

## **Rattan husbandry and its potentiality for income generation in the village groves of floodplain area of Bangladesh**

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**Abstract**—This paper focuses on the husbandry of rattan, its processing, marketing and potentialities of raising the household income of the growers in the floodplain area of Bangladesh. The survey reveals that almost all the clumps (98%) are located in the pond and ditch site and around half of the clumps (48%) are found in the western site of the homesteads. Planting materials used for propagation are suckers and seeds, which are not bought from the market; rather, growers themselves supplied 72% from own source and the remaining 28% comes from neighbours and wildlings. All categorized growers, except the medium and large ones, tend the clumps where female and children were the majority (84%) of the labour force. All the growers, except the medium and large ones, are found to harvest rattan all the year round, while 82% of the growers maintain a three-year rotation. The contribution of rattan husbandry is on an average Tk. 1883 (about USD 32) per household per annum. It has been found that all of the landless and marginal growers (100%) market rattan by themselves, while all of the large category growers (100%) market rattan through middlemen.

*Key words:* Rattan husbandry; income generation; *Calamus tenuis* Roxb.; Bangladesh.

### **INTRODUCTION**

The increasing population, food shortage, poverty and unemployment in Bangladesh, are exerting tremendous strains on the country's scarce resources, especially cultivable lands and forests [1]. About 85% of the total population live in rural areas of the country [2]. Among them 56% of rural households are functionally landless [3]. Under these circumstances, such rural people have to search for supplementary production systems to support their livelihoods. Due to the inadequacy of the agricultural lands, the rural households are to be based on the non-traditional

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agricultural crops in the marginal lands. Rattan husbandry is one of them. Thus the rural non-farm sector has been identified as important in rural economic growth and has been predicted to become a leading sector of Bangladesh's rural economy [3].

Rattans are mostly trailing or climbing palms with characteristic scaly fruits, classified as the tribe Calameae of the subfamily Calamoideae [4] of the palm family *Areaceae* (Palmae). They extend from humid equatorial Africa, Indo-Bangladesh and South China through to Queensland and Fiji, and from sea level up to 3000 m altitude in the mountains [5]. In Bangladesh, rattans grow in the periphery of marshy land, as well as on the cooler slopes of the hills as climber on the other supporting trees [6]. The availability of rattans in Bangladesh was reported by Griffith [7], Beccari and Hooker [8], Prain [9], Blatter [10] and Alam and Basu [11]. Nursery techniques, species composition, association and growth performance in the traditional government forests have been identified by some scientists [12]. But so far, no study has been carried out to identify the indigenous husbandry of rattans in village groves of the floodplains of Bangladesh. For a rural development practitioner, the knowledge of indigenous practice of rattan husbandry is of immense importance in order to find out the potentials and limitations of this production system; and mark the horizon of development in the rural areas. We hypothesized that floodplains of Bangladesh possess a particular pattern of indigenous rattan husbandry. The study identified the distribution of rattans, the use and source of planting materials, tending, harvesting and processing, productivity, marketing and income from rattan husbandry in a floodplain area of Bangladesh. We recommend the use of the results of this study for the integrated rural development in the floodplains of Bangladesh.

## MATERIALS AND METHODS

Field investigations were carried out at Chandina Upazilla (sub-district) of Comilla district (Fig. 1), Bangladesh, between September and November 2002. The sub-district capital is situated at a distance of 19 km to the west of Comilla town and 75 km to the east of Dhaka city; between 23°21' and 23°31' N latitude and between 90°51' and 91°04' E longitude. It comprises a total area of 202 km<sup>2</sup>. The entire Chandina sub-district is formed by Meghna alluvial soils. The climate is tropical monsoon type with maximum temperature of 29°C and minimum 20°C and an average annual rainfall of 2766 mm. Chandina sub-district has 13 Unions, 1 municipality and 235 villages comprising a total of 54 353 households and a population of 324 069. The average size of a household is 5.9 [13].

We used a multistage random sampling technique to identify indigenous knowledge related to rattan husbandry. We selected two unions, and randomly selected two villages in each union. Then we selected 50 households who owned rattan clumps from all of the four villages. On the basis of land holdings, we subdivided the households into five categories, namely landless (up to 0.2 ha of land), marginal (0.21–0.5 ha), small (0.51–1.0 ha), medium (1.01–2.0 ha) and large households

(above 2.0 ha). Respective sample sizes were 10, 12, 10, 10 and 8 households. Data collection included direct observation of the rattan clumps and interviews with heads of households.

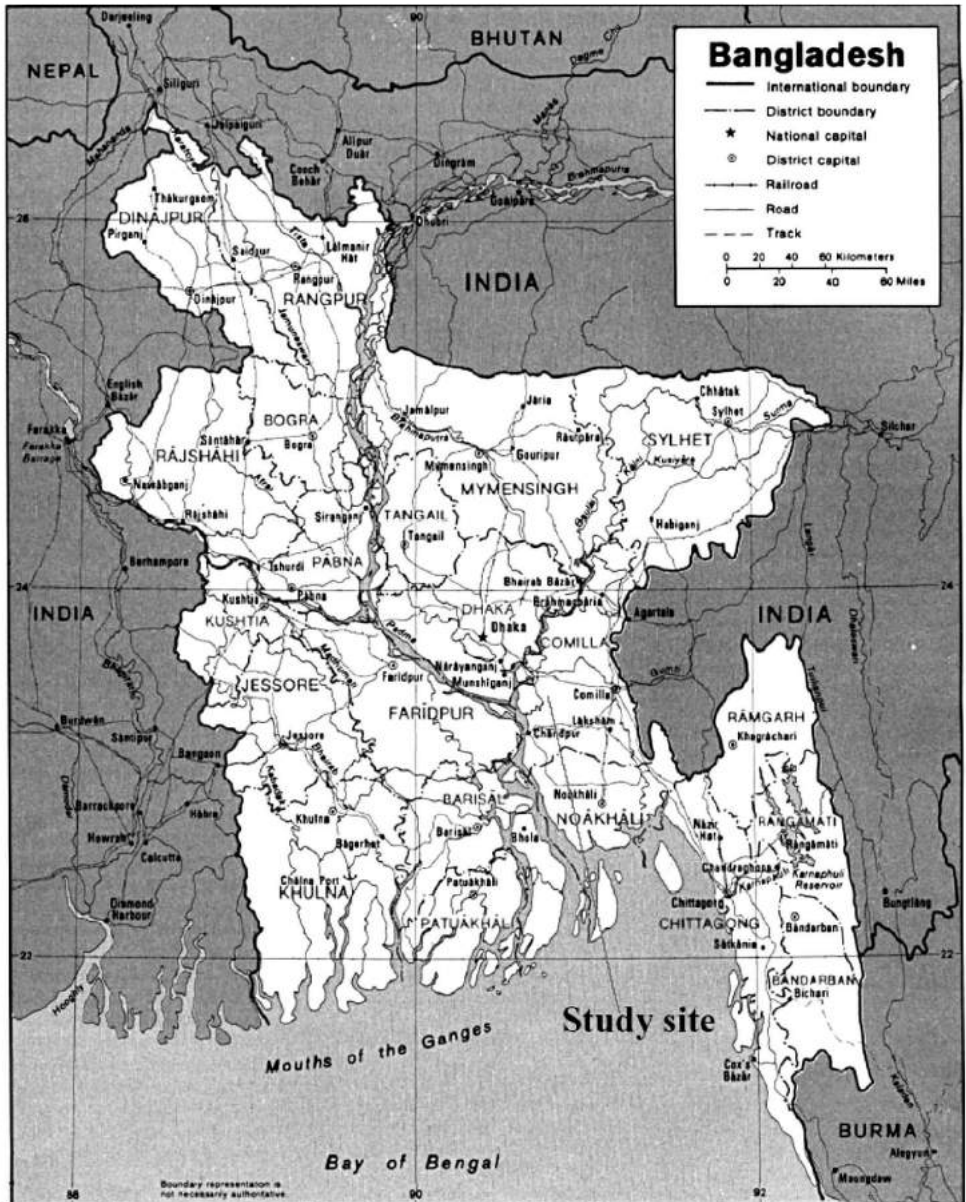


Figure 1. A map of Bangladesh showing the study site.

**Table 1.**  
Distribution of rattan in the village groves of Chandina, Comilla, Bangladesh

Category	Planting site		Number of clumps average		Planting direction			
	Pond side	Ditch side	Road side	average	North	South	East	West
Landless ( $n = 10$ )	10 <sup>a</sup>	4 <sup>bc</sup>	0.00 <sup>b</sup>	1.40	8 <sup>a</sup>	0.00 <sup>b</sup>	0.00 <sup>b</sup>	6 <sup>b</sup>
Marginal ( $n = 12$ )	10 <sup>a</sup>	5 <sup>b</sup>	0.00 <sup>b</sup>	1.25	5 <sup>b</sup>	0.00 <sup>b</sup>	0.00 <sup>b</sup>	10 <sup>a</sup>
Small ( $n = 10$ )	7 <sup>b</sup>	3 <sup>c</sup>	0.00 <sup>b</sup>	1.00	3 <sup>c</sup>	7 <sup>a</sup>	0.00 <sup>b</sup>	0.00 <sup>d</sup>
Medium ( $n = 10$ )	4 <sup>c</sup>	8 <sup>a</sup>	1 <sup>a</sup>	1.30	0.00 <sup>d</sup>	0.00 <sup>b</sup>	3 <sup>a</sup>	10 <sup>a</sup>
Large ( $n = 8$ )	5 <sup>c</sup>	3 <sup>c</sup>	0.00 <sup>b</sup>	1	5 <sup>b</sup>	0.00 <sup>b</sup>	0.00 <sup>b</sup>	3 <sup>c</sup>
Total ( $n = 50$ )	36 (60)	23 (38)	1 (2)		21 (35)	7 (12)	3 (5)	29 (48)

Numbers in parentheses indicate percentage value. The letters a, b, c and d are used to show the significance ( $P = 0.05$ ) of the value according to the Duncan's Multiple Range Test (DMRT). Values in the columns followed by the same letter are not significantly different.

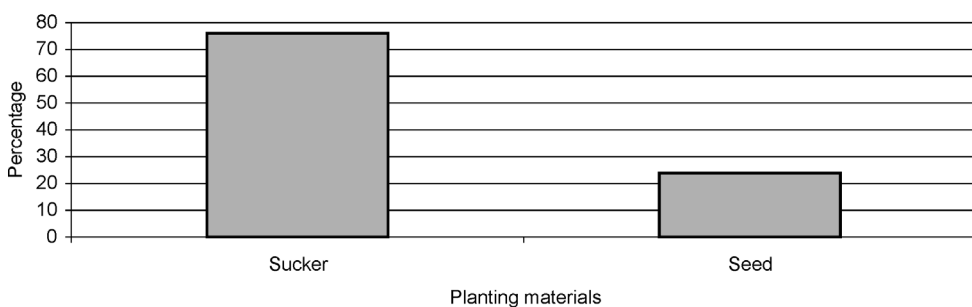
## RESULTS AND DISCUSSION

### *Distribution of rattan in the village groves*

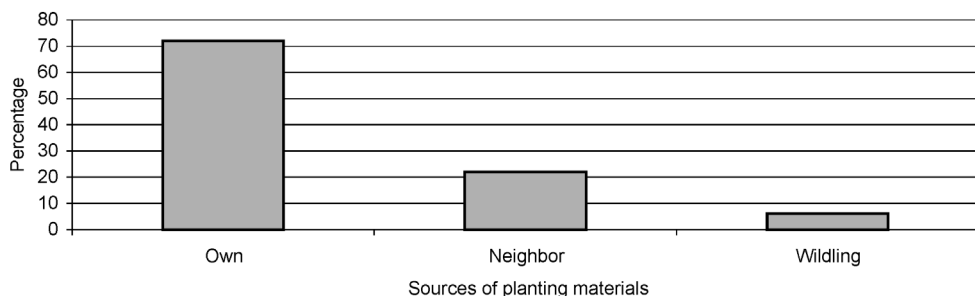
We found only one species, *Calamus tenuis* Roxb., locally known as Jali bet, in the study area. This species is planted in ponds, ditches and roadsides. Farmers mostly prefer pond sides (60%) followed by ditches (38%) and roadsides (2%, Table 1). The western side of the homestead (48%) was reported to be the most preferred orientation for planting, followed by the northern side (35%), the southern side (12%) and the eastern side (5%). The results agree with Chaudhury's findings [6] that rattans in Bangladesh grow in the periphery of marshy lands as well as in the cooler slopes of the hills. Naturally it is widely grown in Bangladesh, Myanmar and India [12]. Alam [12] describes the uses of this species in Bangladesh, as much used for domestic purposes such as weaving, chair bottoms and basket making. The acidic pulp of the fruits are much eaten by children. Also, the seeds are chewed as a substitute for betel nut. In many parts of the country, young shoots are cooked in curries. For edible shoot production only, successful husbandry of this species in Laos People's Democratic Republic and Thailand has been reported by Evans and Sengdala [14]. The length of the stem of this species sometimes exceeds 15.24 m if suitable support is available, otherwise these are shorter. The diameter seldom exceeds 1.27 cm. The air-dry weight varies between 32.81 and 39.37 g/m [6].

### *Planting materials used and their sources*

All farmers use suckers and seeds as planting materials. Alam [15] also reported the same mode of propagation. Suckers were preferred (76% of the households) over the seeds (24%) as shown in Fig. 2. This contrasts with the predominant use of seeds as planting materials in large-scale plantations in Malaysia [16]. The study identified three sources of planting materials: from the owner's farm, obtained from neighbours and collected as wildlings. Most of the planting material used came from the owner's farm (72%) followed by obtained from neighbours (22%) and collected as wildlings (6%), irrespective of the farm size (Fig. 3). The long tradition of rattan husbandry guarantees the supply of planting material from farmer's own estate. No cash exchanged was involved in obtaining planting materials from neighbours.



**Figure 2.** Planting materials used by the villagers in Chandina, Comilla, Bangladesh.



**Figure 3.** Sources of planting materials in Chandina Upazila, Comilla, Bangladesh.

### *Tending operations*

Only landless farmers and also sometimes marginal and small farmers tended their rattan stocks. Medium and large farmers did not tend their rattan stocks. They gave little attention to their farms, as their livelihood was not dependent on rattan. Women and children contributed the major share of labour to rattan tending (62% and 22%, respectively). Men contributed only 16% to rattan tending (Fig. 4). The main tending operations are adding earth to the clump during winter season, adding decomposed water-hyacinth and removing noxious weeds of *Mikania cordata*.

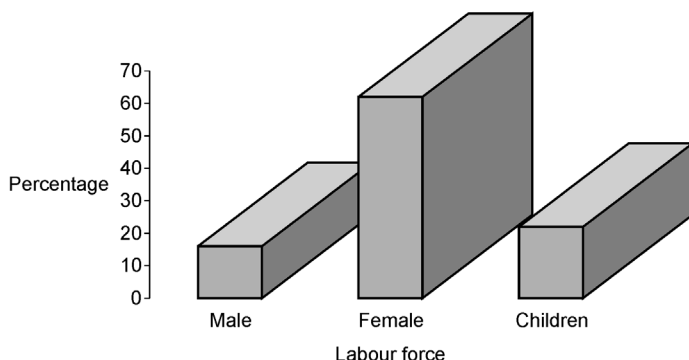
### *Harvesting and processing*

Medium- and large-farm category harvested rattans only during the dry season. They sold the stems to middlemen who only were interested in buying in that period. This is possibly related to the high demand for rattan stems during that time. The other farmer categories did not follow a seasonal pattern. They sold rattan all the year round, whenever they needed money.

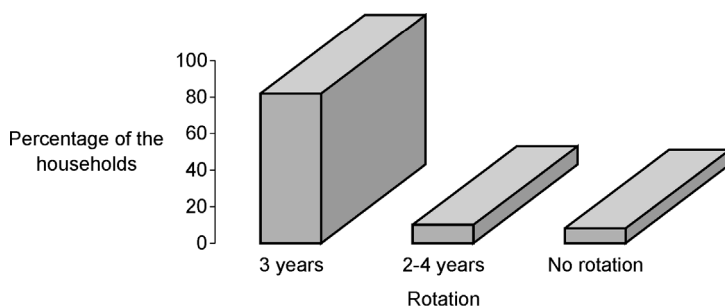
Most of the farmers (82%) maintained a three-year cultivation cycle. Ten percent maintained a 2–4 year cultivation cycle and the remainder 8% was indifference of rotation (Fig. 5). All the farmers cut the stems 7–8 cm above the earth surface. The bottom portion of the stem was debarked for the ease of handling and then pulled down. In the manufacturing process these rattans were cut into suitable length. The knots were trimmed and the surface smoothed. Secondary processing involved bending, splitting, dying, sanding and finishing. Peeling and splitting were often done by hand with simple traditional tools like a chopper (Dao).

### *Productivity*

The rattan productivity varied, correlated to farm size. The landless category reported the highest production of 2.33 number/m<sup>2</sup> per year. The marginal category reported 2.18 number/m<sup>2</sup> per year, in contrary of their lowest clump area. The large farmer category produced only 1.6 number/m<sup>2</sup> per year though they had the largest clump area (Table 2). The large and medium category farmers collected no fruits from their rattans. Usually, the smaller farmers intensively manage their small



**Figure 4.** Labour force in the tending operations of the rattan husbandry in Chandina, Comilla, Bangladesh.



**Figure 5.** Rotation age practiced by the rattan growers in Chandina, Comilla, Bangladesh.

**Table 2.**

Productivity of rattans in the village groves in Chandina, Comilla, Bangladesh

Category	Total number of clumps	Average area of each clump (m <sup>2</sup> )	Average yield (m <sup>2</sup> /year)	
			Culms	Fruit (kg)
Landless ( <i>n</i> = 10)	14 <sup>ab</sup> (1.4)	15 <sup>bc</sup>	2.33 <sup>a</sup>	1.37 <sup>a</sup>
Marginal ( <i>n</i> = 12)	15 <sup>a</sup> (1.25)	14 <sup>c</sup>	2.18 <sup>a</sup>	1.4 <sup>a</sup>
Small ( <i>n</i> = 10)	10 <sup>c</sup> (1.0)	16 <sup>b</sup>	2.21 <sup>a</sup>	1.4 <sup>a</sup>
Medium ( <i>n</i> = 10)	13 <sup>b</sup> (1.3)	16 <sup>bc</sup>	1.61 <sup>a</sup>	0.00 <sup>a</sup>
Large ( <i>n</i> = 8)	8 <sup>d</sup> (1)	24 <sup>a</sup>	1.6 <sup>a</sup>	0.00 <sup>a</sup>
Average ( <i>n</i> = 50)		17	1.99	0.83

Numbers in parentheses indicate the average value. The letters a, b, c and d are used to show the significance ( $P = 0.05$ ) of the value according to the Duncan's Multiple Range Test (DMRT). Values in the columns followed by the same letter are not significantly different.

farms as they depend much more on agricultural production for their subsistence livelihood, compared to the larger farmers. In the rural areas of the floodplain zones of Bangladesh, medium and large farmers focus more on agricultural crops rather than intensively managing the marginal lands of their homesteads.

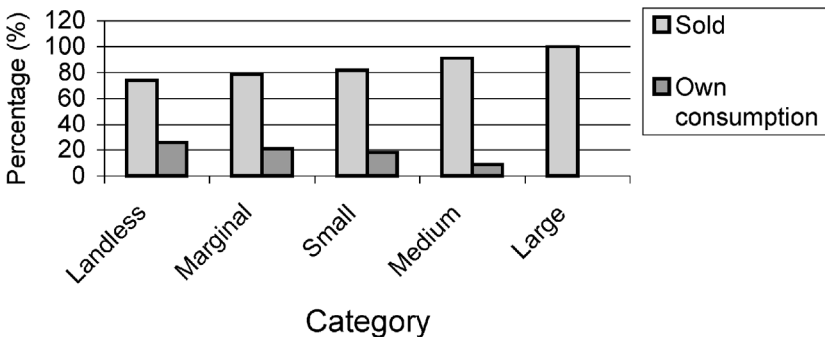
All the farmers reported that ten years ago total rattan production was 1.5–2-times higher than at present. The decline is due to the conversion of the marginal lands into agricultural lands and the fragmentation of single homesteads into several smaller units resulting from the breakdown of the joint families into single family units (personal observation). A traditional typical joint family in Bangladesh contains in one household three generations whose relations with one another are integrated within a family-centered economy, sharing a common larger homestead. Distant kinsman like cousins, aunts, nephews' and nieces rarely lived and worked together but very often met in family reunions. In times of crisis they helped each other and they preserved a widened sense of family solidarity. With the increase of population, unit family is becoming more common among the younger generation, fragmenting the homesteads and other lands (personal observation).

### Marketing

All farmers sold part or all of the produced rattan (Fig. 6). The proportion used by the own household declined from the landless category (26%) to larger category (0%), i.e. the large category growers sold all their rattan. Rattan was sold either directly to consumers, or through middlemen. Landless and marginal farmers sold all their rattan directly to consumers. The large farmers sold 100% through middlemen. Small and medium farmers sold part of their rattan directly and part through middlemen (Table 3).

### Income

Rattan provided an important contribution to income, but the farmers and the level of income varied significantly between categories of farmers (Table 4). Landless farmers derived an income of Tk 2460 (1 US Dollar = 58 Tk) from rattan sales, which constituted 11% of total annual income. The large farmers obtained Tk 1249 from rattan sales, an amount that contributed only 1% to total annual income. Rattan production contributes importantly to incomes of landless, marginal and



**Figure 6.** Percentage of households for own consumption and sale of rattan in Chandina, Comilla, Bangladesh.



**Table 3.**

Marketing channel of rattan products in Chandina, Comilla, Bangladesh

Category	Marketing channel	
	directly (%)	Middleman (%)
Landless ( $n = 10$ )	100	—
Marginal ( $n = 12$ )	100	—
Small ( $n = 10$ )	92	8
Medium ( $n = 10$ )	78	22
Large ( $n = 8$ )	—	100

**Table 4.**

Income from the rattan products of the villagers in Chandina, Comilla, Bangladesh

Category	Income/household per year (Tk)		Total income/household per year (Tk)	Percentage of the total yearly income
	From culms	From fruit		
Landless ( $n = 10$ )	1901 <sup>a</sup>	559 <sup>b</sup>	2460 <sup>a</sup>	11
Marginal ( $n = 12$ )	1863 <sup>b</sup>	598 <sup>a</sup>	2461 <sup>a</sup>	8
Small ( $n = 10$ )	1438 <sup>c</sup>	456 <sup>c</sup>	1894 <sup>b</sup>	6
Medium ( $n = 10$ )	1349 <sup>d</sup>	0.00 <sup>d</sup>	1349 <sup>c</sup>	2
Large ( $n = 8$ )	1249 <sup>e</sup>	0.00 <sup>d</sup>	1249 <sup>d</sup>	1
Average ( $n = 50$ )	1560	323	1883	

1 US Dollar = 58 Tk. The letters a, b, c, d and e are used to show the significance ( $P = 0.05$ ) of the value according to the Duncan's Multiple Range Test (DMRT). Values in the columns followed by the same letter are not significantly different.

small farmers. However, rattan husbandry is not the primary profession of any of these farmers. Other incomes are derived from other agricultural production, share cropping, business, government and non-government services, infrequent revenues from timber and other non-timber products from the homesteads.

The data from Tables 2 and 4 indicate that the price of rattan fruit for landless farmers was 28 Tk/kg, for marginal farmers this was 30 and for small farmers 20 Tk/kg. The variation of the prices of fruit might be due to the unstructured and undeveloped market for rattan fruits. As rattan fruits are perishable and become discoloured quickly after ripening; and fruits come in the market infrequently, consumers have not yet developed a stable consumer demand. The price of rattan stem depends on the quality of the stem, which is related to the age of the plant and to site quality. The marketing channels for rattan stems are well established and pricing is also settled depending on the quality of the stem. In the study area, after harvesting and processing the stems are sold on a weight basis. Tables 2 and 4 indicate that price per stem varies with the different household categories. This variation occurs due to the differences in quality and biomass produced per stem.

## CONCLUSIONS AND RECOMMENDATIONS

The study reveals that edges of the water bodies (pond and ditch side) are the preferred planting site for *Calamus tenuis*, by all farmers. It indicates a strong potential of the rural areas of Bangladesh for rattan husbandry. In the rural areas of the floodplains, innumerable ponds, ditches and some other water bodies like small rivers and canals, as well as large tracts of wetlands are present in Bangladesh. In the edges of these water bodies, husbandry of this species can be extended, which will augment the rural development. In this respect, some other rattan species may be recommended for planting after proper species-site research activities. The maximum planting materials used and their sources were found suckers and owner's farm, respectively, which indicates a non-availability of nursery practice of rattan husbandry in the study area. For the proper augmentation of this husbandry, nursery practice must be developed with the initiatives of government and non-government organization. The practice of the tending operation, harvesting and processing, indicates that landless, marginal and small farmers practice rattan husbandry very intensively where women and children provide the largest share of the labour force. Productivity, marketing and income from this husbandry also indicate the intensive care, strong implications and dependence for subsistence livelihood of the low-landholder farmers. The findings of this study strongly show that the rattan husbandry can certainly be augmented and developed by the three categories of low-land holders in the rural floodplains of Bangladesh, which would be of immense importance for the subsistence livelihood for the rural people. On the contrary, the less attention of large and medium farmers on rattan husbandry, are hindering a part of the overall rural development. In this respect, we recommend these two categories of farmers to be included in the rattan extension service programme by the government and non-government initiatives. In this connection, rattan product development research activities should be carried out for better profit of margin of all the farmers.

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