Primary Processing of Rubberwood in Kerala: Report of a Sample Survey

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Introduction

Sawmilling and peeling are the traditional wood based industries processing timber of various specifications for a wide range of industrial aplications. Globally, the two industries are beset with a number of operational level problems arising mainly from supply constraints and changes in the wood processing technology characterised by the growing importance of vertical integration and value addition. On the supply side, earnest efforts were initiated since 1970s to identify alternative sources of timber and among the identified species, rubberwood enjoys an advantageous position arising from its basic nature as a renewable by-product of rubber plantations. The develoment of an appropriate processing technology in the form of a standardised preservative treatment and seasoning method for rubberwood is another contributing factor. It is estimated that on a global basis the commercial utilisation of economically available rubberwood can contribute to the conservation of six lakh hectares of tropical rain forests per annum (ITC, 1993). Therefore, in the emerging scenario characterised by steadily dwindling supply of tropical hardwood and growing ecological concern, the efficient utilisation of available rubberwood deserves serious attention from the society's point of view.

India is a timber deficit country and the estimated current annual requirement is 27 million cu.m. for various industrial applications (Lal, 1989). The estimated production of rubberwood in India in 1994-95 is 1376 thousand cu.m. of which the available stem wood is 826 thousand cu.m. (George, et al., 1993). Therefore, in an operational sense, contribution of the rubberwood sector to India's timber requirement is around three per cent. An important feature of the primary processing of rubberwood in India is its geographical concentration as 86 per cent of the total planted area under rubber is located in the state of Kerala. Moreover the existing rules prohibit transporation of rubberwood outside the state in log form (GOK, 1981).

The present study was initiated with the main objective of capturing the salient features of the primary processing industries, viz,. sawmilling and peeling. Accordingly, a sample survey was conducted in Kottayam and Perumbavoor regions where the primary processing units are concentrated due to specific historical and locational factors. From the two regions, 94 sawmilling and 25 peeling units were covered and the reference period of the study was 1993-94.

Availability and the Consumption pattern

The supply of rubberwood is mainly dependent on the extent of replanting as normally rubber plantations are maintained on a sustained yield rotation of 25-30 years. However, experimental trials are underway to commercialise the planting of clones with comparatively higher timber yield and negligible tapping options (Ngah, et al., 1993). The genesis of such efforts is the frequent fluctuations of natural rubber (NR) prices during the 1980s and the steady appreciation in the prices of different forms of processed rubberwood in the world market. Conversely, the experience of the NR producers and the rubberwood processing industry in India is distinct mainly due to a very high degree of inward market orientation and the relative size of the market. Therefore, at the operational level, NR production is given primary importance in relation to the exploitation of the timber in India.

The rubberwood log production depends on planting stock, agro-climatic conditions and management practices apart from decision on replanting. In India, the estimated gross yield of rubberwood is 180 cu.m/ha including branches greater thn 5 cm diameter. In 1993-94 the total estimated

rubberwood production in India was 1235 thousand cu.m. About 40 per cent of total production consisted of branch wood which was mainly used for industrial and household fire wood requirements. The remaining 60 per cent stem wood was utilised for various industrial applications. The pattern of rubberwood consumption in India is summarised in table 1.

Table 1. Pattern of rubberwood consumption in India (1993-94)

Industrial use	Girth range (inch)	Volume of consumption (000'cu,m)	Relative share (%)
Packing case	15-25	401	54.1
Plywood and veneers	25 and above	178	24.1
Safety matches25 and	69 above	9.4	
Furniture, panelling & construction components	30 and above	78	10.5
Others	N.A	15	2.0
Total		741	100.0

As evident from Table 1, the present status of rubberwood processing industry in India is characterised by the dominance of end products with relatively lesser potential for value-addition. This situation is in sharp contrast to other major NR producing countries such as Malaysia and Thailand where a major portion of the available rubberwood is converted into a wide range of finished products including furniture, panel products, joinery products, floor tiles and parquet, mouldings, etc. In Malaysia, even smaller-sized logs of less that 20 cm diameter and branches are being processed into a number of panel products such as chipboard, wood cement board and medium density fibreboard (Teng, 1993). The reported value-addition from rubberwood log level to components and furniture is in the range of 1250-2500 per cent (Hallet, 1993).

Historically, the three major sources of timber to the sawmills in Kerala were : mango tree (*Mangifera indica*), jackfruit tree (*Artocarpus integrifolia*) and anjili tree (*Artocarpus Tp*). The timber of mango tree was mainly used for making packing cases whereas the other two were basically converted into construction components. However, since late 1960s steadily increasing demand for packing cases from major industrial centres such as Bombay, Pune and Madras led to substantial rise in prices of conventional species and large scale substitution by rubberwood which was hitherto utilised as a major source of fire wood. By late 1970s only branch wood of rubberwood was utilised as fire wood. The commercial utilisation of rubberwood in the plywood sector is a relatively recent development mainly due to severe shortages in the supply of conventional species. Since 1980s relative share of the plywood manufacturing units has recorded a steady increase compared to a steep fall in the share of safety matches in the total stem wood consumption.

Another important development in the raw material market in the 1980s is the dominant role of intermediaries operating at the level of growers and auction centres before reaching the sawmills or peeling units. Indirectly, the processing units also benefit from this arrangement as it suits the unit-wise size specifications which amounts to saving of the wastage. This is in sharp contrast to a relatively higher level of vertical integration in Malaysia and Thailand where very often such wastes are gainfully utilised in the highly developed panel products industry.

Table 2 shows the distribution of sample units.according to reported annual consumption of rubberwood.

Table 2. Distribution of the sample units by procurement

Procurement (MT)	Sawmills (Nos.)	Peeling mills (Nos.)
0 - 1000	8 (9)	-
1000 - 2000	28 (29)	7 (28)
2000 - 3000	29 (31)	3 (12)
3000 - 4000	25 (27)	6 (24)
Above 4000	4 (4)	9 (36)
Total	94 (100)	25 (100)

Among the sample units, peeling units as a group operated at a larger scale as 36 percent of the units reported an annual procurement of above 4000 MT compared to 4 per cent in the case of sawmills. The two major factors contributing to the difference are specificities of the machinery and market conditions. The sector-wise differences were more obvious in a region-wise comparison of the mode of procurement. Table 3 illustrates the point.

Table 3. Details of rubberwood log procurement

Estimates	Sawmilling Kottayam/Perumbavoor		Peeling Kottayam/Perumbavoor	
Average procurement (MT)	1450	2400	6125	3911
Mode of procurement (%)				
Direct	14	1	25	5
Indirect	86	99	75	95
Range of procurement price (Rs/MT)	740-840	750-1100	1100-1350	1100-1500

The region specific sector-wise comparison of the averge procurement of rubberwood logs shows a relatively wider difference in Kottayam. One of the major factors contributing to the difference is the presence of two large export-oriented plywood manufacturing units in Kottayam among the sample units. Although the relative share of direct procurement in total consumption is insignificant, a higher share in Kottayam region is mainly due to the dominance of units with end products manufacturing facility and proximity to the plantations. The higher range of procurement price in Perumbavoor region is indicative of the large volume of transaction in quality timber belonging to the selection grades (higher girth). The average procurement of a peeling unit is 4266 MT per annum compared to 2100 MT by the sawmills. The peeling units normally procure logs with a diameter of 24 cm and above while the diameter of logs purchased by sawmills ranges between 13 and 24 cm. The differences in the size of the logs procured are refleced in the unit prices, and the average procurement price of peeling units is 40 per cent higher than the sawmills. Another important feature of the primary market is seasonality of supply and prices. Normally, the peak period of supply is during the period from January to May and shortages in the rainy season push up the prices to the extent of 10-15 per cent. However, the average farm gate price of rubberwood logs is only 55 per cent of the terminal market price.

Machinery, Recovery rates and Capacity utilisation

At the operational level, the machinery used, recovery rates of timber and capacity utilisaiton of the rubberwood sawmills and peeling units in India exihibit considerable difference with the prevailing conditions in Malaysia and Thailand. Persistence of the differences appears to be influenced by three factors viz. nature, quality and market orientation of the end products. In Malaysia and Thailand a substantial share of commercially suitable rubberwood is utilised in the manufacture of highly value-added products meant for exports. Conversely, in India around 90 per cent of the available stem wood is being consumed in the comparatively lesser value-added products including packing cases, safety matches and inferior quality plywood . The quality control aspect of the wood is given utmost importance in Malaysia and Thailand and very often the processing factories are involved from the stage of logging operations. It is a common practice by the factories in Malaysia to subcontract the sawing and the initial preservative treatment of sawn timber.

Machinery in the sawmills consist of vertical/horizontal bandsaws, re-saws and accessories. Across the major rubberwood processing countries, sawmilling of the logs with traditional bandsaws is popular. However, it is reported that higher lumber yields and better cutting precision are attained when sawmilling is done with bandsaws equipped with appropriately designed carriages for small diameter logs (Brion, 1993). In India, the installed sawmilling capacity per unit varies from 3-8 cu.m compared to 10 cu.m in Malaysia in one 8 hour shift. The recovery rates of sawn timber from rubberwood logs in India also show considerable difference with Malaysia and Thailand. The three important factors determining the recovery rates are girth of the logs, quality of the sawn timber and the end product to be manufactured from the sawn planks. In Malaysia, an average recovery rate as high as 62 per cent for cutting blockboard sizes using a gangsaw and a recovery of 46 per cent for furniture sizes using a bandsaw have been reported (Lopez et al., 1980). Normally, the recovery of sawn timber from rubberwood logs is in the range of 35-40 per cent. In India, although the recovery rate has been falling since 1980s due to declining girth of rubberwood logs, the reported average recovery rate is higher for two reasons viz., the practice of allowing 'tolerance' in the thickness of sawn planks and a major portion of the sawn timber is utilised for manufacturing packing cases. Therefore, the estimated average recovery rate is 64 per cent. The reported rate of recovery is 80 per cent due to the increase in recovery resulting from the practice of accepting the 'tolerance' limits set by the consumers. The estimated capacity utilisation in the rubberwood sawmilling sector is 68 per cent. The major identified constraints of capacity utilisation are seasonality of raw material supply, power shortages and labour absenteeism.

An important feature observed among the sample sawmills is the reluctance to process sawn timber for the treatment industry for two important reasons viz, an average lower recovery rate of 50 per cent and difficulties in procuring logs of higher diameter. Consequently, the practice of job work/ sub-contracting of sawing for the treatment units is becoming popular.

The development of an appropriate technology for the manufacture of plywood form rubberwood is relatively recent in origin in spite of the experimental trials for the same initiated in Malaysia since the late 1970s. The operational level problems confronting the pioneering efforts were small size and short length of the logs, lack of suitable machinery and warping of the dried veneer. The requirement of a substantial capital investment for large scale units operating on the basis of the standardised technology resulted in the

establishment of few units and in Malaysia the number of such plywood/veneer mills is only six as on 1992 (Ismariah, 1994).

A rotary lathe is the commonly used machinery in the peeling units in the processing of veneers. In India, about 20 per cent of the sample units have imported lathes with an average processing capacity of 25 MT/shift compared to 10MT/shift for the indigenous lathes. A recent development is the computerised lathe charging and the charger is reported to have a higher recovery by 5-15 per cent (Ho.1994). The newly developed spindleless lathe is reported to have the capacity of peeling down to a very small core diameter of about 50 mm. Veneer drying is also an important operation using sectional dryers.

Normally, the recovery rate in the peeling sector is dependent on the girth of the log, required thickness of the veneer and the efficiency of the lathe. The reported average recovery rate among the sample units is 74 per cent and the average capacity utilisation is 53 per cent. A relatively lower level of capacity utilisation is mainly due to supply side constraints arising from shortage of the required sizes of logs and power. An important feature of Indian rubberwood veneer processing sector is that hardly 25 per cent of the sample units possess the basic treatment facilities in terms of dipping and mechanical drying. About 20 per cent of the sample units has in-built plywood manufacturing facility and very often the core and face portions of the finished plywood is made of rubberwood veneers having the potential of affecting the durability of the finished product. This is in sharp contrast to the common practice of using rubberwood veneer in the core portion only. (Ho et al., 1994).

Sales composition and Marketing

The distinct form and technology of primary processing of rubberwood in India is reflected in the sales composition and market orientation. The sales composition of the sawmills in India can be broadly classified into three, viz; packing cases, packing case materials, and others. Qualitatively, the production and sales of packing cases can be sub-divided into three grades. The packing case materials include slabs and boards/shooks of different measurements. The unclassified category (others) consists of sawn timber meant for treatment units and cable reels. The details on the sales composition and relative prices of different types of processed wood products are given in Table 4.

Table 4 shows that 70 per cent of the volume of sales from the sawnmills is in the form of packing case materials and of which a major share (75%) is sold in the form of boards/shooks. Finished packing cases constitute only 20 per cent

Table 4. Sales composition and relative prices

Item	Relative share (%)		Price/cft (Rs)
I Packing cases	20		
i) Low quality cases	82		28 - 35
ii) Good quality cases		13	55 - 60
iii) Beverage packing cases		5	55 - 60
II. Packing case materials	70		
i) Slabs		25	38 - 48
ii) Boards/shooks		75	40 - 45
III. Others	10		
i) Sawn planks for treatment		60	60 - 65
ii) Chemically treated cable reels		25	70 - 80
iii) Miscellaneous		15	

of the total volume of sales and 82 per cent of the same belongs to the lowest grade. The relative share of sawn planks meant for treatment, chemically treated cable reels and other products is only 10 per cent of the total sales volume. The major markets for packing cases are Bombay, Pune, Madras and Hyderabad. Direct marketing accounts for about 75 per cent of the total volume of trade in packing cases. Limited sale of superior quality packing cases made of diffusion treated rubberwood is also reported which is priced at Rs. 85/cft. The relative price of slabs varies according to the thickness and the price of boards/shooks depends mainly on the extent of 'tolerance'. The electricity boards of the Southern States and cable manufacturing units are the main consumers of the rubberwood cable reels.

Rubberwood veneers processed from the peeling mills are mainly sold to the plywood manufacturing units located in the States of Kerala, Maharashtra, Tamil Nadu and Karnataka. Compared to sawmills, the peeling units are dependent on the intermediaries as they control around 50 per cent of the trade. In a few units, plywood manufacturing is integrated and two of the sample units are regularly exporting plywood manufactured from rubberwood. Around 80 per cent of the sales volume consists of the veneers of 2.5 mm thickness at an average price of paise 34/sq.ft.

Postscript

Two inter-related developments since the last quarter of 1994 have altered the prevailing equations in the primary market of rubberwood. A substantial increase in the NR prices and the consequent postponement of replanting of NR to reap the benefits arising from the increased prices led to a

severe shortage. Depletion in the supply of rubberwood logs is estimated to be about 25 per cent of the projected availability during the year 1994-95. The new development had the net effect of a price spiral leading to marked increases in the prices of the logs, sawn timber and packing cases. Table 5 summarises the average prices of different forms of rubberwood.

Table 5. Relative price of various forms of rubberwood during the first half of 1995

Estimates	Kottayam	Perumbavoor
1. Price of logs suitable for packing cases (Rs/MT)	1100	1200
2. Price of logs suitable for treatment (Rs/MT)	1450	1600
3. Price of logs suitable for plywood (Rs/MT)	1800	1650
4. Price of sawn timber for treatment (Rs/cft)	95	100
5. Price of rubberwood veneers of 2.5 mm thickness (ps/sq ft)	54	56
6. Price of packing case materials (Boards) of 1" thickness (Rs/cft)	55	63

A simultaneous development in the world market is the steady increase in the prices of both sawn timber and treated rubberwood resulting mainly from the growing world market size of rubberwood based furniture and panel products. Conversely, the primary rubberwood processing industries in India are mainly catering to the manufacturing requirements of products such as packing case and components and inferior quality plywood. Operationally, it is plausible to surmise that the existing pattern of production of the primary processing industries is a logical extension of the inward-oriented market structure of the finished products. In the process, the potential for higher value addition arising from the manufacture of furniture and panel products is forgone.

Another critical problem facing the rubberwood sector in India is the dwindling supply of quality logs in terms of higher diameter mainly due to steady replacement of conventional planting materials with higher timber content by modern high yielding varieties of planting materials having more latex potential and lesser timber content. The emerging scenario has far reaching implications as the logs with comparatively lower girth has in-built limitations in terms of recovery rates and commercial utilisation in the context of the prevailing technology and the consumption pattern. The policy options surfacing in this backdrop are mainly two, viz. (i) adaptation of advanced technology by the processing and manufacturing sectors to maximise recovery rates and value addition (ii) to explore the possibilities of developing planting materials meant for the joint production of latex and timber. The policy initiatives in this direction which have been already implemented in Malaysia and Thailand by the promotional agencies with regulatory powers are expected to provide the guidelines to maximise the returns from this renewable resource.

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