



# Local Perceptions of Natural Resource Conservation in Chunati Wildlife Sanctuary

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## *Abstract*

*Resource managers and academics are increasingly aware of the importance of recognizing local perceptions, knowledge and participation in defining management strategies and actions for the conservation of natural resources. Despite the close historical symbiotic relationship between humans and forests, Forest Department officials planning for and managing Bangladesh's Chunati Wildlife Sanctuary have failed to solicit local participation. Consequently, because of their ignorance of the relationships between local people and their environment, Chunati Wildlife Sanctuary officials have severely impacted the livelihoods of both local peoples as well as wild animals. Today local people remain interested in playing an active role in protecting the environment so that wild animals can make a come-back. This study examines local peoples' perceptions and attitudes toward the wildlife sanctuary and conceptualizes their understanding of livelihood needs, deforestation, and resource degradation. Using anthropological research methods, such as in-depth interviews and group interviews, we investigated local peoples' perceptions toward the Wildlife Sanctuary. We found that, despite the interest local people have in the program, they have been ignored in the process of establishing the Chunati Wildlife Sanctuary. Having no other income generating sources, people are very dependent on forest resources. Furthermore, Forest Department staff members are not well-equipped to prevent illicit felling, and some are even involved in destructive practices. Emphasizing the views of the local people, we argue that, joint management is needed to make the endeavor a success. An awareness of the political economy of the wildlife sanctuary should help us better understand local perceptions of resource degradation and how best to solicit local participation in the sustainable management of the sanctuary.*

## Introduction

Local perception refers to local peoples' attitudes and understandings that reflect their habitual way of life, as well as their shared expectations. All societies possess a substantial body of beliefs, knowledge and practices built around their everyday life experiences and their surrounding environment. This local knowledge is handed down from one generation to the next, but individual men and women in each generation adapt and add to this body of knowledge in a constant adjustment to changing socioeconomic circumstances and environmental conditions. People who live in or near forests have a deep understanding of natural resource management (Michael 1996, Sekhar 2003). The ecological importance of such local knowledge has been widely acknowledged (Kumar 2002, Logan 2002). It has made significant contributions to the maintenance of many of the earth's most fragile ecosystems, through habitual, sustainable resource use practices and culture-based respect for nature.

From time immemorial, traditional communities have maintained a close and unique connection with the land and environment they live in (Anderson 1993, Ahamed 2004, Michael 1996, Choudhury 2003). This research suggests that local people have established distinct systems of knowledge, innovation and practices relating to the uses and management of natural resources in order to maintain the biological diversity of their environment in terms of animal diversity. Local knowledge and peoples' participation is fundamental for sustainable natural resource conservation. Therefore, it is now a major challenge of our time that we pay proper attention to protection of the rights of local peoples and their knowledge about the environment, while also outlining a scientific conservation policy for maintaining biological diversity.

In recent years, collaborative approaches commonly known as "co-management" have become a significant strategy in many conservation and development related programs worldwide (Davis 1998). In this framework, both government program officials and local people play important roles in successful development initiatives. Many experts have recognized that peoples' participation is key to ecologically sustainable development and wildlife conservation (Grimwood 1969, Choudhury 2003). Bangladesh has already lost many wildlife species during the last few years. Consequently, it is imperative that local resource users provide knowledge of traditional practices in designing or implementing innovative natural resource management approaches.



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The present research documents the beliefs and perceptions concerning wildlife management among communities that have long been resident in forests. These people have developed their own culture, history, way of life, and identities grounded in the natural resources they have traditionally used. They have developed patterns of resource use and resource management that reflect their intimate knowledge of the local geography and ecosystems, and that contribute to the conservation of biodiversity. The purpose of this study is to document and disseminate local knowledge, perceptions and traditions to inform policy making. This study attempts to answer a few specific questions in order to understand the dynamic relationships between local people's understanding and natural resource management in Chunati Wildlife Sanctuary:

- How do local people perceive the political economy of people's livelihoods in the protected areas of Bangladesh?
- How do local people perceive the political economy of deforestation and degradation?
- What is the range of local peoples' traditional understanding and knowledge about wildlife conservation?

We investigated local perceptions in two villages in Chunati Wildlife Sanctuary in order to examine the potential of local knowledge to inform sustainable natural resource management plans and practices.

## Background

A protected area is "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and naturally associated cultural resources, and managed through legal or other effective means" (IUCN 1994:3). The total amount of land under protected area status in Bangladesh is about 243,677 ha, which accounts for 16% of the total area managed by the Forest Department and almost 2% of the total area of Bangladesh. The protected areas of Bangladesh include eight national parks, seven wildlife sanctuaries, one game reserve, and five other conservation sites. The Bangladesh Wildlife (Preservation) Order, 1974 Amendment defines a wildlife sanctuary as "an area closed to hunting, shooting or trapping of wild animals and declared as such under Article 23 by the government as undisturbed breeding ground primarily for the protection of wildlife inclusive of all natural resources such as vegetation soil and water" (paragraph (p) of Article 2).

The Chunati Wildlife Sanctuary was established in 1986 and is located at 21°40' north longitude and 92°07' east longitude. The sanctuary is about 70 kilometers south of Chittagong on the west side of the Chittagong-Cox's Bazaar highway. The sanctuary area is comprised of four main geological formations: Pleistocene, Pliocene, Mio-Pliocene and Miocene. The soils on the alluvial plains and valleys in Chunati Wildlife Sanctuary are mainly silt loam to silt clay loam, moderately to strongly structured, and with neutral to medium acidity in the subsoil. Locally, sandy loams on ridges and silty clay in basins occupy small areas with high acidity (Soil Survey 1971-73). The sanctuary area is generally hilly to mountainous with shallow to deep gullies and gentle to steep slopes. The average elevation is 30 to 90 meters above sea level. The area is traversed by numerous creeks, which are clear with gravelly or stony beds. They provide good drainage and supply clean water to both wild animals and people, as well as for irrigation. The creeks also serve as habitat to a good number of amphibians. The banks of the rivers and creeks and the cultivated tracts are severely eroded, especially during the rainy season. Sheet erosion and rill erosion are most prevalent (Mollah, Rahman and Rahman 2004). Box 1 summarizes some geographical and socio-economic features of the sanctuary. Figure 1 is a map of the sanctuary and Figure 2 shows the specific study areas.

**Box 1: Geographical and demographic features of Chunati Wildlife Sanctuary**

Forest Type: Tropical evergreen and semi-evergreen  
Number of Villages: 15  
Total population: 21,428 (Statistical Book 1991)  
Male population: 11,062  
Female population: 10,366  
Number of household: 3,492

(Source: BBS, 1996)

The study was conducted at two village sites. The settlement of Villager Para of Aziznagar Beat in Lohagarah is situated mostly inside the buffer zone of Chunati Wildlife Sanctuary, although some households are situated outside the buffer zone. The settlement of Jumm Para of Puichhari Beat in Banskhali is situated totally inside the buffer zone. Both sites are developing towards the core zone of the sanctuary. We selected these sites because they are representative of protected areas in Bangladesh in terms of wild animals; and because they show distinctively different trends in terms of forest use, forest dependency and wildlife management. These samples may not be representative of all protected areas in Bangladesh, but



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they may represent the Chunati Wildlife Sanctuary. The people of both sites migrated there from nearby areas and established settlements at these sites in 1953. Most people in the study areas were settled there by the official arrangements of the Forest Department and both they and their villages are officially called "villager".

## Methodology

Due to time, spatial and other constraints, it was impossible to cover all of the fifteen villages surrounding the sanctuary. First, we selected five prospective villages for the study from among the fifteen villages identified through our physical visit and Rapid Rural Appraisal (RRA). Consequently, we purposively selected two villages from them to understand basic issues related to natural resource management. To get a general picture of the selected villages we prepared two community profiles emphasizing several key topics: natural resources, livelihoods, community structures, institutions, and community history. We collected primary data and consulted secondary sources. We used anthropological research tools such as in-depth interviews, focus group discussions (FGD), and key informant techniques. A semi-structured questionnaire comprised of questions on socio-economic and ethno-ecological variables was also conducted to elicit both qualitative and quantitative data from local people. To gather information on local peoples' perceptions and practices towards wildlife management, we used informal conversations, and brief interviews with people from the selected sample, keeping in mind the following four key issues: awareness, knowledge, attitudes and practices. To determine the impact of the sanctuary on wildlife, we talked with local people concerning the status of animal resources in the forest (before and after the creation of the sanctuary). Topics for the semi-structured interviews are listed in Appendix 1; the process we followed in organizing the community profile is listed in Appendix 2.

Between February and July 2006, we collected data on attributes of the local people's connections with the forest, trends of changes in forest conditions, and local peoples' perceptions of changes in forest conditions during the last few years. We collected information to characterize institutional arrangements through community profiles, interviews, group discussions, and field observation. Our research focused principally on qualitative techniques to understand the people's livelihoods, forest dependency and status of wildlife in the sanctuary. We also used

qualitative techniques to analyze historical use and the level of past forest degradation, user perceptions of changes in forest conditions, ranking of forest destruction, and the foresters' appraisal of forest conditions. Local institutions governing the forests, particularly those relating to the maintenance, monitoring and harvest of products were evaluated qualitatively on the basis of the existence of rules, effectiveness of enforcement, and level of compliance.

There are 350 households in the two study areas: 215 in Villager Para, and 135 in Jumm Para (Table 1). We used a purposive sampling procedure to select sample households based on local demographic statistics. We chose senior members of the community to be our main source of information. We first made a list of individuals (generally head of the household) ranging in age from 60 to 70 years old and then randomly chose a 10% sample from this group, including both men and women. We also sampled a few household heads (0.6 %) below 60 years of age to get some sense of how they differed from older people.

We conducted 13 in-depth interviews from Villager Para and 12 from Jumm Para, and selected one key informant from each of the two study sites. Key informants were local residents with sufficient knowledge of forest conservation and wildlife management who were also interested in the project. We conducted brief interviews on the socio-economic issues with 100 households (50 from each beat office area) (Table 2). From this survey we conceptualized their social and economic status, occupation, and forest dependency.

**Table 1: Population of the Study Areas**

Study Area	Beat Office	Households	Population	Gender (male/female)	Age over 60
Villager Para	Aziznagar	215	1200	650/550	153
Jumm Para	Puichhari	135	800	425/375	116

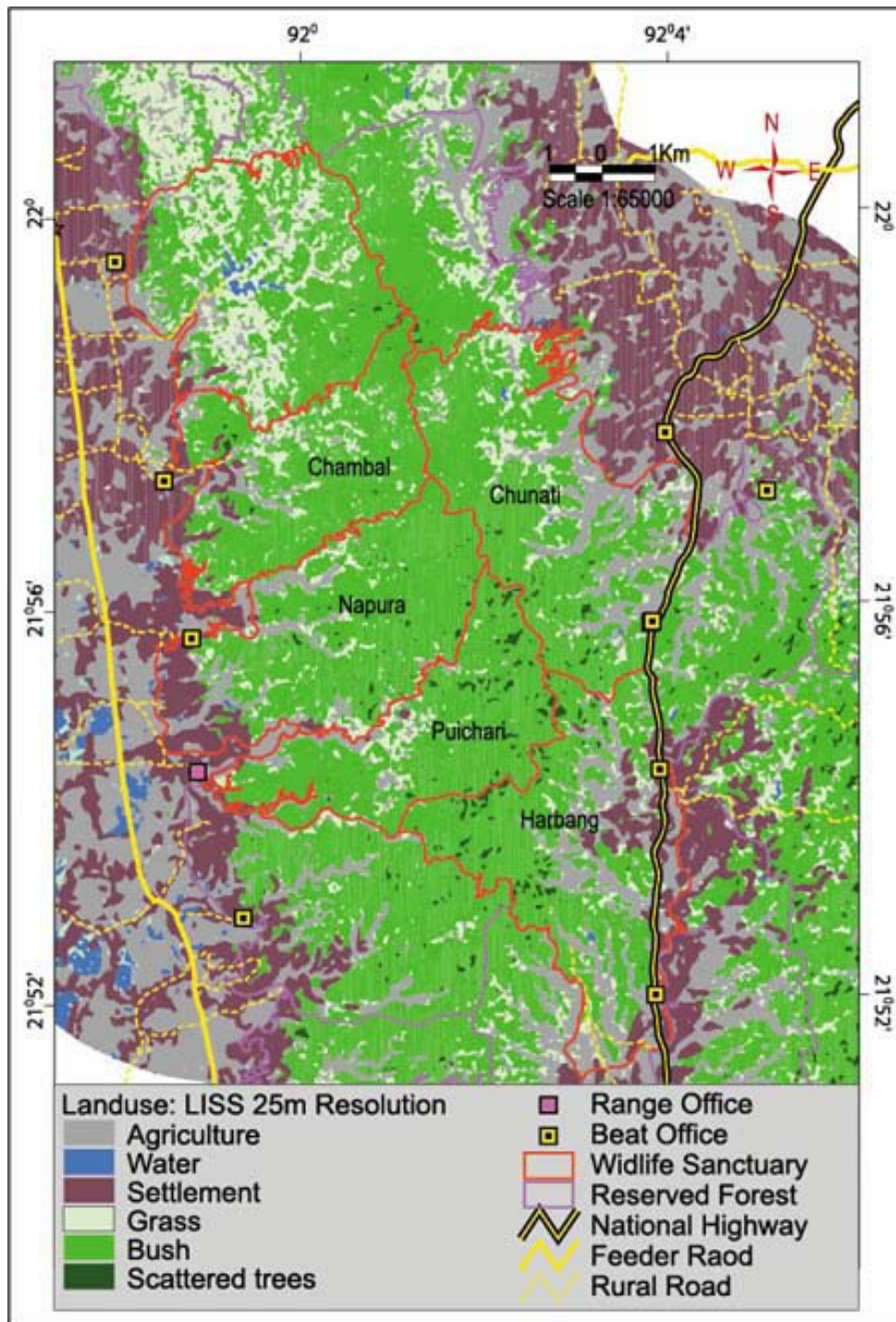
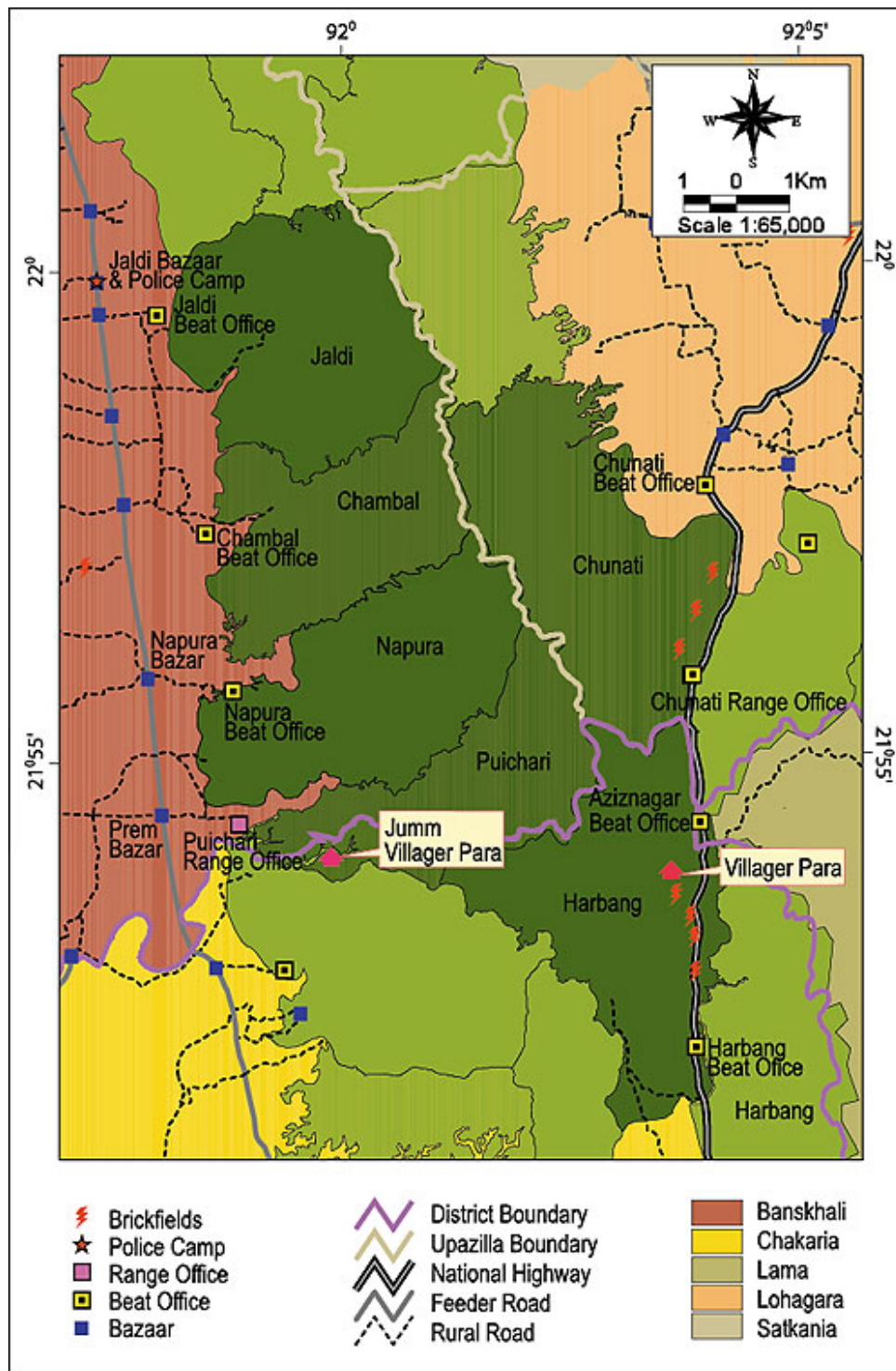


Figure 1: Chunati Wildlife Sanctuary (Source: Nishorgo Support Project 2007)



**Figure 2 : Study Areas of the Chunati Wildlife Sanctuary**  
(Source: Nishorgo Support Project 2007)





**Table 2: Sample Populations and Interviews Conducted**

Study Area	In-depth Interview	Focus Group Discussion	Key Informants	Brief Interviews	Total
Villager Para	13 (8 male, 5 female)	02	01	50	66
Jumm Para	12 (9 male, 3 female)	02	01	50	65

## Results and Discussion

Efforts to document and perpetuate local knowledge are of immense importance, especially where natural resources are declining, as in Bangladesh. In this section we examine local people's traditional lifestyle and their perceptions related to the forest, forest resources and wildlife. We then discuss the forest dependency of both humans and wild animals. We also consider the status of wild animals in the forest and examine local peoples' views on the causes behind the animals' disappearance, as well as their suggestions for the protection and reintroduction of animals. Finally we discuss the rationale for including local communities, and their attitudes and understanding towards wildlife, in the development of management plans for Chunati Wildlife Sanctuary.

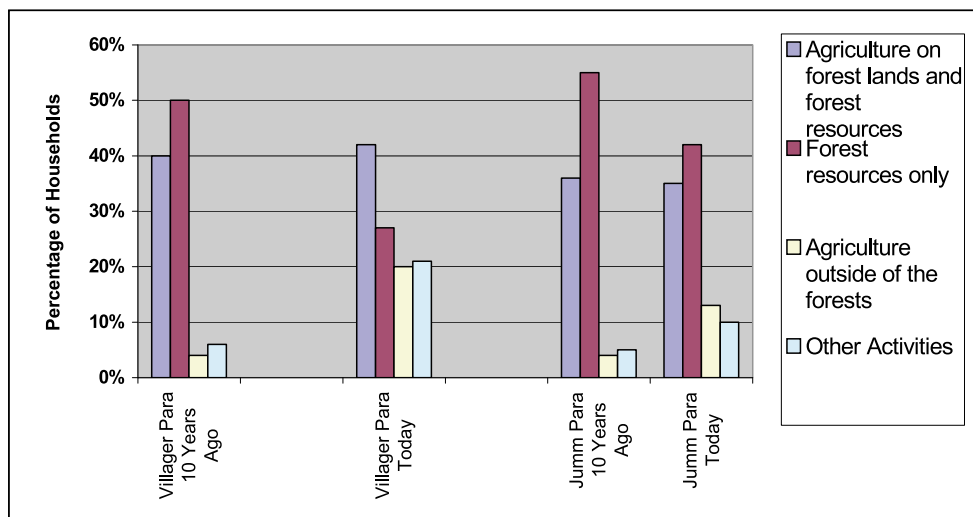
### Political economy of people's livelihoods

In the early 1950s, 70 families from nearby Aziznagar and Puichhari Beat Office were officially invited by the Forest Department to resettle in the area presently occupied by Chunati Wildlife Sanctuary. The Forest Department had insufficient guards to protect the deep forest and therefore wanted a few people to live there to help them protect the forest and to assist Forest Department officers in their daily jobs. Due to poverty and unemployment, people came in order to meet their subsistence needs from the forest and its land. The Forest Department provided settlers with nearly 1 hectare of land per household for agricultural activities to facilitate permanent residence and gain assistance to forest officials in policing and patrolling. Households are defined here as units whose members cook and take food from the same pot. Here land refers to forest land that is converted to agricultural land.

Settlers coexisted with wild animals and their families grew rapidly. Presently most of the respondents of the study do not depend on forest for their livelihoods as they did until about 10 years ago. From information obtained from local informants in Villager Para (Fig. 3) we see that a decade ago at least 40% of people were dependent on the land they had received from the Forest Department as well as forest resources; 50% were dependent only on forest resources (they did not receive

any land from the Forest Department-other than their house plot). As the human population grew, the forest gradually lost its resources. Today because of the growing population and its needs, people can no longer rely only on the forests, and are forced to engage in outside activities to earn cash incomes. Today the livelihoods of most people in Villager Para are based on agroforestry because the forest can not fully meet their livelihood requirements. "This apparently dead wasteland cannot provide animals with food, how could it provide us with our demands?" a local resident told us (personal communication, March 2006).

In Jumm Para, approximately 55% of the population was dependent on forest resources a decade ago (Figure 3). Jumm Para is comparatively isolated and people have no other sources of income other than the forest. Poor access to transportation adds to the sense of isolation and limits the ability to seek jobs elsewhere. That is why forest dependency in Jumm Para is considerably higher today than in the well-located Villager Para. Figure 3 shows the dependency of villagers in the villages 10 years ago and today. Table 3 summarizes livelihood data we collected from Villager Para and Jumm Para.



**Figure 3: Forest Dependency of Households in Villager Para and Jumm Para**

People of Chunati cannot think of an existence without the forest. They survive because of the existence of the forests, which provides food, fuel, fodder, medicine, shelter and housing materials, along with other products, to a variety of people. Bamboo, fuelwood and sungrass are possibly the most important forest resources for the local people and are used for both house construction and agriculture. Next to bamboo, sungrass is the most important material for house construction. Most people meet their livelihoods from the forest on a daily basis. Non-timber forest products (NTFPs) are extremely important as food supplements in the form of



edible fruits, roots, tubers, leaves, etc. Edible wild fruits, seeds and leaves regularly provide food during the lean season and during emergency periods. They depend to a large extent on wild resources of plants and animal origin for many purposes. Since modern medical facilities are not available locally, many people in Chunati - including local patients, herbalists, and other interested people - collect and use medicinal plants from the nearby forest. Agricultural laborers and others that cannot find work collect products such as firewood, poles, and bamboo from the forest for the markets. Although most use of forest products is at a subsistence level, there are good opportunities to rapidly accelerate into commercialization with a closer integration with the market in future years. Forest degradation caused by factors such as unauthorized cutting and indiscriminate felling is known to have resulted in a decrease in the number of wildlife species found in Chunati.

**Table 3: Well-Being Analysis of Villager Para and Jumm Para**  
(Based on Group Interviews and Brief Discussions)

Village	Rich	Middle class	Poor
<b>Villager Para (215 Households, Total Population = 1200)</b>			
	5 HH (3%)	30 HH (14%)	180 HH (83%)
Agricultural Land	2 - 4 hectares	0.2 - 0.5 hectares	None
Number of Cattle	5 - 8	2 - 6	None
			Opportunity to seek alternative income sources due to nearby highway.
<b>Jumm Para (135 Households, Total Population = 800)</b>			
	5 HH (3%)	5 HH (3%)	115 HH (85%)
Agricultural Land	1.5 - 3 hectares	0.50 - 1.5 hectares	None
Number of Cattle	5 - 10	2 - 5	None
			Cannot move easily to seek alternative income sources due to lack of transportation.
<b>Villager Para and Jumm Para</b>			
Income source	Business	Small business	None
Political influence	Control local power, relationship of patron-client with Beat officer	Patron-client relationship with the rich	None
Allotment of forest land	Priority	Diminutive	None
Involvement in Social Forestry Program	Priority	Diminutive	None
Timber business	Yes	None	None
Lean Period & Migration	None	2 months (temporary migration rate low)	5 to 6 months (high temporary migration)
Depended on forests for:	Timber business and fuelwood for brickfield.	Subsistence, domestic needs and fuel wood to supply brickfield.	Own livelihood.
Labor	-----	Share cropping	Sell their labor for agriculture, brickfield, etc.

### **Political economy of deforestation and degradation**

From the beginning of settlement in the Chunati area (1953), the villagers realized the value of forest resources. They lived in the forest without destroying any trees; collecting fuelwood for their own use and to sell in the nearby markets, or to the owners of brickfields. Informants told us that in the past (and even today) they could collect for their subsistence needs without using choppers and spades. The villagers were satisfied with their life. But pressure of outsiders, including the Forest Department staff and other people, hinder the pleasant life of the forest dwellers and the wild animals of the forest. Beginning in the 1980s, outside people began to harm wild animals in two ways: they destroyed the trees and plants (the animals' source of food); and they hunted animals like deer, snakes, and other species. Local people claimed that they previously lived in a harmonious relationship with the wild animals that was free of conflict. They expressed a satisfaction with such a relationship that valued the environment and acknowledged the need to limit its exploitation especially for personal profit. This changed with increasing external market influence and the gradual expansion of agricultural lands into the forests. Habitat degradation and forest fragmentation contributed to increased conflict by cutting off migratory routes and decreasing the availability of food and shelter for wildlife. There was a sense of regret for changed circumstances. Specifically locals are concerned that "animals have no place to hide if people drive them away" (Villager, personal communication, May 2006). They also acknowledged the absolute sense of dependence of wild animals on the forested habitat for shelter and foraging, and admitted that increased exploitation of forests interfered with this dependence. Appendix 3 summarizes plant and animal species occurring in Chunati Wildlife Sanctuary before 1986 and today.

Unlike humans, animals are absolutely dependent on the forest for their livelihoods. They cannot seek 'outside employment' or plant crops. They depend on the forest for their food, shelter, and foraging. Local people described the dependency of major animals in the forest as reported in Box 2. From these descriptions of animals' food and location it is easily understandable that wild animals are extremely dependent on forests for their survival.



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**Box 2: Short Picture of Animals and Their Life****Elephant (*Hati*)**

Food: Elephants spend about 12-15 hours a day eating. Elephants are vegetarians. They eat grass, shrubs, leaves, roots, bark, branches, fruit, and water plants. They especially like to eat bamboo, berries, coconuts, corn, dates, and sugar cane. To find food elephants must roam large areas.

Habitat: Forest and where adequate quantities of food and water are available.

Lifespan: Elephants can live 50 to 60 years.

**Monkey (*Banor*)**

Food: Generally monkeys eat fruits, leaves, flowers, insects, eggs, and small reptiles.

Habitat: Most monkeys live in forest areas.

Lifespan: Monkeys can live up to 45 years.

**Deer (*Horin*)**

Food: Deer eat grass, leaves, bark, twigs, shoots, wild fruits and other plants. They also eat moss and lichens including mushrooms and other types of fungi.

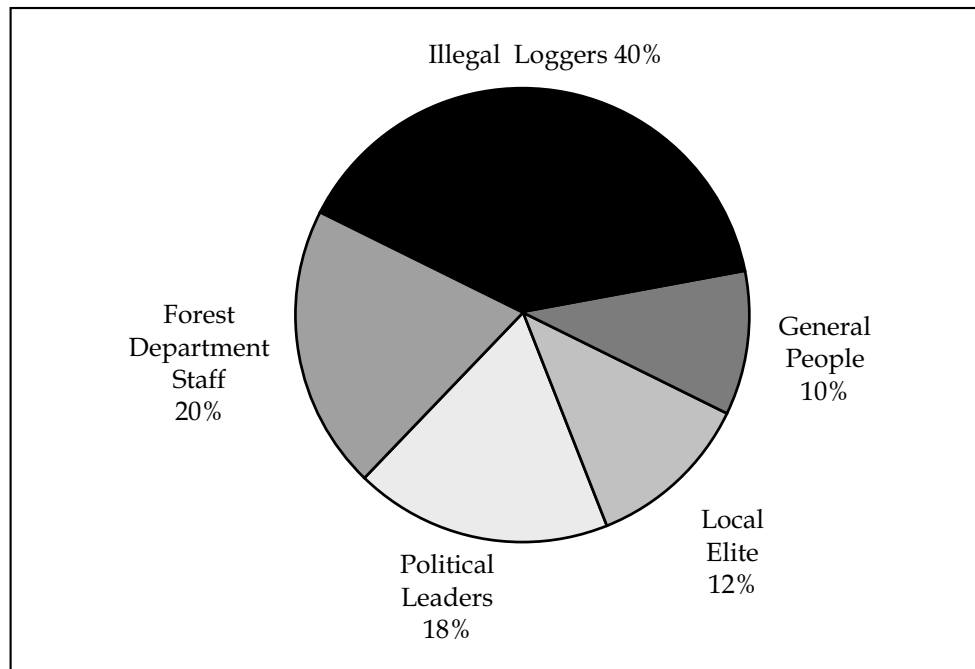
Habitat: They prefer wooded and forested areas and hillsides near cultivated areas. In Chunati Wildlife Sanctuary almost all species of deer were available.

Over time, all are declining including the sambar, the special wildlife of this sanctuary, which are the main victims of hunting.

Economic hardship and environmental changes have created added pressure on the remaining common resources leading to a vicious cycle of poverty and environmental degradation. Where wood or fuel wood is scarce, impoverished local people have been known to uproot stumps and roots, further disrupting the soil and accelerating soil erosion. Unemployed local rural people are particularly dependent upon forest resources. They occupy remote locations, with virtually no education, health care facilities or alternative income opportunities. Even though the forests have now become degraded, with few resources, local people lacking any other job opportunities may still fell the remaining trees. They may also have indirect involvement in illicit felling. Thus, the creation of alternative employment opportunities may evade a crisis by generating much needed income.

With regard to the felling of trees, respondents suggested that the major perpetrators were illegal loggers followed by Forest Department officials. Figure 4 demonstrates how local people perceive the role of various actors in forest

degradation and thereby its negative impact on wildlife habitat.



**Figure 4: Villagers' Perceptions of Who is Responsible for Forest Degradation**

*General people:* Local people of the study area are directly responsible for some forest destruction. Due to poverty and lack of other income sources, they depend on forests to meet their subsistence needs. Usually they go to the forest to collect bushes, undergrowth, etc, but sometimes they are also involved in illicit felling.

*Local elite:* Local elites also extract forest resources. Sometime they buy trees for their own purposes from the Forest Department, but they usually fell much more than they buy. Forest officers are reluctant to prevent or report such crimes.

*Political leaders:* Local political leaders are often involved in illegal felling. They cut trees to use at home and to market to nearby sawmills and brickfields. Local leaders who have good connections with central politicians can clear the forest, because local forest officers are loyal to the central administration and will not disturb these leaders.

*Forest Department staff:* People suggest that some officials of the Forest Department have direct and indirect involvement with illicit felling. Locals said that the *Mia Shab* (Beat Officer) seems to be the owner of the forest; access to forests and forest



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resources depends on his will.

*Logging from unknown quarters:* Illicit logging has a major impact on the status of the forests. Armed groups from nearby areas like Banskhali enter the forest at night and cut trees prodigiously. Local people and the Forest Department officials remain passive. Local people say they do not have any weapons so they cannot prevent them. The Forest Department guards actually indulge these intruders.

### **Conflict and Misunderstanding**

According to our informants there is conflict and misunderstanding between local people and officials of the Forest Department over the wildlife sanctuary. Local people were not involved in planning for the sanctuary and hence did not understand the plans at all. They thought that once the wildlife sanctuary was created, people would have to leave their residences. Wild animals would be set free for foraging. Some people of the Forest Department also thought that they would lose the option to sell and use forest trees. As a result immediately before and after the declaration of the wildlife sanctuary local people and some Forest Department officials cleared the forest as much as possible. Local people said that forest officers came to the villages near which trees were indiscriminately felled, blamed local people for the logging, and filed cases against them without any investigation. Sometimes they also imposed punitive fines on local residents.

The lack of consultation with local people has also led to inappropriate administrative decisions. For instance, major portions of Banskhali, Jumm Para, and Puichhari beats (under Jaldi Range Office) are administratively under Chakoria Upazila of Cox's Bazar District, but some parts are under Banskhali Upazila of Chittagong District. In this particular site, most people involved in activities under the Nishorgo Support Project, such as the nursery, come from the plains of Banskhali and are not accepted by the hill forest people of Chakoria. The hill people want to be part of all programs that affect their lives and their resources. They claimed that political influences play a role in depriving them of their rights. Local people complain that there has been virtually no dialogue between wildlife authorities and local people. Some local forest officer also state that all decisions and activities are strongly dominated by the central Forest Department. As a result, many officials do not appreciate the cultural and economic significance or conservation values of traditional resource practices.

Nishorgo Support Project is working with the Forest Department to protect and conserve the natural resources of the protected area.

### Threats to the Wildlife Sanctuary

Local people of the study area identified the following threats to wildlife:

*Water-body related threats:* Local elite and political leaders control the main stream that runs through the protected area. They have dammed the stream to preserve water for their own needs and to sell water in the dry season for irrigation. As a result the sub-streams of the protected area that surround the Chunati Wildlife Sanctuary have become dry. Local people suggest that, because of this, Chunati Wildlife Sanctuary has suffered changes in wildlife habitat. Local elite also control the small marshes in the lowlands for fish. For want of drinking water animals come down from the hills onto the plains and enter into conflict with local households and their agricultural assets. Local people suggest that if the main stream of the forest was not dammed then the forest would have remained wet and humid and animals could obtain water even in the dry season. On the other hand, during the rainy season, the lowlands and plains around Chunati Wildlife Sanctuary become flooded because of heavy rainfall, causing miserable conditions for wild animals.

*Settlement-related threats:* As the human population is constantly increasing in number, the limited forestland is unable to meet their needs for agricultural land and other demands. To meet their demands, local people sometimes clear the forests for their residents and agriculture. In addition, their settlements have destroyed the animals' migratory routes and wild animals consequently appear less frequently in the plains.

*Miscellaneous threats:* According to the local people, the development of roads and highways in and beside the sanctuary has made life more difficult for wild animals, by fragmenting intact habitat. Likewise increased human access into the forests has increased human-wildlife conflict. Furthermore, indiscriminate collection of medicinal plants, wood and bamboos; random hunting, shooting and trapping; and natural calamities such as droughts, earthquakes and floods have also taken their toll. Ultimately, the failure to implement the existing law, and the dishonesty and indifference of the forest officials, repeatedly came up in the discussion. People suggested that if these problems were not resolved then the efforts to protect the natural resources of the forest as well as wildlife conservation would be in vain. The lack of traditional management systems and the lack of people's genuine involvement in the project were also seen in a negative light.





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### *Indigenous Understanding of Wildlife Conservation*

In Chunati Wildlife Sanctuary local people once traveled between places in groups because they feared wild animals. This is no longer true today because wild animals are scarce and never seen during the day. Local people use traditional tools for collecting trees, fuelwood, bark and other NTFPs without the use of choppers or axes. Local people cut trees during the dry months of January and February. This is scientifically sound, because during the dry season tree growth is comparatively slower than during the wet season. This means there is less starch content in the wood making the wood less susceptible to insect attack. Locals know much about how animals live in the forest-where they usually go for foraging, what foods they eat, and under which trees they prefer to take rest. They also understand the problems the animals face finding water in the dry season.

Local people claim they usually do not cut trees that are useful to wildlife. They mainly collect bushes, underbrush, and dying trees. They argue that outsiders cause deforestation by only looking at the economic value of forest resources. But as good neighbors of the wild animals they want the animals to be alive. They also asserted that they know which trees grow rapidly and which grow slowly. In case of emergency they cut trees that bear little food for wild animals. Local people want forest trees not commercial garden trees such as mangium, akashmoni, eucalyptus, and melaloca that are not good for either the forest or wild animals. They acknowledge that fast growing trees are useful, but they are not good for the long-term sustainability of the forest. Local people try to sustain an environment friendly to both humans and wild animals by neither felling trees nor killing animals. Furthermore, they usually do not clear-cut all trees because they realize their environmental importance. However, outsiders with commercial interests in the forest such as fishing boat owners, shop owners, and brickfield owners often clear-cut trees to meet their economic needs.

### *Local Wildlife Folklore*

Local people of the study area have beliefs and myths that create esteem for wild animals and keep them from killing these animals. Local people usually do not go into the forest on Friday and Saturday. Friday is a holy day and people want to refrain from committing any sins such as tree cutting. Saturday is perceived as a bad day. If people go to the forest on Saturday, it is believed that they might encounter great troubles.

Local people also believe that, once upon a time, elephants and monkeys were human. They became animals by the curse of a religious spiritualist (*Hazrat Luhd*). They also believe that the oriole (locally called 'yellow bird') was once a woman. Her father turned her into a bird to save her from her stepmother's evil motives. The rufous treepie (locally called, *Harichacha* bird) was once a housewife. She became a bird when her husband cursed her to satisfy his mother. Because most local people believe that once most animals were human, they do not kill them or even scold them. People believe that elephant can understand what they say. They call elephants *Mamu* (maternal uncle). They also believe that elephants visit the *mazhars* (shrine) once a year.

Villagers also believe that it is not possible for extinct animals to reappear, but if proper measures are taken threatened animals can increase in numbers. Local people made the following suggestions for enhancing wildlife populations:

- **Afforestation:** Afforestation is the process of planting trees on land formerly used for purposes other than forestry. Reforestation, on the other hand is the restocking of existing woodlands that have been depleted. Local people say if they are given power and authority to protect afforested sites and the right to a share of the benefits they will be responsible for such ecosystem regeneration efforts.
- **Alternative income generating sources:** Because local people have no other sources of income, they engage in indiscriminate extraction that causes resource degradation by direct and indirect causes. Usually they collect sungrass, bamboo and fuelwood from the forest. If they were provided with alternative sources of generating income they would no longer be as dependent on forest resources.
- **Transportation:** Although some people think that modern transport may lead to deforestation, the local people have different views. As most of the residents are located in hilly areas, it is not easy to travel to town for purposes such as education, medicine, or other activities. People feel that if transportation were more developed, they would no longer be solely dependent on the forest.
- **Re-settlement of humans:** Most protected areas are subject to high levels of resource use by human populations. Space required by wild animals is occupied by human settlements in the buffer zone and even core zones. Local people and authorities must develop an understanding so that this urgent



problem can be solved.

Summarizing the local peoples' views we may mention the following steps to be taken to save the forest from further degradation:

- Plant various kind of local plants in the protected area instead of foreign species;
- Ensure space for shelter and grazing for wild animals;
- Protect water bodies and streams for both wild animals and plants;
- Stop corruption of beat and range officers;
- Ensure the punishment of illegal loggers;
- Establish administrative controls over brickfield industries;
- Create awareness among all peoples concerning wildlife; and
- Encourage local people to talk to outside organizations.

Locals also emphasized the following measures:

- Peoples' participation;
- Political will and support;
- Traditional knowledge;
- Adequate scientific research capacities to support objectives;
- Engagement of the scientific community;
- Public education and awareness at all levels;
- Economic incentive measures;
- Benefit-sharing;
- Knowledge and practice of ecosystem-based approaches to wildlife management; and
- Creation of appropriate institutional structures.

### **Local Participation and Sustainable Development**

All people are aware of the importance of trees for the environment, but some are more interested in the short-term economic advantages of marketing natural resources than in long-term sustainability. As long as loggers are well equipped with arms, local people and Forest Department officials cannot prevent them from clearing forests. Timber smugglers often become violent if they try to stop them from felling trees illegally. Some poor local people are also involved with such heinous acts. If alternative income generating sources can be created for the unemployed, they will no longer be dependent on logging. Education is also important. If people are properly educated, they can find jobs to reduce their forest dependency. Locals must be empowered with proper authority. Their participation

will make the program a success. Training programs and visiting successful projects may also inspire them. Local people are aware that the Nishorgo Support Project has initiated such programs. They also emphasized that strengthening the implementation of existing laws would help stop resource degradation. The first and last word of local people is this: if wild animals do not get any space to hide, they will definitely disappear. To encourage wild animals to increase their populations there is no alternative but to bring back forest resources.

Local people say that they were not informed about the sanctuary. Forest Department staff members were also not informed. Local people also thought that wild animals would be set free in the forest and that people would not be allowed in the sanctuary, so they would have no place to live. But the actual situation is different. People are living in the forest as they were before. Staff members from the central Forest Department controlled and organized the planning and implementation of the wildlife sanctuary on their own, ignoring local staff members and local people. Forest Department officials thought they would lose the chance to earn income by selling trees. Therefore, they tried to sell as many trees as possible.

Although in the beginning most locals were against the wildlife sanctuary, after understanding the goals of the sanctuary they now want to be a part of the program. They want power, authority and a share of the benefits from this program, so that they can take care of the forest, prevent illegal felling, and benefit economically. Local peoples' knowledge and experience was not taken into account during the process of planning. Now, to mitigate the gap between central Forest Department officials and local people, local participation must be emphasized. Without their active participation, the wildlife sanctuary cannot succeed.

## Conclusions

Protected areas play a vital role in sustainable development through protection and maintenance of biological diversity, as well as natural and associated cultural resources. As such, protected areas cannot be viewed as islands of conservation separated from the socio-economic and political context within which they are located. It is critical to recognize the importance of people in conservation and to ensure that local people are involved in management and planning activities. Local people should be integrally involved in every stage of protected area establishment and management through consultation. Therefore, local people, sanctuary officials,



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and Forest Department staff members should work together to achieve the goals of the project. In many countries, plans to protect natural resources have failed to address the needs and knowledge of local forest-dependent communities.

In this paper, we have discussed key aspects of local people's attitudes and understanding, and examined the potential of local participation for sustainable natural resource management. We argue that sustainable conservation of natural resources requires the participation of local people and the recognition of their knowledge. Natural resource management is increasingly the subject of social and political conflict between groups claiming an interest in specific resources. Many studies show that the optimal formula for sustainable natural resource conservation is joint control and management by government, NGOs, and local people (see Shiva 1998 and Adnan 1992). Therefore participatory conservation must not only focus on mutual understanding between outsiders and local people, but also on the political economy of different socio-economic groups within the local context.

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### **Appendix 1: Topics Covered in Semi-Structured Interviews with Sampled Individuals**

1. Wildlife living in the sanctuary
2. Diet, shelter, and habitat ranges of animals
3. Human-animal bonding and associations
4. Reappeared animals and animal which already have disappeared
5. Causes behind the disappearing, reappearing, etc. of animals
6. Measures that should be taken to improve the situation
7. Use and protection of wildlife
8. Oral history, myths, and stories about the animals
9. Locals' occupations and livelihoods

## Appendix 2: Process for Organizing Community Profiles

1. Consult with the community leaders. Discuss purpose of the study.
2. Discuss with key informants. Identify social and economic groups.
3. Prepare a community map to establish a general picture of the community and to identify and locate key resources, social and economic groups, and institutions.
4. Conduct a transect walk to validate information from community mapping; observe resource use, social and economic groups, and institutions.
5. Conduct semi-structured interviews; focus group interviews; key informant interviews.

## Appendix 3: Species Occurring in Chunati Wildlife Sanctuary Before 1986 and Today

Resources	Bangla Name	English Name	Latin (Scientific) Name	Available	
				Before 1986	Today
Timber & Non-timber	Pipul	Fig	<i>Ficus sp.</i>	3	5
	Garjan	Garjan	<i>Dipterocarpus turbinatus</i>	3	3
	Jarul	Rose of India	<i>Lagerstroemia speciosa</i>	3	
	Shegun	Teak	<i>Tectona grandis</i>	3	3
	Ashoth	Fig	<i>Ficus religiosa</i>	3	5
	Bot gach		<i>Ficus bengalensis</i>	3	5
	Shimul Tula	Silk cotton	<i>Bombax ceiba</i>	3	5
	Tetul	Tamarind	<i>Tamarindus indica</i>	3	5
	Jam	Indian black berry	<i>Syzygium</i>	3	5
	Gut-gutia		<i>Bursera serrata</i> Wall.	3	5
	Goda		<i>Stereospermum personatum</i>	3	5
	Loha	Iron wood	<i>Xylia dolabriformis</i> Benth	3	5
	Gamary		<i>Gmelina arborea</i>	3	5
	Shill koroi		<i>Albizia procera</i> Benth	3	5
	Chapalish		<i>Artocarpus chapalasha</i>	3	5
	Arjun		<i>Terminalia arjuna</i>	3	5
	Hartaki		<i>Terminalia chebula</i>	3	5
	Kaw foll		<i>Garcinia cowa</i>	3	3
	Amloki		<i>Phyllanthus embelica</i> L.	3	5
	Pahari Aam	Wild mango	<i>Mangifera sylvatica</i>	3	5
	Lotkon		<i>Bauccarea ramiflora</i>	3	5
	Botta		<i>Artocarpus lacucha</i>	3	5
	Vadi		<i>Lannea coromandelica</i>	3	5
	Bell		<i>Aegle marmelos</i>	3	5
Boilum		<i>Anisoptera scaphula</i> Roxb.	3	5	
Bohera		<i>Terminalia bellerica</i>	3	5	
Jolpai	Indian olive	<i>Eleagnus</i>	3	5	





<b>Timber &amp; Non-timber</b>	Kodom		<i>Anthocephalus cadamba</i>	3	5
	Harfata Gula		<i>Strebelus asper</i>	3	5
	Bansh (pia, muli, pati etc)	Bamboo	<i>Bambusa spp</i>	3	3
	Bet	Cane	<i>Calamus spp</i>	3	5
	Kola	Banana	<i>Musa spp</i>	3	5
	Tara		<i>Amomum spp</i>	3	3
	Son/ghash	Sun grass	<i>Imperata cylindrica</i>	3	3
	Nana prokar oushodi gachh-gachhra	Medicinal creepers & plants			5
<b>Mammals</b>	Hati	Elephant	<i>Elephus maximus</i>	3	3
	Banor	Monkey	<i>Macaca mulattta</i>	3	3
	Shrigal	Fox	<i>Vulpes bengalensis</i>	3	3
	Kat-birali	Squirrel	<i>Callosircus erythracus</i>	3	5
	Beji	Mongoose	<i>Herpostis edwardic</i>	3	3
	Shojaru	Porcupine	<i>Hystrix hodgsonii</i>	3	3
	Khorgosh	Hare/Rabbit	<i>Caprimulgus hispidus</i>	3	3
	Sambar	Sambar deer	<i>Cervus unicolor</i>	3	5
	Maya horin	Barking deer	<i>Muntiacus muntjac</i>	3	3
	Bon biral	Jungle cat	<i>Felis chaus</i>	3	3
	Udh biral	Otter,	<i>Lutra lutra</i>	3	3
	Bonno shukor	Wild boar	<i>Sus scrofa</i>	3	3
	Khatash	Small Indian civet	<i>Viverricula indica</i>	3	5
	Bag-dash		<i>Viverra zivetha</i>	3	3
	Goyal	Gayal bison	<i>Bos frontalis</i>	3	5
	Bon Goru	Gaur/Indian bison	<i>Bos gaurus</i>	3	5
	Honuman	Langur	<i>Presbytis entellus</i>	3	5
	Ram Kukur	Wild dog	<i>Cuon alpinus</i>	3	5
	Khud-khudh Shukor			3	3
	Kala Volluk	Black bear	<i>Selenarcious thibetanus</i>	3	5
	Lozzaboti Banor	Slow loris	<i>Nycticebus coucang</i>	3	5
	Bonno Chagol	Serow	<i>Capricornis sumatraensis</i>	3	5
	Pipilika-Vok	Ant-eater		3	3
	Badur	Bat	<i>Pteropus giganteus</i>	3	3
	Chita Bagh	Leopard (before 1986)	<i>Panthera pardus</i> <i>Felis viverrina</i>	3	5
	Mecho Bag	Fishing cat			3
	Bor-Bag	Tiger (before 1970),	<i>Panthera tigris</i>	3	5
	<b>Birds</b>	Hutum Pecha	Eagle Owl	<i>Bubo bubo</i>	3
Vutum Pecha		Brown Fish Owl	<i>Bubo zeylonensis</i>	3	5
Lokkhi Pecha		Barn Owl	<i>Tyto alba</i>	3	3
Tuta		Red-Breasted Parakeet	<i>Psittacula alexandari</i>	3	5

<b>Birds</b>	Bon-Morogh	Jungle fowl	<i>Gallus gallus</i>	3	5
	Dhonesh	Hornbill	<i>Aceros nipalensis</i>	3	5
	Rishala			3	5
	Shokun	Vulture	<i>Gyps bengalensis</i>	3	5
	Chil	Kite	<i>Milvus migrans</i>	3	3
	Eagle	Eagle	<i>Aquila rapax</i>	3	5
	Hargila	Greater Adjutant	<i>Leptoptilos dudius</i>	3	5
	Bok	Egret/Heron	<i>Egretta alba</i>	3	3
	Mayna	Mynah	<i>Gracula religiosa</i>	3	3
	Bhath-Shalik	Mynah	<i>Acridotheres tristis</i>	3	3
	Jora Shalik	Jungle Mynah	<i>Acridotheres fuscus</i>	3	3
	Tiya	Roseringed Parakeet	<i>Psittacula krameri</i>	3	5
	Tila Gugu	Spotted Dove	<i>Streptopelia chinensis</i>	3	3
	Horial	Orange Breasted Pigeon	<i>Treronbicincta</i>	3	5
	Jalali Kobutor	Blue Rock Pigeon	<i>Columba livia</i>	3	5
	Bulbuli	Bulbul	<i>Pycnonotus cafer</i>	3	3
	Babui	Baya	<i>Ploceus philippinus</i>	3	3
	Hari-Cha-Cha	Rufous Tree-pie	<i>Dendrocitta vagabunda</i>	3	3
	Moyur	Peacock/ Common Pea Fowl	<i>Pavo cristatus</i>	3	5
	Manik Jor	White Necked Stork	<i>Ciconia episcopus</i>	3	5
	Tuntuni	Tailor Bird	<i>Orthotomus sutorius</i>	3	3
	Kat-Tukra	Woodpecker	<i>Picoides nanus</i>	3	3
	Modon-tek	Lesser Adjutant	<i>Leptoptilos javincus</i>	3	5
	Kokil	Cuckoo	<i>Cuculus fugax</i>	3	5
	Titir	Hill Partridge	<i>Arborophila atrogularis</i>	3	5
	Machh-ranga	Kingfisher	<i>Alcedo atthis</i>	3	5
Holudh-pakhi	Oriole		3	3	
Chitor			3	5	
<b>Reptiles</b>	Kachhim	Terrapins	<i>Morenia ecallata</i>	3	5
	Koschop	Turtles	<i>Testudi elongata</i>	3	3
	Rokto-chosha Girgiti		<i>Calatesh versicolor</i>	3 3	3
	Totteng/Tohtok	Gecko	<i>Gekko gekko</i>	3	3
	Gui-Shap	Monitor lizard	<i>Varanus bengalensis</i>	3	5
	Ajogor	Python	<i>Python molurus</i>	3	5
	Gokhra	Cobra	<i>Naja naja</i>	3	5
	Daraish/ Daraj-shap	Tar snake	<i>Coluber mucosus</i>	3	3
	Dora Shap	Water snake	<i>Amphiesma stolata</i>	3	3
	Chondro bora		<i>Vipera rusellii</i>	3	5