

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/236903099>

# Rural livelihoods of Rohingya refugees in Bangladesh and their impacts on forests: The case of Teknaf Wildlife...

Chapter · January 2012

DOI: 10.13140/2.1.2406.2409

CITATIONS

0

READS

676

4 authors, including:



**Mohammed Abu Sayed Arfin Khan**

Shahjalal University of Science and Technology

35 PUBLICATIONS 190 CITATIONS

SEE PROFILE



**C. Emdad Haque**

University of Manitoba

18 PUBLICATIONS 27 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



EVENT 3\_climate impact research [View project](#)



SIGNAL - European gradients of resilience in the face of climate extremes [View project](#)

## Chapter-Eight

### **Rural livelihoods of *Rohingya* refugees in Bangladesh and their impacts on forests: The case of Teknaf Wildlife Sanctuary**

**Mohammed Abu Sayed Arfin Khan<sup>a, c</sup>**  
**Mohammed Salim Uddin<sup>b, c</sup>**  
**C. Emdad Haque<sup>b</sup>**

<sup>a</sup> Department of Disturbance Ecology, University of Bayreuth, D-95440 Bayreuth, Germany

<sup>b</sup> Natural Resources Institute, University of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada

<sup>c</sup> Department of Forestry and Environmental Science, Shahjalal University of Science and Technology, Sylhet, Bangladesh

#### **8.1 Introduction**

In many of the countries of the developing world, forest- related activities are an integral part of livelihood of millions of people as well as they are the main source of income (Byron and Arnold, 1999 [789]). When livelihood options are limited, economic activities may place forests under threat (Ghimere, 1996 [305]) as poor people live in or at the periphery of natural forests or woodlands and have easy access to forests (Calibre and SCC, 2000). Refugees who leave their country of origin face even more precarious situation (Khan, 2007 [2]; Krishnaswamy and Hanson, 1999). Often they are forced to live in crowded and unfamiliar situations and totally rely on forest resources for their livelihood activities if they are located near forested areas (Uddin and Khan, 2007 [150]).

Most people living in the world's forested landscapes are poor, and they are growing at a rapid rate (Scherr, 1999). The World Bank estimates that roughly a quarter of the world's poor and 90 percent of the poorest depend substantially on forests for their livelihoods (World Bank, 2001). In India, two thirds of forests are in economically poorer tribal areas; some 100 million people are estimated to be forest dwellers, while another 275 million live in the vicinity of forests (Kumer and Saxena, 2002). As livelihoods of these people depend on accessing forest products and services, their economic activities can have positive or negative impacts on forests and their conservation. For this reason it is important to understand forest dwellers' livelihoods, their perceived needs, and their development strategies.

In recent decades, in many developing countries, the refugees became active users of the forest resource, which generated extra pressure on the forest and have created scarcity of forest resources (Khan et al., 2009 [76]; Birendra and Nagata, 2006 [305]; Hall et al., 1997; Hart and Hall, 1996; Prunier, 1995 [389]; Said et al., 1995 [1]). In Terai forest of Nepal, for example, after the entrance of 100,000 Bhutanese refugees since 1992 who left their home country because of cultural harassment (Baral 1996 [152]), the demand of forest resources increased substantially (Birendra and Nagata, 2006 [305]). Large-scale intrusion into forest areas by refugees for both fuel and timber has created scarcity of forest resources. As well, over the past several years, the wildlife populations of forest areas (e.g. Garamba National Park, Kahuzi-Biega National Park, Okapi Wildlife Reserve) have been severely depleted due to poaching by refugees (Plumptre et al., 2000 [617]).

Presently, in Bangladesh, one of the major concerns for Teknaf Wildlife Sanctuary (TWS) is about the settlement and socioeconomic activities of the Rohingya refugees (Khan, 2007 [2]). The Rohingya refugees were migrated from Rakhine State in Myanmar to Bangladesh in the early sixties (Mollah *et al.*, 2004). By 1992, about 233,000 Rohingyas had been resettled in Myanmar and some 30,000 remained in Cox's Bazar, most of them in Teknaf (Bari and Dutta, 2004). Very recently, due to religious violence between Buddhists and Muslims (Rohingya) in the Rakhine state (previously was Arakan state), a considerable number of Rohingya already crossed Bangladesh border by boat and other transportation means (The Independent, June 17, 2012). At present about 28,000 Rohingya refugees were reported waiting at Kutupalong and Nayapara camps in Cox's Bazar district for repatriation. There are two camps (Nayapara and Kutupalong refugee camps) located inside the reserve, which support a population of 12,617 Rohingyas (Personal communication, 2008). Large populations of Rohingyas also live outside the camp in the south and southeastern parts of the country. The estimates by numerous sources (IRW 2009; Uddin and Khan, 2007 [153]; Sajjad, 2003) place the figure between 150,000 and 200,000 people. They are not recognized as "refugees" (as they are living outside the camp and mixed with the local community) and are seen by the UNHCR and the government of Bangladesh as illegal immigrants (IRW, 2009; Uddin and Khan, 2007 [153]; Sajjad, 2003).

As a strategy to settle down in Bangladesh, the Rohingyas, who have been encroaching in the forest, have attempted to make matrimonial alliance and kinship with local encroachers and villagers within or nearby forests. They are also engaged in illegal felling, hunting and fuel wood collection which are ultimately destroying the TWS (Mollah, *et al.*, 2004). The Teknaf range had almost 100 per cent forest cover in 1980. By 1990 it dropped to 55 per cent. Current data show only 8 per cent of natural forest remains in TWS (NSP, 2006). At least 92 per cent forest area of TWS and the habitat of wildlife have disappeared during the last 25 years (Jahangir, 2005). To save the

wildlife sanctuary and biodiversity of that area it was prime concern to evaluate the main reasons behind it. Therefore, we conducted the present study in two villages namely, Ledha and Kerontoly within the TWS in southern Bangladesh. We attempted to map out various livelihood activities of Rohingya refugees and assess their overall impacts on the wildlife sanctuary.

## 8.2 Methodology

### Study area

Cox's Bazaar South Forest Division manages the Teknaf Wildlife Sanctuary (TWS). It was notified as Wildlife Sanctuary on 24 March, 2010. Earlier, it was the only game reserve in Bangladesh named as Teknaf Game Reserve, part of the former Teknaf Reserve Forest, and was formally established through a gazette notification in 1983 under the Wildlife Act of 1973 (Nishorgo, 2011). More information about this sanctuary is given in the Table 1.

**Table 1:** Description of the study area (TWS; **Figure 1**)

<b>Items</b>	<b>Description</b>
Location	TWS is situated in the southern part of Bangladesh. It lies in between 22 <sup>0</sup> 52' - 21 <sup>0</sup> 29' N and 92 <sup>0</sup> 08' - 92 <sup>0</sup> 18' E.
Area	Total: 11,615 ha
Climate	Temperature ranges from 15° C (aver. minimum) to 32° C (aver. maximum) Rainfall ranges between 130 mm to 940 mm Humidity ranges from 27% (average minimum) to 99% (average maximum)
Soil	Clay loam on level grounds and from sandy loam to coarse sand on hilly land
No. of ranges	03
No. of beats	11
No. of villages	115
Forest products	Fuel-wood, Sun-grass, Timber, Fodder, Bamboo, Medicinal plants etc.

(**Source:** Nishorgo, 2011; Uddin and Khan, 2006)

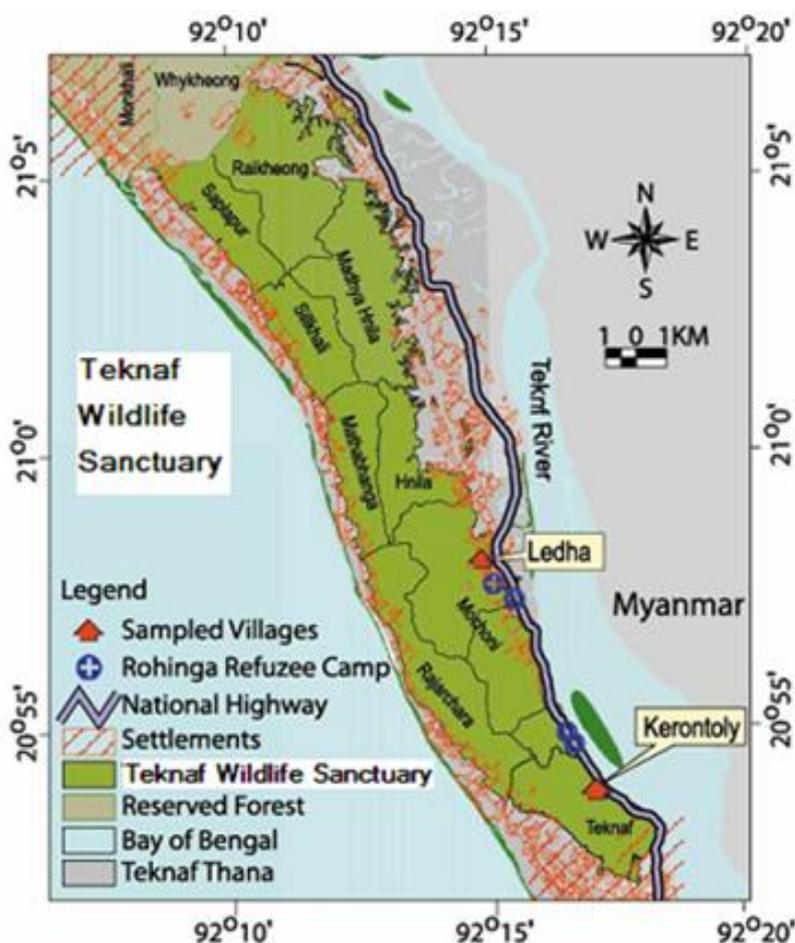
### Methods

At first we performed a reconnaissance survey to obtain the preliminary idea of the locality and the people. We conducted our study in two phases; firstly we developed a community profile and then completed the household interviews.

#### *Development of community profile*

We used a number of methods to progressively build up a more complete understanding of the community where they are working. These methods act as tools for communication with Rohingya refugees. Two community maps were developed by the Rohingya refugees of Ledha and Kerontoly which provided a valuable visual reference for discussion with them. It identified and located key resources, social and economic groups and their livelihood activities. Based on community map we

conducted transect walk to validate information from community mapping. We conducted four focus group discussions (FGDs) to learn more about the livelihoods and social conditions of refugees. In FGDs, we included the local forest staff, officials, settlement heads, resource user's groups, local leaders and Rohingya refugees for obtaining information about the existing livelihoods in this locality. In the FGDs, we also asked all the members to give their opinion about the main causes of forest destruction in TWS. Each and everyone were requested for listing 5 main causes. According to the serial of their 5 preferred causes we allocated 5 distinct values for each such as 0.5, 0.4, 0.3, 0.2 and 0.1 respectively. Finally we ranked all the main causes of forest destruction in TWS. We also selected a key informer for gathering information who has in-depth knowledge about the community and a particular aspect of the community.



**Figure 1:** Map of the study area indicating the study villages  
(Source: Adapted from Uddin and Khan, 2007)

### *Completion of household interviews*

We selected two villages out of 115 namely, Ledha and Kerontoly (**Figure 1**) by multi-stage random sampling. Out of 198 Rohingya households within the two villages, we selected 40 households for interviews randomly (**Table 2**). Sampling intensity was 20%. From each household,

age old male or female was selected for interview because they were experienced and leader of the family. We used a semi-structured questionnaire by which plenty of open ended and closed-ended questions were asked to them. This provided data on the resource collection and amounts of collection from the forest by head loads and shoulder loads. We also conducted a field observation to study the extraction patterns of forest resources.

**Table 2:** Description of the sampled villages (Ledha and Kerontoly)

Items	Village 1 (Ledha)	Village 2 (Kerontoly)
Location	Mochuni beat	Teknaf beat
No. of Rohingya HHs	117	81
No. of HHs sampled	24	16

### 8.3 Result and Discussion

Rohingya refugees lived in both study villages together with local people. Family sizes of Rohingyas were comparatively large, ranging from three to fourteen people, since most of the families were combined (brothers, sisters and their families living in one household). Maximum families fall in the group (>6-7) and average household size was 6.2 people per households. About 82.5% respondents were not formally educated and mainly involved in forest resources collection. Reason of high illiteracy rate was that parents do not send their children to school during the working hours keeping them at home to work and help provide for the household's activities. Among people who have some schooling, the highest percentage is 7.5 % (1 year) followed by 5% (>2-5 years).

It was revealed that 100% of Rohingya refugees were landless. All the Rohingya refugees lived in areas that were officially part of the TWS. Among Rohingya refugees who farm, the average household has only 0.09 ha own encroached land (refugees arriving between 1960 and 1970 were able to encroach land), and 0.06 ha encroached land that were leased from local people (**Table 3**). Respondents were asked about their income from different activities, and calculate the monthly income which were very poor-60% (Tk. 1000-2000), poor-27.5 % (>2000-4000), middle-10% (>4000-6000) and rich- 2.5% (>6000) (Table).

People in our study sites made their homes from tin, mud, bamboo, sun-grasses and other products. We classified housing into five patterns (**Table 3**). Most houses of Rohingyas were made of sun-grass and mud (40%). In the study we explored that Rohingya refugees preferred (5-10 years ago) to make their homes with sun-grass and bamboo. But in recent times they preferred category no. 3 which was sun-grass and mud.

**Table 3:** Demographic characteristics of Rohingya refugees in the study areas

Variable name	Frequency	Percent	Cumulative percent
<b>1. Family size</b>			
<5	3	7.5	7.5
>5-6	9	22.5	30
>6-7	16	40	70
>7-8	7	17.5	87.5
>8	5	12.5	100
<b>2. Education (Years of schooling of the respondents)</b>			
0	33	82.5	82.5
1	3	7.5	90
2	1	2.5	92.5
>2-5	2	5	97.5
>5	1	2.5	100
<b>3. Land holding pattern (ha/respondents)</b>			
<i>Encroached</i>			
<0.09	10	25	25
>0.09	7	17.5	42.5
<i>Rent</i>			
<0.06	15	37.5	80
>0.06	8	20	100
<b>4. Economic Status (BDT)</b>			
Very poor (1000-2000)	24	60	60
Poor (>2000-4000)	11	27.5	87.5
Medium (>4000-6000)	4	10	97.5
Rich (>6000)	1	2.5	100
<b>5. Housing pattern</b>			
Tin shed + mud	4	10	10
Tin shed + bamboo	6	15	25
Sun-grass + mud	16	40	65
Sun-grass + bamboo	12	30	95
Others	2	5	100

### Dependency rate on forest

Rohingya refugees lived within and on the periphery of the wildlife sanctuary depending on the forest directly or indirectly for fuel-wood, house building materials, fruits, vegetables, bamboo, cane, medicinal plants, fodder and other products. We found that they depend on forest for many of their daily household needs and also rely on forest products as a source of additional income. We also classified Rohingyas according to their degree of forest dependency: totally dependent, moderately dependent and less dependent. We found 92.5 % of the Rohingyas to be totally dependent, 5 % to be moderately dependent and 2.5 % to be less dependent (**Figure 2**).

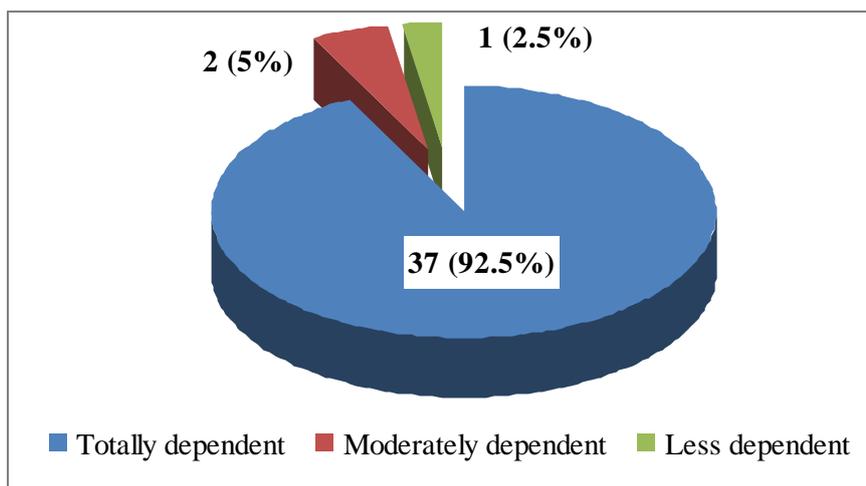


Figure 2: Dependency rate of Rohingya refugees on TWS

### Main causes of forest destruction

We explored the main causes of forest destruction in the TWS through FGD. We identified 12 causes which included over exploitation of fuel-wood, make fire for better sun-grass regeneration, illicit felling, bamboo and cane extraction, brickfield within the forest, grazing, betel leaf cultivation within the forest, encroachment of forest land, medicinal plant and vegetables collection, green and dry leaves collection, sand and stone collection and hunting. Among these twelve causes, Rohingyas were actively involved with eight activities. However, they were engaged as day labour in the brickfield, sand and stone collection and betel leaf cultivation. Rohingyas were not involved in grazing as they have no cattle. Based on the respondent’s opinion in FGDs, we ranked all causes of forest destruction (**Figure 3**). Among all causes over exploitation of fuel-wood ranked as one of the main reasons of TWS destruction.

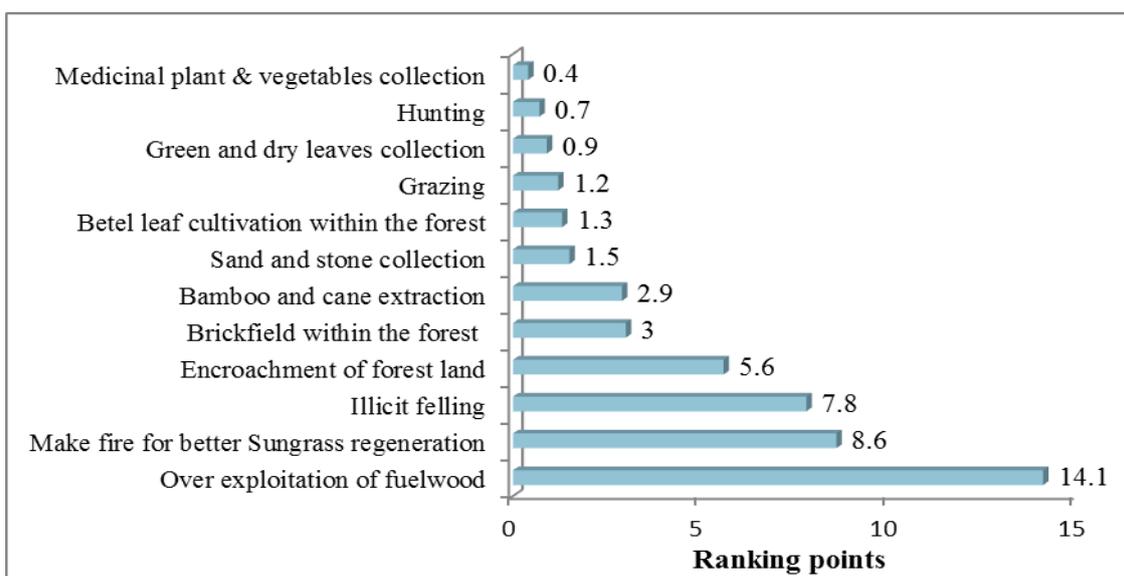


Figure 3: Main cause of forest destruction in the study areas

## Livelihood activities of Rohingya refugees

We revealed that forest-related activities are an integral part of Rohingya's livelihood activities and strategies. They were engaged in various livelihoods activities such as fuel-wood collection and extraction of other forest products. Rohingya refugees engaged in 13 livelihood activities in the study area (**Table 4**). We found that 85% of households were engaged in fuel-wood collection, 50% in sun-grass collection, and 22.5% in illicit felling. These activities have major impacts on the wildlife sanctuary and we classified these as having high risk. We further found that 27.5% of households collected bamboo and extract cane which ranked as having medium risk. We considered collecting medicinal plant and vegetables as well as various types of green and dry leaves and hunting as having low risk (**Figure 5**). However, other 5 livelihood activities have no impact on TWS.

**Table 4:** Livelihood activities of Rohingya households in the study area

No.	Livelihood Activity	Frequency (n=40)	Percentage (%)
01	Fuel-wood collection	34	85
02	Sun-grass collection	20	50
03	Illicit felling	9	22.5
04	Bamboo and cane extraction	11	27.5
05	Medicinal plant & vegetables collection	10	25
06	Green and dry leaves collection	6	15
07	Hunting	2	5
08	Rickshaw pulling	2	5
09	Grocer	1	2.5
10	Fishing	7	17.5
11	Shrimp fry catching	8	20
12	Small business	5	12.5
13	Day labor	19	47.5

### *Fuel-wood collection*

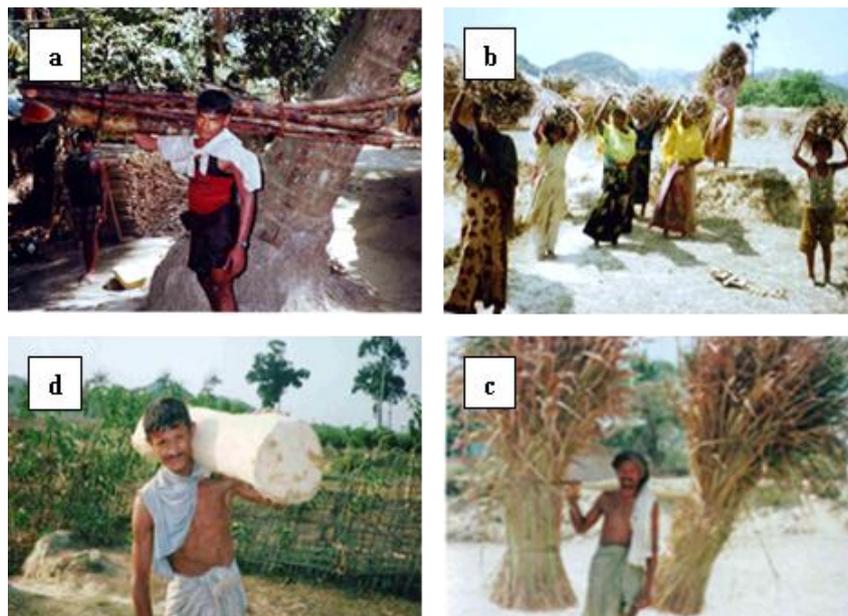
Fuel-wood collection was a major and extensively practiced activity in the TWS (**Figure 4a & 4b**). It provided primary and/or secondary occupations for many households. Fuel-wood was collected for household consumption and also for commercial purposes. Overall, 85 % of households were found to collect fuel-wood from TWS directly, others met their demands by purchasing from markets and/or collecting from their home gardens. Fuel-wood collectors usually worked individually but sometimes they went in groups in the TWS. Each household made 2 to 12 trips per week to the TWS to collect fuel-wood, and the trips lasts for 3-7 hours; they collected one head load or approximately 25 kg per trip. Our observations suggest that 45% of the fuel-wood collected from the TWS was green wood and the rests were dry. Only 12% of the dry wood naturally dried; in case

of the remaining amounts, the collectors leave the felled trees on the forest floor, and then carried the wood out when it became dry. In the study area, fuel-wood collected all the year round, but major extraction occurred during the dry season.

Extensive fuel-wood collection poses a great threat to the forest biodiversity of TWS as they often cut seedlings, small timber and bushy trees which pose threat for regeneration of forest resources. Some of these fuel-wood collectors have substantial linkage with illicit feller and act as informer.

### *Sun-grass collection*

Rohingyas were collected sun-grass (**Figure 4c**) as a building material for commercial purposes and for household consumption. Overall 50% of households collected sun-grass during the months of March to June, with the highest percentage collected in May. Poor people, especially young men and women, were the main collectors of sun-grass. Sun-grass collection have high risk on the forest biodiversity of TWS as collectors burn the area after collection of sun grass which is good for natural regeneration of sun-grass.



**Figure 4:** (Clock wise) (a) Green branches of trees collected as Fuel-wood from TWS; (b) Fuel-wood collection by Rohingya women and children; (c) Sun-grass collection from the TWS; (d) Illicit feller coming from the TWS with a tree log.

### *Illicit felling*

Extensive illicit felling was carried out in the past at TWS and continues to date. Overall 22.5 % of the households we interviewed were directly employed as illegal feller (**Figure 4c**). Some trees are also felled for their own consumption like building homes. Most of the time illicit felling carried out during the rainy season, in the government holidays or at night. Illegal fellers sold their timber

in the local market. Illicit felling made the sanctuary as a Savannah type of forests. Some important floral species of the TWS were declining due to illicit felling. Therefore, illegal tree felling remains as a major threat in the TWS. It was the major cause for the destruction of this forest.

### ***Bamboo and cane extraction***

Overall 27.5 % of respondents collected bamboo and cane to supplement their income. In addition to their use as raw materials in home construction, bamboo and cane supported many cottage industries in and around the wildlife sanctuary. The natural regeneration of bamboo and cane became limited and their future viability was facing serious challenges due to high rate of exploitation. In the past, there was a great abundance of natural *Mooli* and *kali* bamboo in TWS. Due to the over exploitation, these natural bamboo became tends to be disappearing in TWS. Extensive cane extraction also made its availability infrequent in the TWS. According to the forest department officials, there was no natural cane in this forest but they introduced it by their plantation program

### ***Medicinal plants and vegetables collection***

We explored that about 25 % of Rohingya refugees used medicinal plants for curing ailments. Local traditional healers (known as *boiddah* or *kabiraj* or *hakime*) collected these plants form the TWS due to the high demand of natural medicine among Rohingyas and local people. Sometimes these medicinal plants were collected by uprooting them which possess a considerable threat to their diversity. Rohingyas especially women and children collected wild vegetables from the forest. A few respondents (8 %) sold these products to their neighbours or in markets for additional income. Mainly they collected vegetables for domestic consumption.

### ***Green and dry leaves collection***

Overall 15% of households collected dry and green leaves from the TWS. They collected dry leaves mainly for consumption as biomass fuel. Green leaves were used for packing various goods, transporting fish and giving shade to houses. Sometimes Rohingya households sold dry and green leaves in the local market at the rate of 8-12 BDT per sack. Litter is the dead organic material such as leaves, twigs, barks and fruits. It is largely composed of leafy materials and constitutes a major source of nutrient return. Hence, the removal of litter has no immediate effect upon site quality. But in the long run it lowers the site quality

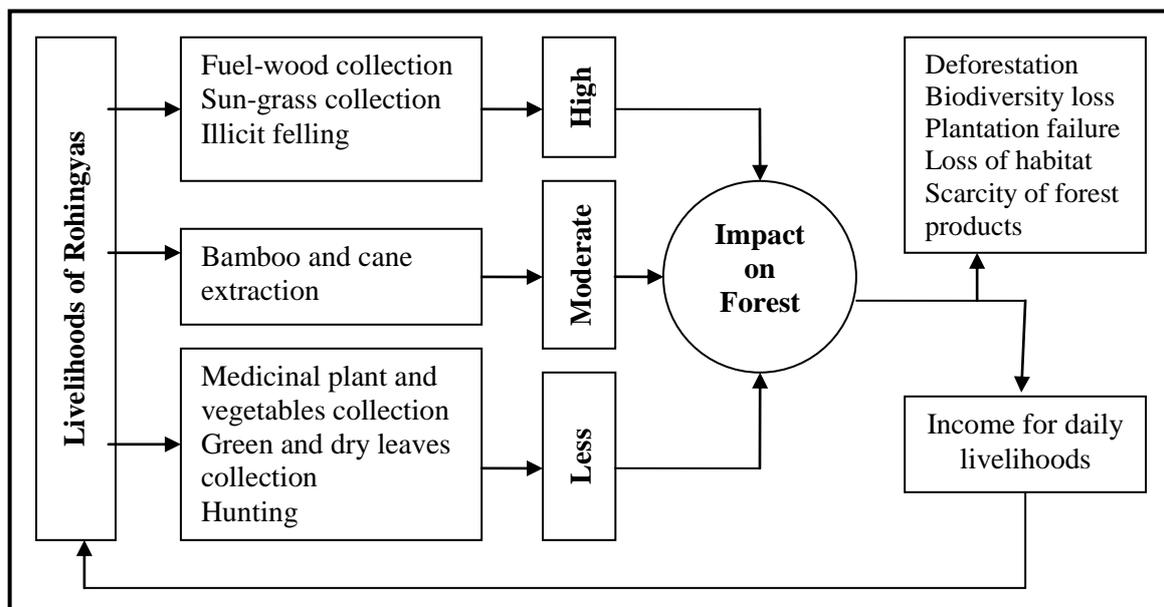
### ***Hunting***

Hunting was a common practice in this forest area in the recent past. Exactly form when hunting started in this forest areas, was unrevealed by our study but three wildlife species namely, Wild Pig (*Sus scrofa*), Sambeer deer (*Muntiacus muntjak*) and Jungle fowl (*Gallus gallus*) were mostly

common hunted species. Now there is a limited scope for hunting in TWS as these species are now disappeared. However, we found only 5% of respondents' were still hunted Jungle fowl (*Gallus gallus*), depending on their availability. They hunted for their own consumption and for sale also.

### Overall impacts on forest resources

Forest dependent rural livelihoods of Rohingya refugees have several impacts on TWS (**Figure 5**). The Teknaf range had almost 100% forest cover in 1980. By 1990 it had dropped to 55%. Current data shows only 8% natural forest remaining in the reserve (NSP, 2006). In contrast, the Whykong Range still has 65% forest cover (Jahangir, 2005). Previously, the forest area supported the highest biodiversity in the country—290 plant species, 55 species of mammals, 286 species of birds, 56 species of reptiles, 13 species of amphibians, and 8 of the 10 primates living in the country (NSP, 2006). In the FGDs, we asked villagers about declining floral species in the forest. According to these villagers, declining floral species included Baitta garjan (*Dipterocarpus scaber*), Jam (*Syzygium* spp.), Tolia Garjan (*Dipterocarpus turbinatus*), Shimul (*Salmalia malabarica*), Dhuila Garjan (*D. alatus*), Bandarhola (*Duabhangia sonneratiodes*), Bailum (*Anisoptera glabra*), Batna (*Quercus* spp.), Shil koroi (*Albizia procera*), Champa (*Michelia champaca*), Koroi (*Albizia lebbek*), Kadam (*Anthocephalus chinensis*), Chakua koroi (*A. odoratissima*), Gamar (*Gmelina arborea*), Chapalish (*Artocarpus chaplasha*), Jarul (*Lagerstoemia speciosa*), Telsure (*Hopea odorata*), Bahera (*Terminalia beleric*), Chandul (*Tetrameles nudiflora*), Harina (*Vitex glabrata*), Pitraj (*Ammora wallici*), Goda (*V. pinnata*), and Toon (*Cedrela toona*).



**Figure 5:** Schematic diagram of Rohingyas' livelihood activities and impacts on forest

The main objective of TWS management is to conserve wildlife, but due to human interferences this has become difficult. One respondent noted, “Once this forest area was famous

for Asiatic elephants (*Elephas maximus*) but now these elephants are few in number.” From the study, we found that respondents were well aware of the decline in wildlife populations in the area. They reported that large number of wildlife could be seen in the recent past but that many species are now extinct. According to them, the following species have already disappeared: Python (*Python molurus*), Wild Pig (*Sus scrofa*), Monitor lizard (*Varanus bengalensis*), Rhesus Monkey (*Macaca mulatto*), Kingfisher (*Alcedo atthis*), Squirrel (*Calloscirus erythracus*), Little Egret (*Egretta alba*), Sambeer deer (*Muntiacus muntjak*), Hornbill (*Anthracoceros albirostris*), Rabbit (*Caprimulgus hispidus*), Dove (*Streptopelia chinensis*), Common Langur (*Presbytis entellus*), Black drongo (*Dicrurus adsimilis*), Jungle cat (*Felis chaus*), Magpie robin (*Copsychus saularis*), Fox (*Vulpes bengalensis*), Wood pecker (*Blythopicus pyrrhotis*), Porcupine (*Hystrix hodgsonil*), Jungle fowl (*Gallus gallus*), Cobra (*Naja naja*), Lapwing (*Vanellus vanellus*), Common mongoose (*Herpestis edwardsi*), Mayna (*Acridotheres tristis*), and Mud turtle (*Trionyz nigricans*).

From the present study, we found that all Rohingya refugees were landless and lived in the encroached forest land. On average, every Rohingya households possess 0.15 ha forest land within which 0.09 ha/households was directly encroached and 0.06ha/households was rented from the local people. We also explored that local people encroached these land and rented to the Rohingyas. After few years of renting, they claimed as the owners of the land and this is the fashion of land encroachment in TWS.

Many of the households we surveyed collect forest products from the sanctuary. They collect primarily bamboo, cane, medicinal plants and sun-grass. These NTFPs were decreasing at an alarming rate in the sanctuary due to the unsustainable collection rates and practices. Through the study, we found that a few years ago all kinds of NTFPs were available within a short distance, but now people have to collect these products at a longer distance, inside the sanctuary.

The forest floor remains rich in humus and mineral nutrients when complete cycling of nutrient occurs. But members of the refugee families collect fuel-wood, green and dry leaves which are considered as litter for the forest floor. Removal of litter has no immediate effect upon site quality, but in the long run it lowers the quality of the site and ultimately leads to a decrease in tree growth and makes the site quality poor in nutrients. In addition, they sometimes burn whole areas after collecting sun-grass. These activities cause serious soil erosion during the rainy season, which removes topsoil and degrades the site quality.

## 8.4 Conclusion and Recommendations

This article has shown diverse livelihood activities of Rohingya refugees which have some impacts on the wildlife sanctuary. Though the Rohingya refugees are involved in various destructive activities, they have no other clear options for income generating activities. Local people do not support Rohingyas, as they are perceived as an unwanted burden for their society. Forest department through Bangladesh government must collaborate with national and international organizations to resolve this refugee situation quickly. Our study in two villages is a small sample of livelihood activities and their impacts on the sanctuary. There is a need to study other villages both within and outside the sanctuary in order to explore further their impacts, because livelihoods and impacts vary from village to village. We highly recommend further research for better understanding the actual situation, and to highlight more participatory and reconciliatory forms of management that may help to save TWS.

Based on our study, we suggest the following recommendations for improving management of the Teknaf Wildlife Sanctuary. These include:

- Firstly, all unregistered Rohingya refugees living inside or around the wildlife sanctuary should be documented with the help of local NGOs and government organization (like forest department and local government). Diplomatic efforts should be made to repatriate them to their Myanmar through bilateral agreement. This will require multimode diplomatic engagements with the United Nations and other international organizations. Secondly, United Nations High Commissioner for Refugees (UNHCR) should have the mandate and capacity to provide complete livelihood support to all registered refugees. Without UNHCR's complete support, registered refugees will not be able to fulfill their daily livelihood requirements and receive humanitarian assistance; their dependency on the forests will remain high. Thirdly, the refugee camp area should be delineated separately from the wildlife sanctuary as our study revealed that registered refugees who were living in the camp close by the forests also enter into these areas for fuel-wood and other forest resource collection.
- Encroachment by both the Rohingya refugees and the powerful locals is a major problem in the TWS. In order to address this problem, the Forest Department should demarcate the forest boundaries and introduce community forestry in the buffer zones. Community forestry will have the means to protect the forest boundaries.
- Illicit felling is another major problem. Illicit fellers often enter into the forest in groups and commit illegal felling. In such cases, field patrolling is difficult without the assistance of the

military or police force as illegal fellers are often equipped with fire arms. This creates problems for effective and rapid action against the illicit fellers. Decentralization of the Forest Department and involvement of local people in forest management may help to resolve this problem.

- International efforts must be strengthened to recognize that the solution to forestry management issues, especially relating to ecologically sensitive zones like TWS, is not an issue of protecting them by the state involving law and order apparatuses, but they are linked with multi-modal diplomatic agreements to repatriate the Rohingyas to Myanmar in a timely fashion. It is related to providing the refugees with adequate and diverse livelihood options so that their reliance on forests is minimal. Bilateral understanding between the refugees and the local communities is required to implement a viable protection plan to save the sanctuaries and other forest resources in southeastern Bangladesh.

### **Acknowledgments**

The study was partially funded by USAID under a joint fellowship programme of the East–West Center, Hawaii and the Nishorgo Support Project (NSP), Bangladesh. We would like to thank Dr. Jefferson Fox and Ms. Shimona Quazi of the East–West Center for their useful comments. Finally, we are also grateful to the local people and Rohingya inhabitants of *Ledha* and *Kerontoly* villages for their co-operation during the field study.

### **References**

- Baral, L. R. 1996. “Bhutanese refugees in Nepal: insecurity for whom?”, in Muni SD, Baral LR (eds), *Refugees and regional security in south Asia*, pp.152-77. New Delhi: Konark.
- Bari, A. and Dutta, U. 2004. “Co-management of Tropical Forest Resources in Bangladesh. Secondary Data collection for Pilot Protected Area: Teknaf Game Reserve.” USAID-Bangladesh. Ministry of Environment and Forest.
- Birendra, K. C. and Nagata, S. 2006. “Refugee impact on collective management of forest resources: a case study of Bhutanese refugees in Nepal’s Eastern Terai region.” *J For Res* 11:305–311.
- Byron, N. and Arnold, M. 1999. “What features for the people of the Tropical Forest?” *World Development* 27 (5):789-805.
- Calibre and S. S. C. 2000. “Number of Forest-dependent people: A Feasibility Study for DFID’s Forestry Research Programme.” Reading, United Kingdom: Calibre Consultant and the Statistical service Center, University of Reading. pp. 1-84.

- Ghimere, K. 1996. "Refugees and deforestation." in Birendra KC and Shin N. Refugee impact on collective management of forest resources: a case study of Bhutanese refugees in Nepal's Eastern Terai region, *J For Res* 11:305–311
- Hall, J. S., Ingwabini, B. E., Williamson, A., Omari, I., Sikubwabo, C., and White, L. J. T. 1997. "A survey of elephants in the Kahuzi-Biega National Park lowland sector and adjacent forest in eastern Zaire" *African Journal of Ecology* 35:213-223.
- Hart, J. A. and Hall, J. S. 1996. "Status of eastern Zaire's forest parks and reserves," *Conservation Biology* 10:316-324.
- IRW (Islamic Relief Worldwide). 2009. "Rohingya refugees - The forgotten people." <http://www.islamic-relief.com/wherewework/stories/12-BD-502-Rohingya-refugees---the-forgotten-people.aspx>. Access date: 09/09/2011.
- Jahangir, S. 2005. The daily Independent, December 24, 2005.
- Khan, M.A.S.A, Mukul, S.A., Uddin, M.S., Kibria, M.G. and Sultana, F. 2009. "The use of medicinal plants in healthcare practices by *Rohingya* refugees in a degraded forest and conservation area of Bangladesh," *International Journal of Biodiversity Science & Management* 5(2):76-82.
- Khan M.A.S.A. 2007. "Rohingya Refugees, local community and Teknaf Game Reserve: towards impact identification and enhancing conservation." A dissertation submitted in the Department of Forestry and Environmental Science, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh. pp. 1-80.
- Krishnaswamy, A. and Hanson, A. 1999. "Our forest, our future. Summary report World commission on Forests and Sustainable Development". Cambridge, United Kingdom: Cambridge University Press.
- Kumer, N. and Saxena, N. C. 2002. "India's forest: Potential for poverty alleviation." in U Lele (ed) *Managing a global resource: challenges of forest conservation and development*, India. pp. 99-136.
- Mollah, A.R., Rahman, M.M. and Rahman, M.S. 2004. "Site-Level Field Appraisal for Protected Area Co-management: Teknaf Game Reserve (Draft)." Nature Conservation Management (NACOM). Bangladesh.
- Nishorgo. 2011. "Fact Sheet of Teknaf Wildlife Sanctuary." Nishorgo Support Project, Bangladesh Forest Department, Bangladesh.
- NSP. 2006. "Site Information Brochure." Teknaf Game Reserve. Nishorgo Support Project, Bangladesh forest Division, Bangladesh
- Personal Communication. 2008. Magistrate. Nayapara refugee camp 1 and 2. Teknaf. Bangladesh.

- Plumptre, A.J., Hart, T., Vedder, A. and Robinson, J. 2000. "Support for Congolese conservationists." *Science* 288:617.
- Prunier, G. 1995. *The Rwanda crisis: history of a genocide 1959-1994*, pp. 389, Kampala, Uganda: Fountain publisher.
- Said, M.Y. Chunge, R.N., Craig, G.C., Thouless, C.R., Barnes, R.F.W. and Dublin, H.T. 1995. "African elephant database. Occasional paper 11." Species Survival Commission, World Conservation Union, Gland, Switzerland. pp. 1-233
- Sajjad, T. 2003. "SRI On-Site Action Alert: Rohingya Refugees of Burma and UNHCR's repatriation program." Asia Researcher, Survivors' Rights International. [http://www.ibiblio.org/obl/docs/SRI-rohingya.htm#\\_edn1](http://www.ibiblio.org/obl/docs/SRI-rohingya.htm#_edn1)
- Seherr, S.J. 1999. "Poverty-environment interactions in agriculture: Key factors and policy implications." Poverty and Environment Issues Series No. 3. New York, United Nations Development Program and the European Commission.
- The Independent (English Daily Newspaper). 2012. Dhaka. June 17.
- Uddin, M.S. and Khan, M.A.S.A. 2007. "Comparing the impacts of local people and *Rohingya* refugees on Teknaf Game Reserve, Bangladesh." in Fox, J., Bushley, B., Dutt, S., Quazi, S.A. (eds), *Making conservation work: linking rural livelihoods & protected area management in Bangladesh*, pp. 149-175. Hawaii and Dhaka: East-West Center and Nishorgo Program of the Bangladesh Forest Department.
- World, Bank. 2001. "Recommended revisions to OP 4.36: Proposals for discussion." Washington, D.C. The World Bank, USA.