Prospects of Hardwood Chip Exports to Japan from The Forests of Godavary Catchment

V. K. SETH

The pulp and paper industry in Japan has made rapid strides in recent years. It has scored an annual growth rate of 10 per cent and now occupies the world's third position. Paper and board production is expected to rise from 12.2 million tons in 1970 to 35.4 million tons in 1990. The accompanying rise in the requirement of pulpwood would be from 29.7 to 86.7 million cubic metres. Domestic pulpwood production in Japan could not be raised beyond 31.2 million cubic metres.

There would be a huge deficit of pulpwood in Japan (to the tune of nearly 55 million cubic metres annually). At present Japan is importing pulpwood and pulp from several countries. Several new projects are also under way. There is a growing trend for importing pulpwood in the form of chips. Due to technological advances and intensive research, the percentage use of hardwood chips is going up rapidly. The paper sets out to describe some of the salient features of the Japanese pulp and paper industry and some of the present arrangements made with Australia for the supply of Eucalypt chips.

India could also play an active role in the matter of supply of hardwood chips to Japan. This trade would be to the mutual advantage of both countries. The forests of Godavary Catchment are known to contain rich, though undeveloped and uncommitted hardwood resources and it should be possible to export 1 million tons of hardwood chips from the forests to Japan via Vishakapatnam, Kakinada and Paradeep Ports. Iron ore is already being exported from these areas, and it is estimated that the value of total exports of iron ore and hardwood chips from these areas could be Rs. 930 million annually (Rs. 730 million for iron ore and 200 million for chips). The investment required for undertaking chip supply to Japan would be around Rs. 40 million. This trade would provide ample employment opportunities in the rural sector and could confer a rich economic value on the hitherto untapped and uncommitted hardwood resources. In addition, this trade would augment the earnings of Forest Departments and give a much needed boost to the question of intensification of forest management and raising of industrial plantations of fast growing species for the pulp and paper industry. The hesitation of the Indian Pulp and Paper Industry for using more and more hardwoods as raw material would be largely removed by the example set by the Japanese industry and the way would be paved for the setting up of large new pulping and paper manufacturing units in the hitherto undeveloped forest areas.

V. K. Seth, Senior Photointerpretation and Mapping Officer, Preinvestment Survey of Forest Resources.

THE JAPANESE DEMAND FOR PULPWOOD CHIPS

The pulp and paper industry in Japan has made rapid strides in recent years, along with other sectors of the economy. In the ten years upto 1969, the paper board industry more than trebled. It has scored an annual growth rate of 10 per cent and occupies the world's third position. Paper and board accounted for 40 per cent of packaging material in 1968, followed by 14 per cent for metals, 11 per cent for plastics and 10 per cent for wood. In 1969, total paper and board production reached 11.3 million tons (an increase of 13.6 per cent over 1968), and pulp production reached 7.7 million tons, an increase of 12 per cent. Particularly large increases were recorded for printing paper (21 per cent) and container board (19 per cent). Paper and board production is expected to undergo a nearly three-fold increase from 12.2 million tons in 1970 to 35.4 million tons in 1990. The accompanying rise in pulpwood consumption would be from 29.7 to 86.7 million cubic metres. This huge increase in raw material requirement cannot be met from the increase in domestic pulpwood available, which would rise, at the most half as much, from the figures of 20.9 to 31.2 million cubic metres over the same period. Forests already cover 68 per cent of the total area of Japan, and the remainder includes areas used for rice paddy, farm land and urban and other purposes.

A notable feature of the Japanese pulp and paper industry is the change in the type of material used for pulping. In 1950 no hardwood was used as pulpwood in Japan, but by 1960 hardwood

and softwood were being consumed in the ratio of 58 to 42. Chips have been replacing logs as the raw material delivered at the pulp mills, the ratio of chips to logs having reached 71 to 29 in 1969.

The pulpwood deficit in 1969 was met by imported pulpwood (4.3 million cubic metres) and by imported pulp equivalent to 2.3 million cubic metres of pulpwood; the corresponding estimates for 1970 are 6.5 and 2.6 million cubic metres respectively. The pulpwood imports in 1969 and 1970 represent 17 and 22 per cent of the total wood consumption; by 1990 this figure is expected to rise to nearly 60 per cent. In 1969 the proportion of chips in the imported pulpwood had already reached 92 per cent, and this will continue to rise. The proportion of hardwood in the imported pulpwood was 13 per cent in 1969, and 7.9 per cent of the imported chips. Inspite of the uncertainties inherent in long range economic forecasts, which can be significantly affected by changing technologies, political realignments and other factors such as environmental pressures, it is apparent from the figures given above that a large and rapidly expanding market for wood chips is immediately available in Japan[1].

SOME FEATURES OF THE JAPANESE PULP AND PAPER INDUSTRY

Many of the paper mills in Japan which are actual or potential users of imported wood chips are already accustomed to using quite a wide variety of raw materials, including combinations of a range of domestic hardwoods, red and black pine, spruce, Douglas fir, hemlock, eucalypts, lauan, rubber wood and imported pulps. It is the general practice in the mills to manufacture a wide range of products by using a wide range of pulping processes. This diversity in materials, processes and products allows opportunities for mixed pulping, mixing of pulping liquors or for pulp blending. Consequently if a particular type of raw material is defective in any way, the undesirable effects can usually be minimised or eliminated.

It is known that the pulping of overmature eucalypts presents problems in chemical recovery. These are, to a large extent, eliminated by blending the offending black liquor with that from the pulping of pines. So also in mills where large continuous digesters are being used for hardwood pulping, it is not unusual to find smaller batch digesters retained for pine pulping. The industrial possibilities for mixing chips, pulps and liquors and the technical effects produced are very relevant factors in properly evaluating a new raw material which is to be introduced into the system. In addition the diversity of processes and products means that a new raw material can be readily diverted to the most appropriate end use.

Another significant feature of the Japanese pulp and paper industry is the marked decline over the past 20 years in the production of sulphite pulps from over 40 per cent of the total pulp produced to around 10 per cent. Over the same period bleached kraft pulp has risen from practically nothing to nearly 30 per cent. This can be attributed (a) to the increasing use of hardwoods, which are less suitable for sulphite pulping than for alkaline pulping (b) improvements in bleaching technology which permit high brightness pulps to be made from hardwood kraft pulps and (c) the more severe effluent problems in sulphite pulping, which have led to the closing down of mills in some localities. These considerations have a good deal of bearing on the question of chip import in that hardwoods can now fit easily into the prevailing kraft pulping economy, which in 1969 accounted for 53 per cent of all pulp production (with sulphite 11.5%, semichemical 7%, chemigroundwood 13.5%, groundwood 11%, refiner groundwood 3%). Their superiority for semichemical pulp, both cold soda and neutral sulphite, should also be borne in mind.

The Japanese pulp and paper industry has acquired a considerable amount of experience and developed a good deal of expertise on the pulping of hardwoods and the use of hardwood pulps for paper manufacture, including papers with 100 per cent hardwood furnishes. For such papers the pulp is only very lightly beaten, to a Canadian standard freeness of about 400 in order to obtain the required drainage rate and runnability required for fast production on the paper machine. In order to get the best strength and surface properties from hardwood pulps it is necessary, however to beat to a much lower freeness, in the vicinity of 200 or even 150 csf. Eucalypt wood responds readily to beating so that energy expenditure is not excessive. The required runnability is obtained by the addition to the furnish of softwood pulp, which improves both drainage and wet strength, and the tearing strength of the paper.

The increases in the production of bleached kraft pulps and printing papers suggest that much imported hardwood will be used in this sector of the industry. The suitability of hardwood pulps for fine papers is well recognised and in Japan domestic hardwoods have been extensively used for this purpose.

Japan is now confronted with a critical level of air and water pollution due to rapid industrial development. Unless the pulp and paper industry, in common with other industries which have contributed to Japan's great technological development, is able to find suitable technical methods of controlling this situation, and to implement them economically, there may be considerable social pressure to arrest the development of new pulp mills or extension to existing mills. In this case the Japanese companies might be interested in developing pulping facilities overseas, close to the forest resources which are already supplying them with chips. If this were the ultimate aim, companies would presumably seek to establish an equity in new chipping projects.

New and interesting procedures have been developed in Japan and Australia for transporting pulp. The pulp is compressed into pellets which can then be handled using normal bulk handling equipment. It is stored in pellet form at the paper mill and reshlushed immediately prior to forming into paper[2].

COUNTRIES FROM WHICH CHIP SUPPLIES ARE OBTAINED AND OTHER LIKELY SOURCES

It has been shown in the preceding parts of this paper that the indigenous raw material supply position for the pulp and paper industry in Japan is extremely inadequate. The shortfall between the demand and supply position in 1990 would be to the tune of nearly 55 million cubic metres. Japan at present imports huge quantities of pulpwood from Canada, North America, South-East Asia, U.S.S.R., New Zea-

land, Australia and New Guinea. There are several more new projects under way. Reports have also appeared in relation to the possibility of Japan importing eucalypt wood chips from South Africa through Durban and from Brazil. India and some Pacific islands have also been suggested as possible chip suppliers. In keeping with the title of this paper, the prospects of large scale chip supplies from India will be examined against the background of available information for the different countries and the impact of this operation on the national economy and status of forest management will be determined. However, before dealing with this question, a brief indication will be given of the position of chip supply from different countries.

North America :— The export of wood chips from the West Coast of America commenced in 1965, the main species being Douglas fir. A cord of Douglas fir contains 2400 lbs., of oven-dry wood, and this is the origin of the B.D.U. (Bone dry unit) which is used widely in international chip transactions. Chip exports from U.S.A. rose rapidly from 76,400 cords in 1965 to 502,800 cords in 1967. The value per cord of the American material has been reported to be $ 24.42 in 1968. Spruce, which is used largely for groundwood production, and hemlock chips are now being exported from Alaska to Japan. Hemlock commands a considerably higher price than Douglas fir.

South-East Asia :— The Phillipines, Indonesia and Malaysia are potential exporters of wood chips to Japan, and surveys have been commenced in these areas. They have large resources of tropical forests. The Japanese mills have had some experience in pulping tropical species, particularly lauan, which is available as chips from sawmill and plywood mill waste. Rubberwood is also being chipped in considerable quantities in Malaysia 800,000 green long tons per year are to be shipped to Japan.

U.S.S.R. :— Although the Soviet Union has a greater forest area and a greater amount of standing timber than any other country, the chances of large scale chip export to Japan from it do not seem to be bright. The internal industrial growth in U.S.S.R. will take precedence in developing new resources Wood is no doubt being imported into Japan from U.S.S.R., but the prospects of developing large scale chip imports are not as attractive as might appear from a glance at the map.

New Zealand :— By an agreement entered into with Japan a quantity of 200,000 tonnes of chips per annum is to be supplied by New Zealand for a period of seven years from the end of 1969, the wood species being conifers and beech. Areas to be clear felled will be replanted primarily with radiate pine. The chipping plant, with hydraulic debarker, is about 16 kilometres from the wharf area, to which the chips are transported in self dumping trucks. Facilities exist for a chip carrier of 20,000 tonnes capacity which will make ten trips a year with a turn around time of no more than 72 hours. The ship is loaded by a pneumatic system at the rate of 300 tons per hour.

Australia :— The availability of pulpwood resources has been revealed in Victoria and New South Wales. A major part of these resources is not being used and is also not committed (just as in the case of the resources of Godavary Catchment). Of the other Australian States, Tasmania, and Queensland also have extensive resources of pulpwood. Some of the chip supply projects in Australia are :

a) **Eden :**— A chip export operation has commenced under a 20 year licence for supply of 700,000 tons by 1975. The chipping project will employ 400 people. Two ships valued $ 10 million in 1967 are to be used, one of 24,000 green tons capacity, and one of 53,000 tons. The investment in logging, chipping and transport from forest to ship was expected to exceed $ 5 million. The FOB price per BDU of chips was expected to be $ 26 in 1971. This was the first project to be taken up.

b) **Triabuna** — The second project to become operative is the Triabuna one, wherein 600,000 green tons of chips will be supplied per year, of which 30,000 tons will be sawmill residue, and the contract will run for 15-18 years. The initial investment was reported as being about $ 7 million, increasing to $ 19 million after 15 years. The FOB price at Triabuna is thought to be $ 27 per BDU.

c) **Tasmania** — A chipping plant is being established at Long Reach with an investment of $ 7.5 million for the supply of 600,000 tonnes of chips per year at $ 27 per BDU.

Another plant is also planned to be built in Tasmania for the supply of 700,000 tonnes of chips per year for 15 years.

BASIC CONCEPTION IN THE APPRAISAL OF PULPWOOD

Makio and Nomura[3] have pointed out that when a variety of wood species is evaluated for pulp materials, multifarious factors have to be taken into consideration. These may be summarised under the following heads :

(i) Economy of pulp production
   a) Price and quality of pulpwood
   b) Severity of cooking
   c) Pulping efficiency
   d) Bleachability
   e) Pulp yield.

(ii) Quality of pulp.
   a) Wood species
   b) Cooking process
   c) Bleaching process
   d) Drying
   e) Special treatment.

For evaluating the economy of pulp production from foreign wood species the following items are taken into consideration.

(i) Density of wood. The larger the density of wood, the larger is the amount of chips that are charged in a digester and the higher is the efficiency of cooking. But at the same time, it is to be borne in mind that the wood of higher density produces pulp of lesser quality.
(ii) Severity of cooking
(iii) Cooking yield
(iv) Pulping efficiency in digester
(v) Bleachability
(vi) Beating properties

Pulp quality is estimated in terms of the strength and optical properties of paper which is made from pulp beaten to a definite freeness. An illustration of the evaluation of some wood species is given by Makio and Nomura as shown below :—

Species	Wood density kg./m³	Severity of working	Cooking yield	Cooking efficiency	Bleachability
1	2	3	4	5	6
Aquilaria	360	XX	O	XX	O
Terenting	380	@	@	X	O
Rubberwood	480	O	O	△	X
Resak	530	△	X	X	△
Meranti	580	△	O	@	O
Adekuli	620	XX	XX	X	XX
Giam	680	X	XX	O	XX
Kapur	700	X	XX	O	XX
Bakau	840	O	O	@	△
Tinger	880	△	O	@	XX
Japanese hardwood	540	O	O	O	O

Species	Beating property	Bursting strength	Tearing strength	Opacity
1	2	3	4	5
Aquilaria	@	XX	X	@
Terenting	O	O	O	O
Rubberwood	X	O	X	@
Meranti	O	XX	@	@
Adekuli	X	XX	@	@
Giam	O	XX	@	@
Kapur	@	XX	O	△
Bakau	△	XX	O	△
Tinger	O	XX	@	X
Japanese hardwood	O	O	O	O

@ ... Excellent, O ... Good, △ ... Fair, X ... Poor, XX ... Very Poor

SCOPE OF SUPPLYING HARDWOOD CHIPS FROM INDIA

There would be a considerable scope for supplying hardwood chips from these forest areas in India in which a bulk of the resources is still unutilised or uncommitted. For such supplies to be economical and viable the forest areas should be easily accessible and should be within a commanding distance from sea ports. The availability of a rail link with a seaport would be essential and the availability of a developed infrastructure would be an additional advantage,. A sizable investment on developing a road network in undeveloped areas would also be justified in view of the promising prospects of developing trade and earning foreign exchange.

The Godavary Catchment comprising forest areas of Andhra Pradesh, Bastar district of Madhya Pradesh, Orissa State and Chanda district of Maharashtra could constitute an excellent source of hardwood chip supply to Japan. These forests are extremely rich in hardwood resources and contain a vast surplus of wood after allowing for projected local market and industrial requirements. Apart from being in a position to meet the expanding industrial requirements of the country, they could be harnessed to meet some of the chip requirements of Japan.

The Pre-Investment Survey organization which has completed a survey of the forest resources of Godavary Catchment covering a compact block of forest area in Central India and lying in the States of Andhra Pradesh, Madhya Pradesh, Maharashtra and Orissa, has established that these forests could play a big role in the development of wood-based industries. The extent of forest area would be nearly 50,000 square kilometres and the growing stock on it would be nearly 350 million cubic metres. The potential annual cut from these areas could be 10 million cubic metres, out of which, on a conservative basis, the component suitable for pulping could be taken as 4 million cubic metres (3 million tonnes). There is very little existing demand for pulpwood and fuel from these forests and vast areas are still lying untapped. On account of the land locked nature of the areas and their remoteness from established markets, they are managed mainly for the exploitation of timber species like teak and sal, resulting in the removal of a few large-sized trees per hectare.

The potential annual availability of hardwood resources of India has been estimated to be 50 million tonnes (42 million tonnes from natural forests and 8 million tonnes from industrial plantations). From this it would be seen that the potential availability of hardwoods from the Godavary Catchment, which has been estimated to be 10 million cubic metres, would constitute near-

ly 15 per cent of the total Indian potential[4].

The forests of Godavary catchment fall under the "Southern Moist Tropical Deciduous" and "Southern Dry Tropical Decidous" types. On the Bailadila hills in Baster district and some parts of the Eastern Ghats in Andhra Pradesh semi-evergreen forests occur in patches. The growing stock in these forests ranges from 250 to 50 cubic metres per hectare. For a rough assessment of the total standing volume over the forest area of the catchment an average of 70 cubic metres could be taken (this is stem timber volume upto 10 cm. diameter under bark). The net available volume after adding branchwood volume and deducting cull and felling and conversion losses would be in the range of 70 cubic metres per hectare.

Based on a study of the utilization pattern and the market prescriptions for different assortments, the author has shown that the break-up of the potential annual yield would be as follows :

Plywood material	...	2%
Timber for sawing	...	23%
Fuel & Pulpwood	...	75%

These figures can only be taken as a general index for application to large areas. There would be a good deal of variation in different localities depending on distribution of species, age gradations and status of forest management.

A hundred and odd species are found in the growing stock, but by and large, only about 20 or 30 species make up 80 per cent of the total volume. Subject to local variations, depending upon the different forest strata, such as teak, sal and miscellaneous, the general pattern of the predominant species is as under[5].

Frequency distribution of Important Species by their volume

Sl. No.	Botanical Name	Percentage volume to the total volume
1.	Terminalia tomentesa	13.2
2.	Shorea robusta	11.6
3.	Anogeissus latifolia	11.0
4.	Diospy-ros melanoxylon	8.1
5.	Cleistanthus collinus	8.0
6.	Tectonagrandis	4.9
7.	Pterocarpus marsupium	4.8
8.	Madhuca latifolia	4.6
9.	Lagerstrosmia parviflora	3.0
10.	Boswellia serrata	3.0
11.	Xylia xylocarpa	2 9
12.	Buchanania Ianzan	1.8
13.	Lannea grandis	1.6
14.	Syzigium cuminii	1.5
15.	Terminalia chebula	1.5

The areas of this catchment are predominently populated by tribals and the density of population is quite thin as compared with Indian standards. These areas have remained comparatively undeveloped, mainly because of their land locked nature and the absence of a proper network of roads and rail links. It is only recently that a rail link has been established between the rich iron ore deposits of Bailadila in Bastar and Kiriburu in Orissa on the one hand and Vishakapatnam port on the other for the supply of huge quantities of iron ore to Japan. The iron ore deposits of Bailadila alone are estimated to be more than 3,000 million tonnes. It would perhaps not be out of place to give a brief idea of the arrangements for supply of iron ore to Japan from these areas.

The extent of iron ore to be supplied to Japan would, in a few years time, reach the figure of 10 million tonnes per year. Japan has collaborated with India for the setting up of a railway line connecting the deposits with Vishakhapatnam and for the setting up of mining and ore crushing machinery. Iron ore is to be supplied to Japan at Rs. 73 per ton, FOB Vishakhapatnam. The approximate break-up of cost figures is :—

	(per ton)
Freight (400 km. lead)	Rs. 33.00
Port charges	Rs. 11.00
Export duty	Rs. 10.00
Royalty to State Govt.	Rs. 1.50
Commission to selling agents	Rs. 0.75
Contribution to Welfare Fund	Rs. 0.25
	Rs. 56.50

The annual earning of foreign exchange from the supply of iron ore to Japan would be in the neighbourhood of Rs. 730 million.

The construction of the railway line as mentioned above would have a tremendous impact on the question of chip supply to Japan. The railway authorities have planned to electrify these lines and it may be possible for them also to double them to cope with the increased goods traffic that would originate if and when chip supply to Japan is taken up in a big way. The forests of Chanda district in Maharashtra, which are situated farthest from any sea port could also lend themselves for economic chip exploitation because of the railway line upto Bailadila. The only requirement for this purpose would be the construction of a road bridge over Indravaty river near Bhopalpatnam at a likely cost of Rs. 5 million.

There are good sea ports on the eastern coast of India, and the ones that could be used for chip export are Vishakhapatnam, Kakinada and Paradeep. The distance of the sea route from these ports via Singapore and Hongkong to Japan is shorter than that between Australian ports and Japan. As such, it would be reasonable to expect Japan to pay a little more for chipwood supply from India than from Australia.

There are at present only four integrated pulp and paper mills within the Godavary Catchment, at Ballarpur, Sirpur, Rajahmundry and Rayagadda with a total production capacity of 150,000 tonnes. Even allowing for future expansion, the figure could be put at 200,000 tonnes. In addition to these, there are proposals for the setting up of new units in Bastar (100,000 tons) and Orissa (50,000 tons). There is adequate raw material to meet the requirements of the existing and proposed units and also to meet the requirements of chipwood supply to Japan that may be placed on the forest of the catchment. It would be a matter of policy decision as to what shape any likely chipwood supply would take, but one of the possibilities would be for these pulp and paper mills to profitably engage in this export trade.

The forests of the Godavary Catchment have a high productivity index (Paterson) and are capable of producing much more wood than they are doing at present. Seth[6] has calculated the "CVP Index" (climate, vegetation and

productivity index) according to Paterson's Formula for the forests of Bastar to be in the range of 500-600. The potential annual production of natural crops has been calculated to be 6-7 cubic metres per hectare and that of exotics like suitable Eucalypts to be 14-15 cubic metres per hectare. It would be seen from these projections, that given effective treatment and management, the productivity of some of the potential areas in the catchment could be raised four to five times the existing level. And if industrial plantations of fast growing tree species like Eucalypts or tropical pines are raised over these areas the corresponding potential productivity would go up even upto 10 times.

RESULTS OF WOOD TESTS

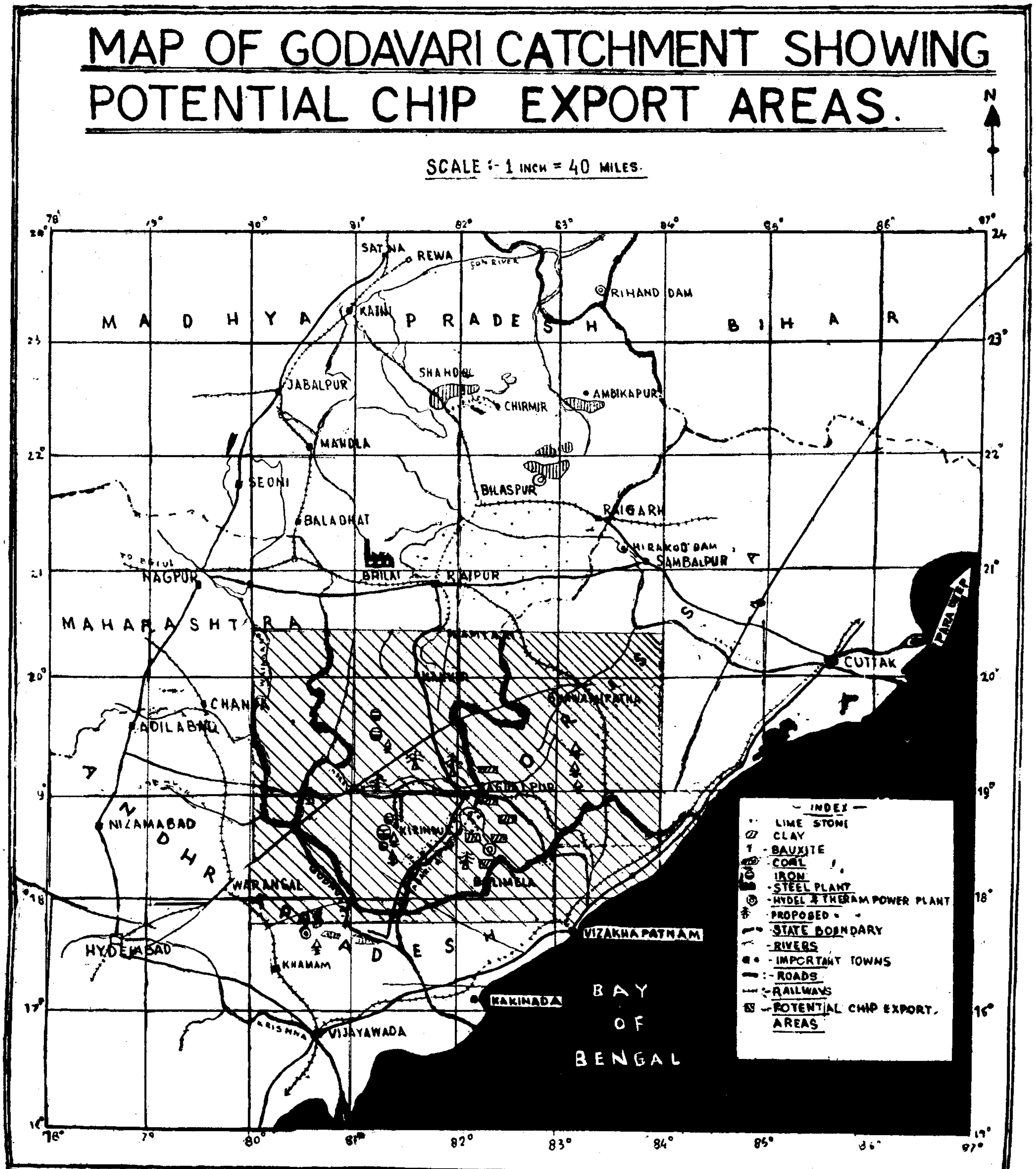
The Preinvestment Survey of Forest Resources Organization did a useful work in this direction in getting wood tests carried out on mixtures of hardwood species from Bastar area in Madhya Pradesh and the forests of East Godavary district in Andhra Pradesh in laboratories and paper mills in India and abroad. The results were found to be quite encouraging. Some paper mills in the country, and especially Nepa Mills, Ballarpur, Sirpur, Andhra Pradesh and West Coast Paper Mills also carried out similar and independent tests and came to the conclusion that mixtures of hardwoods could yield pulps of good quality for the manufacture of writing and printing papers as well as packaging material.[7] The wood test results have been compiled in Pre-Investment Forest Survey Bulletin No. 10.[8] Some of the results of proximate chemical analysis are given below :

Sl. No.	Botanical Name of Species	Av. density at 12% moisture content kg./m³	Ash Content %	Sol. in cold water %	Sol. in hot water %	Sol. in Alcohol Benzene %	Pentosans %	Lignin %	Cellulose %	Colour of wood
1	2	3	4	5	6	7	8	9	10	11
1.	Terminalia tomentosa	880	3.0	13.1	18.0	7.2	14.6	29.9	53.0	Dark brown
2.	Shorea robusta	880	0.3	—	4.8	3.9	10.1	25.3	—	Reddish brown
3.	Anogeisous latifolia	900	2.0	4.5	6.5	5.2	12.8	26.7	56.0	Cream
4.	Diospyros melanoxylon	835			DATA NOT AVAILABLE					Reddish brown Heartwood black
5.	Cleistanthus collinus	—	0.6	5.2	8.2	5.10	11.35	25.3	56.4	Reddish brown
6.	Tectona grandis	640	—	—	—	—	—	—	—	Light brown
7.	Pterocarpus marsupium	800	0.6	2.4	4.5	4.2	12.8	25.4	56.4	Yellowish brown
8.	Madhuca latifolia	910			DATA NOT AVAILABLE					Reddish brown
9.	Lagerstroemia parviflora	755	1.8	3.2	5.5	1.6	11.0	34.6	53.4	Grey
10.	Boswellia serrata	575	1.0	6.3	8.9	4.3	13.0	27.3	50.7	Sap-wood white Heart wood brown
11.	Xylia xyloosrpa	850	2.9	13.3	16.1	8.2	15.3	32.3	49.6	Dark brown
12.	Buchananialanzan	—			DATA NOT AVAILABLE					Reddish
13.	Lannea grandis	575	1.6	3.3	8.5	1.6	15.4	24.1	53.4	Light red
14.	Syzigium cuminii	815	—		DATA NOT AVAILABLE					Reddish grey
15.	Terminalia chebula	—	—		DATA NOT AVAILABLE					Reddish

ECONOMIC IMPLICATIONS OF CHIPWOOD SUPPLY TO JAPAN

The establishment of new wood chip or pulp industries could have considerable economic benefits to the sawmilling industry in (a) providing an outlet for mill waste, (b) making it feasible to saw species and log qualities which are uneconomic at present and (c) removing hitherto useless stems, with consequent silvicultural advantages. These considerations are sometimes overlooked in considering the affect of chip production on the forest products industries as a whole.

Apprehension is sometimes expressed that the development of chipping projects may not be in the best interests of the exporting country, because the forests will be "destroyed" and because chipping involves a relatively small amount of local processing. These fears are completely unfounded, because, far from destroying the forests, such projects will reinvigorate forests which are at present stagnant or not being fully utilised, and will provide an outlet for wood not suitable for other purposes. The revenue obtained by forest authorities will assist in the productive management of the forests in perpetuity. The development of a chipping enterprise on a scale suitable for keeping at least one bulk ship transport on the run provides a wonderful stepping stone to the development of a pulp mill, since the forest resources are organised and proved in advance, and the suitability of the raw material for various purposes becomes fully appreciated before the local pulp mill is established. Most of the chipping agreements which have been so far entered into by Japan with Australia make specific reference either to the necessity for the development of


MAP OF GODAVARI CATCHMENT SHOWING POTENTIAL CHIP EXPORT AREAS.
N
SCALE :- 1 INCH = 40 MILES.
MADHYA PRADESH
BIHAR
MAHARASHTRA
ANDHRA PRADESH
SATNA
REWA
KATNI
RIHAND DAM
SHAHDOL
CHIRMIR
AMBIKAPUR
JABALPUR
MANDLA
SEONI
BILASPUR
RAIGARH
BALAGHAT
HIRAKOD DAM
SAMBALPUR
NAGPUR
BHILAI
RAIPUR
CUTTAK
PARADEEP
CHANDA
ADILABAD
NIZAMABAD
KIRINDUL
WARANGAL
HYDERABAD
KHAMAM
VIZAKHAPATNAM
KAKINADA
VIJAYAWADA
KRISHNA
BAY OF BENGAL
— INDEX —
LIME STONE
CLAY
- BAUXITE
- COAL
IRON
- STEEL PLANT
- HYDEL & THERAM POWER PLANT
- PROPOSED
- STATE BOUNDARY
- RIVERS
- IMPORTANT TOWNS
- ROADS
- RAILWAYS
- POTENTIAL CHIP EXPORT AREAS

pulping facilities, or for the examination of the feasibility of such a project, within a given period, of the order of 7-15 years. It is understood that pulp mills established in North America in collaboration with Japanese interests will supply pulp to Japan for a specified period only, after which the arrangements will be renegotiated.

All the above considerations could be applied to the question of chipwood supply to Japan from the rich hardwood forests of Godavary Catchment. This would go a long way in paving the way for a rapid development of the forest resources of the region and the setting up of new pulp and paper units. Incidentally, a large scale supply of hardwood chips to Japan would help the Indian pulp and paper industry to overcome its hesitation in using more and more hardwoods as raw material. This would eventually be in the interest of the industry

It would easily be possible to undertake a supply of one million tons of hardwood chips to Japan from the Godavary Catchment. The investment required for the operation (viz. installation of chipping plants, etc.) would be around Rs. 40 million and the annual foreign exchange earning from the sale of chips would be around Rs. 200 million (presuming that a BDU of chips would fetch a price of $ 25 to 27 FOB at loading port). These operations would provide employment to nearly 600 persons at the chipping plants. In addition several thousand people could get gainful employment in the exploitation of forest areas, development of infrastructure and establishment of industrial plantations.

According to the "Forest Statistics Bulletin No. 6" on "Foreign Trade of Forest Products" published by the Inspector General of Forests, the total import of all commodities into India in 1969-70 was to the tune of Rs. 15,675 million, of which the import of forest products was Rs. 390 million[9]. It would be seen from these estimates that the impact of the import of forest products, especially pulp and newsprint, could be appreciably balanced or neutralised by the export of hardwood chips to Japan.

The chipping operations could be organised in one of the two ways, i.e. (1) to locate the chipping plants close to the sea port or (2) to locate the chipping plant at the sea port and to transport logs to it from the forest. The agency for undertaking the work could be one of the following:

a) The purchasing company or its part (pulp manufacturer).
b) A subsidiary of the purchasing company.
c) A locally-based company owned by timber, paper or other interests.
d) A State enterprise administered by the forestry authorities and selling directly to the pulp manufacturer.
e) An autonomous body like the National Mineral Development Corporation of Govt. of India which handles the mining and export of iron ore to Japan.

The State Forest Departments could handle the chipping and supply operations. This would provide for earning of profits in addition to the royalty on hardwoods and offer an ample scope for an expansion of the Forest Departments, resulting in expanded employment and promotion opportunities. It would also be possible to intensify forest management and to undertake the important task of raising industrial plantations of fast growing species for the pulp and paper industry.

The existing pulp and paper mills in the region could also play an effective role in this task and expand their chipping capacity so as to be able to export chipwood to Japan. Alternatively, they could as well export pulp and thus play the role of "mother pulp mills" to the Japanese paper mills and subsequently to new Indian mills that would come up in the region.

CONCLUSION

It is hoped that this paper will be able to highlight the scope of developing a large scale trade with Japan in respect of supply of a million tons of hardwood chips (and as for that, hardwood pulp too). This paper is not intended to be a feasibility study on the subject and, as such, it would be beyond its competence to deal with the large items of locations, investments, installation of machinery, and detailed calculations of costs and returns. The purpose of this paper would be more than served if the importance and scope of this topic is appreciated. Further feasibility studies and details could be worked out by competent agencies.

The supply of hardwood chips to Japan would serve as a landmark in the promotion of hardwoods in the pulp and paper industry and also serve as a major incentive for intensifying forest management and undertaking large scale industrial plantations of pulpwood. The remote and uncommitted hardwood forests which are making a negligible contribution to national welfare would acquire considerable economic value and they would become an important source of raw material for woodbased industries in the country and abroad. The earnings of foreign exchange from exports of iron ore and hardwood chips from the Godavary Catchment could be as much as Rs. 930 million (Rs. 730 million from iron ore and Rs. 200 million for hardwood chips).

REFERENCES

1. Higgins H. G. and Phillips F. H. — "Technical and Economic Evaluation of Wood Chips for Export from Australia and New Guinea". (Unpublished Paper).
2. Watson A. J. and Cohen W. E., "Pulping of Eucalypts — An Historical Survey", Appita, Vol. 22, No. 4.
3. Makio Isoda and Yoshika Nomura "Evaluation of Woods Produced in Foreign Countries for their use as Pulpwood", IPPTA, Vol. VI, No. 3, 1969.
4. Seth V. K., "The Promise and Problems of Indian Hardwoods as a Source of Raw Material for the Pulp and Paper Industry", Hardwood Conference held at F.R.I., Dehradun in 1971.
5. Seth V. K., et al, "Feasibility Study for a Paper Mill in Bastar Region of Madhya Pradesh", Hardwood Conference held at FRI, Dehradun in 1971.
6. Seth, S. K., "Potential Productivity of Indian Forests", paper read at the International Symposium on "Tropical Econology Emphasizing Organic Production", held at New Delhi in January, 1971.
7. Same as for item No. 4.
8. "Results of Wood Tests", Preinvestment Survey of Forest Resources Bulletin No. 10.
9. "Forest Statistics Bulletin No. 6" on "Foreign Trade of Forest Products" by Inspector General of Forests.

Presented by Mr. V. K. Seth at the IPPTA Annual Meeting held at New Delhi on November 8 & 9, 1971.