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United Nations Industrial Development Organization

Technical Meeting on the Selection
of Woodworking Machinery

Vienna, 19-23 November 1973

WOOD, WOOD-BASED AND WOODWORKING
MACHINERY INDUSTRIES IN INDIA^{1/}

by

V.R. Sonti
Chief Executive, Ascu Hickson Limited
Calcutta, India

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SUMMARY

Data for this paper was difficult to accumulate since only now is a comprehensive survey by the Government of India being carried out.

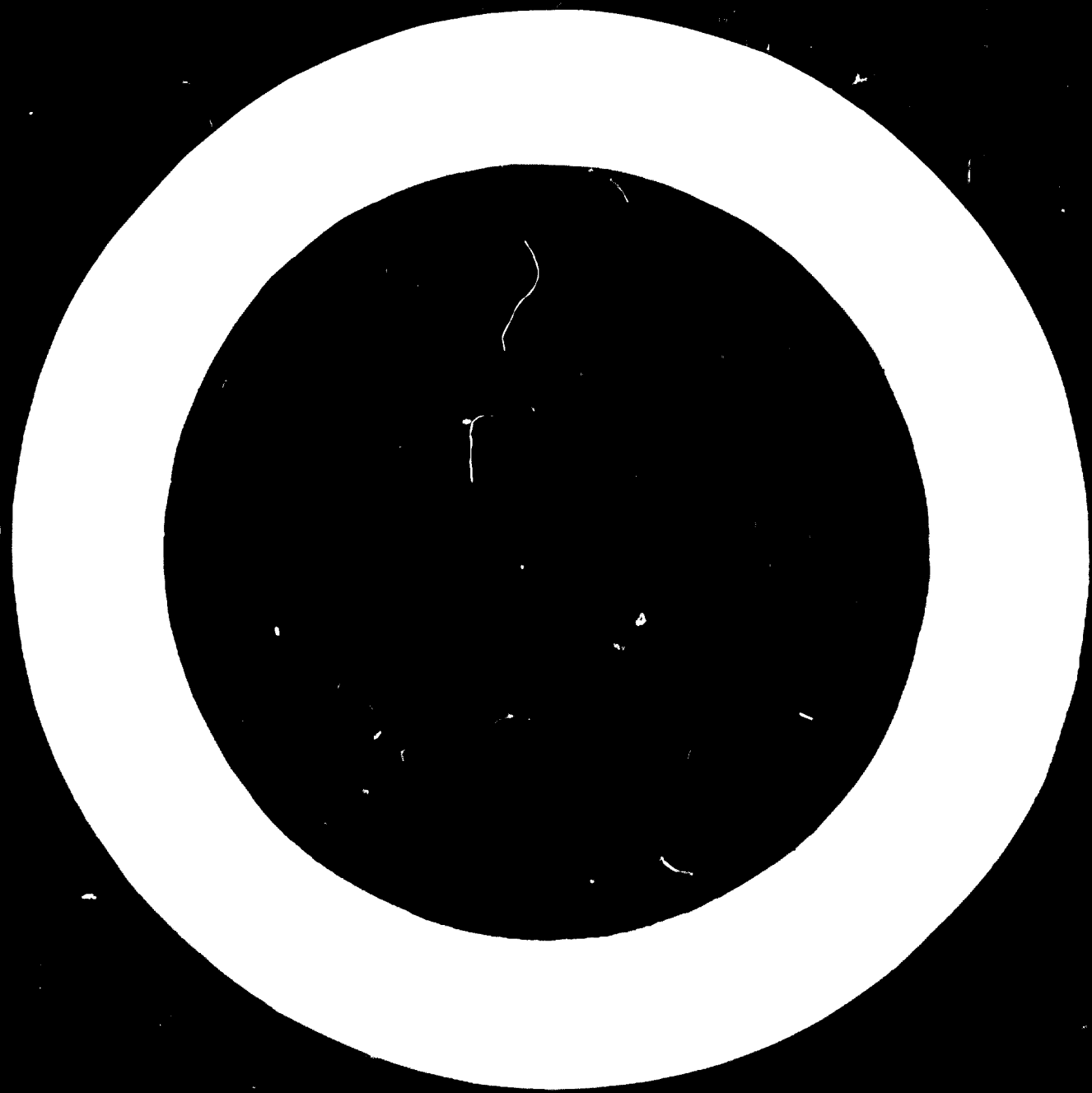
India's forest resources cover some 78.4 million hectares or 24% of its total land area and are predominately deciduous (94%). Bamboo is a valuable resource for the paper and rayon industries and, to a lesser extent, for housing, packaging and furniture. The use of wood for fuel has decreased in the last 15 years, as the panel industries have grown up.

The building industry used about 1.8 million m³ or about 24% of all wood consumed in 1962 and, according to the then current projections, was to rise to 3.7 million m³ in 1970 and 4.8 million m³ in 1975. Plywood production has increased rapidly and primarily supplies material for tea chests. Furniture accounted for only 350,000 m³ of round wood (roughly 60% teak) in the late 1960's. Textile mill accessories are likely to require 70,000 m³ in 1975; other woodworking industries such as toys, sports goods, tool handles, etc. will require 620,000 m³; and other industries such as pulp and paper, rayon and match industries will require 3.9 million m³.

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Almost all essential woodworking and sawmilling machinery is manufactured in India. The leading manufacturers are located in Punjab, West Bengal, Gujarat and Delhi. They number about 15, and each carries the basic sawmilling and wood machining equipment. Band saws, cross-cut saws and saw doctoring equipment, lathes, planer/jointers, panel planers and thicknessers, universal woodworkers, sanders, veneer driers and guillotines, spindle moulders and boring/mortising machines are all produced locally and hence imports are banned. On the other hand, licenses to import wood working machines, multiple drilling and filling machines for brushes, dovetailers, mortisers, copying lathes, three-drum sanders, panel printing machines and gang borers and routers may be granted.

There are only a few large scale joinery workshops - only 10 have turnovers of about US\$ 420,000 annually - who can even consider purchasing and operating sophisticated machinery. Lack of trained operators and maintenance personnel is also a problem. There exist no industry-wide standards applicable to machinery manufacture.

Wood seasoning is practised by over 100 private firms and over 200 Government and semi-governmental organizations. In 1968 the total output of seasoned timber was 1.9 million m³, although the capacity is estimated at 4.8 million m³. The Indian Standards Institute has established detailed codes (Indian Standard 1141 of 1958) with the advice of the Forest Research Institute at Dehra Dun, which carries out a training programme in this field. Solar and low-temperature kilns are expected to help lower costs and increase the supply of dried timber. Some kiln equipment is now being locally manufactured.

Wood preservation and seasoning are closely related and there are some 250 preservative plants scattered throughout India. The railways and port authorities run pressure plants for the impregnation of hot creosote and fuel oil into sleepers and plies. Building normally requires a cold process with pressure. Indian Standard No. 401 of 1967 has laid down proper treatment codes. Both stationary and mobile plants are now locally manufactured and have even been exported.

Panel production began with plywood manufacture over 50 years ago and made rapid progress supplying the tea and packaging industries. There are now 71 approved (large) mills which, in 1961, directly employed 9000 workers. An additional 48 small factories also exist. The lowering of the present high cost of urea formaldehyde resin should help the industry to attain a planned 58 million m² by 1979.

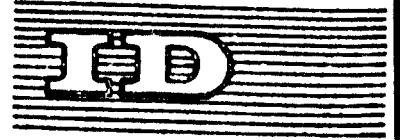
Fibre board and particleboard production is at the low percentages of 18% of the installed capacity of 44,900 tons for particle board and 47% of the capacity of 40,500 tons for fibreboard. Production of fibreboard should reach 54,000 tons in 1974-75 and 92,000 tons in 1980-81.

India's export of sawn wood has been relatively insignificant and of logs only somewhat important (80,000 m³ in 1968). In 1966 there were 110 registered sawmills and probably over 1100 unregistered ones in operation. Recovery figures are lower than in European countries (50% vs 70-80%) due to the generally poor machinery. Most mills are located near the forest, but where good roads exist, they are near the demand centres.

The policy of the Government is one of "progressive yield" of the forest resources, whereby the soil productivity is raised and also the stand productivity through judicious felling and restocking practices. Forest Development Boards have been created in almost all states.

Training of managerial and technical personnel for Governmental and semi-Governmental organizations is accomplished either at Dehra Dun or Coimbatore. The private sector relies on family and unofficial training methods. Other Government training schools are scarce and provide only inadequate training. The Government aims to increase and diversify India's exports and several incentives have been proffered which should be taken advantage of by the woodworking sector.

India urgently requires designing and processing technology for its secondary species; large capacity, modern woodworking machinery for mass producing low cost doors, windows, furniture and panel elements for houses and schools; and knowledge of the design and construction of pole systems to bring electricity to more rural areas.



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FRANCAIS
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Organisation des Nations Unies pour le développement industriel

Réunion technique sur le choix des machines
dans l'industrie du bois

Vienne, 19-23 novembre 1973

RESUME

LES INDUSTRIES DU BOIS ET DES MACHINES A BOIS EN INDE^{1/}

par
V.R. Sonti
Directeur technique de la Ascu Hickson Limited
Calcutta (Inde)

Il a été difficile de rassembler les éléments nécessaires à la rédaction de ce rapport, le Gouvernement indien venant seulement d'entreprendre une étude approfondie sur les industries du bois et des machines à bois.

Les forêts couvrent environ 78,4 millions d'hectares, soit 24 % de la superficie totale de l'Inde et sont en majorité composées d'essences feuillues (94 %). Le bambou, qui est une ressource précieuse pour les industries du papier et de la pyrolyse, est également utilisé, mais à un degré moindre, pour la construction de logements et pour la fabrication d'emballages et de mobilier. Au cours des 15 dernières années, l'utilisation du bois de chauffage a diminué à mesure que se développait l'industrie des panneaux.

^{1/} Les opinions exprimées dans le présent document sont celles de l'auteur et ne reflètent pas nécessairement les vues du Secrétariat de l'ONUDI.

73-7178

L'industrie du bâtiment a utilisé environ 1,8 million de m³ de bois, soit 24 % environ de la totalité du bois consommé en 1962 et, conformément aux projections établies à l'époque, la consommation devait atteindre 3,7 millions de m³ en 1970 et 4,8 millions en 1975. Le contre-plaqué, dont la production a augmenté rapidement, est utilisé essentiellement pour la fabrication de caisses destinées à l'expédition du thé. A la fin des années 60, l'industrie du meuble ne consommait que 350 000 m³ de bois brut (dont environ 60 % de teck). On estime qu'en 1975, 70 000 m³ de bois seront nécessaires pour la fabrication de pièces de machines textiles, 620 000 m³ pour celle des jouets, des articles de sport, des manches d'outils, etc., et 3,9 millions de m³ pour la production de pâte à papier, de rayonne et d'allumettes.

La plupart des machines essentielles pour le travail et le sciage du bois sont fabriquées en Inde. Les principaux constructeurs - une quinzaine environ - sont installés dans le Pendjab, le Bengale occidental, le Goudjérate et à Delhi, et chacun d'entre eux fabrique toute la gamme des équipements de base pour le sciage et l'usinage du bois, à savoir : scies à ruban, scies à trançonner, matériel de réparation des scies, tours, machines à raboter et à assembler, raboteuses-dégauchisseuses, machines à bois universelles, ponceuses, séchoirs à planage et guillottes, machines à moulurer, machines à percer et à mortaiser. L'importation de ces machines est donc interdite. En revanche, des licences d'importation peuvent être obtenues pour le matériel suivant : machines à fabriquer la laine de bois, machines à fabriquer les brosses, machines à queues d'aronde, machines à mortaiser, tours à copier, ponceuses à 3 cylindres, machines à imprimer les panneaux, perceuses multibroches et défonceuses.

Il n'y a que quelques ateliers de menuiserie importants (dont une dizaine seulement ont un chiffre d'affaires annuel d'environ 420 000 dollars des Etats-Unis) qui puissent envisager d'acheter et d'utiliser des machines perfectionnées. La pénurie d'ouvriers spécialisés et de personnel d'entretien qualifié pose également un problème. En outre, il n'existe pas de normes générales applicables à la construction des machines.

Le séchage du bois est effectué par plus de 100 entreprises privées et par plus de 200 entreprises publiques ou semi-publiques. En 1968, la production totale de bois séché a été de 1,9 million de m³. Cependant, elle peut atteindre, estime-t-on, 4,8 millions de m³. L'Institut indien de normalisation a élaboré des normes détaillées (norme indienne 1141 de 1958) avec le concours de l'Institut de recherches forestières de Dhera Dun, qui organise un programme de formation dans ce domaine. L'emploi de séchoirs solaires et de séchoirs fonctionnant à faible température devrait contribuer à faire baisser les coûts et à accroître le volume de la production de bois séché. Certains types de séchoirs sont maintenant fabriqués sur place.

La préservation et le séchage du bois sont deux opérations étroitement liées et il existe environ 250 installations pour la préservation du bois, disséminées dans tout le pays. L'administration des chemins de fer et celle des ports disposent d'installations d'air comprimé pour injecter de la créosote chaude et du fuel oil dans les traverses et les pieux. Dans la construction, on utilise habituellement une méthode d'imprégnation sous pression à froid. La norme indienne No 401, de 1967, a fixé les modes de traitement à appliquer. Des installations fixes et mobiles pour effectuer ce traitement sont maintenant fabriquées sur place et même exportées.

La production de panneaux a commencé avec la fabrication de contre-plaqué, il y a plus de 50 ans, et a fait de rapides progrès car ces panneaux sont utilisés par les industries du thé et de l'emballage. Il existe maintenant 71 grandes scieries agréées qui, en 1961, employaient 9 000 ouvriers. On compte en outre 48 petites installations. L'abaissement du prix de la résine urée-formol, qui est actuellement élevé, devrait permettre à l'industrie d'atteindre, en 1979, le chiffre prévu de 58 millions de m².

La production de panneaux de fibres et de panneaux de particules est faible : 18 % de la capacité installée, qui est de 44 900 tonnes, pour les panneaux de particules, et 47 % de la capacité installée, qui est de 40 500 tonnes, pour les panneaux de fibres. La production de panneaux de fibres devrait atteindre 54 000 tonnes en 1974-1975 et 92 000 tonnes en 1980-1981.

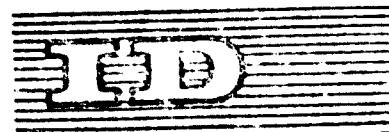
Les exportations indiennes de bois scié ont été relativement faibles et celles de grumes peu importantes (80 000 m³ en 1968). En 1966, pour 110 scieries agréées, on estime que plus de 1 100 ne l'étaient pas. Le rendement des grumes est plus faible en Inde que dans les pays européens (50 % contre 70 à 80 %), en raison du matériel qui est en général de qualité médiocre. Les scieries sont en majorité situées près des forêts mais, là où les voies de communications sont bonnes, les entreprises sont implantées près des centres de consommation.

Le Gouvernement indien a adopté, en ce qui concerne les ressources forestières, une politique "d'exploitation progressive", qui consiste à améliorer la productivité du sol et celle du peuplement, grâce à des pratiques judicieuses d'abattage et de reboisement. Des bureaux pour le développement des ressources forestières ont été créés dans presque tous les Etats.

La formation du personnel administratif et technique des entreprises publiques et semi-publiques est assurée soit à Dehra Dun, soit à Coimbatore. Dans le secteur privé, la formation est assurée dans le cadre de la famille et a un caractère empirique. Les écoles professionnelles officielles sont rares et la formation qui y est dispensée est insuffisante. Les pouvoirs publics envisagent d'accroître et de diversifier les exportations et des mesures ont été adoptées dans ce sens en faveur des industries du bois.

Il est impératif que l'Inde acquière sans tarder l'expérience technique nécessaire au travail des essences secondaires et à leur transformation en produits finis, importe des machines à bois modernes d'une capacité de production élevée pour la fabrication en série de portes, fenêtres, meubles et panneaux bon marché pour les bâtiments à usage d'habitation et les écoles et construise des usines pour la fabrication de poteaux destinés à l'électrification des zones rurales.

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29 octubre 1973

ESPAÑOL

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Organización de las Naciones Unidas para el Desarrollo Industrial

Reunión técnica sobre selección de maquinaria
para trabajar la madera

Viena, 19 - 23 noviembre 1973

**LAS INDUSTRIAS DE LA MADERA, LAS BASADAS EN LA MADERA, Y
LAS DE SU ELABORACION, EN LA INDIA^{1/}**

por

V.R. Sonti,
Gerente de la Ascu Hickson Limited, de
Calcuta (India)

RESUMEN

Los datos necesarios para la preparación del trabajo que aquí se resume se obtuvieron con dificultad, pues hace muy poco tiempo que el Gobierno de la India ha iniciado una encuesta amplia en esta esfera.

Los bosques de la India cubren 78,4 millones de hectáreas -o sea el 24% de la extensión total del país- y en su mayor parte (94%) son caducifolios. El bambú constituye un valioso recurso para las industrias del papel y del rayón y, en menor grado, para los sectores de la construcción, del envasado y del mueble. El empleo de madera como combustible ha disminuido en los últimos 15 años, como consecuencia de la expansión de las industrias productoras de tableros.

La industria de la construcción utilizó aproximadamente 1,8 millones de m³, o sea el 24% aproximadamente de toda la madera consumida en 1962, y, según las proyecciones que por aquel entonces se hicieron, había de utilizar hasta 3,7 millones de m³ en 1970 y 4,8 millones de m³ en 1975. Ha aumentado rápidamente la producción de madera terciada, que se utiliza primordialmente en la fabricación de cajas para té. Al sector del mueble le correspondieron nada más que 350.000 m³ de madera en rollo (el 60%, aproximadamente, de teca) en los años inmediatamente anteriores a 1970. Los accesorios para la industria textil requerirán probablemente unos 70.000 m³ en 1975; otras industrias transformadoras de la madera, como son las que producen juguetes, artículos de deporte, mangos para herramientas, etc., necesitarán 620.000 m³; y otras industrias -tales como la de la celulosa y el papel, el rayón y las cerillas- necesitarán 3,9 millones de m³.

^{1/} Las opiniones que el autor expresa en este documento no reflejan necesariamente las de la Secretaría de la ONUDI. La presente versión española es traducción de un texto no revisado.

En la India se producen casi todas las máquinas esenciales para el aserrado y el trabajo de la madera. Las fábricas más importantes se encuentran en los estados de Punjab, Bengala Occidental, Gujerat y Delhi. Estos fabricantes son unos quince, todos y cada uno de los cuales producen el equipo básico de aserrado y mecanizado de la madera. Se produce en el país, y por lo tanto está prohibida su importación, el equipo siguiente: sierras de cinta y para corte transversal, equipo para reacondicionado de sierras, tornos, cepilladoras/canteadoras, cepilladoras y regresadoras de tableros, máquinas universales o combinadas, lijadoras, guillotinas y secadores para chapas, fresadoras de carpintería (tupis) y taladradoras-mortajadoras. En cambio, se pueden conceder permisos de importación para los elementos siguientes: máquinas para la producción de lana de madera, máquinas taladradoras y tapamudos multihusillo para la producción de brochas y pinceles, aparatos para ensambladura a cola de milano, mortajadoras, tornos copiadores, lijadoras de tres rodillos, impresoras de tableros, y taladradoras y fresadoras multihusillo.

En cuanto a la ebanistería, sólo hay unos pocos talleres grandes -sólo diez de ellos tienen un giro anual de negocio del orden de los 420.000 dólares EE.UU.- que puedan pensar siquiera en adquirir y utilizar maquinaria de alta tecnología. Otro problema es la falta de personal de mantenimiento y de operarios calificados. No existen normas, válidas para todo el ámbito industrial, que puedan utilizarse en el sector de la fabricación de maquinaria.

El secado de la madera lo practican más de 100 empresas privadas y más de 200 organizaciones gubernamentales y semigubernamentales. En 1968, la producción total de madera seca fue de 1,9 millones de m³, aunque la capacidad se calcula en 4,8 millones de m³. El Instituto Indio de Normalización ha preparado unos códigos detallados (Norma India 1141, de 1958) basándose en el asesoramiento del Instituto de Investigaciones Forestales de Dehra Dun, que lleva a cabo un programa de capacitación en esta esfera. Se espera que los secadores solares y de baja temperatura ayuden a reducir costos y a aumentar las disponibilidades de madera seca. En el país ya se fabrica algún equipo de secado.

De la impregnación de la madera, aspecto muy estrechamente relacionado con el de su secado, se ocupan unos 250 establecimientos, dispersos por todo el territorio de la India. Los organismos oficiales encargados de ferrocarriles y puertos tienen sus propias plantas para la impregnación a presión, con fueloil y creosota a temperatura elevada, de durmientes y pilotes. Para la construcción suele requerirse un proceso frío con aplicación de presión. El tratamiento adecuado se ha fijado en la Norma India 401, de 1967. Ya se fabrican en el país, e incluso se han exportado, plantas de impregnación fijas y móviles.

La producción de tableros se inició con la fabricación de madera contrachapada hace más de 50 años e hizo rápidos progresos para abastecer a las industrias del té y del envasado. En la actualidad hay 71 fábricas aprobadas (es decir, grandes) que, en 1961, daban empleo directo a 9.000 operarios. Además, hay 48 fábricas pequeñas. La reducción del costo de la resina de ureaformaldehído, en la actualidad muy elevado, ayudaría probablemente a la industria a alcanzar para 1979 su producción planeada de 58 millones de m².

La producción de tableros de fibra y de partículas alcanza porcentajes muy reducidos: 18% de la capacidad instalada, que es de 44.900 toneladas, en el caso de los tableros de partículas; y 47% de la capacidad instalada, que es de 40.500 toneladas, en el caso de los tableros de fibra. La producción de estos últimos tableros deberá llegar a las 54.000 toneladas en 1974-75; y a las 92.000 en 1980-81.

Las exportaciones indias de madera aserrada han sido relativamente insignificantes; y las de troncos han tenido muy poca importancia (80.000 m³ en 1968). En 1966 funcionaban 110 aserraderos registrados y, probablemente, más de 1.100 no registrados. Los índices de aprovechamiento son más bajos que en los países europeos (50%, frente a un 70-80%) debido a la deficiente calidad general de la maquinaria. Las instalaciones están situadas casi siempre cerca del bosque, pero en las zonas con buenas carreteras se han ubicado cerca de los centros de demanda.

El Gobierno sigue una política de "rendimiento progresivo" de los recursos forestales, mediante la cual se eleva la productividad del suelo y se aprovecha mejor la madera en pie, aplicando unas prácticas racionales de tala y de repoblación. En casi todos los estados de la Unión India se han creado juntas de desarrollo forestal.

La capacitación de personal directivo y técnico para las organizaciones gubernamentales y semigubernamentales se realiza en Dehra Dun o en Coimbatore. En el sector privado, la capacitación tiene, primordialmente, carácter familiar y extraoficial. Las escuelas de capacitación oficiales escasean, y las que hay proporcionan una capacitación insuficiente. El Gobierno piensa aumentar y diversificar las exportaciones de la India, y ya se han ofrecido distintos incentivos que el sector de transformación de la madera debería aprovechar.

La India necesita con urgencia tecnología de proyección y de procesos para sus especies secundarias; maquinaria de gran capacidad y moderna para la producción, en grandes series y a bajos costos, de puertas, ventanas, muebles y elementos de paneles para casas y escuelas; y conocimientos sobre proyección y construcción de sistemas de postes utilizables para llevar la electricidad hasta las zonas rurales más distantes.

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INTRODUCTION

Collecting data for this paper has been both rewarding and paradoxically frustrating. Rewarding, because many developments we were unaware of before, have now come to light. And frustrating, because the data gathered is far from adequate for the task in hand.

When first intimated about writing this paper, its terms of reference were the present status, the problems, the needs and the potential of both the wood processing and wood-working machinery industry in India. This paper has digressed far from those terms of reference, for the data available along those lines is wholly inadequate to present any true and complete picture.

Apart from the manufacture of paper and plywood, which in recent years have grown to big industry status, the rest of the wood processing and wood-working machinery industry is organized along cottage and small scale lines. As numerous as the hills that dot the subcontinent, no comprehensive survey of these units has ever been undertaken to date. We understand, however, that Government of India is currently collecting such information and will publish the findings in due course.

In the meanwhile we have written this paper on data in hand, collected from multiple sources of varying authenticity. Conclusions drawn, therefore, are pure conjectures made by the writer of this paper. They should be accepted as such. Accordingly we have titled this paper: Wood, Wood-based and Wood Working Machinery Industries in India (1973).

I

INDIA'S FOREST RESOURCES .

The total area of land claimed by forests is 78.4 million hectares. This represents about 24% of the total land area of India, and 1.8% of the world's forest area (4,405 million hectares).¹

India's forests may be classified under the two broad categories of:

(i) Coniferous, and (ii) Non-Coniferous.

1. Coniferous occupy only 4.2 million hectares, comprising a very meagre 5.6% of the total forest area.² These are restricted to the Himalayas or the most part in the States of Jammu and Kashmir, Punjab, Uttar Pradesh, Himachal Pradesh, and to a smaller extent, in Assam, West Bengal, and Manipur. Important Indian conifers are - Deodar (*Cedrus deodara*), Chir Pine (*Pinus roxburghii*), Blue Pine (*Pinus wallichiana*), the Khasi Pine (*Pinus insularis*), Spruce (*Picea smithiana* and *Picea spinulosa*) and Fir (*Abies pindrow* and *Abies spectabilis*).
2. Non-Coniferous forests occupy 70.8 million hectares, forming 94.4% of the total forest area.³ These forests comprise of very large numbers of species, only a few of which at present are of value. These are - Teak (7.3 million hectares), Sal (11.3 million hectares), and others (52.2 million hectares).⁴ Some timbers like Rosewood (*Dalbergia latifolia*), Pali (*Palaquium ellipticum*), Andaman padauk (*Pterocarpus dalbergioides*) and Sandal (*Santalum album*) enjoy a wide export market.

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1. Timber Trends and Prospects in India 1960-1975, compiled and written by P. Venkataramany; Issued by Government of India 1962.
 2. India's Forests 1972; Issued by Central Forestry Commission.
 3. Ibid.
 4. Ibid.

Mention must be made of bamboos which occur in many types of forests in India. This is an important raw material in the Paper and Rayon industries and has been put to numerous other end uses. It is found in almost all the States except Jammu and Kashmir. Its annual production has been put at 1.56 million tonnes per annum.⁵ This figure is one of recorded removals, and it should be remembered that recorded removals form only a small part of the total consumption, as bamboos are locally collected and utilized for various end uses like housing and packaging. The estimates of production should therefore be considered as only indicating the order of magnitude of local bamboo resources.

The consumption of the paper mill industry in 1955 constituted 17.6% of the total production during that period.⁶ With increasing dependance of this industry on bamboo resources and improved accessibility of, at present unused remote forests, it is expected that the demand will be met until 1974-75. Thereafter, problems will arise because of the relative shortage of bamboo after 1975. According to official estimates, total availability of bamboo in India is 4.7 million tonnes. Of this, it is assumed that only 3 million tonnes will be available for paper production.⁷ The balance will be allocated for non-industrial purposes, such as houses, buildings, bridges, re-inforcement of river embankments, scaffolding, bamboo baskets, mats, and packaging containers etc.

5. Timber Trends and Prospects in India 1960-75, compiled and written by P. Venkataramany; Issued by Government of India 1962.

6. Ibid.

7. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India, Vol.1, February 1970.

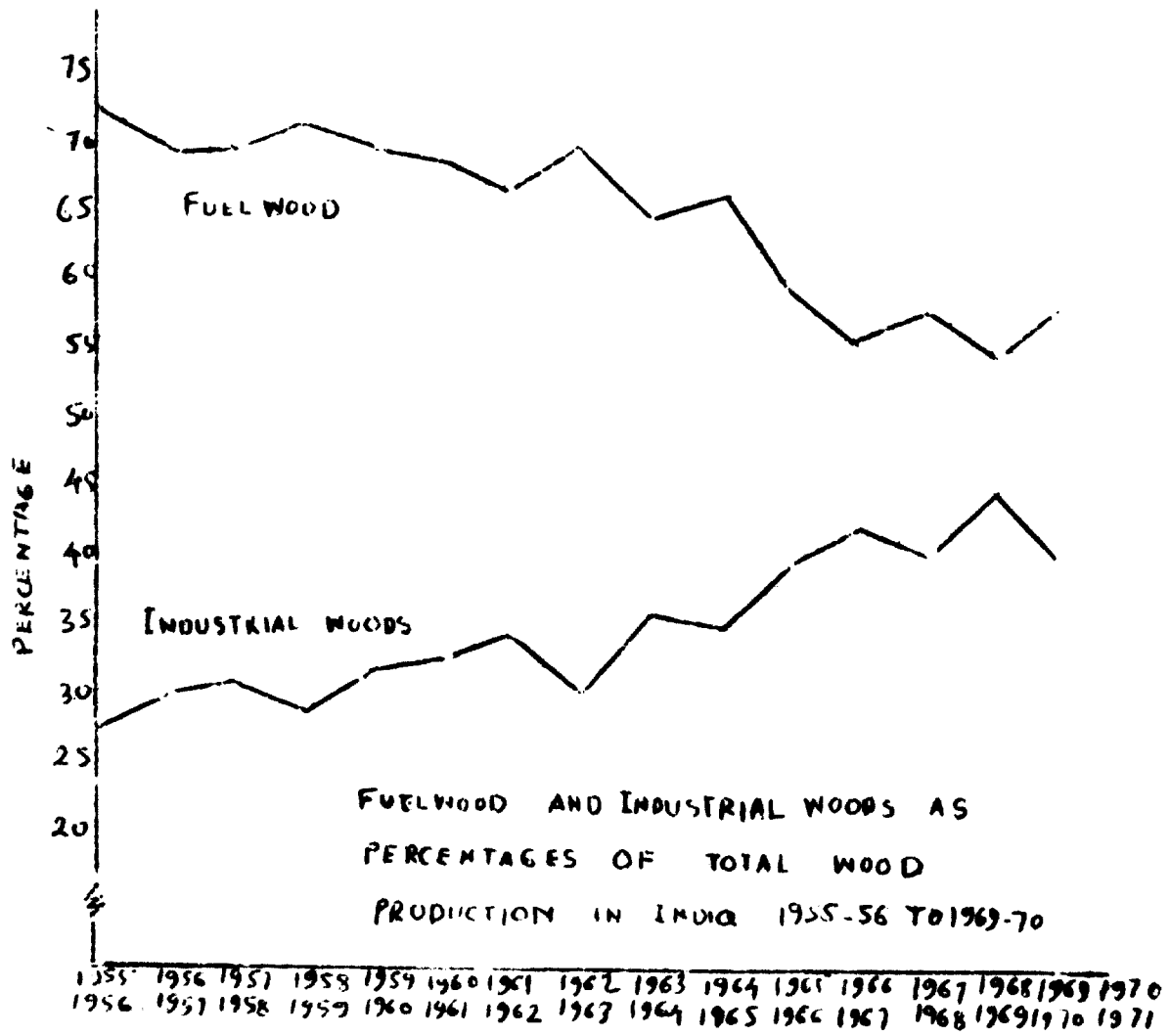
II ANALYSIS OF FOREST PRODUCT IN INDIA

Recorded Production of Wood from 1955 to 1970:

Year	Industrial Wood			Million m ³ (round)			
	Coni-ferous	Non-ferous	Total	(Col.4 as a per-centage of Col.8 in per-cent.	Fuel wood (inclu-ding wood for char-coal)	(Col.6 as a per-centage of Col.8 in per-cent.)	Total Pro-duc-tion of Wood (Col.4 plus 5)
	1	2	3	4	5	6	7
1955-56	0.98	3.18	4.16	27.79	10.81	72.21	14.97
1960-61	1.19	4.24	5.43	31.81	11.64	68.19	17.07
1965-66	1.04	7.57	8.61	39.68	13.09	60.32	21.70
1969-70 (p)	1.30	7.63	8.93	40.99	12.86	59.01	21.79

* (p) Provisional and subject to revision.

It is obvious from the above figures that between 1955 and 1970, the percentage extraction of fuel-wood vis-a-vis industrial wood had decreased by 13 points (see graph). This indicates clearly that market demand had moved up for industrial woods. Whether India has adequate processing facilities to cater to the present and future demands, will be examined later on in this report. It may be remarked, that production of industrial woods have gone up significantly due to construction and other needs under the Five Year Plans. The cessation of toak supplies during the War, and for a few years subsequently, may also have served as impetus for larger local removals and utilisation of secondary woods.



Between the consumption of fuelwood and industrial wood there exists an inter-relationship. When living standards are relatively high, and adequate supplies of alternative forms of energy are available, then wood is put to better use, than merely being burned as fuel. In other words, fuelwood can be regarded as a reserve of industrial wood supplies. Thus the rise in recent decades of the fibre board and particle board industries, has made industrially acceptable, those species of wood and dimensions, that hitherto were used only as fuel.

III THE LARGER USES TO WHICH INDUSTRIAL WOODS ARE PUT.

I. Building Materials:

Housing plays an important role in the economic and social development of the country, the greatest need being the provision of houses for the rural population and low income groups in the urban population. In India, housing accounts for 1.8 million cubic metres (round), or about 24% of all industrial wood consumed. It thus forms the group utilising the maximum percentage of industrial wood. The average annual consumption of industrial wood for housing in 1960 in India was 3.9 cubic metres (round) per 1,000 inhabitants. By 1975, the demand of wood for building purposes is expected to rise to 4.8 million cubic metres (round), as compared to 3.7 million cubic metres (round) in 1970.¹

II. Plywood:

Between 1940 to 1955, production increased rapidly from 1.12 million square metres to 10.3 million square metres.² Thereafter, for a short while, the increase was slow. But from 1957, production picked up again, touching 28 million square metres of plywood (all grades), in 1968. The installed capacity in 1968 was 37 million square metres and was actually utilized to only 77%.³

Indian plywood industry is primarily concerned with producing material for tea chests, in which it has attained self-sufficiency. Increase in production in future, will take place in the field of commercial and decorative plywood. The import of commercial

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1. Timber Trends and Prospects in India 1960-1975, compiled and written by P. Venkataramany. Issued by Government of India 1962.
 2. Ibid.
 3. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India, Vol. 1. February 1970.

plywood as well as tea chest plywood is banned at present, and the indigenous industries are meeting fully the different requirements of the road transport industry, railways, the building and furniture industry, and the tea industry. The quality of the indigenous plywood is of a fairly high standard, and production of most varieties is covered by standard specification laid down by the Indian Standards Institution.

III. Mining:

By 1975 India's coal production is expected to be 100 million metric tons. For mining, this quantity of coal, 1.32 million cubic metres of round wood will be required.⁴

IV. Transport and Communication:

The annual consumption for ship and boat building, mostly teak, is about 16,700 tonnes of round wood. This does not include the very large number of fishing houses and country boats operating on lakes (Kashmir), the great river systems, and along the coasts. This large fleet is one of the big, though hidden consumers of timber.

For power, telephone and telegraph poles, the annual demand has been estimated at 14,000 cubic metres of round wood per annum. Though the need for these is expected to rise considerably in future, the use of concrete posts and underground cables will bring about some replacement of wood. By 1975, the demand of poles is expected to be 42,000 cubic metres of round wood.

4. Timber Trends and Prospects in India 1960-1975, Compiled and written by P. Venkataramany. Issued by Government of India 1962.

The timber requirements for railway sleepers, by 1975, has been put at 300,000 cubic metres.⁵ In the past, almost 50% of the sleeper requirements were met by imports. As regards railway coaches and wagons, two conflicting trends have to be considered, viz.

1. the great effort for increasing domestic production of coaches and wagons and
2. the tendency to eliminate wood altogether from this field, by using metal.

The present timber requirements will, therefore, continue at the same level for some time. In the late 1960's and early part of 1970's the consumption was around 100,000 cubic metres of timber.

About 80% of all trucks and buses have wooden bodies. But there is a tendency to replace it by metal. It is expected, however, that as the number of vehicles increase enormously, the present level of consumption will continue.

In 1962, there were 11 million country carts in India, of which 95% were of wood. In 1960 these carts consumed 210,000 cubic metres of wood. The demand will increase progressively with the population, though counteracted to some extent by mechanisation of transport.⁶

V. Wood Working Industries:

- a) Furniture: It is estimated that the present average annual requirements stands at 350,000 cubic metres of round wood. The allocation between the different species is roughly - teak 60%, other hard wood 39%, and conifers 1%. Some wood is used in the round, by rural folk, catering to their own domestic needs. But the actual amount is negligible, especially as bamboos are largely used in

5. Timber Trends and Prospects in India 1960-1975, compiled and written by P. Venkataramany. Issued by Government of India 1962.

6. Ibid.

rural furniture. In 1968-69 India's export of wooden furniture amounted to U.S. \$ 56,000. This figure is substantially lower than the 1960-61 level of U.S. \$ 266,000 at post devaluation prices.⁷

- b) Textile Mill Assessories: Utilisation of indigenous timbers is confined to production of bobbins for cotton and jute mills. The present annual requirements are put at 60,000 cubic metres of wood in the round. Based on the expected increase in the production of textile mills, the annual demand is expected to increase to 70,000 cubic metres by 1975.
- c) Other Wood Working Industries: A variety of other industries like toys, sports goods, shoe-lasts and heels, spools, picture frames, pencils, battery separators, tool handles, etc. consume wood. It may be assumed that the requirement in 1975, under this category will be around 620,000 cubic metres of round wood.⁸

VI. Other Industries:

Other large consumers of industrial wood are the pulp and paper, rayon, and matches industries. The demand by 1975 is estimated to be 3.9 million cubic metres.⁹

7. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India, Vol. 1 February 1970.

8. Timber Trends and Prospects in India 1960-1975, compiled and written by P. Venkataramany. Issued by Government of India 1962.

9. Ibid.

IV WOOD WORKING MACHINERY INDUSTRY

Almost all essential wood working and saw milling machinery are manufactured in India. The leading manufacturers are concentrated in Punjab, West Bengal, Gujarat and Delhi. The remaining are scattered over Maharashtra and Mysore.

Most of these manufacturers, operate on a small scale basis for the following reasons.

1. The market for their machines is extremely limited.
2. Joinery and other such wood based industries engage cheap skilled labour, in whose rate and level of productivity they are satisfied. Such labour is available plentifully.
3. The potential buyers of wood working machines conduct their own operation on an extremely small scale. They do not need the higher productivity, which wood working machines can give, nor do they have the day to day working capital to run these machines economically after they are purchased.

The maximum number of manufacturers in this field do not exceed fifteen. Each manufacturer produces the basic saw milling machines like band mill, vertical band saw, horizontal-band saw, cross-cut saw, and saw doctoring equipments. Some of the better known and larger manufacturers also produce wood working lathes, combined surface planer and jointer, panel planing and thicknessing machines, universal wood workers, belt sanders, automatic track veneer dryers, automatic guillotine jointers, bobbin sanders, cross-cut trenching machines, spindle moulder, and boring and recessing machines. Since these machines are indigenously manufactured, the Government of India has banned their import. It will however consider issuing import licenses for the following machines - Wood wooling machine, multiple drilling and filling machines for brushes, dove tailing machines, mortising machines, copying lathes, three drums sanders, printing machines for hard boards - to give a decorative finish, hydraulic-feed-gang borers, router machines and fluting machines.

The widest range of wood working machines are bought by the State Forest Departments, wood working integrated units, the larger joinery workshops, Defence establishments, the Railways, and cooling tower manufacturers. It may be mentioned here that a highly sophisticated joinery workshop exists in Srinagar turning out prefabricated doors, windows and timber houses. This unit was gifted by Sweden. An identical unit is now being set up in Jammu.

In the private sector there are less than ten joinery workshops (their turnover not exceeding U.S. \$ 420,000 per annum) who feel the need, or have the finances, to purchase and run these high priced machines. Their greatest use are to those joinery workshops who export finished products and who must of necessity keep the labour cost element in their products at its lowest. Such a need is not felt by the thousands of local selling small wood working shops, and hence they make use of the services of skilled craftsmen rather than of mass producing machines.

A significant factor which retards the sale of wood working machines in India is the dearth of personnel who are able to work such machines. Such personnel do require special training, and as yet there are no recognized institutions who undertake such technical courses. Besides, skilled labour who work with hand tools refuse to have anything to do with these efficient machines, for they believe that their only means of livelihood will be snatched from them. This is an extremely pertinent issue.

The marketing operation for all these small wood working machine manufacturers is left in the hands of three big distributors located in Bombay. For these distributors, wood working machines form an independent department among other machinery departments already in existence. Discussions with these distributors brought to light the fact that there are no industry wide standards which these wood working machinery manufacturers adhere to.

V WOOD SEASONING IN INDIA

There are over a hundred private firms engaged in kiln drying of timber in India at the moment, and twice that amount of kilns are being operated by Government and Semi-Government organizations all over the country. Madhya Pradesh heads the list with 56 seasoning units, followed by Mysore with 36, Uttar Pradesh with 35, Maharashtra with 33, and Haryana with 27. Other States, including Jammu and Kashmir and the Andaman and Nicobar Islands have less than 20 units each.¹

In 1968 the total output of seasoned timber at 40% capacity was 1.9 million cubic metres. The total output capacity during that year was 4.8 million cubic metres. As to how much of this capacity was devoted to the seasoning of teak and how much to the seasoning of non-teak species cannot be pin-pointed, as no data is available. It has now been generally accepted that kiln seasoning is the only answer to stability problems presented by the varying species extracted and used in different climatic conditions of the country. This is even more so when the timber has to be exported. Again, seasoning of timber has grown in popularity, as secondary species are now extensively used for a variety of purposes ranging from packing cases to prefabricated timber houses. Indian Standards Institution has laid down detail codes in Indian Standard No. 1141 of 1958 as to how timbers of varying moisture content should be kiln seasoned. To a large extent, these specifications are followed. But there are occasions when the kiln superintendent by-passes these. Often, timber is badly seasoned, or the kiln sustains damage because untrained personnel are put on the job. The Forest Research Institute at Dehra Dun, strongly recommends, that only candidates with some science background be sent

1. Data collected by Forest Research Institute, Dehra Dun.

to them for training. This Institute runs an intensive one year course in the grading, seasoning, and preservation of timber. Apart from the Forest Research Institute, the biggest manufacturer of seasoning kilns in India also undertake to train personnel in proper seasoning procedures.

Until the late 50's most seasoning kilns were imported from either the United States of America, or the United Kingdom, or Germany. Now these kilns are indigenously made, either in the form of pre-fabricated units or as kilning components. The usual accessories, like Moisture Meters and Temperature Recorders which earlier on were being imported, are now readily available from local manufacturers.

Till the early 60's most timbers were only air seasoned. With the growing demand for industrial and building wood, the waiting time has decreased, and seasoning had to be speeded up. Building activity will continue to grow, and demand for timber on this account is expected to jump to 4.8 million cubic metres (round) by 1975.² Most State Housing Boards, Central Public Work Departments, State Housing Public Works Departments, and the Railways are now beginning to insist that the timber used on their projects be adequately kiln seasoned. This has led to a spurt in demand for seasoning kilns. Seasoning kilns are being manufactured in the country, in capacities varying from 2.83 cubic metres to 28.31 cubic metres. They can bring down the moisture content to as low as 8%. On an average, kiln seasoning costs U.S.\$ 14.00 per cubic metre, per charge. If this cost could be reduced, kiln seasoning capacity in the country would expand. At the moment overhead and side mounted fan type kilns are being manufactured. Research is now being carried out by the Forest Research Institute at Dehra Dun towards the development of low cost kilns. In the offing are the solar kiln and low temperature kiln. Both these developments do away with the need of bulky boilers which are not only costly, but also troublesome. If these developments fructify, then by 1990 the output of seasoning timber can be expected to be 3 million cubic metres.

2. Timber Trends and Prospects In India 1960-1975 compiled and written by F. Venkataramany. Issued by Government of India 1962.

VI WOOD PRESERVATION IN INDIA

That preservation and seasoning of timber go hand in hand is now an accepted fact in India. There are over 250 preservative plants scattered throughout the country.¹ Most of these are pressure plants that use a cold process for the proper impregnation of the preservative. The Railways and some Port authorities run pressure plants for the impregnation of hot creosote and fuel oil into sleepers and piles. For building and industrial uses, pressure plants, using a cold process are mostly utilized. Non-Pressure open tanks are also used, but in a very small way. As was briefly mentioned earlier, secondary timber species in small quantities are now being used to substitute teak. This has led to growth in demand for preservation facilities - though not to the extent desired.

In the late 60's, 400,000 cubic metres of preservative treatment capacity existed. Of this less than 40% had been actually utilised. Among those that get their timber treated, in order of priority are, the Electricity Boards, the Railways, Forest Departments and Defence establishments. In the private sector most treatment facilities are utilized by cooling tower manufacturers and in a small (though growing way) by the building construction industry. Here again Indian Standards Institution has laid down codes in Indian Standard No.401 of 1967, for the proper treatment of timber according to their end use. By and large this code is adhered to.

In the manufacture of preservative treatment plants, local manufacturers have considerable expertise. Both research and manufacturing facilities in this field are far advanced. An off-shoot of this has been that a local manufacturer, with British collaboration,

1. Forest Research Institute, Dehra Dun.

has supplied over 150 plants to the local market and in the past few years has been in the export field. Plants have been exported to Cuba, Brazil, Uganda, Nigeria and Liberia.

Vacuum Pressure impregnation plants are now manufactured in sizes varying from 0.61 metres to 2.75 metres in diameter, and 1.83 metres to 13.73 metres in cylinder length. Treatment capacity varies from 1.55 cubic metres to 28.31 cubic metres per charge. These plants are available, complete, with storage tank, mixing tank, measuring tank, vacuum/pressure pumps, trolley, separator, cylinder, pressure/vacuum gauge and piping circuits. These plants are marketed either as stationary units or mounted on wheels.

VII WOOD PANEL PRODUCTS

Plywood Industry:

This industry has been in existence for over 50 years and from its inception, to date, it has made rapid progress because of a ready market for plywood used for tea chests and packaging. Below is given a brief list of the main uses to which plywood is put in India. The annual consumption¹ is also indicated for both structural and industrial purposes.

1. Packaging	10 million sq. metres.
2. Ammunition boxes, Defence packing cases etc. Barrels, Tool boxes etc.	2 million sq. metres.
3. Construction of Houses and other Buildings	1 million sq. metres.
4. Furniture	4 million sq. metres.
5. Decorative panelling	1 million sq. metres.
6. Wall sheeting and cladding	2 million sq. metres.
7. Door skins and flooring etc.	1 million sq. metres.
8. Concrete shuttering	1 million sq. metres.
9. Musical chests, instruments and cabinets	4 million sq. metres.
10. Sports goods	2 million sq. metres.
11. Marine crafts	0.5 million sq. metres.
12. Aircrafts and gliders	1.5 million sq. metres.
13. Rail coach construction and repair	1.5 million sq. metres.
14. Bus, truck, car bodies	1.5 million sq. metres.
15. Studios	0.2 million sq. metres.
16. Publicity	1.0 million sq. metres.
17. Schools and Offices	1.0 million sq. metres.
18. Miscellaneous	2.0 million sq. metres.

1. Forest Research Institute, Dehra Dun.

The record of past production² of plywood in India is fairly accurate and complete:

In million square metres.

Year	Tea Chest	Commercial	Total
Pre-war 1935-38 average	0.96	0.16	1.12
1947	2.70	0.6	3.3
1951	5.6	1.0	6.6
1955	8.5	1.9	10.3
1957	8.8	3.0	11.8
1958	8.2	3.5	11.7
1959	9.1	5.1	14.2
1960	9.1	5.8	14.9
1961	9.4	7.1	16.5

It can be seen that production increased very rapidly from 1940 to 1955 and rather slowly afterwards, reaching a total of 11.8 million square metres. From 1957 to 1961, production continued steadily and touched a figure of 16.5 million square metres. In 1968 production was 28 million square metres.

In India there are 71 factories on the approved list of plywood manufacturers, with a total installed capacity of 37 million square metres. In 1961-62 they employed directly 9,000 employees, of which 5 to 10% were skilled workers. Another 2000 and odd were employed for procurements and transport of raw material, and for the transport and distribution of finished products. Apart from the above, there exist about 48 small size factories (unapproved) with a capacity of 800,000 square metres.³

Of the 37 million square metres installed capacity, 61.82% was devoted to the manufacture of tea chest plywood and 38.34% was used for the

2. Timber Trends and Prospects in India, 1960-1975 compiled and written by P. Venkataramany. Issued by Government of India 1962.

3. Ibid.

manufacture of commercial plywood. For the year 1961, the state-wise distribution⁴ of factories in the country was:

<u>State</u>	<u>No. of Factories</u>	<u>Total capacity</u> (in million sq.metres)
Assam	17	8.89
North Bengal	6	2.40
Calcutta	28	8.09
Mysore	5	2.86
Kerala	13	7.33
Bihar	1	0.14
Uttar Pradesh	1	0.56
Total	71	30.25

About 51% of the factories were in West Bengal, 25% in Assam, and 18% in Kerala. Thus the bulk of the factories were located in the neighbourhood of the principle centres of consumption of tea chest and plywood.

Production of commercial plywood is expanding fast, and the tempo of production is expected to be maintained through the coming Five Year Plan period. The Planning Commission had set a target of 7.4 to 9.3 million square metres of commercial plywood for the Third Plan period. In the future, development in this field, is expected to be greater than that of tea chest plywood. It is estimated that a production of 2.14 million square metres of furniture, boat building, doors and structural units would find a ready market. By 1975, actual production of both, tea chest plywood and commercial plywood are expected to be 15 million square metres each.

India's exports of plywood have been pitifully small. In 1968-69 a peak of just U.S. \$ 3.3 million was recorded against U.S.\$ 71.4 million by all the South Korean plants and U.S. \$ 23.8 million by the

4. Timber Trends and Prospects in India, 1960-1975 compiled and written by P. Venkataramany. Issued by Government of India 1962.

Philippines in 1968.⁵ India can certainly do better in this field if export prices are brought down to competitive levels with much larger units and more attention to quality, market preferences and delivery dates. Further, production should be planned to about 58 million square metres by 1979, for which modern economic size plants should be located near forest resources, which will reduce timber cost by about 15%. The price of Urea Formaldehyde resin should also be brought down to the international price level, which is one-third the present prevailing price level (U.S. \$ 770 per tonne) in India.

During the Second Five Year Plan, as emphasis changed from tea chest plywood manufacture to commercial plywood production, many factories imported machines like Multi-platen hot presses, Roller veneer driers, splicers, panel sizers, heavy duty peeling lathes and veneer slicers. Due to these changes, it was surmised that by the end of the Third Plan period, commercial plywood production would exceed that of tea chest plywood. It may be mentioned here that most machines, now being used by the plywood industry are being manufactured in India.

There exists two categories of plants: namely those which manufacture tea chest plywood, and others that make commercial plywood. The maximum size of panel is 10.7 metres by 2.4 metres, but most of the factories have small size peeling lathes of size 1.7 metres by 2.8 metres. The average veneer is 1.6 millimetres for 4 millimetres plywood, and the diameter of the unutilizable central core is 7.5 centimetres to 18 centimetres. Some factories are equipped with slicers, the average size being 2.6 metres to 3.7 metres, which are used for cutting thicker veneers

5. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India, Vol.1; February 1970.

out of species like teak (*Tectona grandis*), Walnut (*Juglans regia*), mahogany (*Swietenia mahogani*, *Swietenia macrophylla*) and White cedar (*Dysoxylum malabaricum*). These are used for decorative plywood.⁶

Fibre Board and Particle Board:

Till 1961 there were two units manufacturing hard board in the country. In 1968, the production of Particle Board was 8,130 tonnes out of an installed capacity of 44,900 tonnes, corresponding to average capacity utilization of 18%.⁷ Production has remained at the level of about 8,000 tonnes in the last four years due to high prices, limiting domestic consumption. In the earlier years, there was a rise from 3,400 tonnes in 1963, to 8,100 tonnes in 1965. High prices of Particle Board, as in the case of plywood, are primarily due to excessive urea resin prices at about U.S.\$ 770 per tonne, which includes 36% excise duty. Resin cost forms over 55% of the total manufacturing cost. Until 1969 there was no significant export of Particle Board. In 1969, a leading manufacturer arranged to ship about 6,000 tonnes of Particle Board to United States of America, valued at about U.S. \$ 728,000, with the help of a cash subsidy of 25% available on exports exceeding U.S. \$ 350,000 a year. However there are no prospects of new orders from the United States of America, as market prices have reverted to normal levels and new plants have been set up in that country. Future exports would have to face increased competition which India currently is unable to bear.

In 1968 the production of Fibre Board was 19,100 tonnes, 47% of the installed capacity of 40,500 tonnes. Export in 1968-69 were 3,329 tonnes valued at U.S.\$ 238,000.⁸ Major markets were mainly in the Middle East and neighbouring countries like Kuwait,

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6. Timber Trends and Prospects in India, 1960-1975 compiled and written by P. Venkataramany. Issued by Government of India 1962.
 7. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India; Vol.1, February 1970.
 8. Ibid.

Saudi Arabia, Iraq, Ceylon, Nepal. Taking both, domestic demand and exports into consideration, production of Fibre Board should reach 54,265 tonnes in 1974-75 and 92,000 tonnes by 1980-81.⁹ No difficulty is anticipated in obtaining the wood resources, since this industry uses waste wood as well as mixed tropical hardwood as its raw material.

Brief mention may be made here of the role of sawn wood in India's exports: India's exports of sawn wood has so far been relatively insignificant. A total of 533 cubic metres of teak sawn wood valued at U.S. \$ 56,000 was exported to the Middle East during the last nine months of the year 1968. At the present time India's exports of logs is considerably larger than her export of sawn wood. In 1968 log exports amounted to approximately 80,000 cubic metres valued at U.S. \$ 5.6 million. Of that amount, Rosewood logs amounted to 14,400 cubic metres, valued at U.S.\$ 4.6 million. The volume of exported teak logs amounted to 2,600 cubic metres valued at U.S.\$ 518,000.¹⁰ Most of the teak and Rosewood logs were imported by Japan and by European countries for production of sliced veneers. It will be profitable for India to reduce export of round wood in order to produce more veneers and sawn wood for export.

A recent paper published in the Journal of the Indian Academy of Wood Science¹¹ puts forward the following conclusions:

1. That Particle Board production in India has reached a stability level at 8,620 tonnes and there is no indication of any future growth, whereas world Particle Board production is in its accelerated development stage tending towards stability at 90 million tonnes with a high rate of growth.
2. Fibre Board production in India is yet to make a beginning, where as that of the world is almost

9. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India; Vol.1, February 1970.

10. Ibid.

11. "Trends in Wood Panel Products in India and Other Regions of the World - A Study" by B.G.Maghavendra and S. Nagaraju in the Journal of The Indian Academy of Wood Science, Vol.3, No.2 July-December 1972, Bangalore 560022.

near its stability level at 7.15 million tonnes.

3. That Indian Plywood production is still in its development stages, and has a maximum production stability level of 44.5 million square metres. This is in contrast with world plywood production, which, at the moment, is moderately growing, with the stability level of 36 million cubic metres.

VIII SAW MILLING IN INDIA

It must be stated at the outset that the available data is wholly inadequate to present a true picture of the existing state of the saw-milling industry in India. In 1966, the most recent year for which figures are available, only 110 saw milling firms were registered.¹ It can be safely estimated that the number of un-registered counterparts. Therefore in all, during 1966 there must have been in operation a minimum of 1200 saw mills throughout the country.

The saw mill is a basic and essential equipment in any wood working unit. Therefore, wherever timber is bought and sold, the saw mill will be at hand. In India the percentage conversion to sawn sizes from logs is only 50%, compared with 70 to 80% in some European countries. We lack the machines that could give us such high recoveries.

In 1966, 14.86 million man hours were utilized in saw milling activities, which was 2.84 million man hours less than was worked in the previous year. The cost of labour as a percentage of the value added by the manufacturer has been rising over the years. From 50.2% in 1963, it rose through 79.1% in 1965, to 96.1% in 1966.²

Of all wood working machinery manufactured in India, saw milling equipment holds the biggest share. There is however, large room for improvement in sophistication and efficiency. Most saw mills are located near sources of supply of timber, but here again there are no hard and fast rules. If good roads exist, then saw mills are likely to be located near the sources of demand, for then the logs can be moved with ease from the forest site to where the saw mills are located. Otherwise, saw mills are set up at the felling site. The logs are sawn to manageable sizes and then transported away to sales depots.

1. Forest Research Institute of Colleges, Dehra Dun.

2. Ibid.

IX INDIAN FORESTRY MANAGEMENT AND EMERGING TRENDS

In a high proportion of productive forests in India (62.84 million hectares), the existing growing stock is comprised mainly of species with low economic value. These forests possess the potential to grow economically valuable species such as teak, bamboo, pulp wood etc. Until recently forestry planning was based on the concept of "sustained yield", which meant that the total volume felled during the year was kept as near as possible to the estimated increment put on by the entire forest growth. In 1964-65, actual fellings were 21.8 million cubic metres of commercial forests. While the concept of sustained yield is rational, it is wholly conservative. Gradually, our forest pundits have moved away from that concept to the one of "progressive yield."

As you are aware, the "progressive yield" concept, implies:

1. Raising productivity of the soil.
2. Raising productivity of the stand by:
 - a) Judicious tending;
 - b) Enrichment by changing the composition of the crop; and
 - c) Replacement of the original inferior forests into valuable forests, largely through artificial regeneration.

Under the traditional and conservative procedure of the selection system, only the most mature trees were felled from about a twentieth of the forest annually. Replacement of the species was then left hopefully to natural growth seedlings underneath, or elsewhere in the forests. Most often the replacements never materialized. To forestall depletion of the species, attempts were made towards maintenance of the balance by clear felling and planting teak over small parts of the

annual cutting areas. Special schemes were also drawn up under the Five Year Plan for planting teak, over and above the targets set by the Working Plans. Most of these efforts came to naught, for the simple fact that the rate at which the conversion of pure teak forests were attempted were very slow compared to the area available. Thus long tracts of forests which had the potential to grow better quality stands remained untapped.

The above failures, together with other administrative defects, led to the realization that the then current programmes were neither adequate, nor properly planned, nor properly executed. From such analysis, the "progressive yield" concept emerged, and the following inferences were made:

- 1) Forests will have to be managed on strictly economic grounds, and the management should take into cognizance the growing demand of industries. Rotation will have to be based on purely economic grounds and no other consideration.
- 2) Adequate finances on an assured basis will have to be available over a long span of time to permit implementation of a programme for raising productivity of soils and stands.
- 3) Vis-a-vis the present forest administrative organization, an autonomous organization which will be financially independent and viable, should be set up to implement the programme.

Thinking along these lines has precipitated the formation of Forest Development Boards in almost all the States of India. Under these Development Boards, the country's forest estates, are expected to develop rapidly.

X TRAINING PROGRAMMES AND FACILITIES

All wood working establishments in the Government and Semi-Government sectors are adequately staffed with managerial and technical personnel. The managerial talent is supplied chiefly by the Indian Forest Service, and training to them is given either at the Forest Research Institute at Dehra Dun, or at Coimbatore. In the private sector, the situation is different. Apart from the industries engaged in cooling tower manufacture, ship and boat building, who may recruit managerial talent from some of the better known management institutes in the country, by far, most of the cottage and small scale undertakings, recruit management personnel from within the family or a close relative or friend. Most of these undertakings are run as family concerns and therefore, management passes from father to son. The Small Industries Service Institutes organize courses occasionally, in management practises, for the personnel of such small undertakings. Though some advantage is taken of this service, it never is to the extent desired.

The Forest Institutes at Dehra Dun and Coimbatore, and wood-working integrated units train men in operating the numerous wood working machines available in the country. However, it must be added that these men are absorbed chiefly by Government and Semi-Government organizations. The private sector is not adequately supplied with trained personnel. No doubt there are a few Government run technical institutes scattered throughout the country which do provide some training in this field. However, the training is not intensive or adequate. Only the most cursory knowledge and skills are passed on to the pupils. Thus this is an area where help from both domestic and foreign bodies will be welcome. India's wood processing technology, with the exception of preservative treatment and seasoning techniques, lags some 30 years behind the rest of the world. There is no reason why this should remain so.

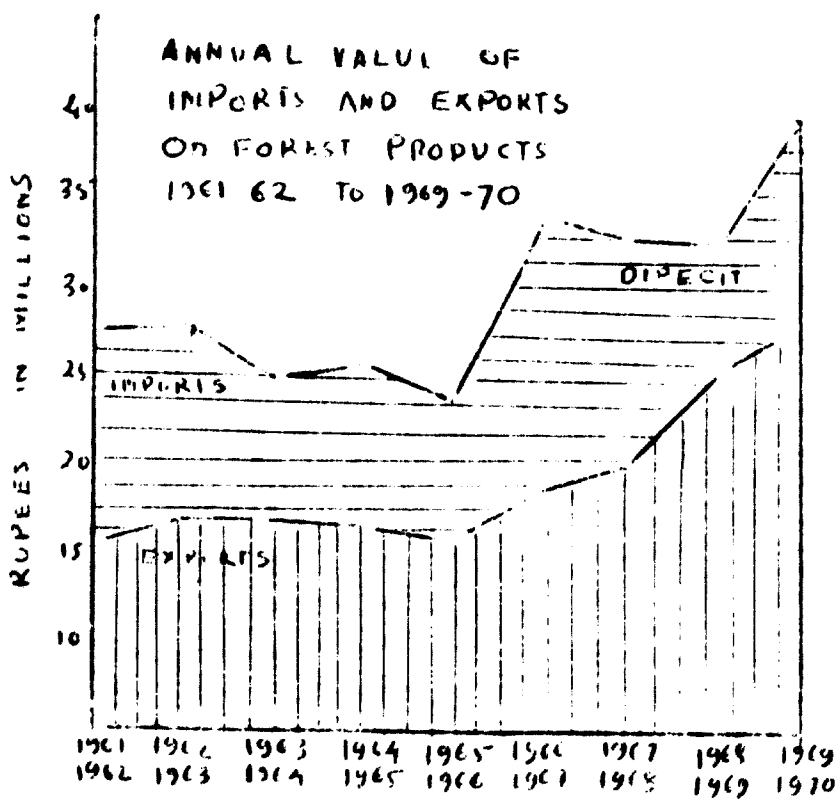
XI GOVERNMENT OF INDIA'S EXPORT POLICY

India has been striving consistently for the expansion and diversification of her exports. A series of measures have been put into operation which cover finance for export, assistance and incentives, transport facilities, training, market research, rationalization of institutional arrangements, technical services, including some, with the help of the United Nations Agencies and friendly countries.

Export trade has been recognized as a priority sector. The Government and the Reserve Bank have taken measures from time to time to facilitate credit for exporters, at a reasonable interest. Exporters can obtain both pre-shipments and post-shipments advances from any commercial bank at a concessional rate. Re-finance is also available from the Reserve Bank for such advances.

Attractive as such incentives are, few wood working machine manufacturers have been able to take advantage of them. In most countries abroad, well known brands from the United States of America, Germany, and the United Kingdom are easily available. The degree of sophistication and range their machines possess cannot be matched by wood working machines made in India.

Wood working machinery manufacturing units are small. Their financial resources are paltry and they have no research facilities to develop the kind of sophisticated machinery needed abroad. Exports therefore, in this area are nil. However, preservative treatment plants and seasoning kilns manufactured in India are finding good markets in many developing countries.



Exports of India's wood and wood products (including minor forest produce) are estimated to rise in value terms from U.S. \$ 33.6 million in 1968-69 to about U.S. \$ 108.5 million in 1979-80¹. This level of exports will have to be supported by increased domestic production of a dramatic order, particularly in the area of paper and paper board.

1. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India. Vol. I, February 1970.

Wood and Wood Products exports as percentage of
India's Total Exports.²

	1967-68	1968-69	1974-75	1979-80
A. India's total exports (U.S.\$ millions)	1611.9	1837.8	2758.1	3867.6
B. Exports of Wood and Wood Products. (U.S.\$ millions)	21.2	33.6	73.9	108.5
C. B as percentage of A (in percent)	1.32	1.83	2.69	2.80

From the above table it will be seen that export of wood and wood products, as a percentage of India's total exports, will increase from 1.83 percent in 1968-69 to 2.80% by 1979-80. It needs to be emphasized that wood and wood product exports, as a percentage of total export, have already witnessed a sharp increase from 1.32% to 1.83%, over a single year from 1967-68 to 1968-69. This increase was largely contributed by increased exports of paper and paper boards and export of panel exports, two components of trade, on which heavy reliance will need to be placed in the future.

2. Survey of India's Export Potential of Wood and Wood Products; The Marketing Research Corporation of India. Vol. I, February 1970.

CONCLUSION

Faith can't move mountains. Technology can! It is the crying need of the wood working machinery industry at the moment. No accepted standards are maintained by the industry, and as a result high priced, low quality machines are dumped on to the market. Government of India, by prohibiting the import of these same machines, perpetuates two evils: i) technological development remains stunted; and ii) no service after sales is ever offered.

No doubt, such protection has allowed the small manufacturer to survive. But demands of the time now necessitate that the industry be allowed to grow.

The infrastructure and finances exist. Every State Government provide finances to small scale manufacturers on liberal terms: interest rates lower than those charged by commercial banks; eighteen years and longer repayment schedules; and sales tax holidays. The National Small Industries Corporation Limited and the State Bank of India vie with each other to assist the small entrepreneur with finances. Even the Housing and Urban Development Corporation of India is ready to finance the setting up of large joinery workshops, building construction and other related project.

The means exist. What is lacking is the will and direction which only Government of India can give. Vacillation will cost the country dearly. All State Governments and State Housing Boards are urgently seeking to erect millions of

cheap school buildings and living quarters. Demand for timber on this account alone has been conservatively estimated at 5 million cubic metres of round wood in 1975. To process this gigantic demand what exist are low capacities, poor quality, outdated wood working machines.

India urgently requires:

1. The knowledge and techniques of designing and utilising secondary species of timber, so abundantly available in the country.
2. Large capacity, modern wood working machines for mass producing low cost doors, windows, furniture and panel elements for low cost houses and schools.
3. Knowledge in the design and manufacture of pole systems. These are absolutely essential for the rural electrification schemes, that will help fight the food-crisis now rampant throughout the country.

India cannot afford to delay longer decision on these matters. What is needed is a top level, high priority, firm policy that will permit the industry to develop its technology to the utmost. It must be done. The technological gap between India and the rest of the world can be bridged if Government of India so wills.

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11. Data was also collected from:
 - a) Forest Research Institute, Dehra Dun.
 - b) Government of India, Ministry of Industries and Company Affairs, New Delhi.
 - c) Government of India, Ministry of Food, Agriculture Community Development and Cooperation, New Delhi.
 - d) Small Industries Service Institutes, New Delhi.

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