EUCALYPTUS CHIPS EXPORT POTENTIAL FROM PAKISTAN

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ABSTRACT

Eucalyptus timber grown under social and farm forestry programmes in Pakistan finds no firm footing in the local timber trade due to various reasons. This situation needs to be redressed to break the deadlock in eucalyptus marketing as well as for the promotion of afforestation programmes by creating better profitability from planting Eucalyptus. Beside many other marketing and utilization measures the export potential of Eucalyptus wood chips from Pakistan could be an alternative to improve eucalyptus marketing and hence its profitability and production. In the present study benefit-cost-analysis has been carried out to determine the economic feasibility of manufacturing Eucalyptus chips at the stump for export purposes. The results of this analysis showed that at present the marketing margin in export of Eucalyptus chips from Pakistan is negative because of high production cost than the price offered in the international market. Higher production cost is mainly due to scattered supplies, higher transportation cost, small scale of chipping and need of integration in the processing of Eucalyptus wood. However, chip production cost could be reduced through economies of scale, specialization, using improved technology and cut down in the transportation cost.

INTRODUCTION

Eucalyptus is planted on farmlands under social forestry and farm forestry programmes in the plain areas of Pakistan. It is grown either in the form of small compact blocks or single or multiple linear rows along the field boundaries. Most of the so grown Eucalyptus trees are ready for harvesting. According to the Forestry Sector Master Plan (1993), the total volume of Eucalyptus trees grown on farmlands is 0.36 million m^3. In an other estimate (Amjad et.al 1992; Amjad, 1991) the volume of eucalyptus wood on the farmlands is 0.57 and 0.16 million m^3 in the provinces of Panjab and NWFP, respectively. This volume must have increased since then because of continuous growth and addition of more Eucalyptus plants under different planting programmes. Eucalyptus planting is to get further momentum because of its excellent performance as a tree species for the rehabilitation of waterlogged and saline areas through biological means. This expected increase in the production of Eucalyptus need expanded marketing and utilization system in the country.

Eucalyptus is an exotic in the Pakistan without much known uses and limited market demand. Farmers are finding it difficult to market Eucalyptus wood because of strong competition from traditional farm trees with established uses. A marketing survey of Eucalyptus (Suleman and Hakim, 1995) conducted in Districts of Attock, Gujrat, Jhelum, Sargodha and D.I.Khan) showed that the majority of the Eucalyptus tree farmers are badly hit by the market constraints. Low market demand of Eucalyptus wood has already started influencing farm resource management decisions in these areas.

Under the existing situation, farmers could be helped out and even motivated for more planting of Eucalyptus if the industrial uses of Eucalyptus could be developed within the country or export possibilities to other countries could be explored. At present the industrial base for the utilization of eucalyptus in the country is not strong enough to absorb the expected supplies. In view of scattered supplies of Eucalyptus the feasible alternative could

be to produce Eucalyptus chips on farm through the use of mobile chippers and export them to the other countries.

INTERNATIONAL TRADE IN HARDWOOD CHIPS

Present Situation

International trade in the hardwood chips has flourished over the past decades. The main exporters of hardwood chips are United States, Canada, Australia, Chile, Indonesia, South Africa, Spain, Portugal, Sweden, Finland and China, while Japan, Korea and Taiwan are the biggest importers. More data about the international trade in hardwood chips are given in Table 1.

As shown in table 1, Australia is the biggest exporter of Eucalyptus chips to Japan. Next largest exporters of hardwood chips to Japan and other countries are South Africa and United States exporting 1,678 thousand cubic meters and 3,600 million tonnes of hardwood chips, respectively between 1993 and 1994 (Flynn, 1995).

Table 1. Major Exporters and Importers of Hardwood Chips.

Exporters	Major Importers	Quantity (1000 m^3)	Species
Australia	Japan, Korea	6917	Old growth Eucalyptus species *E. grandis*, *E. saligna*, Acacia.
South Africa	Japan Korea	1,678	Mixed hardwoods mostly oak
U.S.A	Japan, U.K Korea, Canada Taiwan	3,600 Th. Tonnes	*E. globulus*, Nothofagus genus
Chile	Korea, Japan Taiwan	4,685	*E. camaldulensis*, *E. globulus* Acacia species Mangrove chips
China	Korea, Japan Taiwan Japan Taiwan EC Countries	1,833	*E. globulus*, *E. camaldulensis*
Indonesia		437	
Portugal		36	

Source: FAO Year Book of Forest Products 1994; Flynn, 1995

Trends in International Trade of Hardwood chips

There has been a substantial increase in the international trade of hardwood chips during the last 10 years. Export of chips mainly of hardwoods increased from 13.817 million m^3 in 1983 to 29.731 million m^3 in 1994 (FAO,1994). Import of hardwood chips in Japan has nearly tripled in volume over the same period from 5.5 million m^3 in 1984 to 16.2 million m^3 in 1994. By 1994, Australian hardwood chip export to Japan went down and that of Chilean export increased.

In the Asian hardwood chips market, China has emerged as the major supplier of hardwood chips to Korea, Taiwan and Japan. During 1995, China supplied 60 percent of Korean and 56 percent of Taiwanese chip imports.

Potential Producers of Hardwood chips

In recent years a number of woodchip supply areas, especially in South America, have emerged (Flynn, 1995) or will shortly begin shipping woodchips. These include Ecuador, Peru, Vietnam, Argentina, Costa Rica, Venezuela and Brazil. In addition, pulp and paper companies have expanded programmes to establish fast-growing plantations, not only in Indonesia but also in Australia, Chile, Vietnam, Fiji, Papua New Guinea and many other countries.

Specification of Hardwood Chips for Export

For pulp and paper production, as a rule, the debarked logs are converted into wood chips by use of stationary or mobile chippers. Chip size is mostly established by the pulping process varying among mills and no industry wide standard have yet been adopted. A chips size with maximum of 8 mm thickness and 25 mm length is normally acceptable for hardwoods. Minimum allowable limit for bark and rot contamination in the chips is 1 percent. Moisture content of the wood chips is the most important factor in the selling and buying process because payment is made on the basis of oven dry weight.

MOBILE CHIPPING

There has been a notable increase in the use of portable, semi-portable and permanent chipping facilities at locations (wood landings) remote from the pulp mills and is gaining wide acceptance (Britt, 1970). Mobile chipping technology is available from Sweden and United States. Accessories like mobile screens can be manufactured locally. Debarking can be done manually in the field.

EXPORT OF EUCALYPTUS CHIPS FROM PAKISTAN

Pakistan could be a potential source of Eucalyptus chip export to East Asian countries like Japan, Korea and Taiwan. The main economic factor in the export of Eucalyptus wood chips from Pakistan is the cost of chip production and marketing margin. To work out the economic feasibility of Eucalyptus chips export from Pakistan, the benefit-cost-analysis of manufacturing eucalyptus chips through the use of a mobile chipper with 10 tonnes/hour production capacity of chips has been carried out. The main objectives of this analysis are the:

- creation of market demand for the Eucalyptus grown on farmlands in Pakistan.
- improvement of socio-economic conditions in the Eucalyptus growing area through better return from the Eucalyptus crops.
- provision of motivation to the farmers to practice agroforestry and social forestry for the increased production of timber for fuel, industry and environmental improvement.

Benefit-cost-analysis

In the benefit cost analysis different costs like

capital costs i.e. fixed costs (intest on investment, insurance, rent, depreciation, reapir and maintenance and cost of workers etc.), variable costs (stumpage, harvesting, trnasportation and fuel etc.) and cost of entrepreneur (risk, profit and taxes etc.) have been taken into account (Appendix-1, 2 & 3).

RESULTS OF COST BENEFIT ANALYSIS

On the basis of production capacity of 10 tonnes of chips/hour the cost of production of 1 tonne oven dry (o.d.) eucalyptus chips at the stump is calculated as US $ 136.33. The hardwood chips price in the international market during 1995 varied between US $ 102 to 132/tonne o.d. chips (Forest Products Annual Market Review, 1994-95, Anonymous, 1995). In any case the international prices of hardwood chips are lower by about US $ 4 to 34/tonne of chips than the Eucalyptus chip produced in Pakistan through the use of mobile chipper. This gives a negative marketing margin and at this stage the manufacture and export of eucalyptus chips from Pakistan is not economically feasible.

Variable costs, which mainly depend on the use of machine (Stoehr,1989) are incurred on oil, lubricant, stumpage, transportation and harvesting are US $ 96 per tonne of chips accounting for about 70% of total chip production cost. Harvesting and transportation cost/tonne of chips (FOB Karachi) is assessed at about US $ 31:50, which is 23 percent of total production cost. The negative marketing margin of manufacture and export of Eucalyptus chips from Pakistan is due to higher transportation cost, lack of integration in the utilization of Eucalyptus and absence of economies of scale in Eucalyptus chips production. All these three elements significantly hamper Pakistan's competitiveness in Eucalyptus chips export business in the international hardwood chips trade.

Traditional hardwood chips exporting countries have a number of advantages in the production and export of hardwood chips. Use of improved technology in harvesting, conversion, transportation, economies of scale and integration in operation, ultimately reduce the production cost, increase the profit margin and can market the wood chips at competitive prices in the international chips export business. Contrary to the situation in Pakistan, where most of the Eucalyptus plantations are scattered, chip exporting countries have large compact plantations. Manufacturing chips from compact plantations have comparatively lower cost of production due to sustained supplies and short line of transport. Unfortunately, Pakistan does not have any such technical advantages in the production of wood chips from the home-grown Eucalyptus.

CONCLUSIONS

On account of high production cost the marketing margin in the export of Eucalyptus chips from Pakistan is negative. Therefore, the alternative to develop the demand of home grown Eucalyptus through export of chips is not economically feasible at this stage.

The main reason for the negative marketing margin in the export of Eucalyptus chips is the higher variable cost as a result of higher transportation cost which is about 23 percent of the total chip production cost, small scale of chipping and lack of integration in the utilization of Eucalyptus wood. However, variable cost can be reduced through increased production, economies of scale, specialization and improved technology.

High variable cost in Eucalyptus chip production is also because of scattered supplies of raw-material from the farmlands in Panjab and NWFP provinces as well as high transportation cost due to long line of transport upto Karachi for export. To cut down the long line of transport and transportation cost of chips to improve marketing margin in the international trade Eucalyptus wood production sources should be developed near Karachi in the province of Sindh. Wood production from Eucalyptus/ha could be higher in Sindh than the other provinces because of favourable and longer growing season (Forestry

Planning and development Project, 1990) which will further economize the process of Eucalyptus chip production and export.

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Appendix 2 contd.

4. Fuel	
Diesel for Chipper @ 0.1 liter/HP/Hour = 12.06 Lit/hour or @ Rs 9/liter	Rs 108/hour
Lubricant	Rs 25/hour
Diesel for Tractor 6/liter/hour	Rs 54/hour
Lubricant	Rs 15/hour
Total	Rs. 202/hour
5. Harvesting and Transportation (In-feed)	Rs. 100/ tonne
Transportation (from yard to port)	Rs. 1000/tonne
Total	Rs. 1100/tonne
6. Depreciation (straight line) 5,600,000/16000	Rs. 350.00
Maintenance	Rs. 50.00
Total	Rs. 400.00

APPENDIX-3

Cost of Chip Production from the Home Grown Eucalyptus Wood By Mobile Chipper.

Capital Cost

1. Fixed Cost	Rs/year	Rs/hour/ 8 tonne*
Interest (Axfxi/100)	504,000	
Insurance 2.2 %	123,000	
Taxes 10%	560,000	
Rent of wood yard	25,000	
Depreciation+ Maintenance	640,000	
Operating labour	432,000	
Overhead cost 15% of total cost	342,600	
Total	2,626,600	1,641.25/ hour/8 tonne
Green chips/	5.76** tonne N3 green chips/3.38 tonne o.d chips or Rs.485.58/tonne o.d chips	

2. Variable Cost	Rs/ o.d.tonne
Transportation+harvesting cost (In-feed)	250.00
Transportation cost (Field to port)	1000.00
Fuel cost	59.76
Stumpage (1 tonne o.d chips N3= 2.5 tonne green wood) @ Rs.40/40 kg green wood having 70% moisture.	2,500.00
Total	Rs. 3,809.76/ tonne o.d. weight
Total cost/tonne (1+2)	3,809.76+485.58 = Rs. 4295.34/ tonne o.d chips
Cost of dry wood waste about 400 kg @ Rs.40/40 Kg (credit)	(-) Rs.400
Net Cost	= Rs. 3895.34 or U.S $ 97.37/ tonne***

APPENDIX-1

Summary of Benefit/Cost Analysis

- Acquisition value — Rs. 5.6 million or U.S $ 0.14 million
- Fixed cost/tonne (o.d. chips) — Rs. 485.58 or U.S $ 12.14
- Variable cost/tonne (o.d. chips) — Rs. 3809.76 or U.S $ 95.24
- Total cost/tonne (o.d. chips) — Rs. 4295.34 or U.S $ 107.38
- Cost of entrepreneur/ tonne (o.d.chips) — Rs. 1558.12 or U.S $ 38.95
- Total operational cost/ tonne (o.d. chips) — Rs. 5,453.46 or U.U $ 136.33
- International market price of chips — U.S $ 102-132/bone dry unit.
- Installed Capacity of Mobile Chipper — 80 Tonne/8 hours.

Eucalyptus Plantation Area Needed for 8 hours 1 hectare

APPENDIX-2

BENEFIT COST ANALYSIS

Capital Requirements for the Mobile Chipping.

Machines	Number/Specifications	Price (Rupees)
1. b.Mobile Chipper	1	3,300,000
Power	90 Kw or 120.64 HP	
Lifetime	10 years or 16,000 hours	
Daily Productive Hours	8	
b.Tractor	2	800,000
Power	50 HP	
Lifetime	10 years or 16000 hours	
Production hours	8	
c.Trollies	4	400,000
b.Chain saws	2	100,000
c.Mobile Chip Screen (locally made)		1,000,000
Acquisition Price		5,600,000
Life time.		16,000 hours
2. Wood Yard 5 acres Rent @ Rs 5000/ acre		25,000
3. Operating Labour.		
a. Operator Rs 5000/pm (two)		10,000
b. Helper Rs 2500/pm (ten)		25,000
c. Personal Maintenance 15% of operator pay.		1,500
Total		36,000/pm

Appendix-3 contd.

3.	Cost of entrepreneur	
	Risk 10%	Rs. 389.53
	Profit 10%	Rs. 389.53
	Taxes 20%	Rs. 779.06
	Total Operational Cost	Rs. 5453.46/tonne or bone dry unit U.S $ 136.33****
	International price (1995)	U.S $ 102-132 per bone dry unit

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* based on 80 % efficiency
** based on 72% recovery of N3 chips
*** tonne = 1000 Kg
**** U.S $= Rs 40 (on date of calculation)
A acquisition value
f correction factor for compound interest rate.
i 15%