
Non-timber Forest Products and Livelihoods in the Sundarbans

Fatima Tuz Zohora¹

Abstract

The Sundarbans is the largest single block of tidal halophytic mangrove forest in the world. The forest lies at the feet of the Ganges and is spread across areas of Bangladesh and West Bengal, India, forming the seaward fringe of the delta. In addition to its scenic beauty, the forest also contains a great variety of natural resources. Non-timber forest products (NTFPs) play an important role in the livelihoods of local people in the Sundarbans. In this paper I investigate the livelihoods and harvesting practices of two groups of resource harvesters, the bauwalis and mouwalis. I argue that because NTFP harvesters in the Sundarbans are extremely poor, and face a variety of natural, social, and financial risks, government policy directed at managing the region's mangrove forest should take into consideration issues of livelihood. I conclude that because the Sundarbans is such a sensitive area in terms of human populations, extreme poverty, endangered species, and natural disasters, co-management for this site must take into account human as well as non-human elements. Finally, I offer several suggestions towards this end.

Introduction

A biological product that is harvested from a forested area is commonly termed a "non-timber forest product" (NTFP) (Shackleton and Shackleton 2004). The United Nations Food and Agriculture Organization (FAO) defines a non-timber forest product (labeled "non-wood forest product") as "A product of biological origin other than wood derived from forests, other wooded land and trees outside forests" (FAO 2006). For the purpose of this paper, NTFPs are identified as all forest plant and animal products except for timber. The harvesting and processing of NTFPs provides major employment opportunities to poor rural populations worldwide. In Bangladesh, this amounts to a contribution of about 1.3 billion BDT (18.7 million USD) annually to the economy and employment for nearly 300,000 people (Basit 1995).

Bangladesh is home to the world's largest mangrove forest, the Sundarbans, which is not only beautiful to look at, but also contains a great variety of natural forest resources. The Sundarbans plays an important role in the economy of the southwestern region of Bangladesh, as well as in the national economy. It is the single largest source of forest products in the country, constituting forty one percent of total forest revenue and about forty five percent of all the timber and fuelwood outputs of the country (FAO 1998). Considerable employment and income

¹. Divisional Forest Officer, Management Plan Division, Banabhaban, Mohakhali, Dhaka
(fatima26bd@yahoo.com)

generation opportunities for at least half a million poor coastal people come from the various NTFPs and tree plantations of the Sundarbans. Besides these productive functions the forest also provides natural protection against cyclones to the coastal population of Bangladesh (Banik 2004).

Harvesting from the Sundarbans is the traditional occupation of many people living along the periphery of the forest. This paper attempts to better understand the livelihood conditions of two groups of resource harvesters, *bauwalis* and *mouwalis*, and to investigate their harvesting practices in the forest. Bauwalis are harvesters of *golpata* leaves (*Nypa fruticans*) and *goran* wood (*Ceriops decandra*), which is used as fuelwood. Mouwalis, on the other hand, are harvesters of honey and wax. For clarity, in the remainder of this paper I refer to bauwalis as "wood harvesters" and mouwalis as "honey harvesters". Focusing on these two groups of harvesters, I seek to answer the following research questions: 1) what is the livelihood condition of the NTFP harvesters; 2) are there any possibilities for alternative income activities; 3) to what extent are harvesters dependent on moneylenders; 4) which NTFPs are preferable to harvesters and why; and 5) what are current rules for NTFP gathering, and do harvesters try to follow these, why or why not?

Background

The Sundarbans is the largest single block of tidal halophytic mangrove forest in the world. The forest lies at the foot of the Ganges and is spread across areas of Bangladesh and West Bengal, India. It covers 10,000 square kilometers, of which about 6,000 square kilometers are in Bangladesh. Thirty percent of the Sundarbans is comprised of water bodies and the area is divided by three rivers, the Kalindi, Raimangal and Hariabhanga. In addition, the forest is inundated regularly by tidal water, which shapes the area's floral diversity, wildlife, human livelihood patterns, and forest management. Though the Sundarbans has a human population of over four million, much of the area is free of permanent human habitation (FAO 1998).

Table 1: Timber trees and non-timber forest products harvested from the Sundarbans forest

	Bengali name (common name)	Scientific name	Type of resource/Uses
Timbers trees (harvested until 1989)	Sundry	<i>Heritiera fomes</i>	--
	Keora	<i>Sonneratia apetala</i>	--
	Kankra	<i>Bruguiera gymnorhiza</i>	fuelwood
	Passur	<i>Xylocarpus mekongensis</i>	furniture making
	Gewa	<i>Excoecaria agallocha</i>	--
Non-timber forest products	Golpata	<i>Nypa fruticans</i>	leaves / thatching
	Goran	<i>Ceriops decandra</i>	Fuelwood
	Keora	<i>Sonneratia apetala</i>	fuelwood/fruit
	sun grass	<i>Imperata cylindrica</i>	Thatching
	Hental	<i>Phoenix paludosa</i>	leaves/thatching
	Hogla	<i>Typha elephantica</i>	Leaves
	Malia	<i>Cyperus javanicus</i>	bedding mats
	various mangrove barks	--	Tannin
	medicinal plants	--	medical treatments
	honey and beeswax	--	--
	Fish	--	--
Crabs	--	--	

The Sundarbans was declared a reserve forest under the Forest Act of 1927, so entry into the forest is restricted by the Forest Department. Previously, timber harvesting took place in the forest, but was banned in 1989 (Banik 2004). At present, only NTFPs are harvested from the forest. Table 1 lists the major timber varieties harvested until 1989, as well as the NTFPs currently harvested.

People living around the Sundarbans depend on the forest in many ways. They are generally poor and have little education. They harvest NTFPs from the forest for personal use in the household, as well as for sale in the local market. Golpata is known as "poor man's roofing tin" because the poor coastal people use the leaves as a thatching material. Goran, on the other hand, is used as a fuelwood, as it has a very high calorific value and burns with little smoke. People also harvest honey and wax from the forest, which constitutes approximately fifty percent of the honey production in Bangladesh (Zmarlicki, 1994).

Harvesting patterns in the Sundarbans are strongly seasonal. NTFP harvesters harvest golpata and goran during the winter season and harvest honey and wax during summer. During other parts of the year, when not engaged in harvesting NTFPs, people harvest fish, crab, and shrimp fry. In addition, harvesters sometimes engage in agricultural work, shrimp farming, and other small businesses. However, they always wait for the next harvesting season, when they borrow money from moneylenders (known as *mohajons*) and NGOs so that they can harvest NTFPs. Harvested NTFPs,

are then sold to moneylenders at a low rate. In addition to moneylenders, several NGOs² that work in the area also provide funds, however, they concentrate primarily on micro-credit for the very poor to improve their livelihoods.

Methods

Study area

I conducted this study in the Satkhira Range of the Sundarbans. Bordered by agricultural land to the north, the Khulna Range to the east, the Indian Sundarbans and twenty four *pargana zila* (districts) to the west, and the Bay of Bengal to the South, the Satkhira Range is the largest administrative range in the Sundarbans (Banik 2004). The Satkhira Range lies within the Shamnagar Upazila of Satkhira District (Figure 1). Shamnagar Upzila consists of thirteen union parishads, with a total population of 313,781 people. About 14,588 people are involved in agriculture, forestry, and livestock, while 8,135 people are engaged in fishing (BBS 2001)

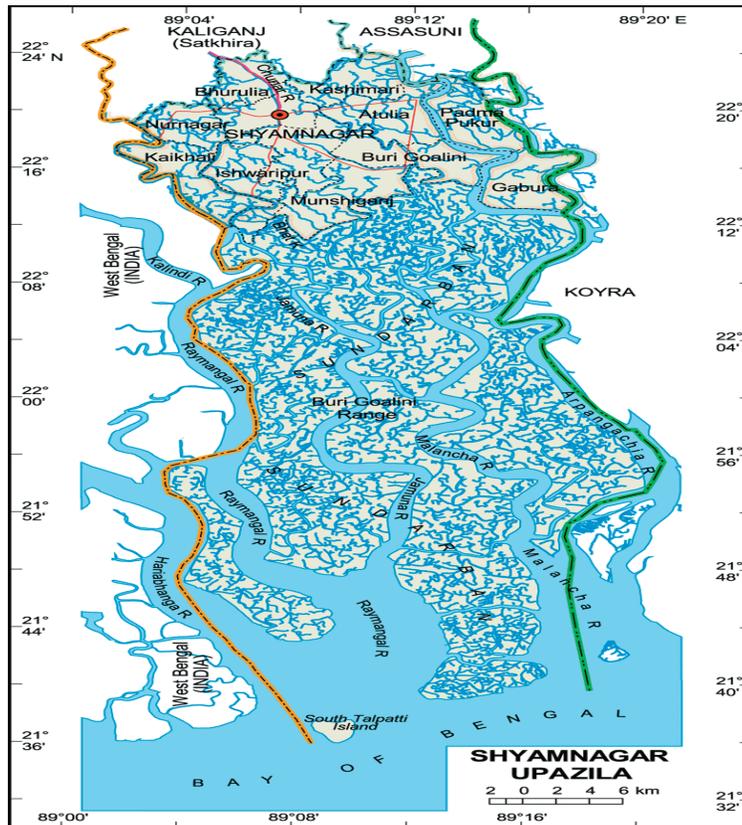


Figure 1: Map of the study area

². NGOs include: BRAC, Noabeki Gonomukhi Samabay Samity, Shushilan, LEDARS, Setu, CARITAS, Nakshi Kantha Mohila Unnayan Sangshtha and Bharasha

Data Collection and Field Techniques

I collected primary data from September 2009 to November 2009. I used questionnaires to profile the community and to learn about NTFP harvesting practices. I chose to collect data in Gabura Union, Atulia Union (Noabeki market), and Burigoalini forest station because most harvesters live in the area, and they come to the Burigoalini forest station to obtain boat licenses and harvesting permits.

I began collecting data at the local forest station office in September. I also collected data in Gabura Union and Atulia Union, where I found many wood harvesters preparing their boats for the next harvesting season. Interviewees were selected through opportunistic sampling. Using a semi-structured questionnaire, I conducted interviews and focus group discussions. I narrowed my interviewee sample to only those who were primary NTFP harvesters and who were harvesting on a valid permit. In November, I made my second trip and visited the Atulia Union and Burigoalini forest station offices. The NTFP harvesters came with their boats to the office to get boat licenses and permits. Through opportunistic sampling I selected amongst the harvesters coming to the Burigoalini forest station, and carried out semi-structured interviews and focus group meetings. Using this sampling technique from September to November 2009, I collected data from a total of fifty nine NTFP harvesters belonging to Atulia, Gabura, and Kashimari Unions. I used simple statistic analysis (such as determining means, averages, percentages, et cetera) to analyze the data.

Results and discussion

NTFP Harvesting Rules

The Bangladesh Forest Department has established rules to govern the collection of NTFPs. In the case of golpata, regulations state that it should not be cut during its growing season, that flowers and fruits should not be damaged, and that the central leaf, as well as one supporting leaf of the central leaf should be spared during harvesting. Cutting should be done at least 9 inches (22.5 cm) from the ground and dead or damaged leaves should be removed from the stand during harvesting.

There are two types of goran in the Sundarbans. Those with a base diameter of more than one inch (2.54 cm) are called *bachai goran*, meaning "selected", while those with a base diameter of less than 1 inch are called *khadi goran*. Selected goran is used for simple construction, roof support, wall structuring, and as a brace to keep young seedlings straight. Khadi goran is most often used for fuelwood. About ninety percent of the goran harvested from the Sundarbans is of khadi quality. When harvesting, at least one individual goran stem should be left in the stand.

For honey harvesting Forest Department rules state that the bee colony should not be permanently damaged and the portion containing larvae should be left during harvest. Honey harvesters should not burn the hive and should take care to only harvest the part of the hive containing honey (Banik 2004).

Harvesting Practices

Wood and honey harvesters work separately from one another but both work in groups of five to ten persons, depending on the size of the boat. Moneylenders contract harvesters for a whole season and pay them a fixed amount of money for each harvesting trip. For wood harvesters, one person acts as a leader or head boatman (known as a head *majhi*). During harvesting, wood harvesters act as day laborers, with the head boatman getting a third of the profit. Sometimes the moneylender may act both as a money lender and as a wood harvester, participating in the harvest.

When harvesters enter the forest, they take all of their supplies, such as drinking water, rice, lentils, vegetables, medicine, and cigarettes to last them for two weeks to a month. All of their daily necessities are paid for by the moneylender. They cook, eat, and sleep on the boat. Sometimes they catch fish from the river, which they cook for meals. A harvesting area, or *gher*, is allotted to smaller groups for harvesting during the day, but all of the harvesters reconvene at night and twenty to twenty five boats stay together. Harvesting is done on the banks of small channels. Because the main boats cannot enter these small channels, harvesters use smaller boats or dinghies to carry the harvested material back to the main boat. Harvesters enter the small channels at low tide and return at high tide with harvested products.

Golpata harvesters cut the base of the leaf and take only an upper seven to ten foot portion of the tree. Then they divide the whole leaf through the midrib and pile them one on top of the other. Harvested golpata is purchased from the government by weight, but sold to the markets by number. Eighty golpata stems make a *pon* and sixteen *pon* equals one *kahon*. After harvest, the product goes to the moneylender and the wood harvesters prepare for the next trip (Banik 2004).

Wood and Thatch Harvesting

The harvesting season for golpata and goran fuelwood runs from November to March. An annual harvesting area is known as a coupe. Every year one forest officer is assigned to each coupe. This officer is assisted by one other coupe officer, some forest guards, and boatmen. At the beginning of the season, the Management Plan Division estimates the harvestable product based on coupe area sampling and guidelines prescribed in the Integrated Resource Management Plan for the Sundarbans Reserved Forest, which is produced by the government. Based on this estimate, the Deputy Chief Conservator of Forests from the Forest Management Plan Division makes a decision on the total amount of harvesting allowed. Wood harvesters who want to obtain a new boat license send a request to the Divisional Forest Office (DFO). With permission from the DFO, the station officer issues new licenses and renews old ones on a first come first entry basis. One inspection officer from the DFO's office checks licenses while cross checking boat dimensions. Government revenue for a single boat license certificate is 3 BDT (0.04 USD) for each twenty five cubic maund³ (932.5 kilograms or 2057 pounds). Entry permits into the forest are given on the 12th, 13th, 14th, 27th, 28th, and 29th of each month of harvesting (Doe and Hasan 2009).

Table 2: Duration boats are permitted to stay in the Sundarbans (Forest Department 2009)

Boat capacity (maunds)	Number of wood collectors allowed	Total time in coupe (days)	Time for travel to coupe (days)	Time for boat mill (days)	Time for travel from coupe (days)	Fridays	Total time permitted (days)
25 to 100	2	9	3	1	3	-	16
101 to 200	3	10	3	1	3	-	17
201 to 300	3	14	3	1	3	-	21
301 to 400	4	16	3	1	3	1	24
401 to 500	5	18	3	1	3	1	26
more than 500	5	24	3	1	3	2	33

After coming from the coupe area, the wood collectors must surrender their certificate to the station office. In exchange they receive a certificate of transit for their harvested materials. The station officer issues a forest case for those who do not surrender their certificate. The present government revenue system for goran fuelwood and golpata are shown in Table 3.

Table 3: Revenue system for goran and golpata (Forest Department 2009).

Product	Amount	Revenue inBDT (USD)
Selected goran	one hundred maund	1200 (17.26)
Khadi goran	one hundred maund	1000 (14.38)
Goran stem	one stem	4 (0.58)
Golpata	one hundred maund	400 (5.76)
Golpata central leaf.	one piece	25 (0.36)
Damaged golpata	one maund	10 (0.14)
Golpata (pon)	one pon	9 (0.13)
Golpata supporting a central leaf	one piece	10 (0.14)
Golpata (clump)	one maund	100 (1.44)

If a boat stays for up to three extra days in the forest, the boat is charged an extra twenty five percent of their revenue. For another three days, the charge is an extra fifty percent of revenue. Each boat is allowed to take four *gewa* logs (*Excoecaria agallocha*), two pieces on each side for buoyancy, but a percentage of the revenue is also collected for this wood (Forest Department 2009).

Honey Harvesting

The harvesting practice of the honey harvesters is somewhat different from that of the wood harvesters. During harvesting, one person stays in the boat while the rest of the group follows a leader, called the *sajuni*. They walk in a row into the forest and search for beehives. The person on the left side of the row is known as the *kor*, and the person on the right side is called the *bair sata*. The *katuni*, who cuts the bee hive, and *ariowala*, who carries the pot, remain in the middle of the row.

The main bee species in the Sundarbans is *Apis dorsata*, but sometimes *Apis cerena* are also found. *Apis dorsata* is a giant bee that is very aggressive in nature and cannot be domesticated. On the other hand, *Apis cerena* is small in size, more passive, and more often found in human settlements. Bees move through the forest in different ways. When searching for flowers, they move indirectly back and forth until they reach a flower. However, when the bees travel from the flower to the hive, they travel in a straight line. In the forest, the honey harvesters follow returning bees until they reach the hive. When one person finds a hive, he calls for the others. The group prepares smoke to drive off the bees by burning *hental* leaves wrapped in a bundle, called *karo*. Finally, they cut down part of the beehive for the honey and beeswax (Karim 2009). Previously, honey collectors used earthen pots called *motka* to store honey, but now they use plastic containers.

The Sundarbans contain a great variety of flowering plants, but bees do not harvest nectar from all of them. The main tree species for honey production are listed in Table 4.

Table 4: Main honey producing trees in the Sundarbans (Banik 2004, Basit 1995).

Bangladeshi name	Scientific name	Remarks
kholshi	<i>Aegicerus corniculatum</i>	best quality
baen	<i>Avicennia officinalis</i>	
kankra	<i>Bruguiera gymnorrhiza</i>	
goran	<i>Ceriops decandra</i>	common
gewa	<i>Excoecaria agallocha</i>	common
jhana	<i>Rhizophora apiculata</i>	
keora	<i>Sonneratia apetala</i>	common
soela / ora	<i>Sonneratia caseolaris</i>	
poshur	<i>Xylocarpus mekongensis</i>	
hargoja	<i>Acanthus illicifolius</i>	
shingra	<i>Cynometra ramiflora</i>	

Ninety percent of the honey and wax produced in the Sundarbans is harvested from the Satkhira Range (Banik 2004). The harvest time is from the first of April to the thirtieth of June. Permits for harvesting are given up to the fifteenth of June.

The total amount of revenue to the government for honey and wax is calculated on the basis of the numbers of harvesters in each boat. Presently, the government revenue system is as follows: each person on a harvesting boat pays 200 BDT (2.88 USD) per month for up to one maund of honey harvested and 150 BDT (2.16 USD) per month for up to one maund of wax harvested. This amount is paid at the station office before harvesting trips. When additional honey and wax is harvested in excess of what was originally paid for, additional revenue is harvested at the same rate without any extra charge (whereas for goran and golpata, additional harvest is charged at double the base rate). No refunds are given if the trip returns empty.

When honey harvesters go to the forest they also gather golpata for thatching to protect their boat's contents from sun and rain. However, in recent years the Forest Department has encouraged the use of plastic sheets for protection rather than natural thatching. When golpata is gathered the Forest Department also collects revenue (Forest Department 2009).

Honey harvesters also use moneylenders to cover expenses for excursions into the forest, later selling harvested products back to the moneylender. The total profit is divided equally among the harvesters, with one share for the boat (this share goes to the moneylender). For example, if there are seven harvesters, the total share will be eight. Harvesters have the right to sell honey to the market, but generally they sell it to the moneylender at the market price. Later on moneylenders sell it to other traders coming from different areas of Bangladesh.

Cultural Practices of Harvesters

Before leaving to harvest, the wood and honey harvesters conduct some religious rituals. Muslims pray to Allah and to the prophet Muhammad. Hindus prepare statues of their goddess, *Bon Bibi*, and pray to her. In addition, they sometimes take a special small piece of red cloth, or paper indicating the blessings from a nearby famous religious person known as a *pir*, or saint, in this case the *Noapara pir*. The wives and mothers of the harvesters also perform some religious activities. They fast and pray for their husbands and sons. All of these activities are for their safety in the jungle while harvesting. All the harvesters take their first step onto their boat in the name of their creator. Sometimes people from one religion will also take on the practices of another before going into the forest. For example, both Hindus and Muslims observe rituals honoring *Bon Bibi* as well as the *Noapara pir* (Karim 2009).

Products from Satkhira Range

As shown in Table 5, the majority of honey, wax and goran fuelwood produced in the Sundarbans is harvested from the Satkhira Range.

Table 5: Total amount of honey and wax production and revenue earned in the Satkhira Range (Forest Department 2009)

Year	Number of permits	Number of honey harvesters	Honey		Wax		Total Revenue (BDT)
			Amount (maund)	Revenue (BDT)	Amount (maund)	Revenue (BDT)	
2008-09	157	1,114	2,910	438,000	547.50	164,250	602,250
2007-08	198	1,452	2,675	535,000	668.75	200,625	735,625
2006-07	227	1,770	3,380	676,000	485.00	253,500	929,500
2005-06	151	1,200	2,051	410,200	512.75	153,825	564,025
2004-05	168	1,305	2,372	474,400	593.00	177,900	652,300
2003-04	132	1,081	2,186	437,200	546.50	163,950	601,150
2002-03	121	963	1,867	373,400	466.75	140,025	513,425
2001-02	84	663	1,358	282,080	339.50	105,370	387,430
2000-01	112	883	1,803	180,300	450.75	67,612	247,912
1999-00	227	1,853	3,718	371,800	929.50	139,425	511,225
1998-99	138	1,165	2,330	233,000	582.50	87,375	320,375
1997-98	111	8,71	1,742	174,200	435.50	65,325	239,525

Livelihood Status of the NTFP Harvesters

The demographic profile of the unions studied (Table 7) shows that the average age of NTFP harvesters is more than forty years old for the three unions. This indicates that the younger generation prefers income generating activities other than NTFP harvesting. The average number of family members in Gabura Union (9) is higher than in the other two unions (6 in each).

An average of fifty percent of respondents in Gabura Union was found to be illiterate; this figure is comparatively low in Kashimari and Atulia Union, at forty three percent and thirteen percent respectively. In Kashimari Union twenty one respondents were found to be educated up to secondary school but no one in Atulia or Gabura Union had reached this level.

Table 6: Demographic profile of unions studied

Criteria	Description	Kashimari (N=14)	Atulia (N=31)	Gabura (N=14)
Average age of respondents		40	41	48
Average number of family members		6	6	9
Traditional occupation		Golpata harvest (wood harvesters)	Goran harvest (wood harvesters)	Honey and wax harvest (honey harvesters)

Literacy (%)	Illiterate	43	13	50
	Can only sign their names	22	74	43
	Primary school	14	13	7
	Secondary school	21	0	0
Housing materials (%)	Katcha: clay and wood huts thatched with golpata	86	90	100% (on the riverside in temporary shanties)
	Semi-katcha: clay huts with tin roofs	7	10	0
	Pacca: brick and cement	7	0	0
Ownership of residence (%)	Own	79	87	100 (government land)
	Others	21	13	0
Sanitary latrine facilities (%)	Yes	86	77	100 (open on the river)
	No	14	23	0
Sources of drinking water (%)	pond sand filter	0	81	100
	Tube –well	100	19	0
Access to boat (%)	Own boat	57	32	0
	Moneylender	43	68	100
Years of experience harvesting NTFP (average)		20	25	23

In Kashimari Union, an average of seven percent of interviewees live in brick houses while no one in Atulia Union has a brick house. Eighty seven percent of respondents in Atulia Union live on their own land, while this figure is only seventy nine percent in Kashimari Union.

Considerably high numbers of the respondents found in Kashimari and Atulia Union use sanitary latrines, (86% and 77% respectively). One hundred percent of harvesters in Kashimari Union use tube-well water for drinking; this figure is only nineteen in Atulia and zero in Gabura.

NTFP harvesters sometimes depend on moneylenders for boats in order to enter the forest area; this was most prominent in Gabura Union, which had a one hundred percent dependency. On the other hand, dependency on moneylenders in Atulia and Kashimari Union was sixty eight percent and forty three percent respectively. Respondents had over twenty years experience in all three unions; and the average number of family members going to harvest was 1.0, 1.1 and 1.3 in Kashimari, Atulia and Gabura Union respectively.

This demographic profile of the NTFP harvesters suggests that they have a low standard of living. Rarely do they live in brick houses with proper sanitation facilities. They have to travel long distances to harvest drinking water, regardless of whether it is from a pond sand filter or tube-well. Respondents from Gabura Union

had the worst standard of living of the three unions.

My findings regarding livelihoods in Gabura Union are strongly reflective of the effects of Cyclone Aila, which struck the coast of Bangladesh on May 25th, 2009. The cyclone destroyed houses, livestock, and food and water sources for many people in the study area, especially those in Gabura Union. At the time of my survey the residents of Gabura were found living in temporary sheds. Residents had to cross a big river in order to harvest drinking water, and were using open latrines built on the river. They were unable to go back to their own homes, which were still under tidal water.

Income Status and Dependency on Moneylenders

I collected data on the average daily income of NTFP harvesters from Atulia, Kashmiri and Gabura Unions during the off-season, when NTFP are not gathered. Income came from activities other than gathering NTFP. On average, the respondents of Kashmiri Union had a higher income than the respondents of Atulia and Gabura Union, as shown in Figure 2. Respondents of Atulia Union earned more than those of Gabura Union, but less than the respondents of Kashmiri Union (Figure 2). This data suggests that the respondents of Gabura Union are poorer than the respondents from the other two unions.

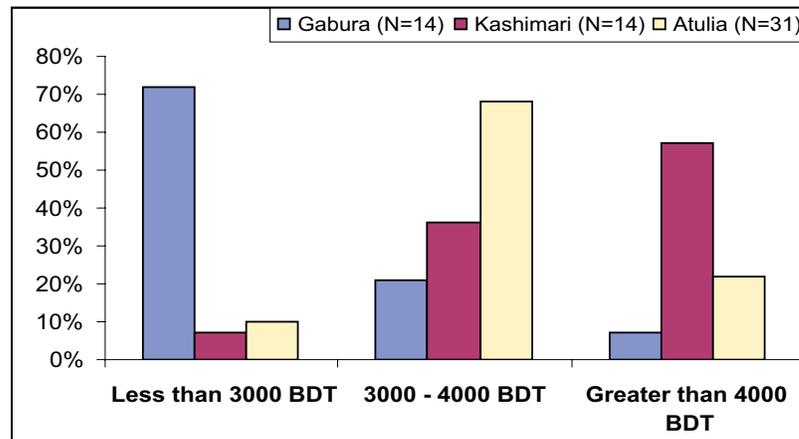


Figure 2: Monthly income status of NTFP harvesters during off-season

During harvesting season, NTFP harvesters depend on NGOs and moneylenders for funds. As shown in Table 8, just less than three quarters of harvesters in Atulia and Kashmiri unions depend on moneylenders for loans, while in Gabura Union all the harvesters I interviewed depend on moneylenders for funds. Dependency on NGOs in Atulia and Kashmiri unions appears to be higher compared to Gabura Union. Several NGOs work in the study area; they provide funding with the goal of improving the living standards of poor people there.

Table 7: Sources of funds for NTFP harvesters during harvesting season.

Union	NGOs	Moneylenders
Atulia (N=31)	26	74
Kashimari (N=14)	29	71
Gabura (N=14)	0	100

Over the last 8 years, in the Satkhira Range 7,528 people harvested golpata and 14,975 people harvested goran on valid permits (Table 8). However, most NTFP harvesters depend on moneylenders for funds, which causes problems. Harvesters harvest NTFPs and sell them to moneylenders at a low rate, who then sell the products at market at a higher rate, so the profit from NTFPs ultimately goes to the moneylenders. Though this pattern has continued for years, at present it appears that there is the potential for change because many NGOs are now working in the area and harvesters are eager for interest free flexible loans with easy repayment systems. The harvesters have to work in a risky forest environment and so donors should take this into consideration.

Though many people (10 out of 14) in Gabura are members of NGOs such as BRAC, Grameen Bank, or Noabeki Gonomukhi Samabay Samity, the credit facilities of the NGOs are less flexible for harvesters. NGOs strongly enforce timely repayment of loans, which does not fit the income patterns of most NTFP harvesters, as they are in a high-risk occupation that requires a lump sum at the outset. A single harvesting trip

Table 8: Forest product and revenue collection records from Satkhira Range over the last nine years (Forest Department 2009)

Forest Produce	Year	Number of Permits	Number of persons	Amount of produce	Revenue collected (BDT)	Remarks
Golpata (maund)	2008-09	347	1,940	140,211	560,844	Extraction banned in 2007 -08 due to Cyclone Sidr in 2007
	2007-08	-	-	-	-	
	2006-07	255	1,080	92,951	371,804	
	2005-06	326	1,341	108,799	435,196	
	2004-05	165	699	60,566	242,264	
	2003-04	140	625	56,888	227,552	
	2002-03	182	836	78,432	470,592	
	2001-02	222	1,007	95,422	417,828	
Goran (maund)	2008-09	-	-	-	-	Extraction banned in 2007 -08 and in 2008-09 due to Cyclone Sidr in 2007
	2007-08	-	-	-	-	
	2006-07	569	2,540	223,580	2,282,864	
	2005-06	609	2,632	222,609	2,271,054	
	2004-05	556	2,275	186,581	1,929,980	
	2003-04	572	2,482	209,535	2,173,880	
	2002-03	517	2,053	200,302	2,069,124	

	2001-02	398	2,993	272,407	1,910,726	
Gewa (cubic feet)	2008-09	-	-	3,636.32	127,271	Gewa is extracted for buoyancy and used as a supporting pole on both sides of the goran and golpata carrying boats
	2007-08	-	-	1,009.56	49,894	
	2006-07	-	-	8,534.46	298,706	
	2005-06	-	-	5,037.02	176,295	
	2004-05	-	-	2,103.65	74,242	
	2003-04	-	-	3,761.18	132,103	
	2002-03	-	-	5,214.01	234,630	
	2001-02	-	-	10,855.98	203,890	

requires a large amount of money, but many NGOs do not give out such large amounts. Furthermore, in the harvesting season NTFP harvesters face threats from environmental calamities, bandits and wild animals. Wood and honey harvesters in particular face high risks from tiger attacks because they spend a significant amount of time in the forest interior. Sometimes these types of hazards drive harvesters to return early from harvesting trips, so they often have difficulties repaying their NGO loans. Therefore, NTFP harvesters are habituated to the traditional money lending system, even though it is not very profitable for them.

Traditional Occupations: which NTFP are Preferable and why?

Sometimes single individuals work harvesting honey and wax from April to June, while also harvesting golpata and goran from November to March. Figure 3 depicts the average numbers of harvesters from the three unions who harvest different products in different seasons. I also investigated harvesters' choices of which NTFP to gather. In Gabura Union an average of sixty four percent of harvesters were found to harvest only honey and wax, whereas in Gabura and Atulia thirty five percent reported harvesting golpata, goran, honey, and wax. An average of sixty four percent of harvesters in Atulia Union harvest only golpata. In Kashimari fifty percent of respondents harvest golpata and goran whereas only forty two percent of harvesters harvest only golpata.

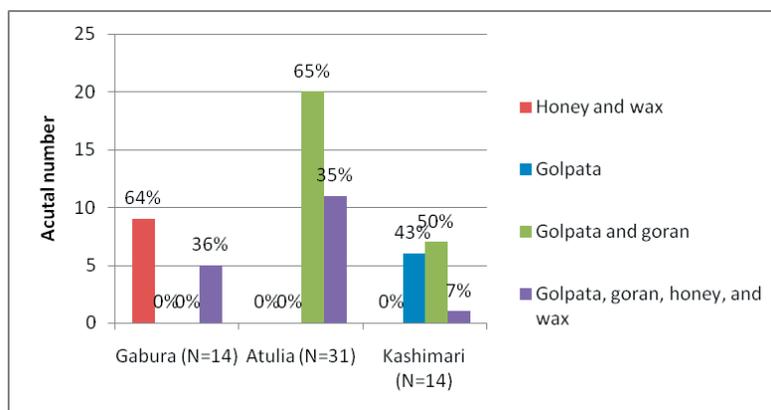


Fig 3: NTFP preferences among harvesters in study area

Though the respondents harvest different products during different times, this study found that harvesters had special preferences for particular products. In general, respondents from Kashimari Union preferred golpata, because it is their traditional profession. Also, golpata is harvested from river bank areas, while goran is harvested from the interior forest, so goran harvesting is more risky in terms of possible wildlife attacks. Respondents in Atulia Union preferred goran, as there is a high market demand for it. They think golpata is too big in size and difficult to handle in comparison to goran. Golpata is used for roof thatching, but goran is needed to build roof structures and wall supports, and for making boundary walls. Harvesting honey and wax, on the other hand, requires special techniques and skills, which is the traditional profession of residents of Gabura Union, so respondents there said they like it. Harvesting honey and wax is more risky than harvesting golpata and goran. Honey harvesters have to walk deep into the forest in search of beehives. They have to look up into the trees and get little chance to keep watch around them, which puts them in greater danger of wildlife attacks. That is why most of the respondents from the Atulia and Kashimari Union do not like gathering honey and wax.

Honey harvesting from the mangroves is a promising business, but harvesters do not have proper storage facilities and so often they cannot maintain the quality of honey. Also, they use primitive methods for extracting the honey from the combs, and a fair amount is wasted due to spoilage. Initiative should be taken to improve the quality of honey and to increase the quantity of harvests. Although beekeeping is not allowed inside the Sundarbans, value additions for the honey such as better harvesting, extraction, preservation and storage techniques should be explored

I noticed that after Cyclone Sidr in 2007, all forest extraction including golpata and goran was banned. From 2008-09 golpata extraction was again allowed but up to the time of my study, goran harvesting was still prohibited. In the meantime, Cyclone Aila struck the coastal area in 2009 and destroyed many houses. This created a high demand for goran stems for building walls and roofing structures. I found respondents from Atulia Union eagerly awaiting permission to harvest goran in order to meet the increasing demand for building materials.

Sometimes government decisions may become troublesome for harvesters; this was apparent when harvesting was banned after Cyclone Sidr (Daily Star 2007). On the one hand, Sidr destroyed houses, while on the other hand government decisions concerning harvesting limited the income generating activities of residents. Therefore, it was a very difficult time for harvesters in the region. Although harvesters believe that the government decision to ban gathering may be right for the sustainability of the forest, it did not fit well with their livelihood needs.

Alternative Income Generation Patterns

During the off-season, NTFP harvesters engage in a variety of different income generating activities. Fig. 4 shows the total numbers of respondents involved in alternative income generating activities. Among the three unions, the main off-season activities are fishing and day labor, although these activities are unevenly distributed across villages. In Gabura the top off-season occupation for respondents is river

fishing, which is absent in the other two study locations. The top off-season occupations in Atulia and Kashimari Union are land based: In Atulia most people work as day laborers, while in Kashimari people work in a wide range of different occupations. There is less diversity of occupations in Gabura than the other two unions, in other words the people there have fewer choices if their main occupations fail.

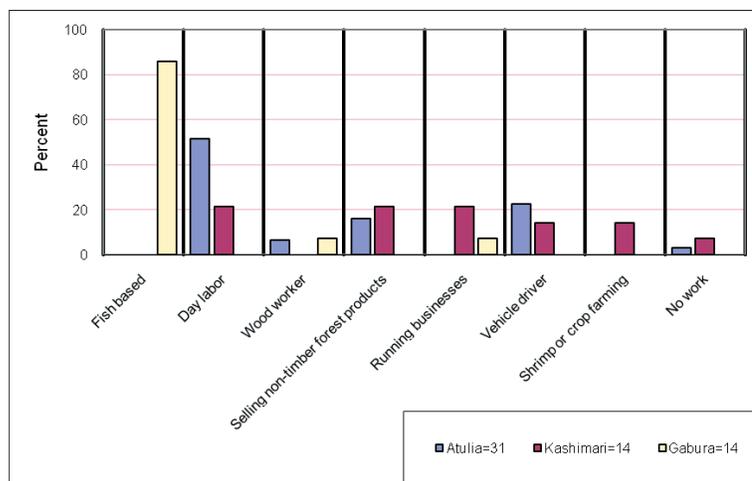


Figure 4: Percentage of NTFP harvesters involved in various alternative income generating activities

Out of fifty nine NTFP harvesters interviewed in Atulia, Kashimari and Gabura Union, eighty six percent of Gabura harvesters worked as fishers in the off-season. In Atulia fifty one percent of respondents worked as day laborers during the off-season, but in Kashimari this figure was only twenty one percent. Another twenty one percent of respondents from Kashimari engaged in selling fuelwood, vegetables, and other NTFPs, while a further twenty one percent said they run small businesses in the off-season. Twenty percent of people in Atulia reported that they drive vehicles both in the town and in the local area. About seven percent of people in Kashimari and three percent in Atulia reported being without any work during the off-season.

Do the Harvesters Follow Rules in the Forest?

In this study I found that both wood and honey harvesters do not always follow the harvesting and cutting rules in the forest. However, this is not due to a lack of awareness. All of the harvesters interviewed were aware of the harvesting and cutting rules prescribed by the government. In group discussions I found that harvesters believe that if they do not follow sustainable harvesting practices, they will not get any product during the next harvesting season. The respondents had an average of twenty three years of experience in harvesting, so they had a great deal of understanding about the forest. I contend that these harvesters are conscious about issues relating to the sustainability of the forest. But at the same time, they confessed that they cannot always follow regulations. When they enter the forest, they are often in a hurry to harvest products. This is because they compete amongst themselves to

rapidly harvest the maximum amount of product; as soon as one harvesting trip is complete, they can go for the next one. In their rush, sometimes harvesters are made to pay compensation for damage to the forest; they are charged extra by the coupe officer for damage to any NTFP.

Main Problems of Harvesters

The main problem that wood and honey harvesters face is a lack of funds. They are totally dependent on NGOs and moneylenders for funding. Other problems include bandits and the forest environment itself. This study found that all respondents have encountered bandits while harvesting. Bandits take water and food supplies and demand ransom money for captured individuals. If the harvesters fail to pay the ransom money then the bandits take one or two people from the boat as hostages and demand extra ransom money from their families. Respondents lamented that though they can get rid of tigers and crocodiles, they cannot get rid of bandits.

Furthermore, during every harvesting season some harvesters are killed by tigers, crocodiles, and other wild animals. The figure is greater for the honey harvesters, who spend much of their time working in the deep forest looking up into the treetops rather than watching the ground for danger. There is no treatment facility inside the forest area, and the nearest hospital is at least eighty kilometers away. All movement in the Sundarbans depends on tidal patterns. If anyone is injured they may have to wait a long time if the tide is against them.

Table 9: Numbers of honey harvesters who have faced tiger attacks while harvesting in the forest area of Satkhira Rain (Forest Department 2009).

Year	Injuries	Fatalities	Total
2008-09	-	5	5
2007-08	-	3	3
2006-07	-	-	-
2005-06	-	-	-
2004-05	2	-	2
2003-04	-	4	4
2002-03	1	3	4
2001-02	-	-	-
2000-01	-	6	6
1999-2000	-	6	6
1998-1999	-	-	-
1997-1998	-	-	-
1996-1997	-	-	-
1995-96	-	1	1
1994-95	-	1	1

From the Satkhira Range Office I found that between 1980 and 2009 a total of 116 villagers were killed by tigers and 27 people were injured. According to the NGO, *LEADERS*, over the last 30 years 291 people from Gabura Union were killed and 37 people were injured by tiger attacks. Research done by *LEADERS* also suggests that after cyclones Sidr and Aila the dependency of villagers on the forest has increased and therefore human/wildlife encounters have also increased (Mahmud 2010).

At the behest of the Forest Department, since about 2003, the Sandhani Life Insurance Company has set up desks at forest stations throughout Sundarban. All of the harvesters now make life insurance agreements before going to harvest. This insurance is mandatory and the premium costs 100 BDT (1.44 USD) per person. If a person is killed in the forest during harvest, their family will receive 25,000 BDT (361 USD). However, this amount is generally considered very low (Forest Department 2009).

Conclusion and recommendations

NTFPs play an important role in the livelihoods of local people in the Sundarbans region. People here use golpata and goran for building and for cooking (goran only). Honey is a great source of nutrition. By selling harvested products harvesters are able to meet the needs of their families. They complete one harvesting trip and wait for the next one.

This study found that the NTFP harvesters are poor with limited livelihood capacities. They have to walk for long distances in search of drinking water. They live in clay houses shaded with goran and golpata. Their family sizes are somewhat big and all of the members are not properly educated. During the off-season harvesters have little opportunities for other sources of income and many people move to metropolitan areas in search of jobs. NTFP harvesters in the Sundarbans live in a part of the country that very often faces environmental calamities.

In addition, I found that NTFP harvesters in the Sundarbans work in an extremely hazardous environment. They work on muddy forest floors full of pneumatophores (Roots that grow above ground) and poor harvesters do not always have proper clothing. Bandits may attack at any time, and sometimes harvesters may lose their harvested products due to environmental calamities. Wild animals are also an ever-present danger and there are no medical facilities nearby to help those injured in the forest area. Even severely injured persons must wait for a couple of days for proper treatment. Government policy should take into consideration the problems confronting harvesters.

Several steps should be taken to help NTFP harvesters increase their incomes and efficiency and improve their livelihoods. Possible actions might include value additions for honey, more favorable loan conditions for wood and leaf harvesters, improved safety and security in the forest, and better health facilities to ensure less lost work days. Perhaps most importantly, forest policy should take the plight of the local poor into consideration, especially when natural disasters occur.

This study suggests that the government and NGOs can take initiative for the betterment of NTFP harvesters in terms of their livelihood security and their personal safety, as well as their financial means. Temporary floating hospitals need to be established in the harvesting area. Patrolling by forest and coast guards also needs to be increased to control the activities of bandits. In addition, easy interest free loans are a must for the benefit of the harvesters.

To ensure the sustainability of NTFPs, harvesters should follow rules for cutting and should not break established rules; the Forest Department should take proper steps to insure this. From an administrative point of view, this means finding ways to reach the poorest harvesters, help relieve them of their dependence on moneylenders, and find other occupations for them during the off-season. This is a complex situation that should be investigated further.

The Sundarbans Biodiversity Conservation Project or SBCP (2000-2004) was a large-scale attempt at resource management in the Sundarbans. Some well-intended activities of the project put local poor people at a disadvantage due to poor planning; any future co-management efforts in the area must be cautious of this. In fact, the Sundarbans is such a sensitive area in terms of human populations, extreme poverty, endangered species, and natural disasters, that the suitability of co-management for this site must be very carefully examined.

References

- Banik, H. 2004. *Bangladesher Sundarban*. Shitutuni Book House, Comilla, Bangladesh.
- Basit, M. 1995. "Non-Wood Forest Products from the Mangrove Forests of Bangladesh," in *Beyond Timber: Social, Economic and Cultural Dimensions of Non-Wood Forest Products in Asia and the Pacific*. Proceedings of a Regional Expert Consultation held in Bangkok, Thailand, 28 November to 2 December 1994. Edited by P. B. Durst and A. Bishop, pp. 193-200. Bangkok: Regional Office for Asia and the Pacific of the Food and Agriculture Organization of the United Nations (RAP/FAO).
- BBS (Bangladesh Bureau of Statistics). 2001. Population Census, Satkhira Zila. Ministry of Planning, Dhaka, Bangladesh.
- The Daily Star, 2007, "Hurricane strikes Khulna Barishal coast." *The Daily Star*, November 16, 2007. URL: [Accessed on February 7, 2010] <http://www.thedailystar.net/newDesign/news-details.php?nid=11868>
- Doe, M. K. and J. Hasan. 2010. Telephone interview. February 2, 2010.
- FAO (Food and Agriculture Organization of the United Nations). 1998. Integrated resource development of the Sundarbans reserved forest project findings and recommendations. United Nations Development Programme.
- FAO (Food and Agriculture Organization of the United Nations). 2006. Responsible management of planted forests: voluntary guidelines. Food and Agriculture Organization of the United Nations: Rome.
- Forest Department. 2009. Official files (compiled by author). Satkhira Range Office, Forest Department, Bangladesh.
- Karim, R. 2009. Personal communication. November 24, 2009.
- Mahmud, I. 2010. "Manusher bosotite bagh, bagher bone manush (Human in the forest and tigers in the locality)," in *The Daily Prothom Alo*, vol. 12.
- Shackleton, C., and S. Shackleton. 2004. The Importance of Non-Timber Forest Products in Rural Livelihood Security and as Safety Nets: A Review of Evidence from South Africa. *South African Journal of Science* 100:658-664.
- Zmarlicki, C.B. 1994. Draft Final Report on the Development of Apiculture. FAO/UNDP, BGD/84/056, Integrated Resource Development of the Sundarbans Reserved Forest, Khulna, Bangladesh.