

## PROSPECTS OF GARJAN PLANTATION IN BANGLADESH

Afzalur Rahman

Garjan (*Dipterocarpus turbinatus*) is one of the most important species growing in the natural forests under Cox's Bazar, Chittagong and Chittagong Hill Tracts forest divisions. Attempts were made to establish Garjan plantations since 1923 and from the last decade more attention has been directed to raise Garjan plantation on wider areas. The prospects of these plantations have been studied in this paper in order to aid planners in fixing up physical targets for production and management, find an indication of long-run price behaviour of produced timbers and finally assess the rate of economic return of plantations.

The paper indicates the long-run gap between the demand for and supply of Garjan timber. Some major problems of managing Garjan plantation are pointed out and suggestions affecting the cost factors and yield position are made.

### INTRODUCTION

Garjan (*D. turbinatus*) thrives very well in the hill forests under Cox's Bazar forest division. It also grows well in the forests under Chittagong Hill Tracts, Chittagong and Sylhet forest divisions. Uptill now Garjan has been extracted from only the natural forests.

The earliest Garjan plantation was raised in 1923 in Dupachari and Gayalmara under Chittagong forest division. Between 1924 and 1930 Garjan was planted

in Hazarikhil, Gayalmara and Dupachari under Chittagong forest division. In Cox's Bazar forest division the earliest plantation occurred in 1928 at Bhomeriaghona. During 1925 and 1930 Garjan was planted at Chinda and Whykeong also. In Chittagong Hill Tracts Garjan plantation was started during late sixties. The working plans reveal that during seventies the extent of Garjan plantation increased widely in all the hill forests of Bangladesh.

## OBJECTIVE

- (i) To indicate the long-run demand for Garjan and its price behaviour.
- (ii) To discuss the prospects of Garjan plantations and give a rough estimate of the rate of return generating from these plantations.

## THE END-USES OF GARJAN

Garjan is a heavy, strong, hard, generally straight grained and coarse textured wood. It has a wide variety of end-uses in Bangladesh. For railway sleeper it is a uniquely excellent timber. It is also a good timber for house building and other construction works ; making bodies of bus, trucks, railway carriages and other vehicles ; boat and ship building purposes and making agricultural implements. Garjan is highly suitable for transmission poles. It is also used in considerable quantity for making furniture, packing boxes and crates, textile and jute mill accessories, tool handles, veneer, plywood and laminated board.

## THE REQUIREMENT FOR GARJAN

Garjan has different competitive species for a particular end-use and, as such, it is not easily possible to assess its requirements alone. It is rather easy to assess the requirement of timber for a particular end-use. For a particular end-use how much Garjan would be used will depend on its availability, its price, its degree of technical suitability etc. Therefore, requirement is, in this sense, not an absolute term but rather a relative term.

Rabbani and Hussain (1968) gave the following estimate of timber requirements for some end-uses where Garjan may also be used as one of the substitute species (Table 1).

Table 1. Timber Requirement by end-uses in Bangladesh by 1985

End-uses	Requirement (c000m <sup>3</sup> )
Railway sleeper	5.66
Railway carriage	22.66
Bus, truck and commercial vehicle	113.28
Ship, launch and boat building	113.28
Transmission poles	351.73
Animal and man drawn cart	0.85
Furniture	808.82
Jute and textile mill accessories	14.16
Plywood	141.60
Agricultural implements	410.64
Packaging	96.57
Construction	988.93
Total 3,065.18	

Expanding Rabbani and Hussain's trend of demand upto 2000 roughly, it is found that at least some 5.38 Mill. m<sup>3</sup> of timber should be required for the above end-uses. This estimate assumes very low per capita wood consumption.

Out of this total requirement how much Garjan is actually used is not known. The demand for Garjan is not likely to remain stable every year because of changing prices of Garjan and the changing

supply of its substitute timbers. If Garjan is very scarce in the market then the price of substitute timbers also would be higher.

In view of Garjan's suitability for different end-uses and considering its growing demand if it is assumed that the requirement of Garjan should be between 5 to 10 percent of the total timber requirements for the end-uses where Garjan is used as a substitute then, total required quantity of Garjan stands at 0.269 to 0.538 Mill. m<sup>3</sup> by 2000. By 1985 it is between 0.153 to 0.306 million m<sup>3</sup>.

### THE PRICE BEHAVIOUR OF GARJAN

The price behaviour of Garjan from 1973 to 1983 is shown in the following (Table 2).

Table 2. Price behaviour of Garjan at Chittagong (Round)

	(00 Tk/m <sup>3</sup> )									
Location	1973	1974	1975	1976	1977	1978	1979	1980	1983	
Chittagong	15.9	17.7	17.7	19.4	17.7	24.7	23.0	30.0	35.5	

The table shows that during the last decade prices of Garjan has increased by about 123 percent giving an annual average of 12.3 percent (relative to base year). Assuming a similar 10 percent increase the price of Garjan would be about Tk. 5680/m<sup>3</sup> (round) by 2000. But if the supply situation worsens over time then the price might even far exceed this amount.

### THE PROSPECT OF GARJAN PLANTATION

Garjan is highly demanded for railway sleepers and construction purposes. It is

a very popular timber in Dhaka and about 75 percent of total timber transaction between Chittagong and Dhaka is based on Garjan. It is observed that the rate of rise in price of Garjan during the last decade has been higher than most other hardwood species (Anon 1982). It indicates that this lofty ever green tree attaining a height of 150 feet or more and a girth of 15 feet or over with a cylindrical bole has a much brighter prospect in future.

The rate of return of Garjan plantation comes close to and compares well with Teak plantation even at 1980 prices. The cost of establishment of Garjan plantation under Cox's Bazar forest Division is shown in (Table 3).

Table 3. shows that the mean total establishment cost amounts to 1075/acre (=0.40 ha).

The logging and transport cost of Garjan in the Cox's Bazar forest division is shown in (Table 4).

Prices for round Garjan timbers of different sizes were collected from 16 sample merchants from Chittagong. They are summarised in (Table 5).

Table 5 shows that as the size of timber gets greater prices also go higher.

**Table 3. Cost of Garjan plantation establishment**

Operation	(Tk. 0.40 ha)						
	Idgaon	Teknaf	Cox's Bazar	Rezu	Bagkhali	Meherghona	Doapalong
Jungle cutting	90	90	90	90	100	90	90
Burning	33	35	33	55	55	55	33
Map making & Inspection	5	7	5	7	7	7	5
Seed collection, Line making and wing	230	270	230	240	240	240	230
Fertilizer, cover tree etc.	62	10	62	43	28	58	62
First weeding	260	260	260	260	260	260	260
2nd weeding	195	195	195	195	195	195	195
3rd weeding	130	130	130	130	130	130	130
1st thinning (5th year)	60	60	60	60	60	60	60
<b>Total</b>	<b>1005</b>	<b>1007</b>	<b>1065</b>	<b>1080</b>	<b>1075</b>	<b>1095</b>	<b>1075</b>

Source : Office Records, Office of the D. F. O. Cox's Bazar

**Table 4. Logging and Transport cost of Garjan at Cox's Bazar Forest Division**

Range	(Tk. 0.028 m <sup>3</sup> )				
	Coupe to depot	Misc.	Roading cost	Depot to Chittagong	Total
Fulchari	4.50	5.50	5.00	15.00	30.00
Fashiakhali	3.00	3.50	7.00	15.00	28.50
Cox's Bazar	8.00	4.00	5.00	20.00	37.00
Doapalong	7.00	5.00	5.00	20.00	37.00
Rezu	6.00	4.00	5.00	25.00	40.00
Teknaf	7.00	4.00	6.00	27.00	44.00
Bagkhali	9.00	4.00	8.00	18.00	39.00

(Mean=36.50).

Source : Office Records, Forest Economics Division, Forest Research Institute, Chittagong

**Table 5. Garjan prices at Chittagong (Round)**

Log size Midgirth/ft=0.305 m)	Log length (ft=0.305 m)	Mean price Tk. 0.028m <sup>3</sup>	Midvalue Tk. 0.028 m <sup>3</sup>
3	9 and over	48-68	56
4	9 and over	49-73	61
5	9 and over	54-80	67
6	9 and over	56-83	69
7	9 and over	63-89	76
8	9 and over	65-92	78
9	9 and over	67-95	81
10	9 and over	70-96	83
11	9 and over	71-110	91

Source : Office Records, Forest Economics Division, Forest Research Institute, Chittagong

The following price-size relation has been established :

$$Y = 44.9 + 4.1 x^2 \quad (1 \text{ ft} = 0.305 \text{ m})$$

$$(R^2 = .94)$$

Where, Y = Value of timber per cft in taka.

X = size of Garjan log in midgirth in feet.

44.9 a = Regression constant

4.1 = b = Regression coefficient.

Kingston (1979) tried to prepare a yield table for Garjan but because of lack of volume table he could not estimate total volume. Thus it is not readily possible to

calculate rate of return from plantations. However, by comparing bassal area and unit value of Garjan with those of Teak for some site qualities a rough estimate has been attempted. In SI 15 and SI 20 bassal area ratio of Garjan to Teak are 1.4 and 1.2 respectively. The price ratio of Teak to Garjan stands at about 2.4 at 1980 prices.

The establishment and logging costs of Garjan are similar to those of Teak. Using bassal area ratio to calculate yield and price ratio to calculate gross return the money yield percent from Garjan plantation is roughly found as follows.

**Table 6. Rate of return from Garjan plantation as compared to Teak in Bangladesh (Rotation : 60 years)**

Site index	Return percent per hectare	
	Garjan	Teak (Rahman 1982)
15	4	5
20	8	10

## SUGGESTION AND CONCLUSION

The wide variety of end-uses and the present volume of production clearly signify that Garjan is one of the major species available in the country. The price trend of different species during the last decade shows that the gap between demand for and the supply of Garjan is going to be wider day by day. In order to meet the long run demand it is therefore necessary to establish Garjan plantation on a larger scale on the one hand and develop intensive management programme on the other. The intensive management programme may, among others, include the following :

- (i) There should have a specific programme regarding how much Garjan to plant every year and for what rotation to plant in different sites.
- (ii) Sufficient money should be allocated for seed collection under the supervision of staff with technical backgrounds
- (iii) Garjan seeds loses viability when stored more than seven days after collection. In order to check wastage and guarantee good germination seedlings should be raised in poly bags.
- (iv) Garjan sites should be properly prepared before plantation/sowing in order to ensure better survival. Brashing, cleaning and weeding operations should be done properly and timely.

- (v) A contract system between the Forest Department and the forest villagers might be developed with the aim of making plantation successful. Under this system a group of villagers who would take responsibility of ensuring a particular percentage of survival of seedling in the plantation will get a particular amount of reward as agreed upon before the contract.

## REFERENCES

- Anon. 1982. Forest Statistics of Bangladesh. Bulletin 1. Forest Economics Series. Forest Research Institute, Chittagong. 115 pp
- Kingstone, Brian. 1979. A Compendium of Mensuration Statistics. Field Document No. 7. UNDP/FAO Project BGD/72/005. Forest Research Institute, Chittagong. 137+8 pp
- Rabbani, A. K. M. G. and Hussain, M. 1968. An Estimate of Long-term Timber Trends and Prospects in East Pakistan. Planning Department, Govt. of East Pakistan (Erstwhile). Dhaka. 48 pp
- Rahman, A. 1982. Economic Prospect and Management Problems of Teak Plantation in Bangladesh. Proceedings of the 2nd National Forestry Conference, Jan. 21-26 : 376-387.

---

*Afzalur Rahman, Senior Research Officer, Forest Research Institute, Chittagong, Bangladesh  
Paper Presented at the 9th Annual Science Conference, Chittagong University, March  
3-7, 1984*