Indigenous Management Practices of *Golpata* (*Nypa fruticans*) in Local Plantations in Southern Bangladesh

Md. Danesh Miah,
Romel Ahmed
and
Sheikh Jahidul Islam
Institute of Forestry and Environmental Sciences, University of Chittagong, Chittagong 4331, Bangladesh
dansmiah@yahoo.com

1. A *Golpata* plantation in Bagerhat district of Bangladesh

***Golpata* (*Nypa fruticans*), a familiar palm, growing naturally or in plantations in the coastal areas of Bangladesh (Fig. 1), is gaining increasing importance for its multifaceted uses. Besides growing naturally in the government-owned mangrove forests, it is being grown extensively through private initiatives in plantations established by rural farmers in the coastal areas, especially in the southern part of Bangladesh.**

The mangrove palm, *Nypa fruticans* locally named as *Golpata* in Bengali, popularly known as the poor man's tin-sheet, is one of the important non-timber forest products of the tidal estuaries in the coastal belt of Bangladesh (Das et al. 2000). It is a stemless palm with tall erect fronds and underground rhizomatous stem (Shahidullah 2001) possessing an extensive root system, well suited to resist swift running water (Percival & Womersley 1975).

The management of *Nypa* in local plantations is accomplished entirely through the use of indigenous knowledge. *Golpata* is reported to be used mainly for housing, food, fuel, fence-making, medicine, cigarette wrapping, molasses, wine, fishing etc. The kernels of immature fruits are used as food. The juice is used for making molasses, locally called *Gur*, and alcohol. Newly developed shoots are reported to be used as a vermicide. Ash from *Golpata* is used as an analgesic against tooth pain and headache. Dry leaves, petiole, stem wood, fruit residues etc. are used as fuel. In fishing rhizomes of *Golpata* are extensively used, facilitating the fishing net to float over the water surface. Farmers also report that *Golpata* in the river or sea attracts deep-water fish. Bomhard (1964) and Killmann et al. (1989) describe the various ways of using *Golpata* for housing and other important purposes. FAO (1995) and Hamilton and Murphy (1988) describe the tapping of the palm for beverages such as wine or toddy and identify this as an ancient and traditional practice in Pan-Pacific and South and Southeast Asian countries. The present study discusses the indigenous knowledge of local farmers in the southern part of Bangladesh regarding planting pattern, multiplication, development of new plantations, tending operation, harvesting, processing, marketing of *Golpata* and income from it.

In Bangladesh, the natural distribution of *Golpata* is restricted to the Sundarbans, the largest single continuous tract of mangrove forest in the world (Chaudhury & Naithani 1985, Akhtaruzzaman 2000). Throughout the country, the demand for *Golpata* products is much higher than the present production. Shiva (1994) reports that *Golpata* has a great potential for commercial use in housing and medicine in Bangladesh. The role of *Golpata* is invaluable for both the rural and urban livelihood economies of Bangladesh. About 50,000 people living around the Sundarbans depend on *Golpata* and about 80% of houses in the area are made of *Golpata* (Faizuddin et al. 2000a). Although many local people around the Sundarbans plant *Golpata* on their available land, the increased demand for housing and other uses can only be fulfilled by increasing production through plantation establishment and sustainable management of the wild resource.

The study site

The study area of Bagerhat falls under the old Ganges meander flood plain zone covering the gray silty acid sulfate clay (BBS 1988). The pH of the soil ranges from 7.5 to 8.0 (Faizuddin et al. 2000b). The district has a hot summer and a mild winter. The summer begins from the middle of April and continues till the middle of June. The winter starts from November and continues till February. The maximum and minimum mean temperature during the summer is 35.6ºC and 24.6ºC, respectively. The maximum and minimum mean temperature during the winter is 27.2ºC and 14.6ºC, respectively. The level of humidity rises above 95% in the monsoon that commences from the middle of June and continues till the end of September (BBS 1988). The range of annual rainfall recorded in the district is 1640–2000 mm (Siddiqi 2001). Topographical, geological and climatological conditions together make the district prone to severe cyclone occurring in the early part of the summer and the later part of the monsoon. But the district is not seriously affected by these due to the locations of Sundarbans in the south part of the districts that acts as a shelter-belt (BBS 1999).

Materials and Methods

The study was conducted in the district of Bagerhat, in the southern part of Bangladesh, for a three-month period between January to March 2002. *Golpata* is commonly planted surrounding the homesteads of Bagerhat within the tidal coastline.

The study was conducted by interviewing 40 rural household-members and visiting the *Golpata* plantation directly. Data were collected from male heads or other important respondents through a semi-structured questionnaire. The distribution of *Golpata* plantations in the study area was directly observed. The information on multiplication, development of new plantations, tending operations, harvesting, processing, marketing and uses of *Golpata* were gathered.

The data were collected from four villages, two each from the Upazilla (sub-district), namely Bagerhat Sadar and Sarankhola where Golpata plantation is a common forestry practice. The name of the villages sampled from Bagerhat Sadar were Saidayllapur and Sayera and from Sarankhola were Rayenda and Soudhkhali.

As nursing and production of *Golpata* plantation are the functions of the land-holding capacity of

Table 1: Distribution of *Golpata* (*Nypa fruticans*) plantations in different sites in the Bagerhat district of Bangladesh.

	Plantation sites (No. of plantations)				Total
Household category	Homestead	Borrow pits	Ditch site	Lower plains of agricultural lands	
Landless	5	2	4	7	18
Marginal	7	9	11	6	33
Small	7	3	4	10	24
Medium	2	1	1	4	8
Large	2	0	2	3	7
Total	23	15	22	30	90

Table 2: Production of sap from different aged *Golpata* in the plantations of Bagerhat district of Bangladesh.

Age class	Sap production (ml/shoot/season)
0–4	0
5–8	800–1000
9–12	1500–1900
13–15	1000–1200
>15	600–700

the households, the farmers were stratified into marginal (0.21–0.50 ha), small (0.51–1.00 ha), medium (1.01–2.00 ha) and large (above 2.00 ha) landowners. Out of this stratification, 40 households, 10 households from each village, randomly representing each stratum, were selected.

Results and discussion

Distribution of Golpata *plantations in the landscape*

Within the landscape of the study area, four different sites under *Golpata* cultivation were identified. These were homesteads, "borrow pits", ditch sites and the lower plains of agricultural land (borrow pits are the pits left after soil is extracted for road building or embankment construction; they fill up with saline water and are thus suitable for *golpata* cultivation). The study revealed that highest number of farms (n = 30) were found in the lower plain of agricultural land followed by homesteads (n = 23), whereas, the lowest number (n = 15) were found along the borrow pits (Table 1). However, the variation in the number of farms among different household categories was easily observed in the study area. All farmers suggested that the production of *Golpata* was higher in lower plain lands where inundation was common and lowest in homesteads, where, of course, inundation is not frequent. This was due to variation of salinity and tidal inundation. This was also supported by Aksornkoae (1987) and Untawale (1987) who reported that salinity and tidal inundation are considered as important requirements for the occurrence of *Golpata*.

The number of plantations was highest in the marginal category of the farmers (n = 33) followed by small (n = 24), landless (n = 18), medium (n = 8) and large (n = 7) as shown in Table 1.

Multiplication within the plantations

The existing plantations were reported to be multiplied through rhizome, viviparous germination and separation of leading shoots. About five to six percent of clumps produced two leading shoots at a time per year instead of one leading shoot. Those two shoots gradually separated from each other at right and left side, respectively and ultimately produced two clumps. This was observed at the periphery of the farm.

Development of new plantations

Soft, muddy and water-logged soils where free access of saline water was available were characteristic of the land used by farmers in selecting sites for *Golpata* plantations. Seed and seedlings, as well as developed seedlings from the viviparous germination were the main planting material. Four different sources of these planting materials were identified and these were floating seeds from water bodies (65%), own material (30%), from neighbors (3%) and from the market (2%). The one-year-old seedlings were generally planted during the rainy season at a spacing of 1.82 × 1.82 m. Farmers reported that if stagnant water conditions lasted 5 or 6 weeks immediately after planting, with the seedlings consequently fully under water, the seedlings would then become rotten. To encourage the establishment

Table 3: Farm size and income of the *Golpata* planters in Bagerhat district of Bangladesh.

Farm category	Average farm size (ha)	Frequency	Av. number of leaves harvested/yr (*Pon**)	Income/ year (Tk**)	Change in income (%)
Landless	0.14	18	22	4667	-
Small	0.3	43	62	12463	16.7
Marginal	0.46	24	91	18833	51
Medium	0.71	8	129	23220	23.1
Large	0.76	7	142	26373	13.57

*1 *Pon* equals 80 leaves.
** 1 US $ = 58 Tk

of the seedlings, at least 10–12 cm of the seedlings should remain above the water level.

Tending operation

It was reported that the farmers practiced weeding, thinning, removal of diseased or unexpanded leaflets, gap filling at 100%, 65%, 35% and 28%, respectively. Faizuddin et al. (2000b) and Siddiqi (1999) also pointed out such maintenance operations for the acceleration of *Golpata* production in Bangladesh. Gonzales (1979) suggested thinning in order to maintain desired density and Siddiqi (1999) recommended pruning of non-leafy leaflet of *Golpata* for the acceleration of production.

Harvesting

All of the farmers surveyed, irrespective of household category, suggested that the extraction of leaves normally started from the 6- or 7-year old plants within the plantation. A slanting cut, maintaining a 45° angle is used. The cutting height above the ground depends on the planting density. According to the farmers, if the density is high, cutting is undertaken at 7 or 8 cm above the ground and in case of low density, at 5 or 6 cm. The season of harvesting was January to February as new shoot development begins in March. The reason behind the harvesting season practiced is to allow access to the new leaves for the next month.

Golpata is also much valued for the sweet sap tapped from the stalk of the inflorescence. It was reported that tapping normally commences from the *Golpata* shoots after four years and continues up to 15 years or more. The shoots of 9–12 year old stems are reported to be the highest yielding, providing up to 1500–1900 ml of sap per stem per season. The stems of 15 years or more were reported to yield a reduced sap production (Table 2). The farmers also reported that palms from canals, ditches or riversides gave the highest amount of sap. Tapping began from the first week of December when the fruit begins to mature and turns tan. The stalk of inflorescence was then pulled down and every morning and evening, a thin slice of stalk was removed and sap collected

2. A stack of *Golpata* leaves in Bagerhat district of Bangladesh.

in a container called a *Got*. This was continued up to the next mid March. It was also reported that 1 kg molasses was produced from 7–8 liters of sap. Most of the farmers surveyed were reluctant to tap the stems because of the decline in the quality of leaf production. However, it was observed that 10% of the landless farmers tapped the stems for wine.

Processing

The harvested leaflets are reported to be cut at 5 or 6 cm above the bottom of the rachis. Then, eight leaflets are arranged one after another keeping the apex at one direction. The rachis of accumulated leaflets is then divided into two parts by pulling them in opposite direction. Generally, the operation is undertaken manually (two men) immediately after harvesting. Each of the separated portions was called *dhali*. Finally, arranging right and left *dhalis* separately, exposing the rachis in a southerly direction for accelerated rapid drying, heaps 0.91–0.95 m high are made. Each side of the heap was fixed by driving two stakes 2.74 m apart and a weight was provided at the top of the heap to make them compact, preventing free air circulation as it promotes the deformation of the leaflets. After 15 days in the heap, the leaflets turned tan in color. Generally they were kept 20–25 days in each heap. A stack of *Golpata* leaves is shown in the Fig. 2.

Marketing

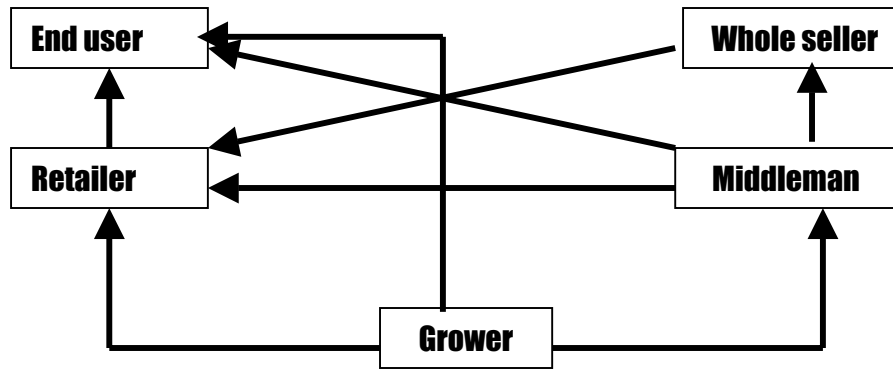
The processed leaves are reported to be the principal product for marketing. Every three to four years, the growers themselves consume a negligible portion of the products for housing purposes and the remainder are sold. Several intermediaries, operating in between the growers and the end users, acted in the marketing of leaves. Generally, the leaves moved from growers through middlemen to wholesalers, to retailers and finally to the end users (Fig. 3). In some cases, the middlemen sell dried leaves to the retailers or directly to the consumers. However, some retailers had another profitable mechanism to bypass the wholesalers or middlemen, directly buying leaves from the growers. Another important product reported to be sold is *Gur* (molasses), which generally followed a short marketing chain; this product is sold directly to the end-users in villages or in local markets.

Farm size and income

The study revealed that *Golpata* farm sizes ranged from 0.14 ha to 0.76 ha, gradually increasing with the increase of land holdings. The highest number of farms (n = 43) of average size 0.3 ha was observed in small category followed by the marginal category (n = 24) of average size 0.46 ha (Table 3). The highest income (Tk 26373 = approx. US$450) was earned by large farmers and the lowest (Tk 4667 = approx US$80) by landless farmer (Table 3). The variation in income among the farmers occurred due to the size of farms and the pattern of their own consumption. It was reported that their own consumption of *Golpata* products by the large farm categories was comparatively higher than the small farm categories. Due to the variation of the farm size, leaf production and sale are varied, which is also reflected in the variation in income of the different farm categories.

Conclusions

Golpata is an important natural resource and the only palm species used for housing in the southern part of Bangladesh. It plays an active role in the contribution to rural livelihoods and to the cultural heritage of the people. Besides solving the housing problem, it also helps to alleviate poverty in the region by providing many people access to the cash economy. The government and NGOs should extend their helping hand providing appropriate technology for cultivation,



3. Marketing channel of Golpata products in Bagerhat district of Bangladesh.

management, processing, marketing and utilization incorporating the traditional knowledge described in this paper. Bangladesh has available newly raised coastal lands along the coastal belt and vacant areas in the Sundarbans suitable for *Golpata* plantation (Faizuddin et al. 1998, Siddiqi & Khan 1990) where *Golpata* plantation can be raised, involving local people who already have knowledge of *Golpata* cultivation.

Literature Cited

Akhtaruzzaman, A.F.M. 2000. Mangrove forestry research in Bangladesh. In: Asia-Pacific Cooperation on Research for Conservation of Mangroves, Proceedings of an International Workshop, 26–30 March, 2000, Okinawa, Japan. pp. 139–146.

Aksornkoae, S. 1987. Country report: Thailand. In: Umali, R.M. (ed.). Mangroves of Asia and the Pacific: Status and Management. UNDP/ UNESCO (RAS/79/002), Philippines. pp. 231–262.

BBS (Bangladesh Bureau Of Statistics). 1988. The Bangladesh Census of Agriculture and livestock: 1983–84. Ministry of Planning, Dhaka, Bangladesh. 108 pp.

BBS. 1999. Statistical Yearbook of Bangladesh. Ministry of Planning, Dhaka, Bangladesh. 652 pp.

Bomhard, M.L. 1964. Palms – their use in building. Leaflet no. 2. Housing and Home Finance Agency office of International Housing, Washington, D.C.

Chaudhuri, A.B. and H.B. Naithani. 1985. A comprehensive Survey of Tropical Mangrove Forests of Sundarbans and Andamans. Part I. International Book Distributors, Dehra Dun, India. 41 pp.

Das, S.C., S. Akhter, A.K.M. Wazihullah and M.S Rahman. 2000.Yield of Vinegar, Alcohol and Sugar from the Sap of *Nypa fruticans*. Bangladesh J. Forest Sc. 29: 92–96.

FAO, 1995. Integrated Resource Development of the Sunderbans Reserved Forest, Bangladesh. Draft final report. FAO: DP/BGD/84/056.

Faizuddin, M., M.M. Rahman, M. Shahidullah, H.U.A. Siddiqui, M. Hasnin and M.H. Rashid. 1998. Plantation of *Golpata* (*Nypa fruticans*) in the newly accreted sites of the Sundarbans mangrove forests of Bangladesh. Paper accepted for presentation in the "Tropical Restoration for the New Millennium Conference", Sun Juan, Puerto Rico, USA, May 23–24,1999.

Faizuddin, M., M.M. Rahman, M. Shahidullah, A.S.M. Helalsiddiqui, M. Hasnin and M.H. Rashid. 2000a. *Golpata* (*Nypa fruticans*)-an important forest produce of the Sundarbans. Mangrove silviculture division, Bangladesh Forest Research Institute (BFRI), Khulna, Bangladesh.

Faizuddin, M., M.M. Rahman, M. Shahidullah, A.S.M. Helalsiddiqui, M. Hasnin And M.H. Rashid. 2000b. Survival and growth performance of *Golpata* (*Nypa fruticans*) in the newly accreted sites of the Sundarbans of Bangladesh. Bangladesh Journal of Forest Science 29: 79–84.

Gonzales, L.L. 1979. Nipa and its innumerable uses. Canopy 5(5): 9.

Hamilton, L.S. and D.H. Murphy. 1988. Use and Management of Nipa palm. Econ. Bot. 42: 206–213.

Killmann, W., W.C. Wong and K. Shaari. 1989. Utilization of Palm stems and leaves: an annotated bibliography. Forest Research Institute, Kuala Lumpur, Malaysia.

Percival, M. and J.S. Womersley. 1975. Floristics and Ecology of the Mangrove Vegetation of Papua New Guinea. Botany Bulletin No. 8, Department of Forests, Papua New Guinea. 94 pp.

Shahidullah, M. 2001. Nursery and Plantation Techniques of *Golpata* (*Nypa fruticans*). In: Siddiqui, N.A. and M.W. Baksha (eds.), Proceedings of the National Workshop on Mangrove Research and Development at Bangladesh Forest Research Institute, Chittagong, Bangladesh 15-16 May, 2001. pp.33–38.

Shiva, M.P. 1994. Report on Mangrove Non-wood Forest Products. FAO/UNDP project BGD/84/056, Khulna, Bangladesh. 147 pp.

Siddiqi, N.A. 1999. Raising plantation of nipa palm on new accretions along the coastline of Bangladesh. J. Non-timber For. Prod. 6: 52–56.

Siddiqi, N.A. 2001. Mangrove forestry in Bangladesh. Institute of Forestry and Environmental Sciences, University of Chittagong, 201 pp.

Siddiqi, N.A. and M.A.S. Khan. 1990. The growth performance of mangrove trees along the coastal belt of Bangladesh. Mangrove Ecosystem Occasional Papers, No. 8. pp. 4–14.

Untawale, A.G. 1987. Country report: India. In: Umali, R.M. (ed.). Mangroves of Asia and the Pacific: Status and Management. UNDP/ UNESCO (RAS/79/002), Philippines. pp.81–87.