---|
| | 1987-88 | 2000-01 | 2010-11 |
| Households sector | 543 | 541 | 539 |
| Industries sector | 742 | 865 | 1,003 |
| Institutions sector | 121 | 10 | 2 |
| Export: To other States* in India | 361 | 565 | 683 |
| To other countries | 2 | 3 | 1 |
| Total demand for timber | 1,769 | 1,984 | 2,228 |

[1] Excluding coconutwood & poles. *Predominantly rubber wood packing cases, including teakwood of 14,000 $m^3$ in 1987-88 and 8,000 $m^3$ in 2000-01.

**Table 12. Trends in supply of timber[1] in Kerala during 1987 and 2011**

| Sources of supply of timber | Volume ('000 $m^3$ round) | | |
|---|---|---|---|
| | 1987-88 | 2000-01 | 2010-11 |
| Rubber estates | 599 | 817 | 1,038 |
| Home gardens* | 830 | 790 | 788 |
| Forests | 156 | 75 | 35 |
| Import: From other States# in India | 78 | 143 | 151# |
| From other countries$ | 106 | 159 | 216 |
| Total supply of timber | 1,769 | 1,984 | 2,228 |

[1]Excluding coconutwood & poles. *Include negligible quantities from private estates other than rubber. # Includes eucalypts, silveroak, etc. Also, rosewood of 2,000 $m^3$ in 1987-88 and 3,000 $m^3$ in 2000-01. $Include teakwood of 2,000 $m^3$ in 1987-88 and 14,000 $m^3$ in 2000-01. #Includes 83,000 $m^3$ rubberwood round logs.

Table 12 show the trends in the supply of timber in Kerala for the period 1987-88 to 2010-11. The home gardens that was the major supplier in the year 1987-88 gave way to the rubber plantations sector by 2000-01, and by 2010-11, almost doubled its share in the total supply. While the production from home gardens declined from 8,30,000 $m^3$ in 1987-88 to 7,88,000 $m^3$ in 2010-11, the production and share of the Forests declined from 1,56,000 to 35,000 $m^3$ in the same period. Imports more than doubled during the period to supplement the decline in production of construction timber and to meet the increasing demand from the industries sector.

**5.2 Trends in timber imports:** Compared to the situation in 2000-01, timber

availability in the global market has improved greatly. Substantial quantities of teak and other hardwood are coming from Myanmar, Malaysia, Brazil and African countries and they are flooding the market. Imported teak coming to Kerala is large dimension logs from the natural forests in Myanmar (Krishnankutty *et al.*, 2010). Due to the exhaustion of large dimension teak in home gardens and forest plantations, the production of such logs in Kerala has almost stopped. The current situation is that there is absolutely no shortage of timber in the Kerala market. Table 13 shows the import of timber to Kerala from other States and from abroad, during 2011-12. Of the total, around 80% was actual import from foreign countries. The total import increased from 2,84,000 $m^3$ in 2010-11 to 3,37,000 $m^3$ in 2011-12. While the import from other States to Kerala remained more or less the same during 2010-11, the actual import from foreign countries increased from 2,16,000 $m^3$ in 2010-11 to 2,67,000 $m^3$ in 2011-12, registering about 24% growth.

**Table 13. Timber import to Kerala during 2011-12**

| Origin of import | Volume ('000 $m^3$ roundwood) | | | | | |
|---|---|---|---|---|---|---|
| | Teak | Rosewood | Eucalypt | Silveroak | Others | Total |
| From other States | 1 | 1 | 3 | 2 | 146 | 153 |
| From abroad | 28 | 0 | 0 | 0 | 239 | 267 |
| Total import | 29 | 1 | 3 | 2 | 385 | 420 |

**Table 14. Long-term trend in timber import through major forest check-posts***

| 5 -Year Periods | Average volume per annum in '000 $m^3$ roundwood | | |
|---|---|---|---|
| | Teak | Other timbers | Total |
| 1981-82 to 1985-86 | 1 | 36 | 37 |
| 1986-87 to 1990-91 | 1 | 78 | 79 |
| 1991-92 to 1995-96 | 2 | 74 | 76 |
| 1996-97 to 2000-01 | 12 | 121 | 133 |
| 2001-02 to 2005-06 | 12 | 124 | 136 |
| 2006-07 to 2010-11 | 15 | 159 | 174 |
| 2011-12 | 23 | 237 | 260 |

*Check-posts at Parassala, Aryankavu, Walayar, Noolpuzha, Muthanga and Manjeswaram. Also includes timber import through Cochin Port. These six check posts handled 77% of the total imports of timber to Kerala during 2011-12.

Table 14 shows the long-term trend in annual import of timber, through six important border check-posts and the Cochin Port, during different five-year

periods from 1981-82 to 2011-12. Import through Cochin Port started only a decade ago. Previously, the traders were sourcing imported timber from Tuticorin and Mangalore Ports. It can be seen that the import of teak and other construction timbers to Kerala is growing rapidly over the years.

Long term trend in timber export through six major check posts from Kerala is presented in Table 15. These check posts handled 91% of the total export during 2011-12 and 77% of the total imports of timber to Kerala. Rubberwood by far is the most important export from Kerala and it has been increasing over the period. The decline in export of teakwood is glaring despite our extensive forest teak plantations. The other exported timbers comprise mostly of low value species such as *vatta*, mango, cashew, etc, accompanying rubberwood as packing cases.

The liberalised import regime brings large volumes of large dimension teak logs and construction timbers from all over the world to Kerala. These timbers are harvested from the old growth natural forests and are sold globally in the liberalised trade regime. It is inevitable that the supply of such timbers will decline or even stop in the coming decades due to depletion of old growth trees and also due to political changes and conservation concerns in the exporting countries. It is high time that the priority for forest management is shifted emphatically towards effective forest conservation and to limit wood production to large-size teak logs from long-rotation teak plantations.

**Table 15. Long-term trend in timber export through major forest check-posts***

| 5 -Year Periods | Average volume per annum in '000 $m^3$ roundwood | | | |
|---|---|---|---|---|
| | Teak | Rubberwood | Others | Total |
| 1981-82 to 1985-86 | 33 | 61 | 364 | 458 |
| 1986-87 to 1990-91 | 24 | 108 | 136 | 268 |
| 1991-92 to 1995-96 | 19 | 216 | 103 | 338 |
| 1996-97 to 2000-01 | 4 | 304 | 90 | 398 |
| 2001-02 to 2005-06 | 2 | 349 | 85 | 436 |
| 2006-07 to 2010-11 | 3 | 515 | 126 | 644 |
| 2011-12 | 3 | 510 | 122 | 635 |

*Check-posts at Parassala, Aryankavu, Walayar, Noolpuzha, Muthanga and Manjeswaram. These six check posts handled 91% of the total exports of timber during 2011-12 from Kerala.

**5.3 Trends in rubberwood production:** The growth in area and replanting of the existing plantations is taking place at a very fast pace. The yield of rubber trees starts declining in 25 to 30 years. Therefore, there is a compulsion for replanting rubber plantations in a predictable cycle to maintain the yield and to remain competitive in the market as producers. The bye-product of this process is the large

volume of rubberwood that comes from slaughter felling of the plantation periodically. The production of rubberwood has increased spectacularly and this has led to a thriving industry producing packing case wood, plywood, and furniture. As can be seen Table 16, the use of rubberwood increased from 6,40,000 $m^3$ in 2010-11 to 6,60,000 $m^3$ in 2011-12. This indicates that rubberwood coming to the market in Kerala will continue to grow. The rubberwood from the neighbouring States is also coming to Kerala because the entire rubberwood trade is centred in Perumbavoor in Kerala.

Rubberwood has the potential to be used as a substitute for the traditional timbers such as teak, jack and *anjily* in furniture and construction sectors if it is properly treated soon after harvest. The success of the treated rubberwood sector depends on quick processing of the harvested rubberwood logs, since any delay will result in discolourisation due to fungal attack. Necessarily, the processing units have to be located in proximity to the plantation areas and suppliers should ensure that the logs reach the units within a day or two after harvesting. The easy workability, uniform colour and finish, make it an attractive alternative to more expensive large dimension durable timber such as teak. Furniture made of rubberwood in the modern treated wood sector competes with teakwood furniture in price and finish. This sector is bound to grow in size and employment in future. However, import of such materials and finished products from Malaysia, Indonesia etc. has already challenged the local producers by their aggressive marketing and advertisements. Although the wage rate in Kerala is relatively higher than that in the neighbouring States, the availability of rubberwood in Kerala provides a locational advantage to such units. Further, the transportation infrastructure and migrant labour available in Kerala is also bound to help the growth of this sector.

**Table 16. Timber export from Kerala during 2011-12**

| Destination | Volume ('000 $m^3$ roundwood) | | | | | |
|---|---|---|---|---|---|---|
| | Packing case* | Teak | Rosewood | Match# | Others | Total |
| To other States | 660 | 4 | 0 | 2 | 25 | 691 |
| To abroad | 0 | 0 | 1 | 0 | 0 | 1 |
| Total export | 660 | 4 | 1 | 2 | 25 | 692 |

*Primarily sawn rubber wood. Also sawn wood of *mavu*, *vatta*, *kasumavu*, etc. #*Matty*, *albizia*, etc.

The bulk of rubberwood is just sawn as planks and transported out of Kerala to be used as packing case materials. Although this represents primary processing and provides some employment and income to the workers, it is much below the true potential of this resource in generating income and value addition. The upgrading of this industry with better facilities for wood treatment, modern machinery, waste treatment and energy conservation should be a priority for this sector. Such development can radically improve value addition and returns. The current preference for teak and rosewood in furniture, doors and other household uses can

shift towards the more plentiful rubberwood if well processed quality products of rubberwood are produced on large scale in Kerala. Such production can compete with that imported from Malaysia and Indonesia in the world market too.

**5.4 Trends in production from home gardens:** After rubber plantations, the Kerala home gardens are the next largest source of timber, producing the bulk of construction timbers and industrial wood consumed in Kerala. The raw-material for the matchwood industry comes exclusively from the home gardens. Multi-purpose trees for fruits, timber, industrial wood, and as supports for crops like pepper, enrich the home gardens landscape and also the economy of the households. It contributes to better land management and long-term health of the farms whereas mono-culture plantations adversely affect ecological functions and bio-diversity value of the landscape. The expansion of monoculture rubber plantations in the home garden areas, reduce the agro biodiversity and transform the culture of agriculture among the people. Although rubber plantations produce more wood per unit area of land, home gardens permit a mixture of food crops, fruit trees, spices, timber and livestock which is more sustainable and healthier in the long run.

A decline in growing stock of large dimension jack and mango trees in home gardens is perceptible. Further, availability of jack wood has drastically declined during the last few years. This could be due to substitution or due to its actual depletion. New planting of teak and mahogany trees is widely observed, so a few decades from now, teak production from home gardens is bound to increase. Even if the availability of Myanmar teak through import is discontinued, home gardens will be capable of meeting the local demand for construction timbers. Mahogany timber in large dimension is already available from home gardens. From a tree harvesting site, contractors sort the logs into sizes suitable for different industries. The large dimension logs go to the plywood industry or sawmills, depending on the species and the smaller dimension logs below 50 cm girth go to the packing case industry and the smallest size less than 30 cm as fuelwood to the tile and brick industries and to households. Durable timbers such as jack suitable for furniture and construction go exclusively to sawmills, while the branch wood and logs containing much sapwood go to the plywood and packing case industries. It is also noticed that, after peeling the sapwood, the inner core is sold to furniture units for a profit. As the timber markets are well developed in Kerala, sawmilling, plywood, packing case industries and fuelwood users are well organised; there is complementarity among these industries so that the entire quantity of wood harvested is efficiently utilised for value addition in different industries. Therefore, production of timber from home gardens is expected to be available as before for construction and all industrial purposes.

**5.5 Trends in production from forests:** It can be seen that forests produced around 4% of the timber produced from the home gardens and when the rubber wood production is also considered, the forest production was below two percent of the total timber production during 2010-11. The production of timber including

pulpwood from forests is declining. The potential for enhancing timber production from the forests is very limited. Therefore, timber production from forests in the future is expected to show a declining trend. Extensive forest areas have already been converted to monoculture plantations by European and local planters during the last century. Public sector corporations like Plantation Corporation of Kerala, Rehabilitation Plantations Ltd and the State Farming Corporation of Kerala have also utilised their leased forest lands for raising rubber plantations. New rubber plantations inside forests must not be promoted even in the guise of tribal welfare. The benefits from forests naturally have to be indirect in the form of sustaining the environmental benefits of sustained water supply, stabilisation of climatic effects, prevention of soil erosion, conservation of biodiversity and critical landscapes and catering to the well-being of the entire population of the State.

**5.6 Status of timber based industries:** Timber-based industries are saw mills, packing case, pulp and paper, plywood, match splints and veneers, furniture and fixtures, pulpwood, tea chests, boat making, handicrafts, pencil, bobbins, block boards etc. The industries are classified into two broad groups: organised and unorganised sectors. All industrial units registered under Section 85 and Section 2(m) of the Factories Act, are included in the organised sector. Units registered as small-scale units and all other unregistered small units like furniture, handicrafts, etc. are included under the unorganised sector. In the earlier wood-balance studies, timber consumption was estimated for the industries sector which consisted of both organised and unorganised sectors. The data on number of timber-based industrial units in the unorganised sector currently is not available. The data on number of timber-based industrial units in the organised sector have been compiled from the registers maintained at the offices of the Factories and Boilers Department of the Government of Kerala.

**Table 17. Timber based industrial units in Kerala in the year 2000 and 2012**

| Type of timber-based industry | Distribution of industrial units registered under Section 85 and Section 2(m) of Factories Act (in Number) | | | | | |
|---|---|---|---|---|---|---|
| | 2000-01 | | | 2011-12 | | |
| | Section 85 | Section 2(m) | Total | Section 85 | Section 2(m) | Total |
| Timber sawing[1] | 2215 | 157 | 2372 | 1900 | 124 | 2024 |
| Packing cases | 398 | 25 | 423 | 330 | 29 | 359 |
| Matchwood | 111 | 455 | 566 | 100 | 213 | 313 |
| Plywood | 174 | 176 | 350 | 155 | 156 | 311 |
| Furniture & fixtures | 292 | 55 | 347 | 310 | 56 | 366 |
| Other industries[2] | 162 | 55 | 217 | 86 | 49 | 135 |
| Total | 3352 | 923 | 4275 | 2881 | 627 | 3508 |

[1]Includes units producing fixtures. [2] Pulpwood, tea-chests, pencil, block boards, automobile body building, bobbins, treated wood, etc.

Table 17 shows the distribution of timber-based units registered under Sections 85 and 2(m).The Table shows a comparison of the number of timber based units functioning in Kerala during the year 2000-01 and 2011-12. It can be seen that between 2000 and 2012 the total number of units have declined from 4275 to 3508. While all categories of timber based industries show a decline in number, furniture and fixtures show a modest increase in number during the period. The highest decline is in matchwood units. Almost all the dipping units have shifted to the neighbouring State of Tamil Nadu, where the dry weather conditions enable year round operations. The number of sawmills is 2,024 and the total quantity of timber processed is 5,41,000 $m^3$, which is the quantity consumed in the Household sector and the Institutions sector in 2010-11 (Table 11). The average annual quantity of timber processed in a sawmill in Kerala is therefore 267 $m^3$. The apparent decline in the number of timber based industrial units does not reflect a decline in the total quantity of timber used. Many units, particularly in urban areas have closed down or relocated to less congested areas. The ownership of units may have changed by inheritance within the family or by sale to others, which may result in change of name and fresh applications for No Objection Certificate (NOC) from the Forest Department.

The large number of applications for starting sawmills may include existing ones which do not have previous approvals from different agencies and new ones awaiting approvals. Many of those applicants perceive that the large volume of rubberwood that comes into the markets which is estimated to increase in the future is an opportunity. If the new sawmills are going to serve the existing local markets for sized timber, then they will cut into the market share and profits of the existing units. If the new sawmills adopt better technology and advanced management practices, they will push out or force the inefficient units to close down. Technological change in any industry takes place by such elimination of inefficient units. Whether the government has a responsibility to defend the existing units by licensing or preventing the establishment of new sawmilling units is debatable. It must be noted that the Government has no mandate to supply or arrange to supply wood raw materials to any of the timber-based industrial units. Therefore, there is no necessity to prescribe a number limit for existing or new units in the sector.

The growing volume of local rubberwood production and imported timber provide business opportunity for new players to enter the market. As in other sectors of the economy in production and in retailing; reorganisation, expansion and consolidation will result in the smaller units being either closed down or amalgamated with the larger and successful firms. There can be no relevance for a number limit or an optimum number of sawmills to be prescribed by an external agency. Changes in technology, scale of operations, market reach, profitability etc. will determine whether a unit can function and survive in a competitive environment. The actual fact is that there are many units functioning without the mandatory approvals from different government agencies. Most of them have little

enforcement authority to ensure compliance. Therefore, the number of existing units varies widely in the records of different agencies and none have a reliable and consolidated State-wide statistics on the number of currently operating units. With the availability of large sized imported timber and more efficient timber processing machinery, the successful and enterprising units may have expanded in size and scale, indicating a reorganization in the industry, by which the less efficient and the inconveniently located units, particularly in the urban areas, would have closed down, harmonizing with the expansion of the more efficient units. This is a natural and welcome development, wherein economies of scale, rationalization of power consumption and management efficiencies lead to higher profits and sometimes cheaper products to customers.

**5.7 Discussion:** The government is faced with a dilemma as to whether the pending applications for sanctioning sawmills are to be approved. It is important to take a decision considering several aspects. The first is that a very large quantity of rubberwood is produced in Kerala and large volume of imported timber is available in the local market. The second is that the sawmills located in the periphery of the forests cannot be effectively policed to check whether illegal timber, clandestinely cut and removed from the forests, is being converted in those mills. Both these issues are relevant. If value addition to rubberwood is to be implemented, it is ideal that integrated sawmills with treatment facilities are available close to the rubberwood production areas. For other timbers, including construction timber, even if a sawmill is situated at a distance of 15 to 20 km, it is sufficient for the consumers since the transporting charge does not increase proportionately with the distance. In other words, difference in transport cost is not significantly different between say 5 to 15 km, since there is a minimum fixed cost for hiring a lorry for transportation. The larger cost is the loading and unloading charges which do not change. An appropriate distance limit from the forest boundary for operating sawmills may be specified, in the interests of forest conservation.

There is a great danger in mixing up different issues like the local availability of timber and the location of sawmills near forest areas. Each of these issues requires a different analysis and approach. The local availability of timber, be it from any source such as rubber plantations, home gardens or forests, need not be the only criteria for matching availability and capacity. Imports of timber and its processing can change this situation where imported timber can just be processed and be exported as is done in Tuticorin. Or imported timber can be processed in the plywood industry and sold in the national market or exported, as is done by the Western India Plywood Ltd. An industrial unit can work continuously in three shifts or work in only one shift, depending on the rules regarding electricity consumption, noise pollution and also the actual market opportunities of the enterprise. Capacity determination in such a context becomes difficult. Further, as the price of a unit of machinery does not increase proportionally with its capacity, there is a natural tendency to purchase and install machines of higher capacity

anticipating growth in the future in situations where investment funds or credit is easily available.

The government does not have a responsibility to ensure full or optimal capacity utilisation by the private industry since more efficient units with better capacity utilisation, lower running cost and higher profits will be encouraged by the competition within the industry and less efficient and loss making units must be naturally eliminated in the process of industrial development. Therefore, the installed capacity or capacity utilisation need not be a valid criterion to be considered in the context of sanctioning sawmills in areas adjoining forests. There the only criteria should be the effective conservation of forests and prevention of smuggling. In areas adjoining rubber plantations, modern integrated units which have the capacity of processing and treating of rubber wood, should be encouraged so that higher value addition, employment and government revenue are generated. Export of processed panels and furniture of rubber wood can radically improve the profitability of industry and contribute substantially to the development of the State.

The demand for timber, or for that matter anything else, cannot be related to the capacity utilisation for a particular industry or the demand for the same from a section of consumers or users. The argument that an industry or public sector undertaking either has a capacity to process industrial wood or a demand for a particular type of timber is not a sufficient justification for harvest and supply of forest timber. The 1988 Forest Policy unambiguously stated that industries should meet their raw-material requirement from outside forests and that forest conservation had an overriding priority. The sanctioning of sawmills in areas close to the forest must be seen in this context. If the compulsion for forest protection necessitates implementation of a regulation to keep sawmills to a reasonable distance away from the forest boundary, to control pilferage and smuggling of forest timber, then it must be implemented to ensure the conservation of forests.

With new investors entering the markets, the profitability in investment will change. How this will affect the forest resources is a moot question to the Forest Department. If the increasing competition is bound to put pressure on the standing growth of timber in the forests by clandestine felling, the new applications must be thoroughly scrutinised. The accessibility into forests has improved dramatically with wide roads, bridges and culverts making it easy to transport timber out of forests through the road and river network. The globalisation and liberalisation of trade has also resulted in the import of a very large number of electric or oil-driven portable hand saws which can quickly fell and dismember a large tree and convert into logs, which took so much more time when the axe was only the tool available to smugglers. Even when sawmills are sought to be regulated and licensed, the use of portable and powered hand saw is totally unregulated.

Rubber plantations and import are the most important components of timber availability in Kerala. Timber like teak, jack, *anjily and* mahogany and

miscellaneous timber such as mango wood, cashew wood, *matty*, *pala*, etc. from home gardens of Kerala, also compliments the timber availability. Teak and eucalypts from forest plantations which used to be important components of local production, have declined considerably during the period. In this context, the question of approving or rejecting applications for NOC from new timber-based industrial units in Kerala should take into consideration, the source of timber the new units will use. When they can establish that they intend to depend on rubber wood or imported timber or timber from home gardens, there need be no hesitation in granting NOC. However, when the units are proposed to be located close to forest areas, they must be considered with caution, since the extensive road network and availability of vehicles make it difficult for the Forest Department to check smuggling of timber from the forest. Appropriate distance limits must be imposed around forest areas in the interests of forest conservation.

The free trade of timber and timber products globally is an opportunity for timber-based industries to establish and flourish in Kerala and such opportunity need not be unduly restricted. For any industry to function and grow, it is necessary to allow the less efficient units to close down or be replaced by new ones. Changes in technology, access to market and management capabilities, affect different units differently. There can be no sanctity for fixing a number limit for the timber-based industrial units. It is a natural process that new ones emerge and old ones disappear in course of time with internal and external changes faced by each unit. The only important consideration should be that our valuable biodiversity rich forests should not be used as a source of raw material for the industrial units. The timber-based units must find their timber raw material requirements from outside forests as the National Forest Policy prescribes.

## 6. CONCLUSIONS

The study reveals a comfortable situation in the matter of timber availability in Kerala at the moment, in the medium-term, say the next five years and possibly in the long-term, say the next fifteen years. The availability of timber from other tropical countries, where the political situation does not compel the conservation of natural forests, may change and the timber mining from the natural old growth tropical forests may either be exhausted or regulated. However, plantation expansion has been taking place on a rapid pace globally and timber availability from such plantations is bound to increase in the future. In the context of wood-based industries in Kerala, the plentiful supply of rubberwood must be seen as a great opportunity to create value added products that will help the industry to grow and diversify and also create local employment and thereby contribute to economic development of the State. The present practice of processing bulk of the rubberwood production in Kerala into very low value added packing cases must change and the units must be modernised through preservative treatment into panel boards and standardised ready-to-use members for the construction sector and the furniture industry.

The timber availability situation in Kerala is quite healthy due to the large volume of wood production from the rubber plantations which support the packing case, plywood and some other small industries. Construction timber is again abundant from international sources, due to the liberalised import policy followed by the Government of India. Large dimension logs with very high out-turn are available as never before in private timber depots throughout Kerala. Forest teak plantations and home gardens produce an equal amount of teak that goes onto the local construction and furniture making. The timber production from home gardens has declined due to the flooding of the market with cheap imported timber. The traditional matchwood industrial units continue to obtain their wood raw material from the home gardens around their production units.

The growing stock of timber in the home gardens may be retained to grow larger, considering the plentiful availability of imported timbers at very cheap rates. At a time when such imported timber availability declines, the home gardens with a larger growing stock can supply the requirements of the housing and other sectors. Tree growing is not just an economic activity to produce timber, it has an environmental role in conserving water and soil and also in mitigating climatic extremes. Therefore, conservation of growing stock of trees in forests and home gardens is a critical necessity for the State. Like all industries, the wood-based industries should also be bound by environment and pollution control regulations. The State has a responsibility to control them, in case the growing stock of trees in forests is pilfered by the industry for profits. The decision regarding locating sawmills in the periphery of forests must be taken in the larger context keeping in mind forest conservation, environmental conservation and the healthy growth of the economy and employment in the State. Although production of timber from the natural forests in Kerala is negligible, there is no dearth of timber either for the consumers in Kerala or for the wood-based industries, including saw mills, which obtain their supplies from sources outside the forests of Kerala and from abroad. For the healthy growth of the timber-based industry, it is important to encourage the modernisation of the existing units and the starting of new units to replace the old ones. As the government has no mandate to supply wood raw-materials to these units, there is no need to impose any number limits for such units.

If the message of the Wood Balance study in Kerala for the reference year 2001 by KFRI was to conserve the remaining timber wealth in the forests of Kerala, the message in this study is to conserve the timber resources in the home gardens also, to enable self sufficiency in large dimension timber, when the availability of old growth imported timber from abroad declines in the future. The large dimension timber now available from abroad is from tropical forests that is unlikely to be sustainably managed, which will surely be depleted and degraded in course of time. The current opportunity for value addition to the rubberwood production must be fully utilised for economic benefits. The comfortable wood availability situation in Kerala provides an ideal opportunity to conserve the biodiversity and timber resources of Kerala for environmental and social wellbeing.

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## Appendix 1
## Timber export from Kerala during 2010-11 and 2011-12

| Timbers | 2010-11 | | 2011-12 | |
|---|---|---|---|---|
| | Volume($m^3$) | % to total | Volume($m^3$) | % to total |
| *Packing case wood* | | | | |
| Rubber wood | 5,28,816 | 77.3 | 5,43,622 | 78.5 |
| Mavu | 12,475 | 1.8 | 4,270 | 0.6 |
| *Vatta* | 23,622 | 3.5 | 26,827 | 3.9 |
| Silveroak | 26,624 | 3.9 | 27,031 | 3.9 |
| Eucalypts | 986 | 0.2 | 8,606 | 1.3 |
| Other species | 47,416 | 6.9 | 49,206 | 7.1 |
| *Packing case sub-total* | 6,39,939 | 93.6 | 6,59,562 | 95.3 |
| *Timber* | | | | |
| Teak | 3,505 | 0.5 | 4,061 | 0.6 |
| Rosewood | 1,180 | 0.2 | 1,273 | 0.2 |
| *Anjily* | 1,206 | 0.2 | 669 | 0.1 |
| Acacia | 13,496 | 2.0 | 10,818 | 1.6 |
| Venga | 5,804 | 0.8 | 5,291 | 0.7 |
| Matchwood | 3,443 | 0.5 | 1,735 | 0.2 |
| Other timbers | 15,275 | 2.2 | 8,950 | 1.3 |
| *Timber sub-total* | 43,909 | 6.4 | 32,797 | 4.7 |
| Total export | 6,83,848 | 100.0 | 6,92,359 | 100.0 |

## Appendix 2
## Export of timber products through Cochin Port

| Year | Items of timber products (Quantity in metric tonne) | | | | | |
|---|---|---|---|---|---|---|
| | Rosewood products | | Rubberwood products | | Other items | Total |
| | Veneers | Others | Furniture | Others | | |
| 2001-02 | 80 | 560 | 17 | 1123 | 765 | 2545 |
| 2002-03 | 223 | 575 | 0 | 1240 | 326 | 2364 |
| 2003-04 | 294 | 492 | 0 | 843 | 212 | 1841 |
| 2004-05 | 201 | 612 | 0 | 1198 | 240 | 2251 |
| 2005-06 | 415 | 528 | 22 | 1188 | 353 | 2506 |
| 2006-07 | 230 | 539 | 57 | 210 | 401 | 1437 |
| 2007-08 | 175 | 584 | 59 | 240 | 250 | 1308 |
| 2008-09 | 197 | 678 | 5 | 1132 | 234 | 2246 |
| 2009-10 | 242 | 422 | 37 | 1779 | 109 | 2589 |
| 2010-11 | 264 | 380 | 101 | 1426 | 46 | 2217 |
| 2011-12 | 214 | 440 | 52 | 314 | 29 | 1049 |

## Appendix 3
## Timber import to Kerala during 2010-11 and 2011-12

| Timbers | 2010-11 | | 2011-12 | |
|---|---|---|---|---|
| | Volume($m^3$) | % to total | Volume($m^3$) | % to total |
| *Import from other States* | | | | |
| Teak | 599 | 0.1 | 577 | 0.1 |
| Rosewood | 1,177 | 0.3 | 516 | 0.1 |
| Eucalypt | 4,320 | 1.2 | 3,052 | 0.8 |
| Silver oak | 1,871 | 0.5 | 1,838 | 0.5 |
| Other timbers | 1,42,956 | 39.0 | 1,46,653 | 34.9 |
| *Sub-total (Other States)* | 1,50,923 | 41.1 | 1,52,636 | 36.4 |
| *Import from abroad* | | | | |
| Teak | 22,187 | 6.0 | 28,511 | 6.8 |
| Pyinkado | 95,528 | 26.1 | 1,18,959 | 28.3 |
| Keruing | 22,807 | 6.2 | 34,327 | 8.2 |
| Purpleheart | 18,376 | 5.0 | 22,585 | 5.4 |
| Mora | 9,171 | 2.5 | 7,596 | 1.8 |
| Other timbers | 47,810 | 13.1 | 55,236 | 13.1 |
| *Sub-total (Abroad)* | 2,15,879 | 58.9 | 2,67,214 | 63.6 |
| Total import | 3,66,802 | 100.0 | 4,19,850 | 100.0 |

## Appendix 4
## Import of timber products through Cochin Port

| Year | Items of timber products (Quantity in metric tonne) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Logs | Veneers | Fibreboard | Plywood | Furniture | Others | Total |
| 2001-02 | 1086 | 1322 | 1262 | 456 | 215 | 578 | 4919 |
| 2002-03 | 1661 | 2198 | 2207 | 287 | 1022 | 411 | 7786 |
| 2003-04 | 1443 | 2436 | 3697 | 303 | 1345 | 553 | 9777 |
| 2004-05 | 6147 | 4760 | 4327 | 422 | 1814 | 812 | 18282 |
| 2005-06 | 8412 | 5050 | 5068 | 552 | 2715 | 1750 | 23547 |
| 2006-07 | 31078 | 5560 | 8626 | 536 | 3428 | 2270 | 51498 |
| 2007-08 | 34547 | 6360 | 12996 | 723 | 4249 | 2261 | 61136 |
| 2008-09 | 50648 | 8779 | 9761 | 783 | 5831 | 2435 | 78237 |
| 2009-10 | 57023 | 9859 | 8116 | 743 | 6295 | 5582 | 87618 |
| 2010-11 | 61115 | 14311 | 16057 | 1535 | 9633 | 4767 | 107418 |
| 2011-12 | 83470 | 12053 | 16016 | 1476 | 11372 | 6750 | 131137 |