

THE EFFECT OF RELIGIOUS SUB-CULTURE ON THE STOCK AND DIVERSITY OF THE VILLAGE FORESTS IN THE FLOODPLAIN AREA OF BANGLADESH

Md. D. Miah and Mohammad M. Rahman

ABSTRACT

An exploratory study of the traditional village forests of two different religious communities (Hindu and Muslim) in the Narsingdi floodplain area of Bangladesh was carried out over a period of five months from January to June 2002. Green coverage, species diversity and species preferences of both communities were assessed and compared. The Hindu community had the highest green coverage of 71% in the homesteads, 80% in temple inside the homesteads, and 63% in temple outside the homesteads. Whereas, the Muslim community had 63% green coverage in the homesteads, 42% in the graveyard, 60% in the mosque and 50% in the Madrasha campus. All economic strata of Hindu were reported to have the highest number of species in comparison to the respective category of Muslim. A total of 76 tree and 45 shrub species were recorded from the homesteads of the Hindu community while 59 tree and 27 shrub species were found in the Muslim community. In all respects, the Hindu community was found very rich in stock of tree and shrub species in contrast to the Muslim community. The sub-cultural activities of the Hindu were found very positive in homestead forest management and conservation of species. The threatened and rare species and individuals of trees and shrubs were found in greater number in the homesteads in the Hindu community than in the Muslim community. The present study has found some important Hindu-sub-cultural factors, which are very positive for the conservation of homestead forests in rural areas of the floodplain area of Bangladesh. The findings may be used in the forestry and environmental planning in Bangladesh.

INTRODUCTION

The village forest is not only a part of our culture, but it also contributes a great deal to our economy. It is an age-old forestry practice in which a number of crops including trees are grown with livestock, poultry, and fish mainly for the purpose of satisfying the farmers' basic needs (Akhtar 1997). The homestead tree production system in villages is a mode of species and genetic conservation for a good number of trees in Bangladesh (Alam and others 1996). Although architectural arrangement and mode of tending operations are not planned in the village forests, human preference or choice and natural adaptation establish an ecological stability and sustained yield in the production system (Alam and Mohiuddin 1992).

In Bangladesh, village forestry enjoys a rich legacy and tradition. Alam and others (1990); Akhtar and others (1989); Momin and others (1990); Kar and others (1990) and Dasupta and others (1990) reviewed and summarized the status of village forestry as practiced in Bangladesh for the first time. Among the six major categories of forestland resources of Bangladesh,

2.14 million hectares are state-owned forests, managed by the forest department of the government. The hill-reserved forests cover about 69% of the total forestland area, while the village forests cover about 13% (Kibria and others 2000; Siddiqui and Khan 1999). Although the area of this village forest is less than one sixth of the state owned forests of the country, they supply 70% of the timber, 90% of the fuelwood and 90% of the bamboo consumption of the country as a whole (Quddus and others 1992). The total standing volume of trees on homestead lands is estimated to be about 80 million cubic meters, which is over seven times the volume of the forest stock in the Sunderbans forests of Bangladesh. About 10 million households in over 85,000 villages have usable land around their homes, and about 80% of such lands are covered with trees (Hossain and Chatterjee 1999).

In the Bangladeshi societal context, village forestry facilitates various social, cultural, and religious activities of villagers. Despite the widespread poverty and destitution in rural Bangladesh, she has a rich traditional culture and a variety of practical and spiritual uses (Hossain and Chatterjee 1999). In the Indian sub-continent the traditional tales, mythological stories, events in the epics, innumerable religious practices of worship in households, in religious institutions, in festivals, birth, and death, are all replete with references to plants (Chaudhury and Pal 1990).

Flood plain areas in Bangladesh occupy 80% of the total area of Bangladesh (Alam and others 1991). Naseem and Alam (1998) argued that people of rural Bangladesh, particularly in the floodplains, generally developed different farming systems and techniques through a process of adaptation that have been fine-tuned with the local environment, economy, and socio-cultural systems. Narsingdi District is a floodplain area through which the three prominent rivers of Bangladesh, (Meghna, Brahmaputra and Sitallakhya) are flowing (BBS 2001). Almost every year these three rivers cause seasonal flooding in most of the riverbanks (BBS 2001). In this floodplain area, there is no government owned reserve or protected forests. Therefore, it is very important for the village forest to maintain ecological balance in that area (Mia and others 1988).

Social attitudes towards homestead forestry in Narsingdi District were studied by Uddin and others (1998). Indigenous knowledge on the production systems of homestead forestry in Narsingdi region was studied by Miah and Hossain (2001). Miah and Hossain (2002) explored the tree resources in the floodplain areas, especially in the Narsingdi region of Bangladesh. But no study on the religious or cultural implications on the stock and management of homestead forests in Narsingdi region was found. The status of the culture, especially religious effects, on the stock and management of the homestead forests, is a prime research question to identify important cultural factors both for conserving and degrading the homestead forests. Such study results will become immensely important to formulate national policy for the conservation and development of the homestead forests in Bangladesh. As Miah and Hossain (2002) explored a large pool of tree species diversity in Narsingdi region as a floodplain area of Bangladesh, it was hypothesized that the

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Narsingdi region had specific types of cultural, especially religious factors, which had positive implications for conservation and development of the homestead forests. Thus, the study was undertaken to explore the religious factors on homestead forests, particularly of the Muslim and Hindu communities in Narsingdi region, Bangladesh.

MATERIALS AND METHODS

Sampling Framework

A multistage, simple, random sampling technique was adopted to locate representative households for the study. Sampling was done at four levels of Narsingdi District: district, upazilla(sub-district), village, and households (respondent). The survey was carried out over a period of five months from January to June, 2002.

Reconnaissance Survey

Before the actual study, a reconnaissance survey was made in three upazillas. The objectives of this survey were to select the study areas, identify respondents, and build rapport with the local leaders and the people in the study areas.

Selection of the Study Area and Respondents

Administratively, Bangladesh consists of 64 districts, 490 upazillas, 4451 unions, and 68,000 villages (BBS 1997). A large number of the Muslim people (92.13%) as well as the Hindu people (13.45%) are living in the Narsingdi district (BBS, 1995). As three prominent rivers of Bangladesh (Meghna, Shitalakhya, and Brahmaputra) flow over Narsingdi district, it was selected purposively. The district comprises six upazillas, of which three upazillas namely Narsingdi sadar, Raipura, and Palash, were selected as a secondary sampling unit, and every two villages from each upazilla were selected as a tertiary sampling unit. From a total of six villages, data were collected both from the Muslim and the Hindu communities. For each community a total of 36 households were surveyed taking six from each village. On the basis of key informants' information, the households were further categorized into three income groups (i.e., Rich (>10,000 tk/month), Medium (4,500-10,000 tk/month) and Poor (<4500 tk/month) in every village taking two samples from each category. In such a way, another 36 households were sampled for the Muslim community. Thus a total of 72 households were sampled for the study. The

sampled respondents consisted of the male or female household heads along with other household members. Woman members and the comparatively old-aged members in particular were interviewed because their involvement was important in practicing the traditional homestead forestry activities and having knowledge about the folk stories and myths. To evaluate the variation of religious approaches and attitudes between the two religious groups 5 graveyards, 5 mosques, 5 *Madrashas* (Muslim educational institute), 5 temples of home compounds, and another 5 temples outside the home compounds, were sampled randomly.

Vegetation Survey Procedure

A systematic vegetation survey was conducted at each selected homestead compound and campus of the religious institutions to ascertain the tree and shrub species composition and their structures. The head of the family and the local old-aged persons were requested to show and tell the local names in situ and other particulars of the species present in the homesteads and in the sacred places.

In the homesteads and on the campus of the religious institutions, a full direct enumeration process was adopted. After the vegetation survey, a list of tree and shrub species present in the homesteads and sacred places was made with the basic reference of Prain (1981).

To ascertain the floristic composition, the plants were first categorized into trees and shrubs. Due to the common presence of the bamboo species in the homesteads, bamboo was included in the vegetation survey as a different vegetation component. Species composition was also shown in terms of natural and plantation; indigenous and exotic growing stock with age-class distribution. The age of the tree and shrub was ascertained through the cross discussion of the family members and the neighboring old-aged people. The mode of natural and plantation growing stock was identified in the same way. The age class distribution of the growing stock in the sacred places was excluded from the study because of the difficulties of age identification. Species richness was calculated as the number of the total species present. To find out the green coverage in the selected sites, areas of the crown of both trees and shrub were measured. The closed crowns of both tree and shrub were measured as intermingled vegetation cover. Other crowns were measured as individual/scattered green coverage.

Table 1.—Green coverage in the homesteads of Muslim and Hindu community in Narsingdi floodplain area, Bangladesh.

Religious community	Economic class	Land holdings in the homesteads (acre)	Green coverage/homestead					Total green	%
			(acre)						
			Tree species	Bamboo species	Shrub species	Intermingled vegetation			
Muslim	Rich	0.37	0.07	0.004	0.04	0.11	0.22	59	
	Medium	0.14	0.03	0.003	0.03	0.04	0.10	71	
	Poor	0.05	0.007	0.001	0.005	0.012	0.03	60	
	Average	0.19	0.04(34)	0.003(3)	0.025(21)	0.05(42)	0.118	63	
	STDV*	0.16	0.03	0.002	0.121	0.168	0.47		
Hindu	Rich	0.34	0.09	0.001	0.03	0.12	0.24	71	
	Medium	0.13	0.02	0.001	0.02	0.04	0.08	62	
	Poor	0.05	0.008	0.002	0.009	0.02	0.04	80	
	Average	0.17	0.04(33)	0.001(0.83)	0.019(16)	0.06(50)	0.12	71	
	STDV	0.15	0.04	0.002	0.011	0.05	0.11		

*STDV= Standard Deviation

** Figures in the parenthesis indicate the percentage value

RESULTS AND DISCUSSION

Green Coverage in the Homesteads

Green coverage percentage with respect to the total area of the homestead was highest (71%) in the Hindu family in contrast to 63% in the Muslim irrespective of economic strata (Table 1). Among the different economic classes, the poor in the Hindu community had the highest (80%) green coverage followed by the rich in the Hindu and medium classes in the Muslim community as 71%.

The study shows that individual tree (34%), shrub (21%) and bamboo (3%) green coverage was higher in the Muslim homesteads than in the Hindu community. But the intermingled vegetation (50%) was higher in the Hindu community than in the Muslim community. The study shows closed groupings of both trees and shrubs making a unique landscape in the Hindu homesteads. But in the homesteads of the Muslim community, trees and shrubs were comparatively scattered.

The result revealed that species diversity was strongly related with the affluence of the respondents. The rich category had the highest number of species whereas the poor had the least in both of the communities. All economic classes of Hindu were reported to have the highest diversified species in comparison to the respective category of Muslim. From the homesteads sampled a total of 124 plant species were recorded. A total of 76 tree species and 45 shrub species were recorded from the homesteads of the Hindu respondents in contrast to 59 tree and 27 shrub species in the Muslim community. Three different bamboo species, *Bambusa tulda*, *Bambusa balcooa* and *Bambusa vulgaris*, were found in both

communities, although it was found comparatively less in the Hindu homestead than that in the Muslim. The result also revealed that all economic classes of the Hindu respondents planted more tree and shrub species than those of the Muslim respondents except for the poor category in the Hindus. Exotic species were found to be planted in the least number by the poor category of both communities (Table 2).

Green Coverage in the Sacred Places

The results revealed that the green coverage in the religious places was highest (80%) in the temple inside the homesteads followed by the temple outside the homestead (63%) and the graveyard was found to have the least (42%) green coverage as shown in the Table 3.

The study revealed that the number of tree species was highest (33) in the temple outside the homestead followed by the Madrasha (28) and the number of shrub species was highest (28) in Madrasha followed by the temple inside the homestead (25) as shown in Table 4. The lowest number of tree species (23) was found in the temple inside the homestead and in mosque whereas the lowest number of shrub species (15) was enumerated from the temple outside the homesteads.

The result revealed that though the species diversity of Madrasha is more than that of the mosque, the average density of vegetation in the mosque is more than that of Madrasha. The reason for this is that the mosques were nearby the homesteads whereas Madrashes were found situated farther from the homesteads than the mosque.

Table 2.— Natural and plantation species including exotic and indigenous species per homesteads of Muslim and Hindu community in Narsingdi floodplain area of Bangladesh.

Religious community	Economic class	Number of tree species			Number of shrub species		
		Natural	Plantation		Natural	Plantation	
			Indigenous	Exotic		Indigenous	Exotic
Muslim	Rich	26	46	3	10	26	1
	Medium	21	42	2	9	24	0
	Poor	18	29	1	7	17	0
Hindu	Rich	28	57	3	16	39	2
	Medium	23	46	3	13	32	1
	Poor	22	24	1	11	17	0

Table 3.—Green coverage in different sacred places in the Narsingdi floodplain area of Bangladesh.

Sacred places	Land holdings (acre)	Green coverage (acre)				
		Tree	Shrub	Intermingled vegetation	Total	Total percentage
Mosque*	0.05	0.007 (23)**	0.005 (17)	0.021(70)	0.03	60
Madrasha*	0.12	0.022(37)	0.018 (30)	0.023(38)	0.06	50
Graveyard*	0.19	0.028(35)	0.036 (45)	0.016(20)	0.08	42
Temples inside the homesteads	0.05	0.011(28)	0.018 (45)	0.01(25)	0.04	80
Temples outside the homesteads	0.08	0.016(32)	0.017 (34)	0.021(42)	0.05	63

* indicate the Muslim sacred places

** Figures in the parentheses indicate the percentage value within the total green area

Age Class Distribution of Tree and Shrub Species in the Homesteads

The study revealed that individuals of both natural and plantation tree species were found more in number in the homesteads of the Hindu community for all economic classes than that of Muslim community. Plantation growing stock was found more than the natural growing stock (Table 5) irrespective of religious communities. It exemplifies the present afforestation trend in the study area, which is also espoused by Uddin and others (1998). Plantation growing stock was found in all the age-classes (<5 - >40 yrs), but natural growing stock was not found in all those age classes except the rich and medium classes of the Hindu community. Table 5 shows a gentle age class distribution of tree individuals in the Hindu community contrasting that of the Muslim community.

The average number of individuals of both natural and plantation shrub species were found more in the Hindu community than in the Muslim community (Table 6). Natural growing stock was higher than plantation growing stock for all religious communities irrespective of economic classes except the rich class of the Hindu community.

DISCUSSION

In the villages of the flood plain area the poor are operationally landless besides their homestead compounds. Therefore, the poor

impose their maximum efforts to derive the crop yields from the limited homestead lands for their subsistence livelihoods in the Hindu community. This was why the poor had the highest green coverage in the homesteads. This result is economically driven. But the differences of the green coverage between the Muslim and the Hindu community claim religious sub-cultural causes. For most of the religious activities, the Hindu community was found dependent on the various plant species. Their religious beliefs and folk-ways compelled them to produce and conserve the plants in their home compounds.

The Hindu community has special myths, beliefs, and respect for plants (Agrawal 1990; Chaudhuri and Pal 1990 and Barua 1995) causing them to maintain a higher diversity of plant species than that of Muslims. The results reflect that religious attitude is the major factor in management of homestead vegetation.

The results showed that the Hindu community planted and retained more plants in their sacred places than that of Muslims. It shows the implications of Hindu religious spirit on trees and shrubs. The Hindu community believes that plants in the temple bear the divine spirits (Agrawal 1990). Chaudhuri and Pal (1990) described some important plant species considered as sacred for the Hindu community in India. They also showed significant implications of the belief in many sacred plants in Hindu mythology. The effect of Buddhist sub-culture on the conservation of plant species in the yards of Buddhist temples in Xishuangbanna, China was described

Table 4.—Total number of tree and shrub species along with average number of individuals per sacred place of Narsingdi floodplain area of Bangladesh.

Sacred places	Number of tree species	Number of shrub species
Mosque	23 (24)*	18 (40)
Madrasha	28 (34)	28 (50)
Graveyard	27 (33)	24 (78)
Temple inside the homesteads	23 (19)	25 (57)
Temple outside the homesteads	33 (34)	15 (37)

*Figures in the parentheses indicate average number of individuals of all species

Table 5.—Average number of individuals of tree species in the homesteads of different age-classes in the Narsingdi floodplain area of Bangladesh.

Religious Communities	Economic Class	Natural						Plantation					
		<5	5-10	10-20	20-30	30-40	>40	<5	5-10	10-20	20-30	30-40	>40
Muslim	Rich	6 (5.4)*	1 (2.22)	1 (1.54)	2 (1.99)	2 (1.59)	-	9 (9.2)	5 (4.95)	3 (3.44)	3 (2.22)	3 (2.59)	1 (1.05)
	Medium	6 (6.9)	1 (2.32)	1 (1.14)	1 (1.46)	1 (1.59)	-	9 (5.1)	5 (4.61)	2 (2.68)	2 (2.8)	2 (1.83)	1 (1.05)
	Poor	5 (4.9)	2 (1.9)	2 (0.9)	1 (0.38)	1 (0.58)	-	6 (4.1)	4 (2.91)	2 (3.15)	2 (2.35)	1 (1.13)	1 (1.58)
Hindu	Rich	9 (9.15)	5 (4.52)	3 (3.58)	2 (1.65)	3 (1.27)	2 (0.7)	8 (7)	6 (8.4)	4 (5.18)	3 (3.05)	2 (1.07)	2 (0.6)
	Medium	13 (6.7)	5 (2.9)	1 (2.02)	4 (1.17)	3 (1.49)	2 (1.06)	13 (5.9)	9 (4.57)	8 (4.94)	8 (4.79)	4 (1.23)	3 (1.4)
	Poor	10 (18)	3 (2.2)	2 (1.88)	2 (1.97)	1 (1.48)	-	4 (4.54)	3 (2.25)	3 (2.55)	3 (1.50)	1 (1.55)	2 (1.32)

* Figures in the parentheses indicate the standard deviation

Table 6.—Average number of individuals of shrub species in the homesteads of different age-classes in the Narsingdi floodplain area of Bangladesh.

Religious Communities	Economic Class	Natural				Plantation			
		<5	5-10	10-15	>15	<5	5-10	10-15	>15
Muslim	Rich	12 (7.7)	5 (4.72)	1 (1.41)	1 (1.21)	9 (12)	6 (6.37)	1 (1.43)	1 (1.92)
	Medium	18 (7.2)	5 (5.27)	1 (1.05)	1 (1.41)	8 (11)	3 (5.6)	2 (1.56)	2 (1.04)
	Poor	13 (6.1)	5 (5.62)	1 (1.05)	1 (1.32)	7 (12)	4 (4.29)	3 (1.38)	2 (1.84)
Hindu	Rich	12 (6.6)	8 (4.23)	4 (1.52)	3 (1.58)	12 (12.4)	9 (6.77)	5 (2.73)	4 (1.40)
	Medium	20 (5.2)	10 (3.03)	3 (1.42)	2 (1.71)	14 (19)	6 (5)	4 (1.73)	2 (1.23)
	Poor	22 (5.63)	10 (2.58)	2 (1.05)	2 (1.21)	7 (5.7)	6 (4.42)	3 (1.39)	3 (1.71)

* Figures in the parentheses indicate the standard deviation

by Anon (2002). It was described that the general Buddhist temples plant more than 100 plants relevant to Buddha, many of which are nationally protected, rare, and precious plants. These plants have received protection from Buddhist monks and local inhabitants. Pikun (1996) also described the positive effects of religious sub-culture on the conservation of forests in China.

The age-class distribution of trees in the homesteads derives a gross sustainability idea of yield from the growing stock in the Hindu community. The high presence of the individual shrub species in the Hindu community was due to the religious folk-ways. Most of the shrub species were allowed to grow in the homesteads for the purpose of flowers and fruits which were frequently used for an offering presented to a deity. Some species were also found to be worshipped. It was also supported by Agrawal (1990). In the Muslim community, no religious folk-ways were found to have positive effects on plant growth, excepting one species (*Lawsonia inermis*). The leaves of the species were reported to be used for dyeing hand-palm and hair. The leaves of that species were assumed to be sacred. *Lawsonia inermis* was reported as a plantation shrub in the homestead. Most of the other shrub species/individuals present in the Muslim community were for aesthetic purpose. Some were for fruits and flowers. All those activities were observed as economical and not spiritual. Exclusively preferred tree and shrub species of the Hindu community were *Aegle marmelos* and *Ocimum sanctum*, whereas *Psidium guajava* and *Sesbania bispinosa*, were preferred in the Muslim community.

CONCLUSION

The green coverage in the homesteads and sacred places of both Muslim and Hindu community indicates an obvious effect of religious sub-culture on the stock and diversity of the village forests in Bangladesh. The higher green coverage and stock of tree and shrub species in the homesteads and sacred places of the Hindu community shows a positive attitude of religious sub-culture on the stock and diversity of the village forests in the floodplain area of Bangladesh. Furthermore, the higher presence of natural vegetation in the Hindu community signifies the importance of conservation of village forests as well as ecosystems. On the contrary, little effort was found in the Muslim community towards conservation of village forests. This study has found some effects of religious sub-culture on the stock and diversity of village forests. To get a clear understanding on the specific religious sub-cultural factors more ethno-botanical studies should be carried out, which would ultimately be a forest conservation tool in the floodplain areas of Bangladesh.

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AUTHORS

Md. Danesh Miah
Assistant Professor
Institute of Forestry and Environmental Sciences
University of Chittagong
Chittagong 4331
Bangladesh
Telephone: +88 031 714914
dansmiah@yahoo.com

Mohammad Moshir Rahman
Research Fellow
C/o. Md. Danesh Miah
Institute of Forestry and Environmental Sciences
University of Chittagong
Chittagong 4331
Bangladesh