

Traditional Coconut Farming in the Rural Landscape of Meghna Floodplain in Bangladesh

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Abstract : An exploratory survey was performed to assess the present status of distribution and production of coconut palm (*Cocos nucifera* Linn.) in the rural landscape of Meghna floodplain of Bangladesh. A multistage simple random sampling technique was adopted to identify the study area and respondents. A total of 50 households were selected randomly for the study. Traditional knowledge on cultivation, management, and production of coconut palm was emphasized. Marketing of coconut palm products and income derived from coconut palm cultivation was taken into consideration. Perceptions of farmers, traders and professionals were described in due context of opportunities and constraints of coconut palm cultivation. Coconut palm cultivation was found to play an important role in household economy in rural Bangladesh sharing considerable contribution to the total income. About 10% of their total annual income was reported to come from coconut husbandry. Highest number of the coconut palms, 24%, was found to grow in the homestead compounds and in the pond banks. About one-third lands of the households were found to be covered by the coconut palms. Maximum, 19%, coconut palms were found in the 16-20 years age-class. Production of coconut was found highest at the age-class 11-15 years. The study found some important opportunities and constraints of coconut farming in rural Meghna floodplain area of Bangladesh. The results of this study would be useful for the rural development practitioners in Bangladesh.

Key words : coconut palm, constraints, distribution, land use, opportunities, preferences, production, traditional farming

Introduction

Edible nuts are used by mankind for food, edible oils, spices, condiments or beverages (Blatter, 1978). They have been an important food source for human kind from prehistoric times. They are considered as foods, high in protein, oil, minerals and vitamins (Brandis, 1978). The coconut palm is one of the most useful plants in the world (Thampan, 1984). It grows in more than 80 countries of the tropics, as the most important of all cultivated palms.

The coconut (*Cocos nucifera* Linn.) is important and outstanding in that it provides a variety of useful products, every part being utilized for some economic purposes. The coconut is chiefly cultivated for the nuts from which copra, oil, oil cake and fibers are obtained (Chowdhury, 1997). These products are used for diverse purposes and are of great commercial importance. The use of the trunk of mature palms as timber in house con-

struction, and of the plaited leaves to thatch houses is very common in the tracts where the coconut is extensively grown. The unopened coconut inflorescences of spadices are tapped to extract the juice, which is converted into jaggery, sugar, vinegar and fermented toddy (Davis, 1988). In certain parts of Bangladesh, especially, Meghna floodplain is encompassing a large number of small-scale industries employing hundreds of workers (*pers. obs.*). The coconut shell is largely used as fuel and also for the production of charcoal (*pers. obs.*). Coconut palm is one of the most important species that has an influential role in the enrichment of rural economy in Bangladesh (Leuschner and Khaleque, 1987). The harvestable palm provides a considerable amount of cash annually. The palm can be harvested year after year for a long time with a small amount of investment.

The natural distribution of coconut is in the saline soils throughout the world (Thampan, 1984). Meghna floodplain in Lakshmipur is transitional between the coastal islands and the interior. Most of the land is intermediate-level. This is different in geographic distribution

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in comparison with other coconut growing areas in Bangladesh. It is a river estuarine flood plain where production of coconut palm is very well encompassing a favorite cultural practice in their life style (John, 1965). The amount of sugar in the coconut of this area is sweeter than any other part of Bangladesh (Agarwala, 1969). Almost every household is engaged in the production and cultivation of coconut in this area (*pers. obs.*).

It was hypothesized that in the rural Meghna floodplain area, there was a particular type of distribution of coconut and production system. To know this particular type of distribution and production, is a prime research question to understand the rural production system and make policies for rural development in the Meghna

floodplain zone of Bangladesh. The MCC (Mennonite Central Committee) in 1969 conducted an elaborate survey and identified a good prospect of coconut cultivation for rural socio-economic development (Agarwala, 1969). Rashid (1991) gave a brief description of coconut palm distribution in this area. But the distribution and production of coconut in this estuarine flood plain area was not explored properly. Thus the study was undertaken to understand the distribution and production of coconut in the Meghna floodplain zone of Bangladesh.

Materials and Methods

The study was conducted in the middle Meghna river

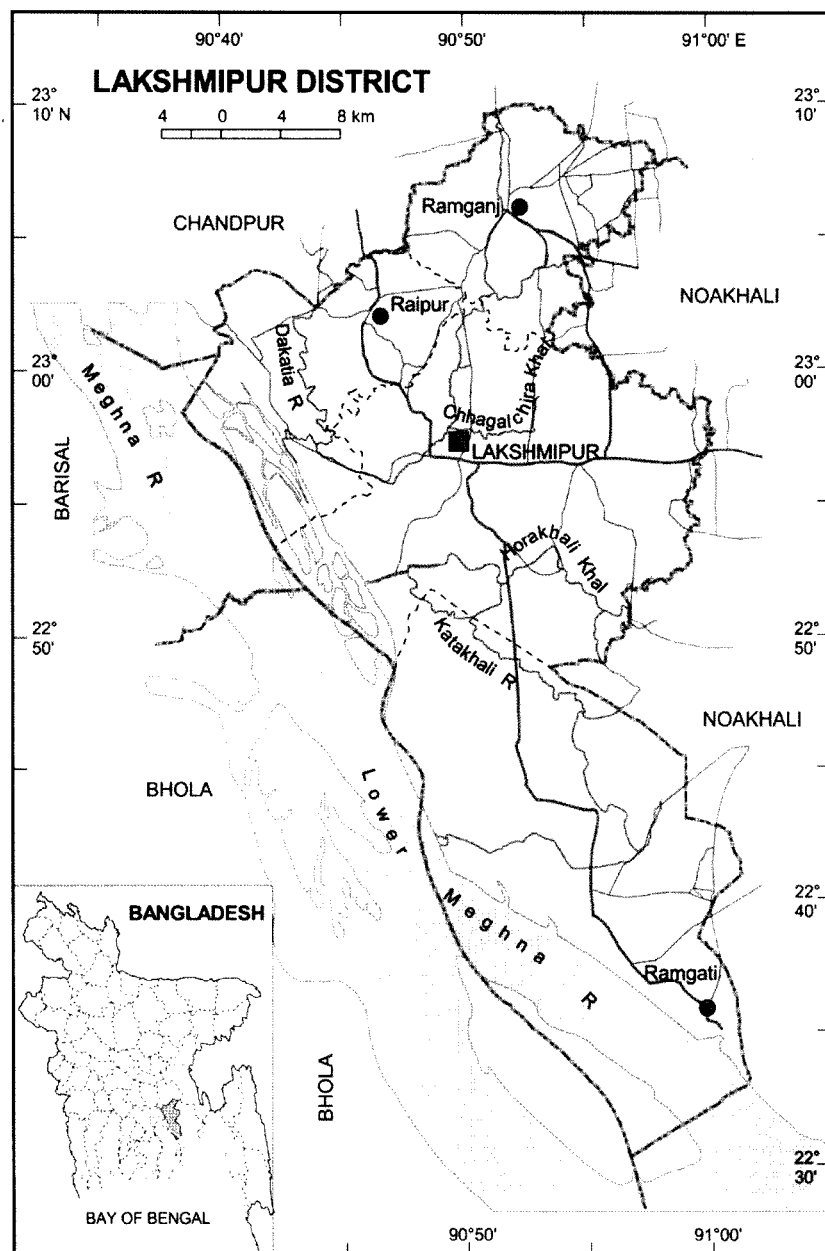


Figure 1. Specific study site in the Meghna floodplain area of Bangladesh (Anon, 2005a).

floodplain agro-ecological zone of Bangladesh in the Lakshmipur district of Bangladesh. The study was carried out over a period of five months in three phases. The first phase of fieldwork was from April 2002 to May 2002 covering the distribution of coconut palms in the rural landscape and the socio-economic status in this area. The second phase of fieldwork (from July 2002 to August 2002) focused on the production of the coconut palms and indigenous techniques used in the homesteads and their problems regarding that. The last phase of the survey was done in the month of September 2002 to know the marketing system, pricing, coconut based cottage industries and dependency on the profit from coconut.

1. Selection of the study area

Lakshmipur district as the representative of the Meghna floodplain area was selected purposively. The district consists of four Upazila (sub-district). A list of the Upazila of Lakshmipur district was arranged alphabetically and Ramganj was selected randomly from the list for the present study (Figure 1). There are ten Unions in Ramganj Upazila distributing 140 Mauzas and 126 villages. There are a total of 51000 households in the area (BBS, 2001). A list of the unions of Ramganj Upazila was collected from the respective Upazila Statistics Office and the two unions named Noagaon and Bhadur were selected from the list using a simple random method. Ten villages, five from each union were randomly selected from the list.

2. Selection of households

After sampling the villages from the list, household survey was conducted by random selection method. The households were stratified into five categories based on landholding size: (a) landless (up to 2 acres), (b) marginal (2-5 acres), (c) small (5-10 acres), (d) medium (10-15 acres) and (e) large (>15 acres). From each village 5 households were selected randomly taking one from each household category. Thus, a total of 50 households were selected for the study.

For each household, a semi-structured questionnaire was used to gather the field data on distribution of coconut palms, production and marketing of products and income from the products. Indigenous cultivation and management techniques of coconut and their cropping pattern were interviewed. Some information was also explored by the group discussion methods. Along with the farm owners, the key informants viz., village leaders, traders and middlemen were also interviewed for figuring out the opportunities and constraints of the coconut farming.

3. Description of the study area

Ramganj had a total area of 169.31 sq km. It had a

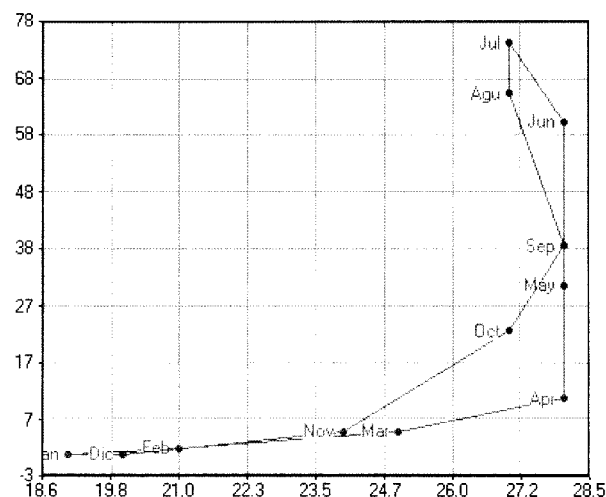


Figure 2. Climogram showing monthly average temperature (°C) in the X-axis and monthly rainfall (cm) in the Y-axis of the rural Meghna floodplain area, Bangladesh.

population of 47489; male 49.58%, female 50.42%. The density of population was 1285 per sq km. The literacy rate among the town people was 46.2% (Anon, 2005a). The average monthly temperature is 25°C with an annual rainfall 313.9 cm (Anon, 2005b). The climogram is shown in the Figure 2.

Ramganj lies under Middle Meghna river floodplain, which occupies an abandoned channel of the Brahmaputra river on the border between the greater Dhaka and Comilla districts. Soils of the area are grey loam on the ridges and gray to dark gray clays in the basins. The dominant general soil type is non-calcareous gray floodplain soil. Topsoil is strongly acidic and subsoil is slightly acidic to slightly alkaline. General fertility level is medium with low N and organic matter (Anon, 2005a).

Household size varied from a minimum of three to a maximum of seven, averaging four members. Fifty nine percent of the total population was male and the remaining was female. Of the total household members, 31% were less than 15 years old, 37% were in 15-30, 13% were in 30-45, 13% were in 45-60 and only 6% were older than 60 years. The average age of the household head was 42 years (ranged between 32 and 63 years), with only two farmers interviewed being over 60.

The male and female literacy rate was estimated to be 44% and 34% respectively, giving a figure of 40% for the population as a whole. Twenty seven percent of the population had a primary education, with 13% secondary education. Across the household category, about 72% respondents were engaged in agriculture. Only 22% respondents were service holders and businessmen.

Results and Discussion

1. Land use pattern

Total land for different categories ranged from 1 acre to 28 acres. It was found that landless and medium category households used maximum, 36%, of their total lands for coconut farming in comparison to the other categories (Table 1). On an average, 31% of the total lands were used for this purpose irrespective of the household categories.

The comparatively higher percentage of lands used for coconut farming by the landless category shows that landless household tries to use their homestead compound very efficiently than the other categories. Due to the subsistence livelihood, landless households usually try to have their maximum production from their small piece of land. But the maximum share of total land for the coconut farming by the medium categories might be due to the existence of comparatively higher lands for homestead and ponds. Medium categories might be more business oriented for coconut farming than the other categories. The least share (25%) for the coconut farming by the large category indicates that they may be reluctant for coconut farming, as they have different well-established income sources.

2. Distribution of coconut palms over landscapes

In Bangladesh, coconut palm is grown in homestead areas and marginal lands along the roads, canals and ponds. Coconut palm is found on slightly raised embankments. It is also found within the land with other palms. Orchards are mainly established around the homestead and agricultural lands. When distribution of coconut palms in the study area was observed, 24% of the palms were found on homesteads, 17% on orchard, 24% on pond bank and 21% on roadside. Table 2 shows the distribution of coconut palm in different location of the village.

3. Age class frequency distribution of coconut palms

Presence of palms of different age classes is very

Table 2. Distribution of coconut palms (%) over landscapes in the rural Meghna floodplain area, Bangladesh.

Category	Coconut palms (%) in the landscapes				
	Homestead	Orchard	Pond bank	Roadside	Others
Landless	15	13	27	9	14
Marginal	24	14	22	21	19
Small	22	16	20	22	19
Medium	26	21	24	26	21
Large	32	23	25	25	28
Average	24	17	24	21	20

Table 3. Age-class distribution of coconut palm (%) in the rural Meghna floodplain area, Bangladesh.

Category	Percentage of the coconut palm Age class (year)							
	0-5	6-10	11-15	16-20	21-25	26-30	31-35	>35
Landless	10	7	10	18	12	6	1	0
Marginal	9	13	17	16	16	8	7	3
Small	17	17	18	17	14	9	8	4
Medium	13	18	14	21	14	14	10	6
Large	13	22	23	25	26	18	11	8
Average	12	15	16	19	16	11	7	4

much important for sustainable production of coconut. Coconut palms of different age classes in the study area are shown in the Table 3. It was found that the highest number of individuals was found in the 16-20 years age-class, and it gradually decreased in the higher and lower age-classes. The different presence of the coconut palm individuals in the different age-classes indicates that the production and management of coconut palms are not sustainable. It might be due to the irregular plantings of the coconut seedlings.

4. Yield of coconut in different age classes

Production of coconut varied in different age classes. Generally the coconut palms start yielding from the age of 7 or 8 year. At the beginning of the production, the

Table 1. Area distribution of different farm categories and land allotted for coconut cultivation in the rural Meghna floodplain area, Bangladesh.

Category	Types of land (acres)					Total Land (acres)	Land for Coconut Cultivation (acres)	Land for Coconut Cultivation (%)
	Homestead	Agricultural land	Pond	Farm Forestry	Others			
Landless	0.85	0.62	0.04	0.01	—	1.52	0.55	36
Marginal	1.01	2.87	0.15	0.03	0.32	4.38	1.28	29
Small	1.45	6.42	0.27	0.11	0.55	8.80	2.63	30
Medium	2.22	10.25	1.36	0.49	0.11	14.43	5.23	36
Large	2.91	18.52	2.24	2.23	0.45	26.35	6.56	25
Average	1.69	7.74	0.81	0.57	0.29	11	3.25	31.2

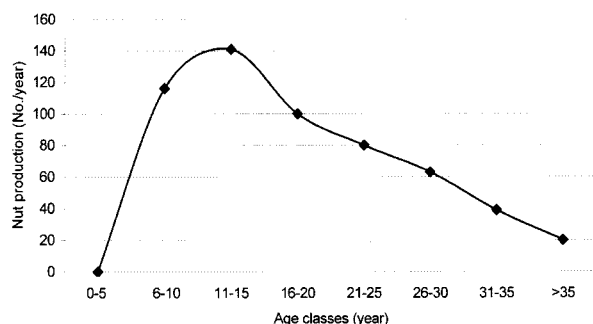


Figure 3. Annual nut production from the different age-classes of coconut palm in Meghna floodplain area, Bangladesh.

nuts are larger in their size. And used to yield more coconut up to their age 15 years. After this age, the yield of coconut decreased gradually. Age-class 0-5 years was reported not to give any production as they were in the seedling stage. On an average 116 coconuts in an individual palm were found in a year during its age of 6-10 years. Production was reported to be highest at the age of 11-15 years (Figure 3). Then the production gradually decreased up to 20 per year at the age of 35.

5. Net income from coconut

The principal marketable products of coconut palm were reported to be green coconut and matured coconut. Price of green and matured coconut were more or less the same. But the price varied in different climatic seasons and also in different time of festivals like *Nabanna* (Bengali new year day), Eid festival etc. But the average price of each coconut to the cultivators was not more than US \$ 0.14. The cultivation of coconut palm incurred a number of costs, but the costs for rearing up of coconut palms were very nominal. Up to coconut marketing, it included land preparation, fertilization, shade management, harvesting etc. During the production, it took not more than US \$ 1.00 of cost per individual. Coconuts were reported to be harvested generally

6-12 times a year. Net annual income of each household from the coconut farming varied from US \$ 100 to US \$ 280 (Table 4). Marginal and small household category earned much income from the coconut cultivation on their total income.

6. Opportunities and constraints of coconut farming

(1) Opportunities

The cultivation of coconut had been found popular and common among the farmers of this region due to some opportunities. These can be stated as follows:

1) Not only climate, but also the physiographic condition of this region is strongly favorable for the cultivation of coconut.

2) The cultivation of coconut had been adopted by the farmers, as it can be grown to wide range of habitat such as, agri-land, fallow land, homesteads, high lands etc. Thus much unproductive land can be used through its cultivation.

3) Once a coconut palm is planted, it will produce for a long time; these phenomena also inspire the farmers to their coconut farming.

4) People were skilled with indigenous knowledge required for cultivation, management, harvesting and such other that was also a significant factor for the development of coconut husbandry in this region.

5) Farmers deemed the cultivation of coconut palm as an age-old heritage, thus they were not interested to stop it easily.

6) Demands for the products produced from coconut were higher. If steps are taken to export products to the abroad, significant amount of foreign exchange is possible to earn every year.

7) Not only the farmers, but also people in a number of professions i.e. traders, rickshaw pullers and van pullers are directly and indirectly helped by the coconut palm husbandry, which also favor the cultivation.

(2) Constraints

The study found the constraints of coconut farming as

Table 4. Yield and net income from coconut cultivation in in the rural Meghna floodplain area, Bangladesh.

Category	Total sale value per household @ US \$ 0.14 per coconut	Production cost per household US \$	Net annual income for each household from the coconut farming US \$	Total annual income per household US \$	Ratio of income from coconut production to the total annual income (%)
Landless	122	11	111	1200	9
Marginal	198	16	182	1490	12
Small	212	17	195	1841	11
Medium	227	20	207	2286	9
Large	294	22	272	2810	10
Average	210.6	17.2	193.4	1925.4	10.2

follows;

1) Fruits theft

At least 25% of fruits are stolen in the ripen stage. Some dishonest people or thieves of the villages do this indiscriminately at night.

2) Lack of technological knowledge

Farmers, not only of these areas but also the whole Bangladesh cultivate coconut with a low level of technology. From the seedling stage of coconut palm upto the marketing of products, coconut palm cultivation system suffers from obsolete technological know-how.

3) Haphazard marketing systems and poor communication

Though the high demand of coconut products makes coconut palm most dominant in homestead agroforestry, due to the absence of proper marketing facilities and any legislation on the price of products, the farmers remain deprived of the actual price. The businessmen related to coconut marketing always try to pay lower prices to the farmers. Low prices are sometimes obtained due to poor communication system also. Moreover there is no control of Government on marketing system.

4) Lack of credit facilities

For large-scale farming, a large amount of finance is essential. But most of the farmers were generally reluctant in providing money and they could not provide money when necessary. No NGO or Government was found to ensure the credit support for coconut based intercropping system.

5) Damage by natural calamities

Damage of fruits and palms by cyclone, tornado etc is a common feature in the study area. During the cyclone of 1998 a large number of old-aged palms died.

6) Damage by biotic interference

Seedling stage of coconut was reported to be often browsed by grazing animals. Young fruits were reported to be damaged by rat, a very common feature in most orchards. Wood-peckers were also reported to be harmful for coconut.

7) Insufficient support from government and NGOs

No effort from the Government of Bangladesh or NGO was reported favoring coconut farming in the study.

Conclusion and Recommendations

The share of the lands for coconut farming to the total lands of the households shows that coconut farming is very important component of agroforestry production system in the rural Meghna floodplain area of Bangladesh. The contribution of the income from the coconut farming to the total income also shows that it is playing a great role in the rural economy. The age-class distribution

of coconut palm indicates that presence of the individuals in all age-classes are not well balanced. The opportunity study shows that coconut farming is more potential to contribute more in the rural economy, but the problems and constraints are hindering this potentialities. For the well balancing of the age-class distribution, more coconut palms should be planted every year. For the sustainable plantation, sufficient numbers of nurseries should be established. For releasing high yielding varieties, coconut research stations should be established in the country. The institutional development by the government or NGOs is necessary for the augmentation and sustenance for this production system. Proper marketing facilities should be opened for the farmers with the initiatives of the Government and NGOs, so that the coconut farmers are not exploited by the middlemen. Socio-economic and biological suitability of the coconut farming indicate that large-scale plantation is possible in the Meghna floodplain area. Government fellow lands can be leased to the landless and marginal farmers with appropriate credit facilities and training for the successful establishment of the large-scale coconut farms. Coconut based small scale cottage industries development is mandatory for the sustenance of coconut farming. It will further contribute in the rural economy. However, this study will be of immense importance for the development of coconut farming in the whole Meghna floodplain areas of Bangladesh. As most of the areas of Bangladesh are floodplain, so this study may be useful to assume the coconut farming in other floodplain areas also.

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