REGIONAL OFFICE FOR ASIA AND THE PACIFIC (RAP), BANGKOK
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

July-September 2007

TIGERPAPER

Regional Quarterly Bulletin on Wildlife and National Parks Management

Vol. XXXIV : No. 3

Featuring

FOREST NEWS

Vol. XXI : No. 3

TIGERPAPER

REGIONAL OFFICE FOR ASIA AND THE PACIFIC

TIGERPAPER is a quarterly news bulletin dedicated to the exchange of information relating to wildlife and national parks management for the Asia-Pacific Region.

ISSN 1014 - 2789

Address

TIGERPAPER

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FOREST NEWS

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Cover: Adult male proboscis monkey
Photo: G. Agoramoorthy

CONSERVATION STATUS OF PROBOSCIS MONKEYS IN DISTURBED MANGROVE FORESTS IN SABAH, NORTHERN BORNEO

by Govindasamy Agoramoorthy

Introduction

Proboscis monkeys (*Nasalis larvatus* van Wurmb, 1787) are large and sexually dimorphic *Colobines* endemic to the island of Borneo (Bennett and Gombek, 1993; Rowe, 1996). The natural habitat of proboscis monkey includes lowland coastal rainforests with mangroves, and riverine peat swamps and freshwater swamps (Salter *et al.,* 1985). This leaf-eating monkey is considered "endangered" according to the IUCN (2003) threat criteria, with a population reduction of at least 50% projected or suspected to occur within the next 10 years or three generations.

Mature males have an elongated and pendulous nose, from which the common name is derived. The male monkeys are pot-bellied and twice as large as the females. The average body mass for an adult male is between 16 and 22 kg, and for the females it is between 7 and 12 kg. The nose, mostly in males, looks like an outsized appendage and is used in sexual displays and also as a voice amplifier.

In Kalimantan (Indonesia), proboscis monkeys are widely distributed (Meijaard and Nijman, 2000a), but their population in Sarawak and Sabah (Malaysia) is restricted and threatened (Bennett and Gombek, 1993; Bennett, *et al*., 1987; Agoramoorthy, 2003). The on-going habitat alteration for urban development, agriculture activities, palm plantation expansions, and hunting pressure may cause the numbers of these rare primates to decline at an alarming rate if long-term conservation measures are not met to safeguard the threatened habitats (Agoramoorthy, 2003).

This paper presents data on the status of proboscis monkeys in Labuk Bay Sanctuary, which is a disturbed mangrove forest in Sabah (Malaysia), northern Borneo—a biological hotspot in Asia. Data on the foliage consumption by proboscis monkeys in the disturbed mangroves are presented with appropriate conservation recommendations to protect the species and its habitats in Sabah.

Methods

A survey was conducted to assess the population status of proboscis monkeys in Labuk Bay proboscis monkey sanctuary, in Sandakan District, Sabah, northern Borneo, between May 2002 and June 2003. Attempts were also made to record information on the destruction of mangrove forest near Kunak that harbored proboscis monkeys. Population data on proboscis monkeys was collected by following standard primate survey methods described elsewhere (Agoramoorthy, 1989; Agoramoorthy & Hsu, 1995). Direct observations were made and monkeys were located either by their vocalizations or by searching different parts of the forests thoroughly using trails, footpaths and transects, or by canoeing through the mangroves during mornings (06:30-10:30) and evenings (15:30 to 18:30). After finding each group of proboscis monkeys, data on the composition, structure, sex, age classification, and physical characteristics (e.g., body size, coat color of infants, etc) were recorded. Observations on the foliage feeding of proboscis monkeys were recorded using the all-occurrences sampling method (Lehner, 1996).

Results

Population status and feeding behavior of proboscis monkeys

The Labuk Bay proboscis monkey sanctuary is located near Samawang village, which is about 38 km from the Sandakan airport. The 162 ha area is managed by a local oil palm plantation owner and supports a small population of proboscis monkeys. Five troops of wild proboscis monkeys, totaling 89 individuals, were surveyed. There were four one-male bisexual groups and an all-male group. Two of the one-male bisexual groups and the all-male group have been habituated to human presence. Monkeys of these groups could be approached closely, up to 5-10 m, without apparent disturbance. The other two bisexual groups were shy. In addition, four wild orangutans (2 adult males and 2 adult females) were sighted in the mangrove forest during the survey.

The average size of the bisexual groups was 20.75 ±10.31. The average density of monkeys was 0.55 individuals/ha. The adult male-female sex ratio was 1:5.0. The juvenile male-female sex ratio was 1:2.0.

Table 1: Group composition of proboscis monkeys surveyed in the disturbed mangrove forests at Labuk Bay and Kunak, Sabah (May 2002 to February 2003)

No	Location	Group type	AM	AF	SAM	SAF	JM	JF	IN	Total
1	Labuk Bay	Bisexual	1	14	-	6	3	9	3	36
2	Labuk Bay	Bisexual	1	4	-	4	-	4	1	14
3	Labuk Bay	All male	3	-	1	-	2	-	-	6
4	Labuk Bay	Bisexual	1	9	-	2	1	1	1	15
5	Labuk Bay	Bisexual	1	8	1	3	2	2	1	18
6	Kunak	Bisexual	1	3	1	1	1	2	1	10

M-male; F=female; A=adult; SA-sub adult; J=juvenile; IN=Infant

The proboscis monkeys at Labuk Bay sanctuary were observed feeding on young leaves of plants such as Rhizophora apiculata, Bruguiera parviflora, Acrostichum aureum, Sonneratia alba, Ficus benjamina, Ipomoea pescaprae, Tetrastigma glabratum, and Sphenodesme stellata. They also ate the fruits, shoots and mature leaves of Rhizophora apiculata (the predominant mangrove tree) and also the spores of Acrostichum aureum, the predominant fern in the site.

Table 2: Major food plants eaten by proboscis monkeys in disturbed mangrove habitat in Sabah Northern Borneo

Scientific name	Family	Plant parts eaten
Mangrove plants		
Rhizophora appiculata	Rhizophoraceae	Mature and young leaves, fruits, shoots
Bruguiera parviflora	Rhizophoraceae	Young leaves
Acrostichum aureum	Pteridaceae	Young leaves, spores
Sonneratia alba	Sonneratiaceae	Young leaves
Non-Mangrove plants		
Ficus benjamina	Moraceae	Young leaves
Ipomoea pescaprae	Convolvulaceae	Young leaves
Tetrastigma glabratum	Vitaceae	Young leaves
Sphenodesme stellata	Verbenaceae	Young leaves

Proboscis monkeys in distress at Kunak after destruction of habitat

In November 2002, the District Office of the local government in Kunak selected about 81 ha of mangrove forest to develop for resettling people from the neighboring village of Hambilan. Within two months, the mangrove forests in Kunak were cleared. In late January 2003, local villagers rescued an infant proboscis monkey that had been abandoned by its mother, but the infant died within 24 hours due to stress and starvation. The author surveyed the area and found a small group of 10 individuals scattered within an 0.8 ha area of forest. The monkeys were mostly hiding in ground vegetation, since the canopy height was only 3 m, making the monkeys vulnerable to predation by feral dogs and suffering from stress/starvation from lack of food resources. Although the villagers are predominately Muslim and do not eat monkeys, the absence of a viable natural mangrove forest posed a serious threat to the remaining proboscis monkeys.

Discussion

Despite the fact that Labuk Bay sanctuary has a small area, a healthy population of proboscis monkey exists and the sanctuary has the potential to protect the habitat from further destruction. The proboscis monkeys at Labuk Bay were organized into two types of social groups, which is similar to reports from other sites for this species (Boonratana, 1999; Bennett and Gombek, 1993; Yeager, 1991). The data on average group size and adult male-female sex ratio were also close to that of a previous study of proboscis monkey carried out in Lower Kinabatangan forest, Sabah (Boonratana, 1999). The diversity of plant species was low in Labuk Bay, with about eight predominant plant species, all of which were readily consumed by proboscis monkeys.

Northern Borneo, especially Sabah, has about 350,000 ha of mangrove forests located along the coastal areas and river estuaries (World Conservation Monitoring Center, 1992). Mangroves have been utilized by people in Sabah for centuries, but the smaller mangroves in places such as Labuk Bay and Kunak are increasingly coming under threat from deforestation due to conversion of land for plantation development. There is no doubt that the proboscis monkey habitats are under attack in Borneo (Mackinnon, 1987; Yeager, 1992; Bennett and Gombek, 1993; Meijaard and Nijman, 2000b; Agoramoorthy, 2003). Even in protected areas such as Tanjung Putting National Park in Indonesia, an increase in habitat disturbances including pollution, boat traffic and logging was recorded between 1984 and 1991 (Yeager, 1992). Recently, several proboscis monkey groups were displaced as a result of development activities in the Pulau Kaget Nature Reserve, Indonesia (Meijaard and Nijman, 2000b), which is to some extent similar to the incident which occurred in Kunak. The proboscis monkeys in Kunak were unable to escape to other areas since no suitable natural habitat was available. Villagers already occupy the entire area and the existing narrow strip of degraded mangrove cannot support the specialized leaf-eating monkeys. Furthermore, palm plantations already occupy the lowland rainforest adjoining the mangroves. Therefore, protecting these rare monkeys and their threatened habitats in northern Borneo should be given priority (Agoramoorthy, 2003). Fortunately, the proboscis monkey is not among the top 25 primates whose eventual extinction have been predicted (Conservation International, 2002). So, there is still time for conservation organizations to actively work with government agencies in northern Borneo to protect this fascinating species and the vanishing coastal mangrove forests.

Conservation recommendations

The following recommendations are proposed to strengthen conservation measures for proboscis monkeys that live in disturbed habitats such as the Labuk Bay proboscis monkey sanctuary in Sabah, northern Borneo.

1. There are about 500 ha of secondary forest near the Labuk Bay sanctuary. It is vital for the government to gazette the additional forest as a buffer zone to the sanctuary to extend protection to proboscis monkeys and other mangrove-associated species.
2. Wild orangutans were sighted in Labuk Bay, which indicates that the disturbed lowland forest could also support these endangered great apes. Therefore, it is essential to

protect adjoining forest areas before neighboring plantations absorb them.

3. The original landscape of natural rainforest with streams and rivers at the Labuk Bay has been transformed to accommodate the growing number of palm plantations over the last few decades, which has created obstacles to the natural inflow of water to mangroves. Therefore, it is important to rehabilitate the degraded mangrove forests.
4. The Labuk Bay sanctuary is an ideal site with the potential to promote eco-tourism and environmental education.
5. Private plantation-owners who have properties near forest areas in Borneo can promote tourism and biodiversity conservation, that will eventually benefit both people and biodiversity.

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A STUDY ON TIGER (*Panthera tigris*) POPULATION DISTRIBUTION IN SOME RESERVED FOREST AREAS OF ARUNACHAL PRADESH

by Asif Ahmed Hazarika

Introduction

The Indian tiger (*Panthera tigris tigris*) is distributed over India, Nepal, Bangladesh and Myanmar, where it co-exists with the Indo-Chinese sub-species.

In India, the tiger is well distributed in the northeastern part of the country, mainly in the seven states of Assam, Arunachal Pradesh, Meghalaya, Nagaland, Mozoram, Manipur and Tripura. Among these states, Assam has the highest number of tigers, followed by Arunachal Pradesh. The population of tigers in the other northeastern states is much lower. Due to the rugged topography and dense vegetation pattern, direct field observations of tigers, as well as indirect sampling studies, are very difficult in this region. The absence of other logistical infrastructure also adds to the difficulties.

Arunachal Pradesh is basically mountainous and stretches from the Brahmaputra valley up to the high Himalayas in the north and to the mountains of northern Myanmar in the southeast across the Patkai Mountain range.

This paper deals with the population distribution of tigers in seven selected reserve forests, all outside wildlife protected areas in Arunachal Pradesh.

Study area

The study was conducted in seven localities distributed over the whole state of Arunachal, from west to east, taking into consideration the largest patches of undisturbed forests in the lower Himalayan foothills and lowlands. The seven field study blocks are as follows:

Block 1 - Doimara-Amatulla Reserved Forest: This block lies in the extreme southwestern part of Arunachal along the Assam border. It is situated south and west of Eagles Nest Wildlife Sanctuary and Pakui Tiger Reserve respectively.

Block 2 - Papum Reserve Forest: This block lies in the southwestern part of Arunachal Pradesh. It lies to the east of Pakui Tiger Reserve.

Block 3 - Panir and Talle Reserved Forest: This block lies in the south central part of Arunachal in the catchments of the Subansiri and Ranga rivers, along the border with Assam.

Block 4 - Digaru and Paya Reserved Forest: This block lies in the floodplains of the Digaru and Lohit rivers in southeast Arunachal Pradesh and consists of grasslands and riverine forests.

Block 5 - Danning Reserved Forest: This block lies in the eastern part of Arunachal and extends from the lower hills to the high mountains along the western boundary of Dalli proposed reserve forest.

Block 6 - Kamlang Reserved Forest: This block lies in the southeastern part of Arunachal, south of the Lohit river, in the catchments of the Lohit, Lai and Kamlang rivers.

Block 7 - Manabhum and Tengapani Reserve Forest: This block lies in the southeastern part of Arunachal with tropical lowland rain forests and low hills, in the catchments of the Lohit and Baratengapani rivers.

Methods

The entire study area was categorized and segmented into seven field survey blocks, representing lower to mid-altitude hill ranges and lowland forests of Arunachal Pradesh, moving from west to east. In each block, 3-5 survey transects were laid out, each one 5 km long, with

the use of GPS at sites randomly selected along stream banks and bed, footpaths and elephant trails. A total of 27 transects were laid out in the 7 blocks. Five survey trips were conducted on each transect, going up the transect in the morning and down the transect in the evening to make one complete trip. Survey teams consisted of 3 observers/field workers. There were 135 transect survey field days, covering a total distance of 1,350 km over the total transect length of 135 km.

Direct observation and tiger sign sampling methods were used in the study. Tiger signs in the form of scats, pugmarks, scratch marks, tiger kills, etc. were recorded. Traces of pugmarks were made on glass sheets.

Results

Over a period of eight months, from February to September 2005, 133 signs of tiger were recorded in the form of pugmarks, scats, scratches and samples. The frequency of encountering evidence of tiger was almost equal in all the field survey blocks, but slightly higher in the central and eastern blocks. The highest sample encounters were made at transect number 16 in Denning Reserve Forest block, with 8 encounters, followed by transect number 27 in Manabhum-Tengapani Reserve Forest block with 7 encounters. Five transects recorded 5 encounters each, 8 transects had four encounters each, and two transects had three encounters each.

Table 1: Transects and corresponding numbers of tiger signs and types

Block No.	Transect Name	No. of tiger signs	Types of evidence
1	Belsari	4	2 pugmarks, 1 scat, 1 scratch
1	Betali north	5	2 pugmarks, 2 scats, 1 scratch
1	Khellong	5	All pugmarks
1	Foothills nala	4	1 pugmark, 3 scats
2	Upper Papun river - Habia	5	2 pugmarks, 3 scats
2	Paso nala	5	1 pugmark, 4 scats
2	Singte	4	All pugmarks
3	Upper Dullung	4	3 pugmarks, 1 scratch
3	Jumi north	5	3 pugmarks, 1 scat, 1 scratch
3	Sika nala	4	All pugmarks
3	Pange Poliyang	3	All pugmarks
4	Upper Haza river	5	3 pugmarks, 2 scats
4	Balijan chapori	5	1 pugmark, 4 scats
4	Bhekuliang south	6	3 pugmarks, 1 scat, 2 scratches
4	Hazukhoti north	4	2 pugmarks, 2 scats
5	Soblaliang	8	5 pugmarks, 2 scats, 1 scratch
5	Tafragam Derainala	6	4 pugmarks, 2 scats
5	Lower Denning	6	4 pugmarks, 1 scat, 1 scratch
6	Lower Lam	5	4 pugmarks, 1 scat
6	Kanghai/Kamjam	5	2 pugmarks, 1 scat, 2 scratches
6	Kamphai nala	6	4 pugmarks, 1 scat, 1 scratch
6	North Tumba	5	2 pugmarks, 1 scat, 2 scratches
7	Foothills Manabhum	4	3 pugmarks, 1 scat
7	North Manabhum	4	2 pugmarks, 2 scats
7	Madhuban	6	4 pugmarks, 1 scat, 1 scratch
7	Khainala	3	All pugmarks
7	Mekai depot	7	5 pugmarks, 2 scats

Note: The encountered pugmarks were 51.85% male and 48.14% female.

Discussion

This is the first systematic survey on the population distribution of tigers conducted in Arunachal Pradesh using the transect survey and sampling method. The survey provided the basic data as to the population distribution status in seven selected sites outside the existing wildlife protected areas in the state of Arunachal Pradesh. The survey results showed a substantial tiger population in these least protected sites and provides the base for further studies and conservation model development. As the seven different study sites represent a diverse landscape and habitat pattern ranging from tropical lowland rainforest, riverine forests, to tropical broadleaf evergreen hill forests, it showed the potential existence of tiger at the different habitat types.

The terrain of the state makes it quite difficult to enter and set up camps in most of the areas and thus, intensive field studies are very difficult and time-consuming. The present study basically identified the potential maximum tiger occupancy zones of the state and the next stage of field study could be to further intensify the field surveys within a broader realm of these seven blocks and beyond into higher altitude landscapes.

The tiger population has always been only vaguely understood and studied in Arunachal Pradesh and other northeastern states, due to the difficult terrain, lack of trained manpower and proper equipment and the infrastructure.

In the coming years more and more areas of the region, including tiger habitats, will be altered or encroached upon for agricultural purposes or for commercial exploitation. This and the threat of poaching will make it of the utmost importance to have a proper study of the tigers, their numbers and habitat integrity for the development of a viable long-term conservation strategy.

Conclusions and recommendations

The field study examined the tiger population and potential habitat in seven sites in Arunachal Pradesh outside wildlife protected areas, laying the foundation for further intensive tiger conservation work for the identified areas and beyond. It is recommended that:

- Stringent habitat conservation measures should be taken up for the protection of the identified potential tiger landscapes
- Long-term population and ecological field studies should be started in the identified areas and beyond.
- Community-level participatory tiger conservation and awareness programs should be started.
- Well-organized tiger conservation enforcement and anti-poaching/anti-smuggling networks should be set up with joint coordination of the forestry departments, civil administration, police department, NGOs, and community groups.
- Enhancement of the forest department infrastructure and capacities for better tiger conservation and management should be taken up as a priority.

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ASSESSMENT OF THE IMPACT OF TOURISM ON GIR NATIONAL PARK AND WILDLIFE SANCTUARY, GUJARAT, INDIA

by Satya Priya Sinha and Bitapi C. Sinha

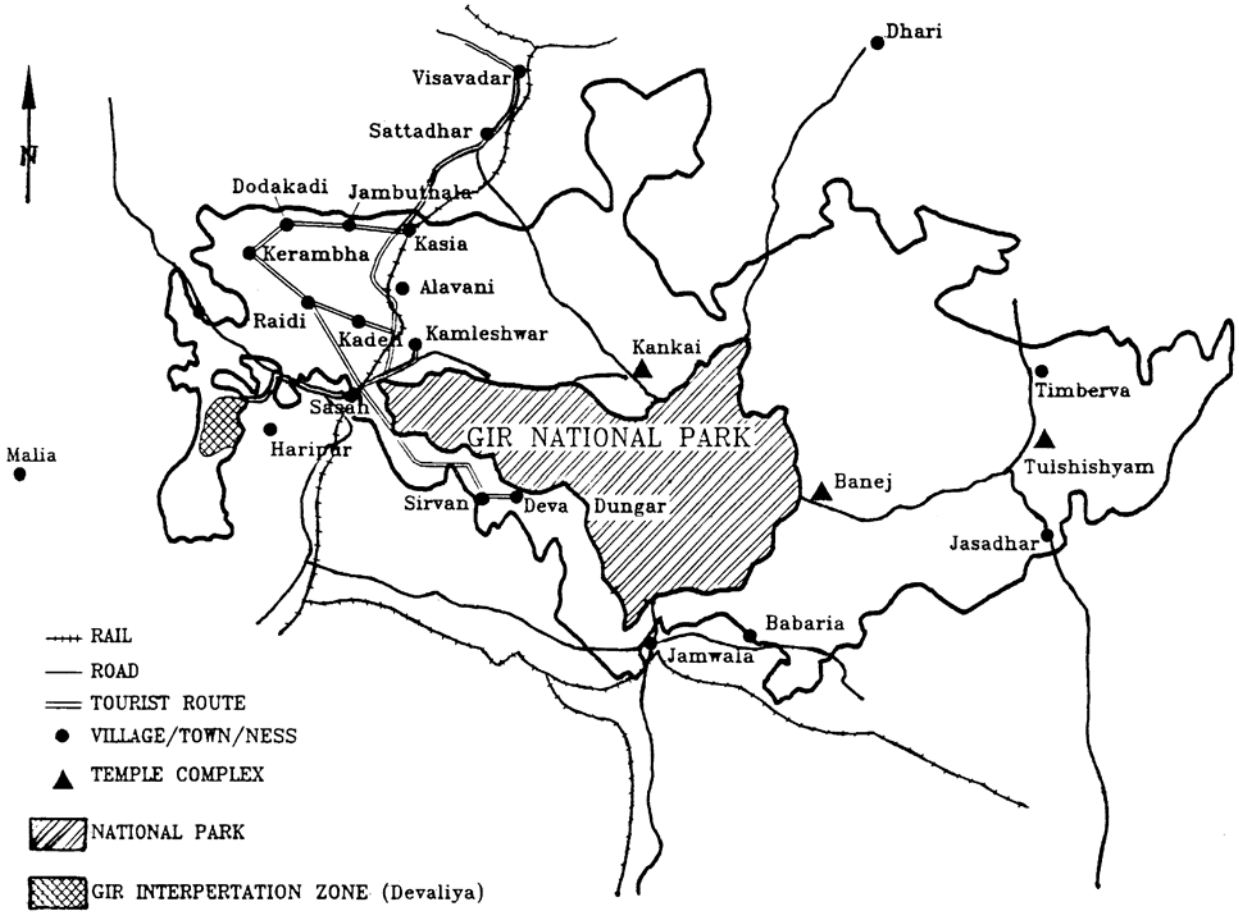
Introduction

In India, the presence of religious places in wilderness areas is historically quite common. In due course of time, such wilderness areas came under the protected area network with certain restrictions, rules and regulations in accordance with the status of the particular protected area. In the past, a limited number of devotees used to visit such remote areas, despite hardships like the lack of convenient transportation and lodging. In recent years, however, access has become much easier with the development of the road network and infrastructure facilities. The resulting increase in visitors is not without conflicts with the protected area management.

The main causes of conflict between protected area managers and temple authorities are basically the restrictions, rules, and regulations over the temple area, infrastructure development, and on the movement of pilgrims, which in the past was overlooked because of the limited number of pilgrims who used to visit such areas. But with easy access, the influx of pilgrims and vehicular movement has increased many fold, causing different types of problems, which often go to the courts for settlement. In this regard, Gir is not an exception and faces a number of problems dealing with the existing temple complexes.

An increase in the influx of visitors to nature reserve areas can cause ecological damage, especially to the wildlife and vegetation. The popularity of religious places inside Gir has created increasing problems for wildlife managers. Kankai, Banej and Tulsishyam are three major religious sites within the sanctuary. Kankai and Banej are situated in the central part of the sanctuary, whereas Tulsishyam is located on the eastern boundary of the sanctuary.

Pilgrims coming to Kankai are given free entry from two nakas viz. Meldi-Ai and Chhodavodi,



while the entry register at Chhodavadi is combined for Kankai and Banej. The exact number of pilgrims visiting Tulsishyam temple is difficult to ascertain because not all the vehicles and people passing through Timberva and Jasadhar checkpost go to Tulsishyam temple.

Lodging for pilgrims within the Kankai temple premises has been built. It includes few rooms with an attached bath facility and a large hall which provides a dormitory kind of facility. The Kankai temple trust has constructed several buildings and a boundary wall enclosing an area of 9,516.55 m^2 in the sanctuary, exceeding the 3,724 m^2 designated temple area. Currently, out of 24 constructions, only 5 were legally constructed. Cows are also kept inside the temple grounds, which is not officially permitted by the Gujarat Forest Department.

In the 1980s, in the summer months a large herd of cattle used to graze in the Bhuatirath area on the way to the Chhodavadi checkpost. The cattle camp belonged to the Satadhar Temple, which in recent years was discontinued after proper negotiation with the temple authorities.

Banej also has modest lodging facilities along the Ban Ganga River. The number of pilgrims and vehicle entry to Banej temple in 1987-88 was 7,838 and 887, which has risen to 19,201 and 2,231 respectively.

In recent years, the number of pilgrims visiting the temple and vehicle entries have increased drastically. In 1987-88, the total number of pilgrim visits and vehicle entries to Kankai temple alone was 8,086 and 1,049 respectively, which rose to 57,200 and 5,668 in 1998-99 (Source: Gujarat Forest Department).

Temples, pilgrims and road network in Gir Wildlife Sanctuary and National Park

During the period from 1980-85, the paper's first author was associated with this area to carry out field studies on the ecology of the Gir lions, and on many occasions had the opportunity to stay in different temples and interact with the temple mahant, sadhu, pilgrims and common visitors. That was the period when some small temples were founded or trying to establish themselves under the influence of established temples. Most of the temples were well maintained by sadhus, assisted by associated people or maldharies who provided logistical support. The main temple complexes were Tulsishyama, Kankai and Banej. All of them have developed in many ways in recent years in terms of infrastructure and other facilties. Other temple complexes like Patla Mahadev, Raidi, Billiyat, Batheswar, Aral, Jeyagar, Hadala and Kokhra temples are well-maintained and people used to visit from different areas, but in limited numbers. Only on special occasions or festival days would large numbers of people visit these places.

To reach Kankai temple, bus services were available from Junagadh, which used to go to Banej and Tulsishyama and make a regular night halt at Kankai temple. Similarly, bus services were also available from Savar Kundala and Amreli and used to stop at Kankai temple, depending on the number of pilgrims staying in the temple, and return back on the same evening before 6 pm. The author observed that people were more concerned about the fixed time of entry and exit from check posts. It was also observed that in Kanaki there was strict rule that after 6 p.m. no one was allowed to go outside the temple premises and the doors were locked. On some occasions visitors who arrived late in the evening were warned to not to repeat this in the future. Occasionally, trustees were stopped at the check post and were not allowed to travel to the temple in the late evening. Most of the pilgrims were totally dependent on the ST buses, with only a few travelling on foot or by bicycle. Tourists from Sasan and some officials used to visit by using four wheelers. Only trustees were seen using private cars. The majority of the pilgrims used to visit only during the festival time for a limited stay, which is not the case today.

Study methods

The present study was conducted to collect information on the impact of religious places and pilgrims on the flora and fauna and on the sanctuary as a whole in Gir. The impact on the park of the cattle owned by the temples was also assessed. They do cause damage to the vegetation and compete with wild herbivores for similar forage, and are sometimes the cause of disease transmission in the wild. In particular, the cattle of Kankai temple, situated on the boundary of the national park area, seem to be a threat. Weekend visitor statistics and the responses of pilgrims/ visitors and managers of different temple complexes and mahants were also included in the study.

The twenty-eight religious sites visited during our study in Gir PA are all situated the around the Gir Wildlife Sanctuary. The sites vary in size. Most of the old temples are unattended and people visit only during special occasions or at festival time, especially during the monsoon months.

The data related to disturbances were collected from four 1.5 km radial transects laid near both Kankai and Tulsishyam temples in four different directions. Near Kankai temple, a fifth transect of equal length was laid along the road to compare with the information from the other four transects. Another extra transect was also laid near Tulsishyam temple. On each transect, five circular plots of 10 m radius and 5 m radius were overlaid after every 300 m. Data related to cattle dung density, wildlife dung density, distribution of non-biodegradable substances, grazing signs, tree cutting and lopping, etc., were collected from these circular plots. A total of 50 circular plots were overlaid.

To collect information on disturbances in the river system near Kankai temple, the river was divided into three major zones, i.e., impacted zone (200m), upstream and downstream. The upstream data was collected from five zones of 100 m length each. The same method was applied to collect the downstream data. Zones 3 and 4 downstream were not accessible for collecting data, so they were not included in the study. Data related to the distribution of non-biodegradable substances along the river bed, cattle use and wildlife use were collected.

Data related to the distribution of non-biodegradable substances along the road near Tulsishyam temple was collected through surveys on one side of the road. The road was divided into 6 zones of 1 km each. The first zone was near the temple and the other 5 zones were towards Jasadhar.

A one-day survey was conducted for Tulsishyam temple to assess the average influx of pilgrims and vehicles. Vehicles and visitors were counted from 6.00 a.m. to 8.00 a.m. in the early morning, 12.00 p.m. to 2.00 p.m. in the afternoon and 4.00 p.m. to 6.00 p.m. in the evening. The entry of heavy vehicles, light vehicles and two wheelers were counted separately. In Kankai, the survey was conducted each day for 4 hours between 11.00 a.m. to 3.00 p.m. for 3 days.

Statistics on pilgrims/visitors visiting the temple complexes on weekends were also collected and interviews on the entry fee issue was carried out at different check posts, temple complexes and with mahants and managers of temples.

Results of the study

Pilgrim influx and vehicle entry

November to May is the peak visitation period for Kankai temples, but it receives an influx of pilgrims more or less throughout the year. Particularly on the eve of festivals, it gets a large number of pilgrims. Tulsishyam temple receives a large number of tourists on the eve of Janmashtami, but many pilgrims also visit throughout the year. The study on vehicle entry and pilgrim influx for Tulsishyam temple showed approximately 344 vehicles (140 light vehicles, 38 heavy vehicles and 166 two wheelers) and 8,362 visitors entering per day. In Kankai, an average of 47 vehicles and 532 pilgrims visited per day. The vehicles entering the park are mostly diesel-driven.

In most years, the influx of pilgrim and visitors occurred mainly on festival days, major holidays, school holidays (April & May) and weekends.

In recent years there has been an increase in the number of weekend visitors. Data collected on weekday visitors during 1998 and 1999 shows that weekend visitors form the majority of the total number of pilgrims visiting per month in both Kankai and Banej temples. They constitute more than 50 percent of the visitors during April, November and December, and more than 70-80% during September and October. This coincides with the vacations and holidays during those months.

Pilgrims/visitors response to entry fee survey

During the study, 1,152 people were questioned to find out their attitude towards different aspects of conservation and entry fees to Kankai and Banej temple complexes. Some activists near Tulshishyam and Banej temple once disrupted attempts to fill out questionnaires, so subsequent attempts were changed to direct questioning without a questionnaire. On the matter of entry fees, 38.88% of the pilgrims questioned were against them. These pilgrims were mostly from the neighboring areas of Junagarh, Amreli and Kodinar and were regular visitors. But 48.69% of the pilgrims were in favor of an entry fee, and were mostly from far off places like Ahmadabad, Baroda, Mumbai and abroad. The remaining 12.43% did not given any proper response on this matter. People working in government offices from Amreli and Junagarh favored the entry fee, even though they were frequent visitors.

During the interviews, several people were of the opinion that there should be some restrictions on visitors to the protected area to make sure that they do not damage the area. Some visitors not only disturb the wildlife, but also pollute the surroundings with litter. It was also felt that there should be forest guards to monitor the area during

peak periods and give instructions on park regulations.

Impact on vegetation and wildlife

Kankai and Tulsishyam have very different vegetation. The forest near Kankai temple is dominated by tree species such as *Tectona grandis* (49%) followed by *Wrightia tinctoria* (12%), *Acacia catechu* (7%), *Ziziphus mauritiana* (5%) and *Aegle marmelos* (3%). The total tree density was 300/ha. Near Tulsishyam, five important tree species of the area are *Anogeissus latifolia* (22%), *Lannea coromandelica* (14%), *Acacia catechu* (14%), *Wrightia tinctoria* (8%) and *Boswellia serrata* (7%). The total tree density was 249 tree/ha. More than 65% of the trees near Tulsishyam have a girth at breast height (GBH) of 31-50 cm.

Table 1: Five important tree species of the forests near Kankai Temple

Sl. No.	Species	Density/ha	Percentage of the total tree species	Total tree density/ha.
1	*Tectona grandis*	147	49	300
2	*Wrightia tinctoria*	36	12	
3	*Acacia catechu*	21	7	
4	*Ziziphus mauritiana*	15	5	
5	*Aegle marmelos*	9	3	

Table 2: Five important tree species of the forests near Tulsishyam Temple.

Sl. No.	Species	Density/ha	Percentage of the total tree species	Total tree density/ha.
1	*Anogeissus latifolia*	53	22	249
2	*Lannea coromandelica*	36	14	
3	*Acacia catechu*	35	14	
4	*Wrightia tinctoria*	21	8	
5	*Boswellia serrata*	17	7	

There was little lopping and tree cutting recorded from near Kankai and Tulsishyam temples. The grazing near Kankai temple by temple-owned cows was reported to be heavy. Cattle dung was recorded from only two plots in transect No.1, which was in the national park area. Transect No.4 went through rough terrain along the river and hence, cattle dung was not found in that transect. The dung density decreased moving away from the temple in all four transects. But dung distribution along the fifth transect showed irregular and continuous distribution. Cattle dung was found only within a 1,200 m area, or up to the fourth plot in all directions from Kankai temple. Near Tulsishyam temple there were no patterns of dung distribution. Dung was found in all plots of all transects and there were no decreasing signs moving away from the temple. Here, the dung density was continuous and high in all the plots.

Fuelwood from the adjoining forest is used for cooking at the Banej temple. This wood is also used to keep the Dhuni fire burning 24 hours a day. Banej temple does not have any cattle.

The distribution of pellets of wild animals near Kankai temple showed increasing trends while moving away from the temple. In transect No.5, dung density was low compared to other transects. This is due to the transect's location near the road, which causes more disturbance, and shows that the area near the temple is less used by wild animals due to disturbances. Near Tulsishyam temple, the dung density of wild animals was much

less in comparison to the area near Kankai temple; this may be due to more biotic disturbances.

Distribution of non-biodegradable materials

Non-biodegradable materials such as polyethylene bags and plastic materials were found in only two plots of each of the four transects near Kankai temple. These materials were confined to up to 600 m away from the temple inside the forest. Near Tulsishyam temple, the distribution of non-biodegradable materials inside the forest was negligible, although along the road there was an abundance of such materials The distribution of non-biodegradable materials along the road near Tulsishyam temple was very high, which decreased while moving away from the temple towards Jasadhar. This indicates that the distribution of these materials is only due to the temple complex.

Disturbances in the river system

A survey conducted along the river near Kankai temple showed heavy disturbances for 200 m in the Impacted Zone near the temple. The distribution of non-biodegradable substances and cattle use were both very high in this zone. Upstream, moving away from the temple, the distribution of non-biodegradable materials and evidence of cattle use decreased, and after few hundred meters was completely absent. But downstream, the distribution of non-biodegradable substances was found in all the zones. Evidence of cattle use was noted even up to 500 m distance from the Impacted Zone. Evidence of wild animals was very low in the Impacted Zone, and in the downstream area this may be due to the presence of cattle and human activities around the water in this area.

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ASSESSMENT OF BUTTERFLIES IN BIR SHIKARGAH WILDLIFE SANCTUARY, HARYANA

by V.P. Uniyal and Vinay Bhargav

Introduction

Bir Shikargah Wildlife Sanctuary, Haryana (N 30°45' 43.4", E 076°58' 38.5") is under the district jurisdiction of Panchkula in Haryana. The sanctuary was notified in 1986, and has an area of 7 km^2, with three beats. The altitude of the sanctuary is about 537 meters above sea level. Maximum temperatures can reach 43°C and minimum temperatures of 4°C have been recorded. The dominant floral species are chiefly *Cassia tora, Bamboo* sp., *Lantana camara, Parthenium* sp., *Ipomoea fistulosa, Murraya* sp., *Cassia fistula, Mellotes philippensis, Acacia catechu, Tectona grandis, etc.* The faunal species include monitor lizard, cobra, vipers, python, pangolin, spotted deer, barking deer, nilgai, wild boar, jackal, fox, sambhar and leopard. It also has a rich diversity of bird fauna *viz.*, red jungle fowl, pea fowl, grey partridge, rufous tree-pie, bee eaters, drongo, larks, babblers, shikra, crested pied serpent eagle, green pigeon, stone curlew, sunbirds, black-headed and European golden oriole, grey hornbill, etc. No documentation on invertebrate species has been recorded from the sanctuary so far. The first ever butterfly survey was carried out during the monsoon season in 2006 in order to assess the species diversity and estimate the number of individuals per species.

Sampling design

To assess the butterfly diversity of the sanctuary, three different transects (100 m.) in all three beats of the sanctuary were surveyed. Well established methods for the sampling of butterflies were used to determine the average density of butterflies in a 10x10 m plot in each of the three transects. The sampling was carried out in the morning hours when the butterflies show the maximum activity (0800 to 1100 hrs). Butterflies were identified by ocular observations and unidentified specimens were collected by sweep netting and identified with the help of relevant literature and references (Haribal, 1992; Singh, 1999 and Uniyal, 2004).

Observations

A total of 24 butterfly species belonging to four families *viz.* Papilionidae, Pieridae, Nymphalidae and Lycaenidae, were documented during the survey. A large proportion of species of Papilionidae and Pieridae were found to be engaged in mud-puddling behavior in many locations. Common mormon (*Papilio polytes*); Mottled emigrant (*Catopsilia pyranthe*) and Lemon emigrant (*Catopsilia* sp) have been observed in puddling conditions with a large number of individuals (>50) in many places (Table 1). This behavior of mud puddling is chiefly manifested by the male species in order to make up for the deficiency of sodium salts lost during copulation; the chief sources may be from contaminated ground water, dung, urine, damp earth, etc. (Plate 1). Butterflies are an important food chain component of the spiders, birds, reptiles and other predatory insects. They are good indicators of environmental changes, as they are sensitive and are directly affected by changes in their habitats, atmosphere, temperature and weather conditions (Haribal, 1992). The survival of butterflies depends mainly on the availability of larval food plants, which are generally secondary growths consisting of shrubs, creepers, saplings, etc. Increased human activities such as deforestation, construction, pollution, grazing, agricultural practices, and urbanization threatens the habitat of the butterflies. Thus, monitoring the butterfly populations in a given area provides an opportunity to find out the impact on the ecosystem at a landscape level, and help to plan the appropriate management strategies to protect the degrading habitats.

Acknowledgements

We would like to thank Shri P.R. Sinha, Director and Dr. V. B. Mathur, Dean, Wildlife Institute of India, Dehradun for necessary support. Thanks are also due to Chief Wildlife Warden, Haryana for permitting to carry out the study. Thanks to Shri Sada Ram, Wildlife Inspector for his assistance during the field work.

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Table 1 List of Butterflies documented in Bir Shikargah Wildlife Sanctuary

Family	Species	Diversity status
1. Papilionidae	1. Common mormon (*Papilio polytes*)	**E**
	2. Crimson rose (*Tros hector*)	**A**
	3. Lime butterfly (*Papilio demoleus*)	**B**
2. Pieridae	4. Spotless grass yellow (*Eurema laeta*)	**C**
	5. Three spot grass yellow (*Eurema blanda*)	**B**
	6. Small grass yellow (*Eurema briggita*)	**C**
	7. Dark clouded yellow (*Colias feldii*)	**A**
	8. Yellow orange tip (*Ixias pyrene*)	**B**
	9. Great orange tip (*Hebomia glaucippe*)	**C**
	10. Common jezebel (*Delias euceris*)	**A**
	11. Common gull (*Cepora nerissa*)	**D**
	12. Common emigrant (*Catopsilia pomona*)	**B**
	13. Mottled emigrant (*Catopsilia pyranthe*)	**E**
	14. Lemon emigrant (*Catopsilia crocale*)	**F**
3. Nymphalidae	15. Danaid eggfly (*Hypolimnas misippus*)	**A**
	16. Choclate pansy (*Precis iphita*)	**A**
	17. Common leopard (*Phalanta phalantha*)	**C**
	18. Orange oakleaf (*Kallima inachus*)	**A**
	19. Plain tiger (*Danaus chrysippus*)	**A**
	20. Common bush brown (*Mycalesis perseus*)	**A**
	21. Common crow (*Euploea core*)	**A**
	22. Common nawab (*Polyura athamas*)	**A**
4. Lycaenidae	23. Common pierrot (*Castalius rosimon*)	**A**
	24. Forget-me-not (*Catochrysops strabo*)	**A**

[A= <10, B= 10-20, C= 20-30, D= 30-40, E= 40-50, F= >50]
(Numbers depict the species abundance in a 10x10 m sampling plot)

STATUS OF RAPTORS WITH SPECIAL REFERENCE TO VULTURES IN AND AROUND KUMBHALGARH WILDLIFE SANCTUARY

by A.K. Chhangani, P. Robbins and S.M. Mohnot

Introduction

Raptors are found all over the world and in all types of habitats. Birds of prey are among the most dramatic of all the avian species. Their impressive appearance, spectacular hunting techniques and mastery of the air have inspired generations of bird watchers. Raptors are, in general, large and heavy-backed, with large claws used for catching and killing prey. They also have acute binocular vision and excellent hearing. The birds of prey, or raptors, make up the large order falconiformes, with nearly 300 species. Most species of raptors subsist mainly on live prey, which they generally capture on the ground, in trees and sometime in the air, except for most of the vulture species, which feed solely on dead carcasses.

Out of nine species of vultures found in India (Ali and Ripley, 1987), seven species have been observed in Rajasthan and Gujarat, viz. the King vulture (*Sarcogyps calvus*), Cinereous vulture (*Aegypius monachus*), Egyptian vulture (*Neophron percnopterus*), Eurasian griffon (*Gyps fulvus*), Himalayan griffon (*Gyps himalayensis*), Long-billed vulture (*Gyps indicus*) and White-rumped vulture (*Gyps bengalensis*) (Chhangani *et al*., 2002; Chhangani, 2005). Of these, four species - King vulture, Long-billed vulture, White-backed vulture and Egyptian vulture - are resident and breed in and around the Kumbhalgarh Wildlife Sanctuary (KWS) in central Rajasthan (Chhangani, 2002) . Notably, the Long-billed vulture in this region roosts on cliffs, while the White-backed and King vultures nest on large and medium-size trees. These latter species have been sighted in less numbers compared to the Long-billed vulture.

Material and Methods

Study site

Kumbhalgarh Wildlife Sanctuary (KWS) lies between 73º15' and 73º45' east and 25º00' and 25º30' north in the Aravalli Hills of Rajasthan. It was declared a Wildlife Sanctuary in 1986 and covers an area of 585 km^2. KWS is situated along a portion of the western slopes of the Aravalli Hills, with altitudes varying from 274 to 1,155 meters in elevation. During summer, the temperatures climb higher than 30º C and maximum temperatures may rise up to 48º C. The minimum temperature recorded during the study period was 2º C. The average annual rainfall is 725 mm, with a maximum 950 mm and minimum 403 mm. This wide range of climatic conditions, along with the wide elevational variations, harbors different micro-habitats. The sanctuary encompasses vegetation types such as deciduous, dry-deciduous, dry-savannah-forest, euphorbia scrub and dry grasslands.

The forest is dominated by *Anogeissus latifolia*, *A. pendula*, *Boswellia serrata*, *Lannea coromandelica*, *Wrightia tinctoria*, *Acacia senegal*, *A. catechu*, *Zizyphus mauritiana* and *Butea monosperma*. The undergrowth mainly consists of *Z. nummularia*, *Adhatoda vasica*, *Grewia tenax*, *G. flavescens*, *Capparis separaia*), *Lantana indicus*, etc. Some climbers and grasses are also found.

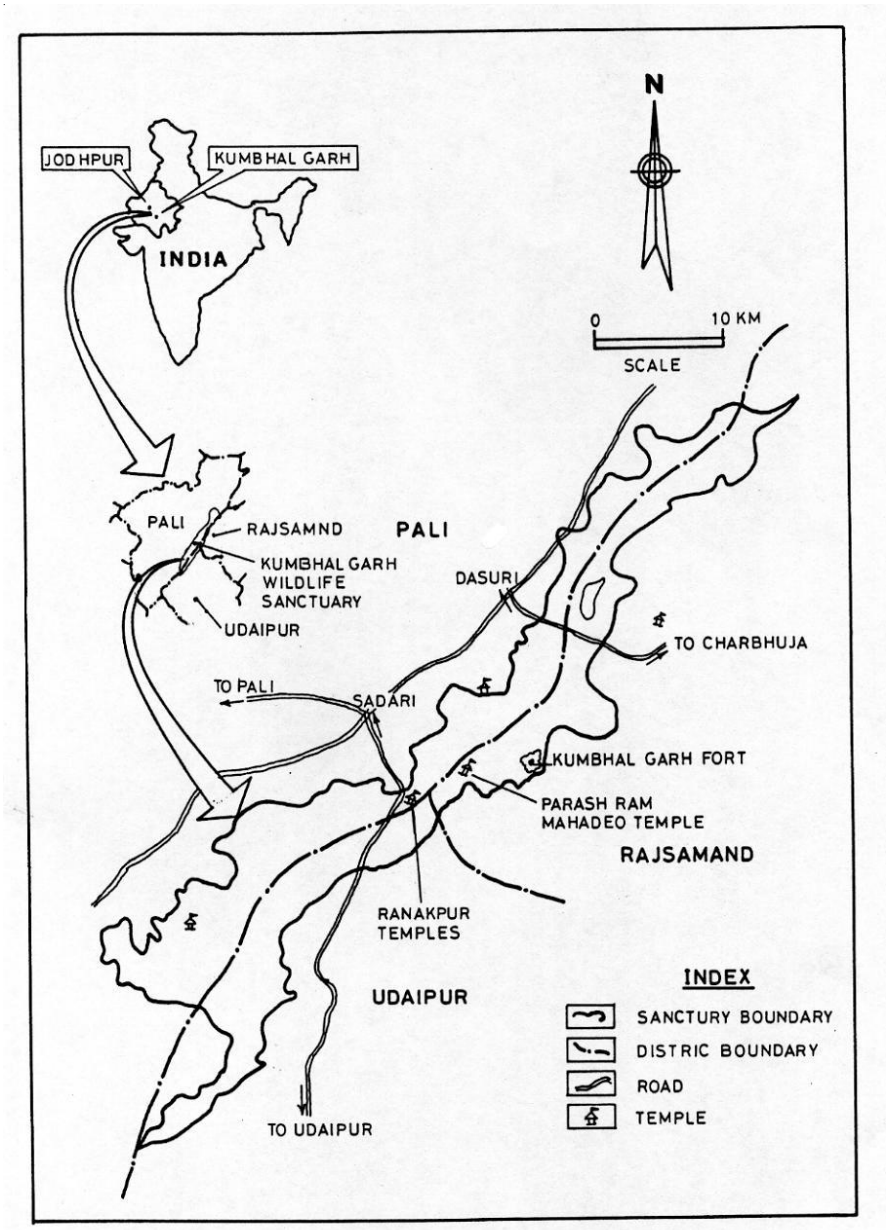
The main fauna of KWS includes leopard (*Panthera pardus*), hyena (*Hyaena hyaena*), Indian wolf (*Canis lupus*), jackal (*Canis aureas*), Hanuman langur (*Semnopithecus entellus*), fourhorned antelope (*Tetracerus quadricornis*),

(continued on p.17)

(continued from p.16)

chinkara (*Gazella gazella*), porcupine (*Hystrix indica*), sambar (*Cervus unicolor*), blue bull (*Boselaphus tragocamelus*), toddy cat (*Paradoxorus hermaphroditus*), jungle cat (*Felis chaus*), Indian fox (*Vulpes bengalensis*), mugger crocodile (*Crocodilus palustris*) and rock python (*Python molurus*) (Chhangani, 2004).

The sanctuary itself has no human inhabitants, but two small villages are encompassed by the park's boundaries. Some 94,388 people live within five kilometers of the boundary of the park in 33 settlements and a number of small satellite villages. The twelve largest and most proximate villages flanking the reserve are home to more than 43,100 people. Around 150,000 animals, which includes about 29,200 cows, 18,900 buffalos, 90,500 sheep, 5,500 goats and 4,800 camels are living in and around the sanctuary (Chhangani, *et al*., 2002).



TEXT FIG. 1. LOCATION OF KUMBHALGARH WILDLIFE SANCTUARY IN THE ARAVALLI HILLS.

Methods

Data was collected during a long-term study (October 2004 to May 2006) to evaluate the effects of human activity during the period following the establishment of the sanctuary, by examining the relationship between land cover and human activity/access. Vegetation changes were determined through use of time-series satellite image analysis. The relationship between areas of change (either to increased or decreased vegetation density) and human activity was determined through a GIS distance analysis from high traffic forest access points. The resulting patterns were considered in further detail with reference to interviews with local producers and Forest Department personnel. The aim of this study was to ascertain the nature of birds of prey in various microhabitat types in and around KWS.

A series of transacts and quadrats were laid in the sanctuary for an intensive wildlife and vegetation survey. Additionally, birds were recorded by point count methods in the major vegetation types, at water bodies (rivers, dams), and in all agro-ecosystems for the six-year period. Finally, chance encounters with raptor species were also recorded while following langurs. All identifications were based on Woodcock (1980), Ali and Ripley (1987), Grewal (1995) and Kazmierczak (2000), and only those species with confirmed identification are listed in this paper.

Results and discussion

A total of 201 species of birds were recorded in the KWS over the study period. In comparison, only 72 birds species have been sighted at Mount Abu, the highest altitude of the Aravalli region with good rainfall and forest (Devarshi and Trigunayat, 1989). Similarly, only 123 birds are listed for management in the KWS management plan for the years 1996-97 to 2000-01 by the state Forest Department. While Kumbhalgarh is actually the area of highest density for bird species in the Aravalli, its management plan remains behind actual species estimates. Out of the 201 sighted species, 23 are raptors, of which 19 species belong to the Family Accipitridae and 4 belong to the Family Falconidae.

Table 1: Raptor population found in and around the Kumbhalgarh Wildlife Sanctuary.

S. No.	Observed Species	Place	District & State	Vulture Population	Observed Activity in the area
1.	Long-billed vulture	Rajpura Dam	Pali, Rajasthan	3	Drinking
2.	Long-billed vulture	Bijapur	Pali, Rajasthan	20	Nesting, flying
3.	Long-billed vulture	Harganga	Pali, Rajasthan	16	Nesting, feeding
4.	Long-billed vulture	Desuri	Pali, Rajasthan	3	Feeding
5.	Long-billed vulture	Kot-Diver Road	Pali, Rajasthan	3	Drinking
6.	Long-billed vulture	Sumer	Pali, Rajasthan	8	Flying
7.	Long-billed vulture	Meethari Dam	Pali, Rajasthan	17	Drinking, resting
8.	Long-billed vulture	Parshuramji	Rajsamand, Rajasthan	24	Nesting, flying
9.	Long-billed vulture	Roop Nagar	Rajsamand, Rajasthan	17	Nesting, flying, roosting
10.	Long-billed vulture	Jhalachhatri	Udaipur, Rajasthan	3	Nesting, flying, roosting
11.	Long-billed vulture	Sali Mata	Rajsamand, Rajasthan	12	Nesting, roosting
12.	White-backed vulture	Gomti Choraha	Rajsamand, Rajasthan	7	Feeding

13.	White-backed vulture	Savantri	Rajsamand, Rajasthan	43	Nesting and roosting
14.	King vulture	Bijapur KWS	Pali	4	Nesting and flying
15.	King vulture	Sumer	Pali	2	Feeding
16.	Egyptian vulture	Kot Deever Nal	Pali, Rajasthan	3	Protected area
17.	Egyptian vulture	Sawari	Pali, Rajasthan	8	Water body (Dam)
18.	Egyptian vulture	Bijapur	Pali, Rajasthan	14	Water body (Talab)
19.	Egyptian vulture	Desuri	Pali, Rajasthan	6	Dead cow KWS area
20.	Egyptian vulture	Sumer	Pali, Rajasthan	12	Dead cow KWS area
	Total			**225**	

A total of 225 resident vultures species were observed in the study area; 126 long-billed vultures, 50 white-backed vultures, 43 Egyptian vultures and 7 king vultures were observed in and around KWS.

Table-2: Raptors of Kumbhalgarh Wildlife Sanctuary with Status and their preferred micro habitats.

S. No.	Name	Scientific Name	Status	Preferred Micro-habitats
1	Blackwinged kite	*Elanus caeruleus*	UC	4, 5, 6
2	Oriental honey buzzard	*Pernis ptilorhynchus*	UC	1, 2, 4
3	White eyed buzzard	*Butastur teesa*	C	1, 2, 5
4	Black Kite	*Milvus migrans*	UC	1, 2
5	Laggar Falcon	*F. jugger*	C	3, 4, 6
6	Pariah kite	*Milvus migrans govinda*	C	3, 6
7	Shikra	*Accipiter badius*	UC	2, 4, 6
8	Sparrow-hawk	*A.nisus*	C	1, 2, 6
9	Longlegged buzzard	*Buteo rufinus*	C	1,2,4
10	Crested hawk eagle	*Spizaetus cirrhatus*	UC	1,2,5
11	Tawny eagle	*Aquila rapax*	C	3,4,6
12	King vulture	*Sarcogyps calvus*	R*	3,4,6
13	Indian longbilled vulture	*Gyps indicus*	UC*	2,3,4,6
14	Indian whitebacked vulture	*Gyps bengalensis*	UC *	1,2,3,4,6
15	Scavenger vulture	*Neophron percnopterus*	C	3,4,6

16	Pale-harrier	*Circus macrourus*	R	2,4,5
17	Montagu's harrier	*C.pygargus*	R	2,5
18	Marsh harrier	*C.aeruginosus*	C	2,5
19	Short-toed eagle	*Circaetus gallicus*	C	1,2
20	Crested serpent eagle	*Spilornis cheela*	UC	1,2
21	Red necked falcon	*Falco chicquera*	UC	3,4,6
22	Peregrine falcon	*Falco peregrinus*	R	4,6
23	Kestrel	*F. tinnunculus*	C	2,3,6

C - Common; R - Rare; UC - Uncommon; VC - Very common
** - Listed in threatened birds of the world (IUCN red list-2000)*
1. Deciduous
2. Dry-Deciduous
3. Euphorbia scrub
4. Dry grassland
5. Wetland
6. Agro-ecosystem.

Nesting sites are very important for all raptors. The population and nesting success depends primarily on the availability of nesting sites (Newton, 1979). Out of 4 resident vulture species, long-billed vulture, white-backed vulture and king vulture were observed nesting in and around KWS. A total of 36 nests of long-billed vultures in the cliffs and 17 nests of white-backed vultures were observed, along with 3 nests of king vulture on trees.

A reduction in the availability of safe nesting sites can severely reduce breeding success. It was observed that many nesting sites of long-billed and white-backed vultures have come under heavy mining and deforestation pressure in the study area. A decline in breeding success due to a decrease in the preferred breeding habitat has been reported among many bird species (Gole, 1989; Newton, 1979). This appears to be an important cause of vulture population decline (Chhangani, 2005).

During normal rainfall years, when all dams and water bodies in and around KWS reach capacity, there is obviously no scarcity of food materials (aquatic as well as terrestrial), and resources are largely sufficient for resident and migratory raptors. Also, the number of undisturbed trees, rocks, cliffs and small islands in the reservoirs provide enough safe places for nesting and roosting of raptors. These are the main reasons for the attraction of the resident as well as migratory raptors. The high cattle population in and around the sanctuary further supplements vulture populations, as the natural deaths of these domestic animals provide a regular supply of food.

Threats

Out of 23 species of raptors found in KWS, three are listed as "Threatened Birds of the World" (Birdlife International, 2000). Of these two species, *Gyps bengalensis* and *Gyps indicus* are categorized as "critical", while *Sarcogyps calvus* is classified as "near threatened."

Although some studies suggest that Diclofenac (a medication used to treat inflamation and pain) is the main cause of the Gyps vulture decline, in this study we failed to confirm this hypothesis and found several other causes of vulture mortality. In our opinion these causes are more important and require investigation without further loss of time.

Hunting provides one such pressure. Many tribal areas in parts of Aravalli are dominated by indigenous communities like 'Bheels' and 'Garasiyas'. They were observed hunting vultures for feathers to prepare bows and arrows. However, the main cause of mortality in and around KWS is habitat disturbance, along with deaths from road

accidents, predation, weather, failed fledgings, scarcity of nesting material, and disturbance by humans.

In the last 10-15 years, the traditional agricultural practices have changed drastically in and around the KWS study area, with implications for the survival of the traditional culture. A range of traditional practices have declined, including fallowing the land in the dry season or over several years, the use of integrated agro-pastoral practices, and continuous crop rotation. With intensive agriculture increasingly relying on tubewells for year-round production and the decline of trees in crop fields owing to the increased use of tractors, habitat is lost. Indigenous tree species have been replaced by plantations of eucalyptus, *Prosopis juliflora*, etc., which further reduces nesting choices. The satellite vegetation change analysis in KWS itself further demonstrates a decline in canopy cover, which is especially important for white-backed and king vultures.

In sum, KWS is under a range of biotic and abiotic pressures with serious implications for the viability of the vulture populations. Changes within the forest include tree cutting, road accidents, forest fires, mining, etc. (Chhangani, 2001). Areas around the sanctuary suffer from decreased landscape diversity owing to intensification of agricultural production. Together, these lead to habitat loss and the lack of available safe nesting, roosting sites, and prey base for the raptors at Kumbhalgarh Wildlife Sanctuary. Failure to address the institutional and socio-economic drivers of change will result in further, potentially irreversible, change. Action is required immediately.

Acknowledgements

The authors would like to thank Mr. R.N. Malhotra, PCCF and Mr. Bhopal Singh, ACF, Kumbhalgarh Wildlife Sanctuary, Forests Department, Government of Rajasthan, for giving permission to work in KWS and necessary information. This work was supported by NSF grant 0351037.

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CHANGE IN AVIFAUNAL DIVERSITY DUE TO THE MANAGEMENT OF COMMUNITY FORESTRY

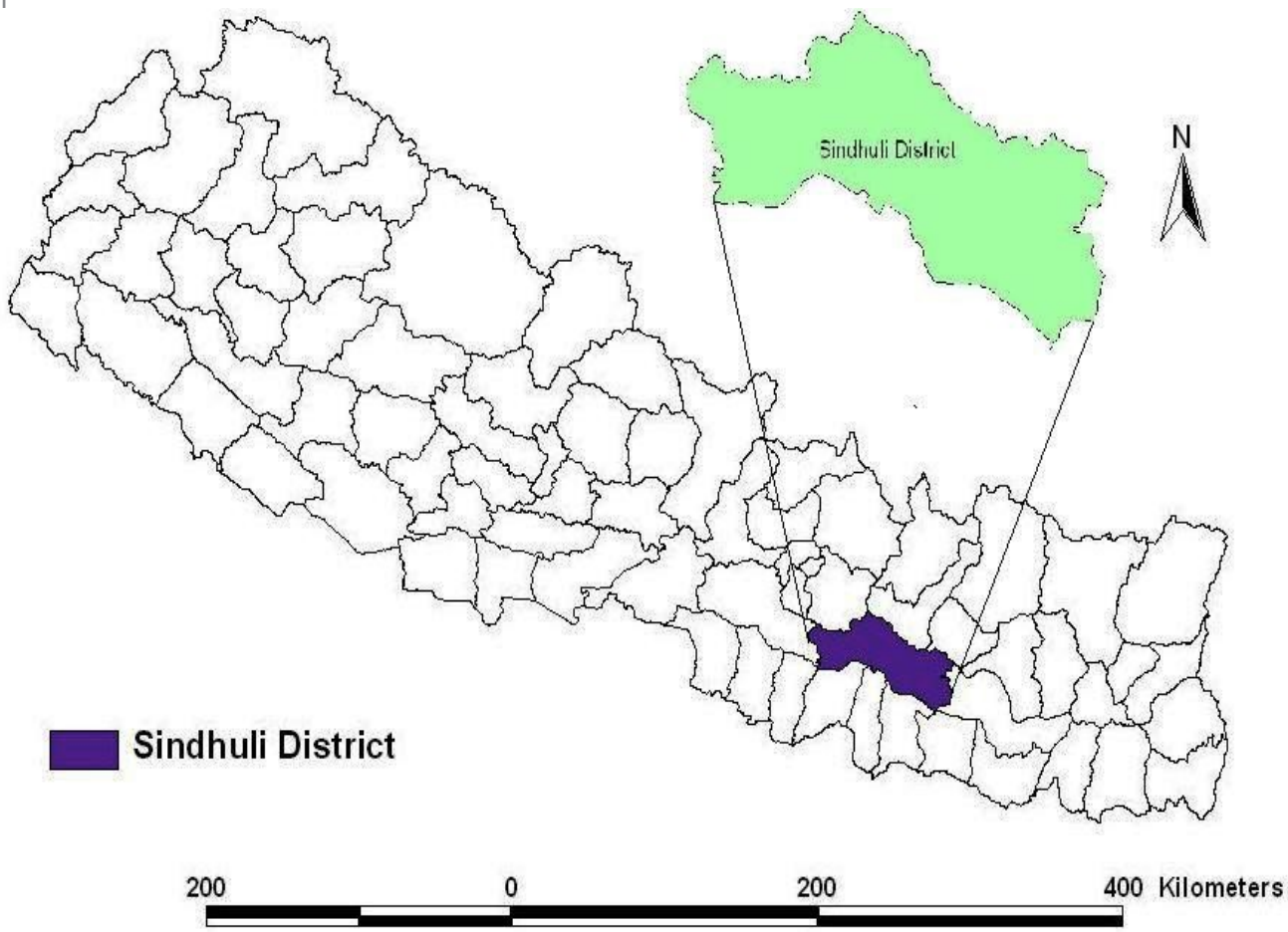
by S.P. Phuyal and S.P. Dhoubhadel

Introduction

Nepal incorporates the Palaearctic and Indo-Malayan biogeographical regions and the major floristic provinces of Asia, creating a unique and rich terrestrial biodiversity (HMGN/MFSC, 2002). The Government of Nepal introduced the community forestry (CF) concept during the late 1970s as a strategy to preserve the degraded hills of Nepal and to provide forestry products to meet the basic needs of the rural people (Acharya, 2002; Malla, 2000; Hobley, 1996; HMGN/ADB/ FINIDA, 1989 and Gilmour and Fisher, 1991).

It is claimed that the protection of degraded forest through CF has improved the forest condition and has a positive impact on biodiversity. The change in forest cover in most handed-over forests has in fact created changes in wildlife habitats that resulted in changes in the avifaunal biodiversity, although to what extent and degree was unknown.

Figure 1: Location of study area



As a part of a study carried out by first author, alterations in the diversity of birds due to the management of CF were analyzed as a case study between two CFs having similar ecological parameters, but altering the period after they were handed over to users.

Study Area

The study was carried out in Sindhuli District, which extends into the Oriental Realm between 26°55' to 27° 21' North parallels and 85° 24' to 86° 22' East longitudes.

Sindhuli District is surrounded by the Churia hills in the south and the High hills in the north. The district forms a unique geographical entity and represents tropical, subtropical and temperate climates.

Materials and Methods

Two community forests – Katahare CF of Ladabhir Village Development Committee (VDC) and Durga CF of Kakurthakur VDC – which were located in similar socio-economic and ecological conditions having almost equal area and forest types, were selected for the study. Except for the management regime, both forests have similar altitude, aspects, climate, temperature and rainfall, which are main determinants of vegetation distribution and, thereby, wildlife habitat. One of the community forests has been actively involved in forest management for the last 10 years and the other for 3 years. Some of the key features of two CFUGs are given in Table 1.

Table 1: Bio-physical and socio-economic characteristics of the study sites

Sn.	Characteristics	Katahare CFUG	Durga CFUG
1.	Location of Forest	Ladabhir- 4, Sindhuli	Kakurthakur - 8, Sindhuli
2.	Area of forest	271 ha	280 ha
3.	Altitude	600 – 1000 m.	600 – 1000 m.
4.	Slope	10° - 30°	10° - 25°
5.	Aspect	North, South and East	North, South and East
6.	Topography	Typical hills and slopes	Typical hills and slopes
7.	Forest origin	Natural forest	Natural forest
8.	Forest type	Mixed broadleaved forest	Mixed broadleaved forest
9.	Forest development stage	Mature tree forest	Mature tree forest
10.	Dominant vegetation	75% *Shorea robusta*	75% *Shorea robusta*
11.	Soil types	Black, brown and gravel mixed	Black, brown and gravel mixed
12.	Distance from district headquarters	54 km	60 km
13.	Years managing the forest actively	10	3

Primary data were collected by means of a reconnaissance survey, a questionnaire survey, group discussions and direct observations. Transects of different lengths were laid out in both the CFs. The birds were observed using the point count method at fixed stations between 6 am to 9 am everyday. Observed birds were recorded using an Encounter Rate List and the Index of Relative Abundance was calculated using the Encounter Rate Species Richness Method described by Bibby *et al.* (2000). Secondary data were collected through reviews of CF documents and other published and unpublished sources.

A Species Discovery Curve was prepared for bird species. In this study, the unit of time used was a day. The relative abundance of birds was calculated using encounter rates, in which the numerical abundance of birds is the number of individuals of a species of bird encountered per 10 hours observation period. The numerical abundances thus found were transformed into crude ordinal categories of abundance. The crude ordinal scale of abundance followed Lowen *et al.* (1996). The crude ordinal scales were scored respectively and the total scores were calculated. In this way, the total score of abundance, i.e. the cumulative total of the total score was found for each CF and the differences were considered for comparison.

Results and discussion

A total of 46 species of birds belonging to 10 Orders and 19 Families were recorded from Katahare CF, whereas, 42 species belonging to 9 Orders and 18 Families were recorded in Durga CF.

Forty-two species of birds were common in both CFs. However, four species were found in Katahare CF (common chiffchaff, small niltava, Asian swift and whiskered yuhina) that were not found in Durga CF during the study period. The reason behind the absence of these four species at the time of data collection is presumed to be due to the lower abundance of these birds in the newer CF than in the older CF.

The analysis indicated that the abundance of 33 species of birds was higher in the older CF (Katahare) than in the younger one (Durga), whereas the abundance of the remaining 13 species of birds was lower in Katahare CF than in Durga CF. The increase in the abundance of many species of birds suggests the positive effect of CF management on the diversity of most of the bird species. However, the decrease in abundance of 13 species of birds showed a possible decline in the abundance of some species.

None of the birds found in Katahare CF were rare species, whereas four rare species of birds were found in Durga CF. Three uncommon bird species were recorded in each forest. Durga CF holds more species of frequent birds than Katahare CF does, but Katahare CF includes more species of common birds than Durga CF. The number of abundant bird species was higher in Katahare CF than in Durga CF. Katahare CF received a total score of abundance of 172, whereas Durga CF's total score was only 153.

Table 2: Crude Ordinal Scale of Abundance and Total Score of Abundance of Birds in Katahare and Durga CFs, Sindhuli.

Sn	Ordinal abundance	Abundance score	Katahare CF		Durga CF	
			No. of observations	Total score (No. of Obs. X Abundance Score)	No. of observations	Total score (No. of Obs. X Abundance Score)
1	Rare	1	0	0	4	4
2	Uncommon	2	3	6	3	6
3	Frequent	3	16	48	19	57
4	Common	4	17	68	14	56
5	Abundant	5	10	50	6	30
Sum of Total Score			----------	**172**	----------	**153**

Conclusion

Both CFs possess a high degree of bird diversity. Katahare CF is home to 46 bird species, whereas Durga CF holds just 43 species. The relative abundance of 33 bird species was found to be greater in the older CF than in the younger one. Similarly, the relative abundance of the remaining 13 species was found to be comparatively higher in the younger CF. The total score of abundance of birds was greater in the older CF than in the younger CF. Thus, CF management would seem to have instigated the increase in diversity for most of the bird species.

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Acknowledgements

We gratefully acknowledge ComForM/IoF/ DANIDA for the research grant to carry out the study titled "Analysis of Change in Wildlife Diversity through Community Forestry, a case study from two community forests of Sindhuli district." This paper is primarily modeled on the basis of the final report of same study conducted by the first author from September-2005 to February-2006. For more details, please contact: rohini400@yahoo.com

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Annex 1

List of bird species found in Katahare and Durga Community Forest, Sindhuli

Sn	Common Name	Scientific Name	Family	Habitat	Fou
1	Eurasian Sparrowhawk	*Accipiter nisus*	Accipitridae	Well wooded country and open forest	K, I
2	Alpine Swift	*Tachymarptis melba*	Apodidae	Hills and Mountains	K
3	Oriental Turtle Dove	*Streptopelia orientalis*	Columbidae	Open forest, especially near cultivation	K, I
4	Spotted Dove	*Streptopelia chinensis*	Columbidae	Cultivation, habitation and open forest	K, I
5	Indian Roller	*Coracias benghalensis*	Coraciidae	Cultivation, woodland, groves, gardens	K, I
6	Ashy Drongo	*Dicrurus leucophaeus*	Corvidae	Broadleaved and coniferous forest	K, I
7	Ashy Woodswallow	*Artamus fuscus*	Corvidae	Open wooded country	K, I
8	Bar-winged Flycatcher-shrike	*Hemipus picatus*	Corvidae	Broadleaved forest and forest edge	K, I
9	Black Drongo	*Dicrurus macrocercus*	Corvidae	Around habitation and cultivation	K, I
10	Common Lora	*Aegithina tiphia*	Corvidae	Open broadleaved forest, wooded area	K, I
11	Grey-Chinned Minivet	*Pericrocotus solaris*	Corvidae	Moist broadleaved forest	K, I
12	Red-Billed Blue Magpie	*Urocissa erythrorhyncha*	Corvidae	Broadleaved and coniferous forest	K, I
13	Scarlet Minivet	*Pericrocotus flammeus*	Corvidae	Broadleaved and coniferous forest	K, I
14	White-Throated Fantail	*Rhipidura albicollis*	Corvidae	Broadleaved forest and secondary growth	K, I
15	Green-billed Malkoha	*Phaenicophaeus tristis*	Cuculidae	Dense forest and thickets	K, I
16	Lineated Barbet	*Megalaima lineata*	Megalaimidae	Open Sal forest and well wooded area	K, I
17	Blue Whisling Thrush	*Myophonus caeruleus*	Muscicapidae	Close to stream and result	K, I
18	Grey Buschat	*Saxicola ferrea*	Muscicapidae	Secondary growth, forest edges, scrub	K, I
19	Small Niltava	*Niltava macgrigoriae*	Muscicapidae	Bushes, along streams, edges and forest clearings	K
20	Spotted Forktail	*Enicurus maculatus*	Muscicapidae	Rocky streams in forest	K, I
21	White-Rumped Shama	*Copsychus malabaricus*	Muscicapidae	Undergrowth in broadleaved forest	K, I

22	Thick-Billed Flowerpecker	*Dicaeum agile*	Nectariniidae	Broadleaved forest, well wooded country	K, I
23	Great Tit	*Parus major*	Paridae	Open forest, favors broadleaves	K, I
24	Indian Peafowl	*Pavo cristatus*	Phasianidae	Dense riverian vegetation, open Sal forest	K, I
25	Fulvus Breasted Woodpecker	*Dendrocopos macei*	Picidae	Forest edge and open forest	K, I
26	Greater Yellownape	*Picus flavinucha*	Picidae	Broadleaved forest and forest edge	K, I
27	Grey-Capped Pigmy Woodpecker	*Dendrocopos canicapillus*	Picidae	Open broadleaved forest	K, I
28	Grey-Headed Woodpecker	*Picus canus*	Picidae	Broadleaved forest	K, I
29	Lesser Yellownape	*Picus cholorolophus*	Picidae	Broadleaved forest, secondary growth	K, I
30	Rufous Woodpecker	*Celeus brachyurus*	Picidae	Broadleaved forest and secondary growth	K, I
31	Speckled Piculet	*Picumnus innominatus*	Picidae	Broadleaved forest, secondary growth	K, I
32	Alexandrine Parakeet	*Psittacula eupatria*	Psittacidae	Sal and riverain forest	K, I
33	Rose-Ringed Parakeet	*Psittacula krameri*	Psittacidae	Broadleaved forest, wooded areas	K, I
34	Himalayan Bulbul	*Pycononotus leucogenys*	Pycnonotidae	Dry scrub, secondary growth, bushes	K, I
35	Chestnut-Bellied Nuthatch	*Sitta castanea*	Sittidae	Broadleaved forest and groves	K, I
36	Chestnut-Tailed Starling	*Sturnus malabaricus*	Sturnidae	Open wooded area and groves	K, I
37	Blyth's Leaf Warbler	*Phylloscopus reguloides*	Sylviidae	Bushes and open forest	K, I
38	Common Chiffchaff	*Phylloscopus collybita*	Sylviidae	Forest, bushes and secondary growth	K
39	Greater Necklaced Laughingthrush	*Garrulax pectoralis*	Sylviidae	Moist broadleaved forest, secondary growth	K, I
40	Jungle Babbler	*Turdoides straitus*	Sylviidae	Cultivation and secondary scrub	K, I
41	Lemon-Rumped Warbler	*Phylloscopus chloronotus*	Sylviidae	Forest; also secondary growth in winter	K, I
42	Striped Tit Babler	*Macronous gularis*	Sylviidae	Undergrowth in broadleaved forest	K
43	Whiskered Yuhina	*Yuhina flavicollis*	Sylviidae	Broadleaved forest and secondary growth	K, I
44	White-Bellied Yuhina	*Yuhina zantholeuca*	Sylviidae	Broadleaved forest	K, I
45	Common Hoopoe	*Upupa epops*	Upupidae	Open country, cultivation and village	K, I
46	Oriental White Eye	*Zosterops palpebrosus*	Zosteropus	Open broadleaved forest	K, I

Note: K= Recorded in Katahare CF, D= Recorded in Durga CF

BIODIVERSITY CONSERVATION STRATEGIES IN BANGLADESH: THE STATE OF PROTECTED AREAS

by Sharif Ahmed Mukul

Introduction

Over the past few decades, biodiversity has become the issue of global concern due to its rapid reduction worldwide. It is also widely supposed that it is the poorest people of most developing countries, who depend most immediately upon local ecosystems for their livelihoods, that will be most affected by the consequences of this biodiversity loss (CBD, 2006). It is, therefore, essential to conserve this threatened biodiversity for the well being of these people. To date, various programs and strategies have been undertaken to tackle this problem at both national and regional levels. Governments throughout the world have been strengthening their conservation capacity by developing and adopting various policies, legislations and innovative approaches.

Bangladesh, the world largest deltaic region, lies in the northeastern part of South Asia, between 20˚34'and 26˚38' north latitude and 88˚01' and 92˚41' east longitude. The majority of the country's land was formed by river alluvium from the Ganges and the Brahmaputra and their tributaries, which consists mostly of flood plains (80%) with some hilly areas (12%). Although a small country, Bangladesh is exceptionally endowed with a vast variety of flora and fauna due to its unique geophysical location (Nishat *et. al.,* 2002; Hossain, 2001). An estimated 5,700 species of angiosperms alone, including 68 woody legumes, 130 fiber yielding plants, 500 medicinal plants, 29 orchids, 3 species of gymnosperms and 1,700 pteridophytes has been recorded from the country (Islam, 2003). The country also possesses a rich faunal diversity and has approximately 113 species of mammals, more than 628 species of birds (both passerine and non-passerine), 126 species of reptiles, 22 species of amphibians, 708 species of marine and freshwater fish, 2,493 species of insects, 19 species of mites, 164 species of algae (or seaweed) and 4 species of echinoderms (Islam *et. al.,* 2003; IUCN, 2000).

Like in other regions around the globe, the biodiversity of Bangladesh is also entering through a critical period. Already, 12 wildlife species have become extinct from the country (Rahman, 2004). In addition, IUCN (2000) has listed a total of 40 inland mammal species, 41 bird species, 58 reptiles and 8 amphibians under various degrees of risk in the country, and the Bangladesh National Herbarium reported 106 vascular plant species under risk of various degrees of extinction in the country (Khan *et. al.*, 2001).

Biodiversity conservation initiatives in Bangladesh

Bangladesh has practiced both *in situ* and *ex situ* conservation methods to maintain the remnants of the country's biological diversity. The declaration of protected areas, ecologically critical areas (ECAs), World Heritage Sites and Ramsar sites are some examples of *in situ* conservation; alternatively, *ex situ* conservation measures includes botanical gardens, preservation plots, gene banks, arboretums, etc. There are also five eco parks and one safari park in the country, which also contribute significantly to biodiversity conservation.

The country has ratified most of the international treaties and conventions related to conservation of biodiversity. As a signatory party of these agreements the government has developed various legislative policies and inventions to conserve its remaining biodiversity (Ali and Ahmed, 2001; Kothari *et. al.,* 2000). Following are the major legislative policies and approaches taken by the government which provide provisions

for biodiversity conservation in the country. These include the following:

- National Biodiversity Strategy and Action Plan (NBSAP);
- National Conservation Strategy (NCS);
- Bangladesh Wildlife (Preservation) (Amendment) Act, 1974;
- Bangladesh Forest Act, 1978 and subsequent amendments;
- National Environment Management Action Plan (NEMAP);
- The Bangladesh Environment Conservation Act, 1995 and Environment Conservation Rules 1997;
- Sustainable Environment Management Programme (SEMP); and the
- Nishorgo Support Project (NSP) for the co-management of protected areas.

Protected Areas of Bangladesh

Declaring protected areas has long been the most effective and widespread measure for conserving nature and natural resources around the world; however, the declaration of PAs for biodiversity conservation is rather a new concept in Bangladesh. In 1974, the Bangladesh Wildlife Preservation Act defined three types of PA under different IUCN protected area management categories in the country, namely:

- ***Wildlife Sanctuary:*** an area maintained as an undisturbed breeding ground for wild fauna and where the habitat is protected for the continued well-being of the resident or migratory fauna.
- ***National Park:*** a comparatively large area of natural beauty to which the members of the public have access for recreation, education and research, and in which the wildlife is protected.
- ***Game Reserve:*** normally comprises a relatively isolated area meant for protection of wildlife in general and to increase the population of specified species.

Presently, there are 18 notified protected areas (i.e., ten national parks, seven wildlife sanctuaries and one game reserve) in Bangladesh (NSP, 2006). Compared to other regions of the world, this figure is still very poor. The PAs of Bangladesh cover nearly 1.7% of the total landmass of the country, which is the second lowest per capita area under PAs in any country. Also, the PAs of Bangladesh do not effectively represent all the ecosystems, habitats and species important for conservation. At present, the PAs of the country cover 11.08% of the total forest area of the country and represent hill forests, sal forests and mangrove forest in percentages of 5.22%, 11.24% and 23.3% respectively.

Threats to protected areas of Bangladesh

In Bangladesh, protected areas are part of the Reserved Forests and have been notified as PAs after severe ecological degradation and destruction. The following are some major challenges concerning sound PA management in the country:

- rural poverty and the high unemployment rate in the surrounding of protected areas;
- conflicts between the Forest Department and local forest-dependent people due to ignoring local people's customary resource use practices;
- fuelwood collection, illegal poaching and overexploitation of other non-timber forest resources;
- poor and inefficient management facilities due to a shortage of trained personnel, modern equipment and budget deficiencies;
- the absence of a proper monitoring body and improper implementation of laws; and
- lack of people's awareness about the importance of biodiversity.

Conclusions and recommendations

During the last few decades a noteworthy area of Bangladesh forests has been converted to other land use practices (e.g., agricultural crop fields) due to country's enormous population pressure. It is now essential to conserve the country's remaining natural forest patches by bringing them under a well defined PA network system, ensuring a fair representation of all vegetation types. However, in Bangladesh, simply declaring a protected area under the provision of the law, but excluding the needs of the rural people, cannot stop the rapid loss of biodiversity or secure the future of PAs, since the local people will consider such efforts to be ignoring their traditional rights

to the forest, which they have enjoyed for generations. The Government needs to manage PAs through an adaptive collaborative management system and should immediately consider the following in order to achieve a long-term and effective PA managerial system:

- Implementing poverty reduction strategies around PAs by developing alternative income generating (AIG) activities and providing micro-credit facilities to the rural people.
- Create opportunities to develop the tourist industry (ecotourism) based on protected areas.
- Adopting a participatory PA management regime which ensures the equity of the local people in decision making and benefit sharing.
- Restore and manage buffer zones as an alternative resource exploitation zone, as well as fixing an allowable resource exploitation limit from the PAs; this offers both ecological and economical sustainability in the local environment and livelihoods.
- Formulate a separate institutional body for the management and monitoring of PAs.
- Promote capacity building of PA managerial staffs by designing specialized courses in the conservation and management of PAs.
- Generate and create internal income sources (e.g., selling entry tickets, permissions for photographs, souvenir, etc.) for the sustainable financing of protected areas.

Acknowledgements

The author would like to thank Dr. Jefferson Fox and Mrs. Begum Marzan for their invaluable assistance and guidance. Literature and other information support from IUCN-WCPA, Nishorgo Support Project (NSP) and SCBD are also gratefully acknowledged.

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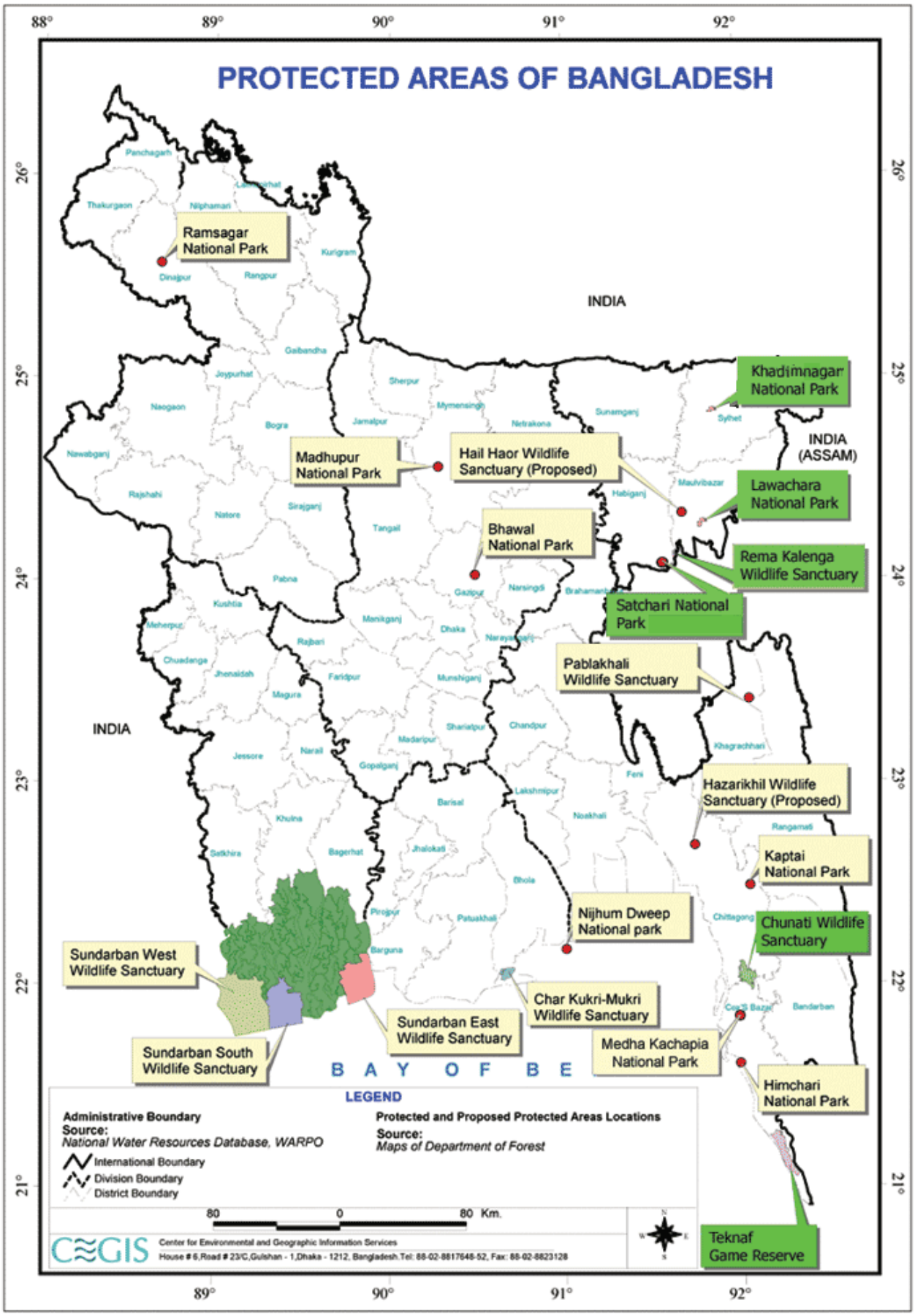
Table 1. List of protected areas of Bangladesh

Sl.	Protected Areas	Forest types	Location	Area (ha)	Established (Extended)
A.	**NATIONAL PARKS** (IUCN category V)				
01.	Modhupur NP	Sal forest	Tangail	8,436	1962(1982)
02.	Bhawal NP	Sal forest	Gazipur	5,022	1974 (1982)
03.	Himchari NP	Hill forest	Cox's Bazar	1,729	1980
04.	Lawachara NP	Hill forest	Maulvibazar	1,250	1996
05.	Kaptai NP	Hill forest	Rangamati	5,464	1999
06.	Ramsagar NP	Sal forest	Dinajpur	27.75	2001
07.	Nijhum Dweep NP	Coastal mangrove	Noakhali	16,352.23	2001
08.	Medha Kachapia NP	Hill forest	Cox's Bazar	395.92	2004
09.	Satchari NP	Hill forest	Habiganj	242.82	2005
10.	Khadimnagar NP	Hill forest	Sylhet	679	2006
B.	**WILD LIFE SANCTUARIES** (IUCN category IV)				
11.	Sundarban (East) WS	Natural mangrove	Bagerhat	31,226.94	1960 (1996)
12.	Pablakhali WS	Hill forest	Rangamati	42,087	1962 (1983)
13.	Char Kukri Mukri WS	Coastal mangrove	Bhola	40	1981
14.	Chunati WS	Hill forest	Chittagong	7,761	1986
15.	Rema-Kalenga WS	Hill forest	Habiganj	1,795.54	1996
16.	Sundarban (South) WS	Natural mangrove	Khulna	36,970.45	1996
17.	Sundarban (West) WS	Natural mangrove	Satkhira	71,502.13	1996
C.	**GAME RESERVE**				
18.	Teknaf GR	Hill forest	Cox's Bazar	11,615	1983


PROTECTED AREAS OF BANGLADESH
88°
89°
90°
91°
92°
26°
25°
24°
23°
22°
21°
INDIA
INDIA
INDIA (ASSAM)
Ramsagar National Park
Madhupur National Park
Hail Haor Wildlife Sanctuary (Proposed)
Khadimnagar National Park
Lawachara National Park
Bhawal National Park
Rema Kalenga Wildlife Sanctuary
Satchari National Park
Pablakhali Wildlife Sanctuary
Hazarikhil Wildlife Sanctuary (Proposed)
Kaptai National Park
Nijhum Dweep National park
Chunati Wildlife Sanctuary
Char Kukri-Mukri Wildlife Sanctuary
Medha Kachapia National Park
Himchari National Park
Teknaf Game Reserve
Sundarban West Wildlife Sanctuary
Sundarban East Wildlife Sanctuary
Sundarban South Wildlife Sanctuary
B A Y O F B E
LEGEND
Administrative Boundary
Source:
National Water Resources Database, WARPO
International Boundary
Division Boundary
District Boundary
Protected and Proposed Protected Areas Locations
Source:
Maps of Department of Forest
80 0 80 Km.
CEGIS
Center for Environmental and Geographic Information Services
House # 6,Road # 23/C,Gulshan - 1,Dhaka - 1212, Bangladesh.Tel: 88-02-8817648-52, Fax: 88-02-8823128

FOREST NEWS

Vol. XXI: No. 3 Jul-Sep 2007

BIOFUEL AND POVERY EXPERTS MEET

Contributed by Regan Suzuki, Associate Consultant, Forest Policy

In the rush to benefit from the emerging potential of bioenergy development, there is increasing interest in a careful accounting of costs and benefits. *Sustainable Bioenergy: A Framework for Decision Makers,* a joint UN agency report sponsored by FAO, was released in May 2007 and helped to set the direction of the workshop on "Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction," which was jointly organized by FAO, the Asian Development Bank (ADB) and the International Fund for Agricultural Development (IFAD). The May report cautioned that, "The economic, environmental and social impacts of bioenergy development must be assessed carefully before deciding if, and how rapidly, to develop the industry and what technologies, policies and investment strategies to pursue."

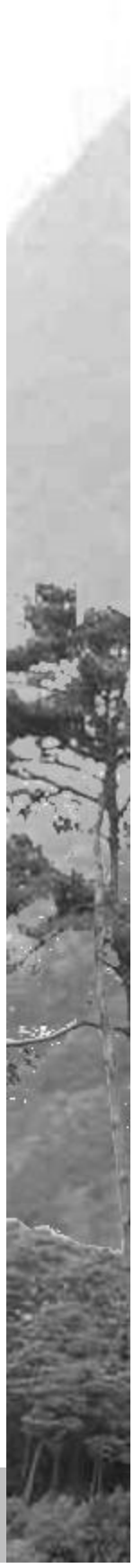
The workshop, held 11-12 June 2007, in Bangkok, Thailand, demonstrated that the perceived potential of bioenergy in different countries is both strong and varied. The target countries of the Greater Mekong Sub-Region (GMS) (i.e., Cambodia, China, Lao PDR, Myanmar, Thailand and Vietnam) differ in the degrees to which bioenergy use and production has been adopted. Some countries are at the stage of potential crop identification, while others are well advanced in implementing pilot and industrial bioenergy projects and programs.

A number of themes were recurrent throughout the workshop. These included the global concern over food security should arable land be used for fuel crops rather than food crop production. Participants, however, did not see this as an insurmountable obstacle, but rather one that could result in higher crop prices and income for rural farmers. A further theme throughout the workshop was the general enthusiasm shown for biofuel production, even where basic information and data were either not available or inconclusive. A case in point was the conflicting reviews of the use of *Jatropha curcas* for oil production.

The outcomes of the workshop included overall agreement on the enormous potential benefits of bioenergy across a number of crosscutting fields, including new opportunities for rural development and infrastructure, increased income generation for rural producers, the development of environmentally friendly energy sources, and the increased availability of energy to rural areas in the GMS. The workshop also recognized the significant gaps in information, particularly cross-sectorally, that limit the ability of the region to respond to emerging opportunities and mitigate potential challenges. It is critical that in-depth, inter-sectoral studies and assessments be undertaken and linked to rural livelihoods, equitable economic development and the environment.

On the basis of workshop discussions, a series of priority actions and recommendations were identified. These included the need for further research and studies to be taken on a range of issues, such as:

- linkages between bioenergy development and food prices, food security, rural economics, trade, employment, biodiversity and climate change;



- the adaptability and feasibility of alternative energy crops and conversion and end-use technologies; and
- piloting of experiences, policies, models and practical tools in national, regional and international organizations in areas such as land use planning, bioenergy potential evaluation and impacts on food security and commodity prices.

Other recommendations for bioenergy development in the Asia-Pacific region included the following:

- Assist governments in formulating appropriate policies based on the knowledge gained in the above assessments;
- Promote engagement of small and medium-sized enterprises in seeking production models of varying scales to allow them to be more competitive;
- Promote active entry of small-scale farmers into bioenergy conversion stages and upward movement in the market supply chain;
- Develop criteria to evaluate pros and cons of biofuel production for national and GMS use versus export market entry;
- Promote, develop and upscale small-scale bioenergy technologies;
- Promote subregional policy dialogue, cooperation and establish a network among GMS countries on the key issues and recommendations emerging from this workshop; and
- Establish and support public-private partnerships in the field of biofuel development.

Reports on the expert consultations on the "Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction" are in preparation and will be available from Patrick Durst, Senior Forestry Officer, FAO. Fax:(662)6974445;
E-mail: Patrick.durst@fao.org

NEW FOREST POLICY INITIATIVE FOR ASIA-PACIFIC

Despite continuing commitments and declarations avowing the protection and sustainable management of national forest cover within the Asia-Pacific region, the extent and quality of the forests continues to decline. This begs the question of why success in preserving and managing forests has been so elusive, and specifically, what role policy plays in this equation?

In response to this, FAO, the Philippines Department of Environment and Natural Resources and the Asia-Pacific Forestry Commission jointly organized the second expert consultation on *Establishing an Asia-Pacific Forest Policy "Think Tank,"* 16-17 August 2007, in Manila, Philippines. The meeting was attended by participants from governments, academia, research, civil society and international organizations in the Asia-Pacific region and beyond.

As a follow-up to the first expert consultation held during March 2006, this workshop gathering had four main objectives:

- reaffirm the need for establishing an Asia-Pacific forest policy initiative;
- explore some of the possible forms, modalities and models that the regional "think tank" might take, and develop consensus on a suitable model for delivering the functions and impacts of the initiative;
- generate options, nominations and commitments – both at an institutional and individual level – to "champion" the establishment and operation of the think tank; and
- gain indications of interest from international partner organizations, and explore ways in which their institutional mandates and strategies may support and collaborate with the future think tank.

The first consultation involved only participants from Asia-Pacific countries, with the intent that it should be Asian voices and ideas that initially and ultimately shape this initiative. The second consultation was designed to bring in representatives from a number of regional and international organizations to add valuable perspectives, and particularly to consider support for such an initiative over the long term.

During the two days of overview presentations, panel discussions, working groups, and brainstorming in plenary, the assembled experts tackled the stated objectives, and were able to identify not only what the proposed think tank should do, but also what it should not do. The scope was prioritized and narrowed to key functional areas such as: communications, advocacy, coordination, capacity building, policy analysis and resource mobilization. It was agreed that the focus should be on policy implementation, adding value to existing efforts, and building upon existing networks and partnerships.

The think tank should be able to provide real-time, holistic and objective analysis on key issues and problems – as they unfold – as well as periodic assessment of emerging issues and their larger implications. This can only be done by bringing together the best brains capable of analyzing issues in their totality. Furthermore, the work must be totally unbiased (not driven by the agenda of any particular organization).

Recommendations on the appropriate structure highlighted the need for: an appropriate organization to host the initiative; an independent and flexible secretariat with a full-time coordinator; an active advisory group; and thematic focus groups to carry out various activities supported by the think tank. The expert group also identified a list of potential institutional and individual champions within the region to support the establishment and operation of the proposed think tank.

Feedback on the term "think tank" (a label that might imply "technical arrogance" to some) indicated the need to revisit and reconsider a more appropriate name for this initiative.

Several national, regional and international organizations expressed their interest to collaborate with the think tank/network/forum, and offered a range of in-kind and financial support. Practical recommendations were made regarding the way forward, and these will be discussed with the APFC Executive Committee. It was also recommended to explore further linkages with the Asian Forest Partnership (AFP), the ASEAN Secretariat, and other key partner countries, organizations and international processes.

To support and implement the next steps, it was decided that an interim coordinator and core group should be constituted as follows:

- FAO Regional Office for Asia and the Pacific agreed to act as interim coordinator, working with a core group comprising the Regional Community Forestry Training Centre (RECOFTC), the Asian Forest Network (AFN) and the new Responsible Asian Forest & Trade (RAFT) Program;
- FAO will mobilize resources and consultants to conduct a gap analysis, and develop and package proposals and materials for marketing to partners and donors (e.g., document and share relevant policy success stories and toolkits); and
- RECOFTC and RAFT also have available resources to support some actions.

The next steps forward included these concrete measures and actions:

- Ensuring linkages to APFC: Outcomes and recommendations from the consultation to be submitted for endorsement by the APFC Executive Committee.
- Exploring linkages with AFP: There will be an AFP meeting at the end of 2007 in Japan to discuss the next five-year work program; there may be scope to include discussion of the proposed think tank/network in the agenda.
- Reaching out to other partners: Seek participation and representation from other key partner countries, organizations and international processes (e.g., ASEAN Secretariat, IUCN, UNFF, etc.).
- Identifying interim coordinator and core group to support the following:
  - The FAO Regional Office for Asia and the Pacific agreed to act as interim

coordinator, working with a core group comprising RECOFTC, AFN and the new RAFT program.

- FAO will look for resources and a consultant to do a gap analysis, and develop and package proposals and materials for marketing to partners and donors (e.g., document and share relevant policy success stories and toolkits).
- RECOFTC and RAFT also have resources to support some actions.

The report on the expert consultation on Establishing a Forest Policy Think Tank for Asia and the Pacific is available from Patrick Durst, Senior Forestry Officer, FAO. Fax (662) 697 4445; E-mail: Patrick.durst@fao.org

PROMOTING COMMUNITY PARTICIPATION IN COASTAL FORESTRY -- EXPERIENCE FROM SRI LANKA

Contributed by Jeremy Broadhead, Assistant Coordinator, Forestry Programme for Early Rehabilitation in Asian Tsunami-Affected Countries

When coastal forests have been reduced by years of exploitation and a natural disaster occurs, all eyes naturally turn to the survival needs of the affected people. This is all well and good during an emergency, but we also have to ask at what point do longer term issues such as environment become a priority? All too often, "long term" means "to be dealt with in the future." In the case of the 2004 Indian Ocean tsunami, such a perception may have meant that environmental issues were never addressed, given that emergency funds were only available for a relatively short period of time.

The FAO *Forestry Programme for Early Rehabilitation in Asian Tsunami-Affected Countries* set about tackling this problem in Sri Lanka by implementing a short-term forestry project that not only supported coastal afforestation, but also provided direct benefits to villagers to address their immediate requirements. Through this approach, both short- and long-term needs were embraced, while the sustainability of the project's interventions was enhanced.

The project ran from late 2005 to April 2007, and within this short period achieved significant progress, with respect to both coastal forest rehabilitation and village development. Implementation of such projects is usually thought to require much longer periods, but with the emergency conditions and only short-term funding available, this concept had to be challenged.

The project worked with the Forest Department in six of the districts most affected by the tsunami: Kalutara, Galle, Matara, and Hambantota districts in the southern part of the country, and Batticaloa and Ampara districts in the east. The principal objective was to help restore villagers' livelihoods and to contribute to the future wellbeing and security of the coastal communities.

The project addressed the villagers' immediate needs by providing forest-related employment through afforestation activities. These included coastal afforestation and shelterbelt establishment, mangrove rehabilitation, home garden development and roadside and urban planting. The communities gained the following direct benefits:

- income from nursery operations (e.g., raising and selling plants to the project under the "buy-back" system);
- capacity building in operating nurseries; and
- income from employment in site preparation, planting and tending.

Longer term benefits, including coastal protection and erosion control, environmental restoration, improved income and supply of wood and non-wood forest products, were an integral and equally supported part of the project.

All coastal planting activities were undertaken with the active participation of the communities. Prior to commencement of activities, Participatory Rural Assessments (PRA) were undertaken to assess community needs in relation to and also beyond the project's core reforestation activities. The PRA ensured that the project's activities were in accord with the communities' needs and desires, thereby resulting in improved results and greater sustainability.

Discussions with local people indicated that although they were interested in coastal afforestation, their major concern was for organization and support to be provided for wider activities. Through broader support for community development, villagers felt they would be in a better position to protect and manage the established shelterbelts.

The establishment of Community-Based Organizations (CBOs) was particularly successful. The project staff assisted in framing the constitution and the nature of functions to be undertaken by the CBOs in support of village development. Nearly 80 percent of local households joined in forming the CBOs. Officers were elected democratically and the CBOs were registered with local authorities.

The CBOs held monthly meetings at which village issues were discussed and responses formulated. One challenge that was addressed was the lack of funding available to female villagers to support income-generating ventures. Discussions with CBO members indicated that provision of "seed money" to village women would strengthen the CBO and indirectly build more support for the maintenance and sustainability of the established shelterbelts.

In Udagalpitiya, Galle District, the project succeeded in obtaining 30,000 rupees (US$ 270) seed money from a well-wisher to undertake income-generating activities. The 30-member women's group in the village decided to divide into six sub-groups, each with five members. Five thousand rupees were loaned to each member of the first group. The sequence in which the groups received money was decided on the basis of a lottery. The women's group decided that the repayment should commence two months after receipt of the loan and comprise ten monthly installments of 525 rupees each (5,250 rupees in total). The additional 250 rupees per 5,000 rupee loan was considered a "service charge" by the women's group.

By January 2007, repayments totalled 5,250 rupees and a sixth loan of 5,000 rupees was awarded to a member of the second 5-member group. This process will continue until all 30 members have received loans.

The women who have received loans have invested in fish drying, tailoring, operating small shops and trading in vegetables, fish, clothes, etc. To date, every beneficiary of the loan has repaid the agreed sum according to the repayment schedule.

The main lesson learnt is that communities are more willing to conserve local natural resources if they feel that the Forest Department is also interested in improving the livelihoods of community members. Through this mutually beneficial relationship the project not only contributed to village development but also supported the following:

- 122 hectares of coastal afforestation;
- 27.5 hectares of mangrove forest rehabilitation;
- 15,955 households provided with tree seedlings;
- 44 kilometers of avenues/roads planted with trees; and
- 24 hectares planted in urban areas.

The *FAO Forestry Programme for Early Rehabilitation in Asian Tsunami-Affected Countries*, continues to work in Indonesia and at the regional level. It will come to an end in September 2007 (http://www.fao.org/forestry/site/tsunami/en/). Future coastal forestry and coastal ecosystem rehabilitation activities in Sri Lanka will be supported by FAO though the IUCN-led *Mangroves for the Future (MFF) initiative* (http://www.iucn.org/tsunami/). FAO is a founding partner in the MFF initiative and is actively involved in the program's preparatory activities, which will be completed by March 2008.

IMPROVING FOREST HARVESTING IN ASIA AND THE PACIFIC

Contributed by Kenichi Shono, Associate Professional Officer, FAO-RAP

The *Regional Workshop on Progress with the Implementation of Codes of Forest Harvesting Practices and Actions for the Future* was held 13-18 May 2007, in Sandakan, Sabah, Malaysia. The workshop was organized by the FAO Regional Office for Asia and the Pacific, in partnership with the Forest Research Institute Malaysia (FRIM) and the Sabah Forestry Department.

The workshop brought together 35 experts and practitioners from Australia, Cambodia, China, Fiji, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Russia, Solomon Islands, and Vietnam. Resource persons came from ASEAN, the Secretariat of the Pacific Community (SPC), the Malaysian Timber Certification Council (MTCC), Tropical Forest Foundation (TFF), Sabah Forestry Department, KTS Plantation, FAO, and Forestry Tasmania.

The objectives of the workshop were to:

- review the progress of the implementation of national codes of practice, drawing on the expert assessments of ASEAN and the South Pacific countries;
- develop concepts, strategies and action plans to better improve the uptake and implementation of national codes of practice; and
- demonstrate the impacts of effective (and otherwise) implementation of codes of practice for forest harvesting and the utility of formal systems for the monitoring and evaluation of implementation through field visits and discussions with field practitioners.

The workshop was officially opened by Datuk Sam Mannan, Director of Forestry in Sabah. The Director challenged the participants to "make a difference," noting that whilst they may not individually have the power to make changes to the way that codes of practice are being implemented in their countries, they at least have the capacity to facilitate the process of change by providing sound advice to inform policy and decision-makers. The Director affirmed the importance of objective monitoring, so that there is no confusion or differing expectations about the standards that are being sought.

Following the opening remarks, recent assessments of national codes implementation in ASEAN and South Pacific countries were presented. They reported that progress towards the effective implementation of codes of harvesting practice throughout the Asia Pacific region has been variable. Sound progress has been made in some countries, but implementation has stalled or declined in others for a number of reasons, including loss of institutional capacity and a lack of high level support. A resource person from the Malaysian Timber Certification Council stressed that effective code implementation is a must for certification and markets.

The participants reviewed the strengths and weaknesses of code implementation and identified opportunities for enhancing the uptake of codes at the national and regional levels. Group discussions and exercises focused on: 1) the relevance of code implementation to certification; 2) the development of action plans for assessing progress with the implementation of codes; and 3) the importance of monitoring and evaluation as a driver for continuing review and improvement.

On the third and fourth days of the workshop, field visits were organized to the Deramakot Forest Management Unit and the logging area of KTS Plantation to conduct field inspections and exercises on forest certification, code implementation, environmental management systems and monitoring and evaluation. At Deramakot, participants viewed tree marking and mapping, recent harvesting, post-harvest

restoration and road maintenance. Opportunities were taken to review the standard of operations against the provisions of the Asia-Pacific Code of Harvesting Practice. Participants agreed that Dermakot provides an excellent example of the benefits of good forest management planning and certification. Operations are conducted to a high standard and regular monitoring fosters a process of continuing improvement. At the KTS Plantation, inspections were made of forest enrichment planting, secondary road maintenance, stream crossings, recent harvesting and post-harvesting restoration. Excellent examples of skid trail rehabilitation were viewed, including the value of well-formed and well-located water bars in preventing soil erosion and the sedimentation of streams. Participants noted that the achievement of KTS Plantations in gaining formal accreditation of its Environmental Management System was an excellent example of high level commitment by a private company to the pursuit of sustainable forest management practices.

On the final day of the workshop, the participants summarized their recommendations on strategies for improving codes implementation in the Asia-Pacific region. They stressed the importance of keeping up the pressure to further promote implementation of the codes in order to maintain the positive momentum. The participants noted that the increasing interest in forest certification at both national and international levels, provides an excellent opportunity to strengthen the commitment to improve the implementation of codes of practice. The need for a simplified manual with illustrations that presents the codes in an easily understandable manner was stressed. Dissemination of the codes, awareness raising and field training must continue in order to translate development of the codes into the actual practice of sustainable forest management on the ground. Monitoring and evaluation was identified as a key component in ensuring codes compliance and ensuring continuous improvement of the codes. The participants also developed concrete strategies that they can carry out within their authority and capacity to improve implementation of the codes in their respective countries. It was suggested to convene a similar meeting in one year to update each country's progress.

The key findings of the workshop were:

- Codes of practice are fundamental tools for sustainable forest management and forest certification. Codes must be tailored to fit country-specific conditions.
- Codes of practice are of little value unless effective implementation systems and strategies are in place.
- Code implementation systems (CIS) should contain adequate provisions within each of the following components: legal and policy framework; planning; operations, including supervision and training; monitoring and enforcement; and review (evaluation) and improvement.
- The ongoing development of the CIS is a never-ending process of striving for continuing improvement. Gaps or deficiencies in the CIS, including a lack of political will or the loss of institutional capacity, will prevent progress being made and may even cause the standard of code implementation to decline over time.
- Strategies and actions are necessary to ensure that continuing improvements are made to the CIS.
- Actions plans and strategies for CIS should be specific, realistic and achievable
- There are no effective shortcuts or alternatives to good supervision.
- Monitoring and evaluation (M & E) are key components of the CIS because they provide critical information about the standards of code implementation.
- M & E must be systematic and objective. Areas of good performance should be recognized to encourage and strengthen commitment to the code. Continuing improvement in code implementation comes about through understanding the nature and cause of poor performance and by carefully crafting and applying appropriate corrective actions.
- The introduction of M & E should not be rushed, as it requires careful development and effective training.

The report of the workshop will soon be available online at the APFC website: http://www.fao.org/forestry/site/33592/en/

DEVELOPING INVASIVE SPECIES MANAGEMENT PLANS

Contributed by K.V. Sankaran, APFISN Coordinator

The workshop *Developing Invasive Species Management Plans* was organized 8-10 May 2007, in Kuala Lumpur, by the Asia-Pacific Forest Invasive Species Network (APFISN). The workshop was jointly sponsored by the USDA Forest Service, FAO and the Asia-Pacific Association of Forestry Research Institutions (APAFRI). Thirty-one participants (including 9 resource persons) from 16 countries attended.

The main objectives of the workshop were:

- to identify key components of an overall forest invasive species (FIS) biosecurity strategy to mitigate the risk of entry, establishment and spread of FIS in the Asia-Pacific region;
- to identify efficient and effective methods for preventing new incursions, especially through implementing effective quarantine measures and various appropriate codes of practice; and
- to identify and develop key elements and activities to enhance capacity and capability for early detection and rapid response to mitigate the impacts of FIS in the region.

There were four technical sessions. Technical session 1 included presentations by various participants on invasive species management programs adopted by their respective countries. In Technical Session 2, the resource persons discussed quarantine systems in force in different countries and their roles in preventing incursions. Technical Session 3 dealt with early detection and rapid response, which included key factors related to invasive plant pest preparedness.

During Technical Session 4 (Panel Discussion), the workshop was divided into breakout groups to discuss the following issues:

- What are the major constraints to effective invasive species management in the Asia-Pacific region?
- What can APFISN do to help fill gaps in country biosecurity strategies?
- What are the key actions that are necessary in the short term for early detection and rapid response of invasive species in the region?

The panelists were: Mike Cole and Ross Wylie (Australia), Marcial C. Amaro (Philippines), A.K. Goyal (India) and S. Soetkino (Malaysia). The panel discussion was led by Boryz Tkacz (USDA Forest Service).

The workshop recommended that in order to implement an effective invasive species management plan in the Asia-Pacific region, the network should strive to:

- create awareness on forest invasive species (FIS) among foresters, quarantine personnel, policy makers and the general public;
- develop a database and compile country reports on FIS, prepare pest lists for the region and prioritize and produce target pest lists;
- arrange hands-on-training on quarantine methods, early detection, diagnostics, pest risk assessment, regional germplasm handling and forest health surveillance;
- identify and compile taxonomic expertise in the region;
- link the network with other networks on invasive alien species (e.g., IPPC, CBD, APEC, ASEAN, OIE, etc.);
- activate the network website; and
- assist in identifying, sourcing and facilitating funding for research and training, and further promote the objectives of the network.

BUILDING BACK BETTER -- LONG-TERM SUPPORT FOR REHABILITATION OF TSUNAMI-AFFECTED AREAS

Contributed by Shingo Shibata, Chief Technical Adviser, GCP/RAS/218/JPN

The majority of people in Indonesia, the Maldives, Sri Lanka and Thailand who were affected by the December 2004 tsunami were small farmers and fisherfolk who depend on seasonal agricultural, fishing and other income-generating activities, and on home gardens and forests/trees for household items. In an effort aimed at "building back better" in these communities over the long-term, it is imperative to develop multifaceted livelihood rehabilitation strategies with full consideration of the three pillars of sustainability: economic, ecological and social. For this purpose, strategies must be crafted through a carefully designed integrated, multi-sectoral, ecosystem-based approach with appropriate stakeholder participation, and gender and culture-sensitive focus, among others.

In September 2006, FAO initiated a 5-year programme entitled "*Regional programme for participatory and integrated agriculture, forestry and fisheries development for long-term rehabilitation and development in tsunami-affected areas (RAFFTA),*" with funding from Japan. The overall objective of the programme is to strengthen national capacity and participatory processes in the agriculture, forestry and fisheries sectors for the integrated and sustainable management and use of land and other natural resources in the tsunami-affected areas of Indonesia, the Maldives, Sri Lanka and Thailand, in order to enhance the livelihoods of the affected communities and reduce their vulnerability to coastal storms and economic downturns. The programme analyzes the present status of coastal resources of affected areas and explores integrated management approaches that are best suited to local conditions, balancing the competing demands of different users and optimizing the benefits on a sustainable basis.

The regional project inception workshop was held 25-26 April 2007, in Bangkok, Thailand, to bring together the national project coordinators (NPCs) who represent the National Project Steering Committee (NPSC) of each country. The NPCs drafted national Plans of Operations for the proposed target sites in Indonesia, the Maldives, Sri Lanka and Thailand. Major forthcoming activities include the formulation of Local Partnership Groups (LPGs), PRA activities, and national workshops.

Forestry and coastal ecosystem rehabilitation activities are also planned, along with livelihood development activities. For example, in Indonesia, the target sites will include one of the sites of the Finland-funded emergency forestry assistance project, in order to implement much-needed livelihood development activities and maintain the momentum/awareness of reforestation fostered by the project. In Maldives, Sri Lanka and Thailand, income-generating activities utilizing coastal forests and mangroves will be explored, including agroforestry, non-wood forest products, agro-/eco-tourism, etc.

For further information, please contact:
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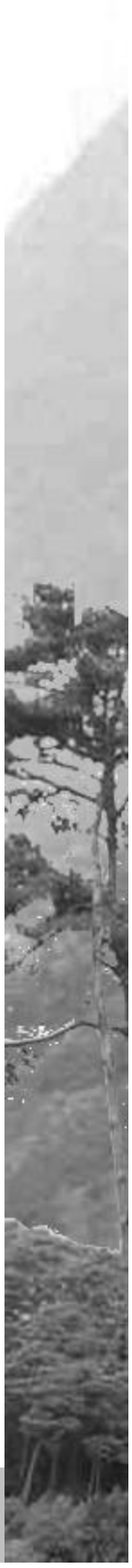

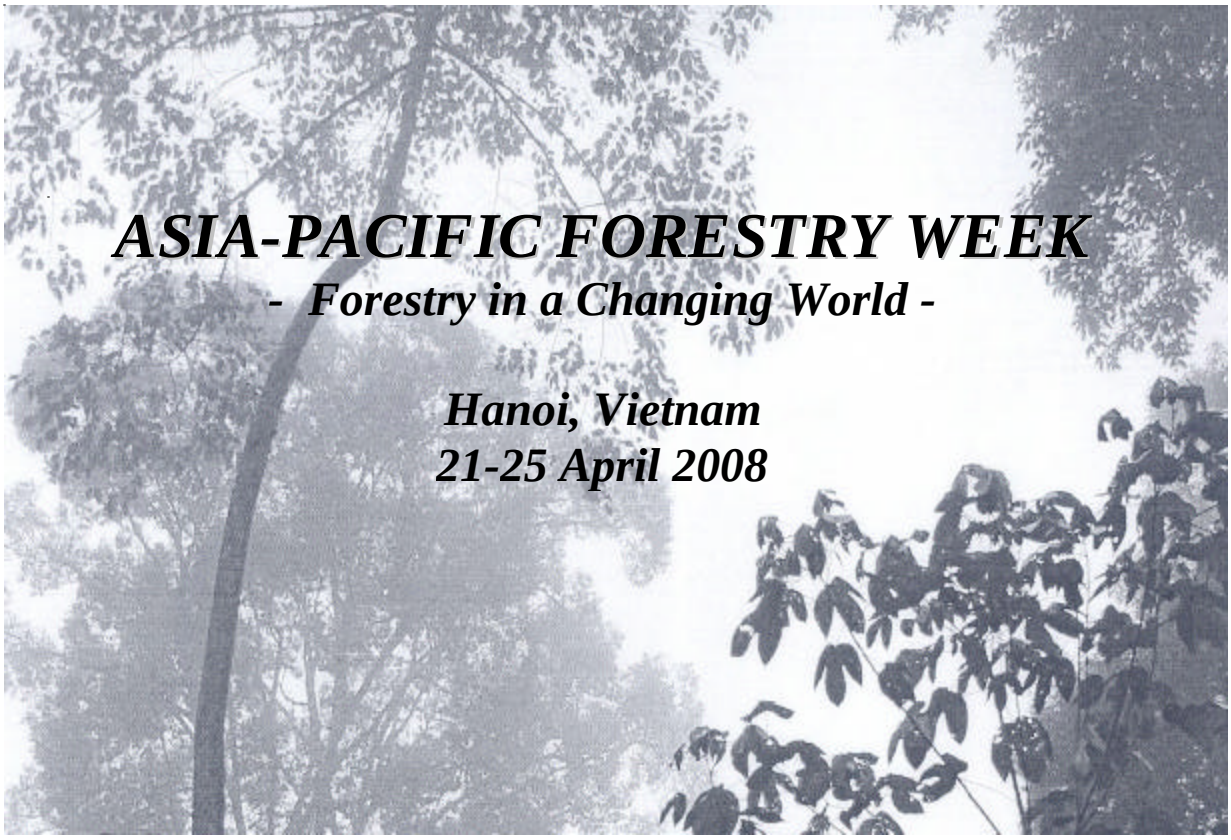

ASIA-PACIFIC FORESTRY WEEK

- Forestry in a Changing World -

Hanoi, Vietnam
21-25 April 2008

The first-ever *Asia-Pacific Forestry Week* will be organized 21-25 April 2008, in Hanoi, Vietnam. It is expected to be the largest and the most important forestry event in the region in 2008. *Asia-Pacific Forestry Week* will bring together 350-500 individuals from governments, non-governmental organizations, research institutions, regional and international networks, UN agencies and the private sector. High-level forestry officials from throughout the Asia-Pacific region, spanning from Pakistan to the South Pacific island countries, are expected to attend.

Leading regional and international natural resource organizations will convene special plenary sessions each morning of *Asia-Pacific Forestry Week*, focusing on the three pillars of sustainable development: social, environmental, and economic. Under the social pillar, "forests and poverty" issues will be highlighted, with consideration given to resource tenure and access, decentralization, livelihoods and community participation. Forests and climate change will top the agenda on "environment" day, with consideration given to what forestry can do to mitigate climate change, as well as how forestry will need to adapt in response to climate change. For the economic focus, topics related to trade, timber certification, forest law enforcement and governance, and forestry investment will dominate. The findings from the ongoing Asia-Pacific Forestry Sector Outlook Study (2020) will enrich the discussions throughout.

Asia-Pacific Forestry Week will provide a unique opportunity for diverse stakeholders and forest managers to interact, share perspectives, and collectively seek solutions to some of the most challenging issues facing forests and forestry today. The discussions during *Asia-Pacific Forestry Week* will serve to regionalize the important agenda developed by the United Nations Forum on Forests (UNFF). Recommendations and conclusions from the Week will be forwarded to the UNFF to further highlight regional perspectives. *Asia-Pacific Forestry Week* is also certain to attract extensive media coverage and serve to increase the attention given to forestry by the policy makers and the general public.

Asia-Pacific Forestry Week will be anchored around the 22nd Session of the Asia-Pacific

Forestry Commission, but numerous other international and regional organizations and networks are planning important events and activities throughout the week as well. By supporting the *Asia-Pacific Forestry Week* concept, FAO seeks to expand the engagement of APFC members with a wider range of stakeholders to more effectively address the important challenges of forest management in the region. For more information on APFC, please visit: http://www.fao.org/forestry/site/33592/en/

To inquire about participating in *Asia-Pacific Forestry Week*, or to coordinate the organization of an event during the *Week*, please contact:

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Tel: (66-2) 697-4139; Fax: (66-2) 697-4445

4TH MEETING OF THE ASIA-PACIFIC FORESTRY COMMISSION EXECUTIVE COMMITTEE

The 4th Meeting of the Asia-Pacific Forestry Commission (APFC) Executive Committee was held 30-31 August 2007, in Hua Hin, Thailand. A total of 13 participants, including elected APFC officers, representatives from Vietnam (the host country for the upcoming 22nd APFC Session) and staff of the FAO Secretariat attended.

The objectives of the meeting were to:

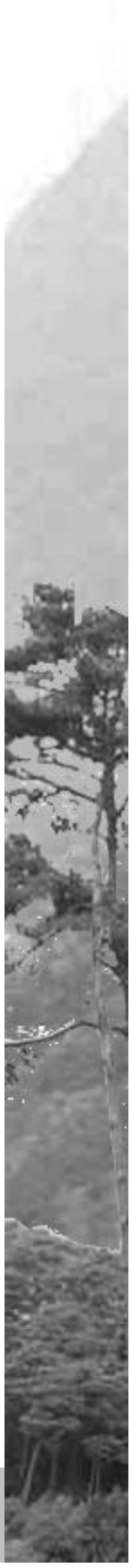
- review follow-ups to the recommendations from the 21st APFC Session and the 3rd APFC Executive Committee Meeting;
- consider linkages between APFC and other regional/international mechanisms, including the Committee on Forestry (COFO) and United Nations Forum on Forests (UNFF);
- plan for the 22nd APFC Session; and
- discuss other items of importance to APFC.

Much of the discussion centered on the proposed "*Asia-Pacific Forestry Week*." The Committee members acknowledged the overwhelmingly positive responses from partner organizations in the region. They expressed support for the concept and emphasized that it is a very positive move that will help draw more attention to forestry and improve regional cooperation.

However, some concerns were also expressed. It was stressed that the value of APFC sessions in guiding FAO and member countries' forestry activities in the region should not be undermined. Other issues raised include: logistical challenges; additional burden on the host country; linkage between the *Forestry Week* and the APFC Session; time constraints for the APFC Session; and concerns over organizing too many events.

The draft concept format of the *"Asia-Pacific Forestry Week"* was presented for further discussion. The proposed format would allow for discussion of agenda topics in the general plenary sessions in the morning, while specific APFC deliberations would take place in the afternoon. FAO's views and directions would be incorporated into the morning plenary sessions as well the afternoon APFC sessions.

The participants agreed that the event will help attract broader participation, which APFC has been striving for. Overall, the Committee members were supportive of the concept format. The Committee urged the FAO Secretariat to pursue organizing the *Week* in conjunction with the 22nd APFC Session.



ASIA-PACIFIC FORESTRY CHIPS AND CLIPS

CHEVRON AND WEYERHAEUSER TO EXPLORE BIOFUELS

Weyerhaeuser and Chevron are teaming up to conduct further research on producing biofuel from wood-based by-products. Weyerhaeuser will be contributing its knowledge and supply of cellulose, and Chevron its fuel technology expertise.

– ITTO TTM Report 12:11–

FOREST MANAGEMENT RECEIVES SIZEABLE STATE FINANCIAL SUPPORT

A forest management and protection program for 2006-10 that aims to plant five million more hectares of forest nationwide will receive funding of VND5 trillion (US$312.5 million) from the State budget and VND10 trillion (US$625 million) from other sources. The program will pay VND100,000 per hectare for forests planted for protective purposes. It will also provide food and allowance for ethnic minority residents who replace their fields with forests.

– Viet Nam News –

SARAWAK ENCOURAGES COOPERATION IN PAPER AND PULP RESEARCH

Sarawak is encouraging cooperation across boundaries in its efforts to improve research and development capabilities in the integrated paper and pulp industry. The Malaysian state has set a target of planting one million hectares with fast-growing *Acacia* species by 2020.

– Malaysian National News Agency –

AUSTRALIA PLANS SATELLITE SYSTEM TO PROTECT WORLD'S FORESTS

Australia will establish a new global satellite system to monitor changes in forest cover and forest carbon levels as part of a A$200 million Global Initiative on Forests and Climate. The U.S. has agreed to work with Australia on the initiative to reduce global deforestation and improve forest management.

– Environment News Service –

LOGGING MORATORIUM IN ACEH

The new governor of Indonesia's tsunami-ravaged Aceh province declared a moratorium on logging as part of efforts to develop a new long-term forest management strategy. Irwandi Yusuf said all logging would be banned indefinitely.

– The Star, Malaysia –

THE WORLD BANK FUND TO FIGHT DEFORESTATION

The World Bank is planning an international fund of at least US$250 million to fight deforestation and the effects of global warming. The fund aims to encourage developing countries to stop deforestation in return for access to carbon credits.

– Times of India –

BP AND D1 OILS SET UP JATROPHA BIODIESEL VENTURE

Oil conglomerate British Petroleum is to collaborate with UK biofuels producer D1 Oils to accelerate the planting of Jatropha to make sustainable biodiesel feedstock available on a larger scale. The joint venture will focus on Jatropha cultivation in Southeast Asia, Southern Africa, Central and South America and India. It is anticipated that some one million hectares will be planted over the next four years, with an estimated 300,000 hectares per year thereafter. Investments will be made through directly managed plantations on owned or leased land.

– BBC News –

INDIA'S PLAN TO LEASE DEGRADED FORESTS SPARKS ANGER

A plan to lease out degraded forestlands in India to pulp and paper companies has sparked criticism from social activists who say the scheme will leave millions of poor forest dwellers homeless and with no livelihood. Under the plan, private pulp and paper firms would be invited to help grow trees on degraded lands with tree cover of less than 10%. Authorities contend that the plan will benefit both the environment and industry, as well as provide employment to the rural poor.

– Reuters –

C. CHANDRASEKHARAN
(1933 – 2007)

Dr. C. Chandrasekharan, known to his friends and colleagues as Chandra, passed away on September 11, 2007 leaving an imprint in professional forestry spanning more than 50 years.

Born in the Indian state of Kerala (then part of the erstwhile Madras Presidency) in 1933, Chandra graduated in economics and joined the Madras Forest Department as a forester in 1953. Subsequently, he obtained the certificate in forestry from the Madras Forest College, a diploma in forestry from the Indian Forest College, and Masters and Doctoral degrees in forestry, economics and forestry economics from Michigan State University.

His career is a remarkable example of hard work and commitment as he moved up the professional ladder, occupying various positions and dealing with a wide array of issues. Prior to joining FAO, he worked in India as Divisional Forestry Officer, Industrial Economist, Deputy Conservator of Forests (Evaluation) and as Director of the Kerala Forest Research Institute. As founder director of this Institute, Dr. Chandrasekharan played a critical role in developing a robust autonomous structure for the institute, paving the way to making it one of the foremost forestry research institutions in the region.

Chandrasekharn's career in FAO began in 1975 at the Regional Office in Bangkok, where he worked as the Regional Forestry Economist and where he played a leading role in developing its forestry programme. He realized the significance of information exchange and was responsible for starting the *Forest News*, which eventually was developed as a feature of *Tigerpaper*.

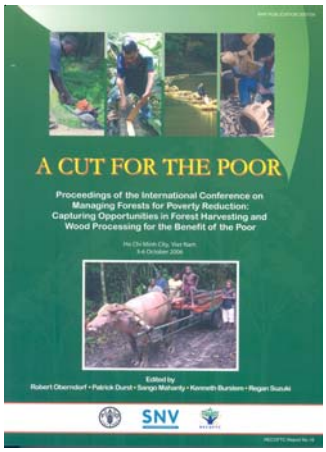
His subsequent assignments with FAO included: Senior Forestry Planning Officer at FAO Headquarters; Team Leader of the FAO/World Bank Project in Indonesia; Forestry Institution Specialist in Bangladesh; and finally, Chief of the Non-Wood Forest Products and Energy Branch in the Forestry Department at FAO Headquarters in Rome – a post he held until his retirement in 1995. Bringing non-wood forest products to the forefront of the forestry agenda has been one of his significant accomplishments. He was the architect of *Non-wood News*, which he launched in 1993, and which has since become a leading source of information on non-wood forest products and a means of networking among those interested in the subject.

Although retired from FAO, Chandrasekharan's professional involvement in forestry probably increased and his advice and expertise was much sought after by organizations like ITTO, Asian Development Bank, FAO, UNDP, Ford Foundation, CIFOR, WWF and IDRC. Notwithstanding his ill-health, he maintained his professional interest and commitment. Even a few days before his end, he was coordinating the electronic discussion on science and technology development in the non-wood forest products sector in support of the Asia-Pacific Forestry Sector Outlook Study.

As a person, Chandra was known for his soft-spoken approach and for his ability to motivate and enthuse co-workers. When a roll call of outstanding foresters in the world is taken, Chandra will be in the forefront.

A CUT FOR THE POOR

A large proportion of the world's poor remain heavily dependent on forest resources and there is a need to explore new prospects for the forest-dependent communities. In recent years, forest-based poverty reduction strategies have largely focused on enterprises that process and market non-timber forest products. Less emphasis has been given to the more complex and risky, but potentially more lucrative aspects of timber harvesting and processing.



The *International Conference on Managing Forests for Poverty Reduction: Capturing Opportunities in Forest Harvesting and Wood Processing for the Benefit of the Poor* was held 3-6 October 2006 in Ho Chi Minh City, Vietnam.

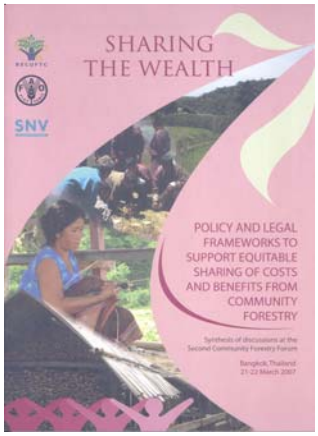
The aims of the conference were to:

- review technical, economic, institutional and policy aspects of small-scale and labor-intensive forest management practices and wood processing with regard to their impacts on the poor and their potential for reducing poverty;
- identify constraints to, and opportunities for, managing forests and processing activities with poverty alleviation as an explicit objective in Asia and the Pacific; and
- establish a task force that will develop a strategic plan for promoting forest management for poverty alleviation by encouraging support for small-scale forest and labor-intensive forest management practices and wood processing.

NEW RAP FORESTRY PUBLICATIONS

SHARING THE WEALTH

Policy and legal frameworks to support equitable sharing of costs and benefits from community forestry



The *Second Community Forestry Forum* was convened 23-24 March 2007, in Bangkok, Thailand, to share experiences on how to distribute the benefits and costs of community forestry more equitably. This report presents a synthesis of the discussions that took place during the two-day forum. It should provide a useful resource for those who share an interest in harnessing community forestry to support poverty reduction and sustainable forest management.

Potential benefits from community forestry include the development of social capital, political empowerment, employment opportunities, capacity development, financial returns from the sale of timber and NTFPs, direct use of the same resources, maintenance of environmental services, etc. However, community management of forests also involves costs in terms of time, money and opportunities foregone by community members. The Second Community Forestry Forum focused on how the balance of benefits and costs can be tipped in favor of sustainable forest management and poverty reduction. The specific focus was on legal and policy frameworks which influence what benefits communities can secure from forests, as well as the distribution of such benefits at the community level.

WHAT DO YOU KNOW ABOUT THE ROLE OF FORESTRY AND FORESTS IN POVERTY REDUCTION?

Efforts to find ways to achieve the Millennium Development Goal I (MDG I) of halving the number of absolute poor by the year 2015, have made poverty reduction one of the most important objectives of governments, development organizations and the donor community. Almost every sector is – one way or another – compelled to mainstream the goal of poverty reduction into policies, programs and plans. This has led to a variety of assessments underscoring the varying importance of sectors in lifting people out of poverty. There is a sense that the forestry sector also has a role to play, but there is an urgent need to understand what forests and forestry can do – and what they cannot do. Many analyses have failed to provide a critical assessment of the current situation, potentials and limitations.

As one of the thematic studies under the Asia-Pacific Forestry Commission's Asia-Pacific Forestry Sector Outlook Study (APFSOS II), the Regional Community Forestry Training Center (RECOFTC) is reviewing the current knowledge on the subject matter. A requirement for predicting future scenarios is a clear understanding of the current situation.

In September 2007, an International Conference on "Poverty Reduction and Forests: Tenure, Market and Policy Reforms," supported by FAO, RECOFTC and more than 10 regional and international organizations, provided an overview about what is – and what is not – happening and the latest developments on how to significantly contribute to poverty reduction. Similar events were organized in previous years and it is virtually impossible to pinpoint an issue that has not been addressed and debated. Thus, there is no dearth of literature on the role of forests and forestry in poverty reduction. However, good quantitative information that defines the link between forests or forestry and poverty reduction is hard to find.

We know a lot and yet, at the same time we know so little. For example, we know that the approximate number of people living in and around the region's forests is 450 million. Many of them use forest products and benefit from the environmental services that forests provide. But we do not know whether the benefits that people derive from forests are enabling them to escape poverty or just helping them to survive. Do forests provide a safety net for emergency situations, such as crop failures, or can they assist in creating assets that open opportunities for long-term economic advancement?

We know that millions of hectares of forests – many of which are degraded – are managed by hundreds of thousands of households in some form of devolved forest management. There is no doubt that the devolution of forest management is contributing to income generation and rural development. Yet, we do not know who tangibly benefits from being part of a forestry user group or joint forest management committee. Are the funds that are channeled towards the rural infrastructure benefiting the poor just as much as the better-off villagers, or perhaps even more? Are the direct financial and in-kind benefits justly distributed, or do the rural elite prevent the poor from obtaining a fair share? It should be clear that "income generation" and "poverty reduction" are not the same, although in the literature the two terms are frequently used interchangeably.

If you have good and relevant information that you would like to contribute to the study, we would like to hear from you. The study will be finalized at the end of January 2008, so a timely response would be appreciated. Before you reply, please revisit what you intend to send and ask whether it provides evidence of "income generation" only, or a clear picture of poverty reduction. Your efforts will be acknowledged in the report and if you provide your contact details you will receive a copy of the final report. If you can help, please contact the lead author, Thomas Enters, at: thomas.enters@gmail.com.

FAO ASIA-PACIFIC FORESTRY CALENDAR

10-12 October 2007. Nadi, Fiji. ***Workshop on Monitoring, Assessment, and Reporting for Sustainable Forest Management in the South Pacific Region.*** Contact: Masahiro Otsuka, Forestry Officer (Forest Monitoring Assessment and Reporting), FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4130; Fax: (662) 697-4445; E-mail: Masahiro.Otsuka@fao.org

16-18 October 2007. Chiang Mai, Thailand. ***The Future of Forests in Asia and the Pacific.*** Contact: P. Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

19 October 2007. Chiang Mai, Thailand. ***APFSOS National Focal Points Workshop*** and ***APFSOS Scientific Committee Meeting***. Contact: P. Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

24-26 October 2007. Chiang Mai, Thailand. ***International Agroforestry Education Conference: Integrating Conservation in Upland Agriculture in Southeast Asia.*** Contact: Ken Shono, Associate Professional Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4254; Fax: (662) 697-4445; E-mail: Kenichi.Shono@fao.org

28 October - 4 November 2007. Balikpapan, Indonesia. **Training Course for Instructors on Community-based Fire Management**. Contact: P. Vuorinen, Forestry Officer, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy: E-mail: Petteri.Vuorinen@fao.org

12-13 November 2007. Yokohama, Japan. ***Seventh Meeting of the Asia Forest Partnership***. Contact: AFP Secretariat, E-mail: apf@cgiar.org

19-30 November 2007. Fiji. ***Forest Policy Short Course for the South Pacific***. Contact: Sairusi Bulai, SPC Regional Forestry Adviser, SPC Private Mail Bag, Suva, Fiji; Tel: 679 3300432; Fax: 679 3305212; E-mail: Sairusib@spc.int

3-4 December 2007. Bangkok, Thailand. **Mangroves for the Future Regional Steering Committee Meeting**. Contact: Kent Jingfors, Regional Programme Coordinator, IUCN-The World Conservation Union, Asia Region, #63 Sukhumvit Soi 39, Bangkok 10110, Thailand; Tel: +02 662 4391; Fax: +02 662 4387; E-mail: kent@iucnt.org

8 December 2007. Nusa Dua, Bali, Indonesia. **Forest Day**. (Parallel to UN Climate Change Conference COP13) Contact: Rachel Carmenta, Climate Change Research Officer, CIFOR, P.O. Box 6596 JKPWB, Jakarta 10065, Indonesia; Tel: +62 (251) 622 622; Fax: +62 (251) 622 100; E-mail: rcarmenta@cgiar.org

17-20 December 2007. Kunming, China. ***Sustainable Forest Management and Poverty Alleviation: Roles of Traditional Forest-related Knowledge***. (Co-sponsored by FAO) Contact: Dr. Liu Jinlong, Sustainable Forestry Research Centre, Chinese Academy of Forestry, Beijing 100091, China; E-mail: liujl@caf.ac.cn

21-25 April 2008. Hanoi, Vietnam. ***First Asia-Pacific Forestry Week and the 22nd Session of the Asia-Pacific Forestry Commission.*** Contact: P. Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

FOREST NEWS is issued by the FAO Regional Office for Asia and the Pacific as part of TIGERPAPER. This issue of FOREST NEWS was compiled by Patrick B. Durst, Senior Forestry Officer, FAO/RAP.

FORESTRY PUBLICATIONS: FAO REGIONAL OFFICE FOR ASIA AND THE PACIFIC (RAP)

- APFC - The unwelcome guests: Proceedings of the Asia-Pacific Forest Invasive Species Conference (RAP Publication 2005/18)
- Helping forests take cover (RAP Publication 2005/13)
- Elephant care manual for mahouts and camp managers (RAP Publication 2005/10)
- Forest certification in China: latest developments and future strategies (RAP Publication 2005/08)
- Waves of hope – report of the regional coordination workshop on rehabilitation of tsunami-affected forest ecosystems: strategies and new directions (RAP Publication 2005/07)
- Forests and floods – drowning in fiction or thriving on facts? (RAP Publication 2005/03)
- In search of excellence: exemplary forest management in Asia and the Pacific (RAP Publication 2005/02)
- What does it take? The role of incentives in forest plantation development in Asia and the Pacific. Executive summary (RAP Publication 2004/28)
- What does it take? The role of incentives in forest plantation development in Asia and the Pacific (RAP Publication 2004/27)
- Forests for poverty reduction: opportunities for Clean Development Mechanism, environmental services and biodiversity (RAP Publication 2004/22)
- Forests for poverty reduction: can community forestry make money? (RAP Publication: 2004/04)
- Advancing assisted natural regeneration (ANR) in Asia and the Pacific (RAP Publication 2003/19) - 2nd edition
- Bringing back the forests: policies and practices for degraded lands and forests (RAP Publication 2003/14) **out of print**
- Community forestry – current innovations and experiences (CD-ROM included)
- Community-based fire management: case studies from China, The Gambia, Honduras, India, the Lao People's Democratic Republic and Turkey (RAP Publication: 2003/08)
- Practical guidelines for the assessment, monitoring and reporting on national level criteria and indicators for sustainable forest management in dry forests in Asia (RAP Publication: 2003/05)
- Giants on our hands: proceedings of the international workshop on the domesticated Asian elephant (RAP Publication: 2002/30)
- Communities in flames: proceedings of an international conference on community involvement in fire management (RAP Publication: 2002/25)
- Applying reduced impact logging to advance sustainable forest management (RAP Publication: 2002/14)
- Monograph on benzoin (Balsamic resin from *Styrax* species) (RAP Publication: 2001/21)
- Proceedings of the International Conference on Timber Plantation Development, 7-9 November 2000, Manila, Philippines
- Trash or treasure? Logging and mill residues in Asia-Pacific (RAP Publication: 2001/16)
- Regional training strategy: supporting the implementation of the Code of Practice for forest harvesting in Asia-Pacific (RAP Publication: 2001/15)
- Forest out of bounds: impacts and effectiveness of logging bans in natural forests in Asia-Pacific: executive summary (RAP Publication: 2001/10)
- Forest out of bounds: impacts and effectiveness of logging bans in natural forests in Asia-Pacific (RAP Publication: 2001/08)
- Regional strategy for implementing the Code of Practice for forest harvesting in Asia-Pacific (July 2000)
- Development of national-level criteria and indicators for the sustainable management of dry forests of Asia: background papers (RAP Publication: 2000/08)
- Development of national-level criteria and indicators for the sustainable management of dry forests of Asia: workshop report (RAP Publication: 2000/07)
- Asia-Pacific Forestry Commission: the first fifty years (RAP Publication: 2000/02)
- Decentralization and devolution of forest management in Asia and the Pacific (RAP Publication: 2000/01)
- Asia-Pacific Forestry Towards 2010 - report of the Asia-Pacific Forestry Sector Outlook Study
- Trees commonly cultivated in Southeast Asia: an illustrated field guide - 2nd edition (RAP Publication: 1999/13)
- Code of Practice for forest harvesting in Asia-Pacific (RAP Publication: 1999/12)

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