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TIGERPAPER is dependent upon your free and voluntary contributions in the form of articles, news items, and announcements in the field of wildlife and nature conservation in the region. In order to better serve the needs of our readers please write to us and send in the information you have or let us know if there is any information that you need. We appreciate receiving your letters and make all efforts to respond.

Cover: Leopard cat (*Prionailurus bengalensis*)
Photo: K.S. Shekar

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NOTES ON SMALL WILDCAT STATUS AND THREATS TO THEIR CONSERVATION - A SURVEY IN THE EASTERN GHATS OF INDIA

by K.S. Shekhar

Natural history of the study area

The Eastern Ghats are located between 11°30' and 22° N latitude and 76° 50' and 86° 30'E longitude extending north-east to south-west. The Ghats (meaning "pass" – not mountains) spread over three states of India, namely Orissa, Andhra Pradesh and Tamilnadu. They cover an area of about 75,000 km², with an average width of 200 km in the north and 100 km in the south. They extend over 1,750 km between the rivers Mahanadi and Vaigainal along the east coast. (Pullaiah and Rao, 2002). The elevation in the study area varies between 20 m and 1,100 m above mean sea level. The Eastern Ghats and the Western Ghats converge in the state of Tamilnadu, forming the Nilgiri Hills. Six species of wildcats are reported to inhabit the Eastern Ghats (Prater, 1988). They are as follows:

Small wildcats:

Leopard cat (*Prionailurus bengalensis*):

female weight c. 2.5-3 kg,

male weight c. 3.3 - 4 kg

Rusty spotted cat (*Prionailurus rubiginosus*):

female weight c. 1.5 kg

male weight c. 1.5 kg

Fishing cat (*Prionailurus viverrinus*):

female weight c. 6 -7 kg,

male weight c. 11- 12 kg

Jungle cat (*Felis chaus*):

female weight c. 4 kg,

male weight c. 6 kg (IUCN, 2004)

Large cats:

Tiger (*Panthera tigris*):

female weight c.100-160 kg,

male weight c. 180- 258 kg

Leopard (*Panthera pardus*):

female weight c. 25-40 kg,

male weight c. 40-75 kg

The region's forests can be classified as: 1) dry and moist mixed deciduous forests; 2) small patches of semi-evergreen forests; and 3) dense thorn scrub and bamboo patches. Coastal forests and inland fresh water swamps were also surveyed to determine the status of the wildcats. (Champion and Seth, 1968)

The study site in the Eastern Ghats of Andhra Pradesh supported nearly all the different vegetation types found in the Eastern Ghats. Locations in the districts of Visakhapatnam and Vizianagaram were surveyed between October 2003 and January 2004 for small wildcats and other meso-carnivores.

Data was collected by several methods, e.g. through systematic photo trap surveys to establish the presence of wildcats (Henschel, 2003), scent station surveys, night surveys using powerful beams of light, surveys at weekly local shanties (bazaars) to identify the species of wild meat being traded, accompanying local hunters during their hunting runs, an inventory of road kills, detailed questionnaire surveys, etc. Data collected on the wild cats is given in the tables below.

It was found that even though the species diversity was high in the region, the frequency with which the various species were encountered varied drastically. Certain species like the jungle cat (*Felis chaus*) that seemed to tolerate constant human presence and preferred open habitats, were sighted most often, while species like the fishing cat (*Prionailurus viverrinus*) and leopard cat (*Prionailurus bengalensis*) were restricted to niches in pockets of the jungle. Similar information on the cats was revealed by the local hunters who claimed that they trap jungle cats just on the periphery of the village but capturing leopard cats is a chance occurrence. A preference as to habitat was

Table 1: Small wildcat sightings during the study period.

Species	Presence/location	Coordinates	Habitat
Jungle cat (<i>Felis chaus</i>)	Kambala Konda sanctuary	N17°58' E 82°77'	Animal trail Highway crossing Human trail
	Konda Karla Awa swamp	N17°36' E 82°59'	Paddy fields Human trail
	Narsipatnam forest division	N17°39' E 82°26'	Along the road Sitting in a bush
	R.V. Nagaram	N17°60' E 82°19'	Human trail in coffee plantation
	Gudem	N17°64' E 82°12'	In fields
	Sapparla	N17°68' E 82°01'	Coffee plantation In fields
	Downuru	Not recorded	Road Kill
Leopard cat (<i>Prionailurus bengalensis</i>)	Kambala Konda sanctuary	N17°58' E 82°77'	Dense mixed forest
	Paderu	N18°05' E 82°40'	Forest cleared out area (2 orphaned pups found)
Fishing cat (<i>Prionailurus viverrinus</i>)	Coringa Sanctuary	N16°41' E 82°14'	Dried up water body Degraded mangroves
Leopard (<i>Panthera pardus</i>)	Kambala konda Sanctuary	N17°58' E 82°77'	Major walking trail Highway Dense thorn thicket
	Sapparla	N17°68' E 82°01'	Near forest stream Tracks through coffee plantation
	R.V. Nagaram	N17°60' E 82°19'	Bamboo thickets

Table 2: Threats to their conservation.

Species	Immediate threats	Other threats for conservation
Jungle cat*	Feral dogs Hunting	Low awareness levels about species; jungle cats are considered pests near urban settlements and a delicacy in tribal areas.
Leopard cat	Habitat destruction	Lack of knowledge on the exact distribution of the species in the region. Most of the leopard cat habitats in the Eastern Ghats also harbor anti-government nexalites and they are difficult to access and conduct surveys. Forest fragmentation is another main cause for the disappearance of leopard cats from many areas.
Fishing cat	Habitat destruction	Most of their habitats close to the coast have disappeared or have become surrounded by farming, thus leaving no corridors and restricting the animals' movement. No surveys have been conducted on the river basins and other interior areas of the Eastern Ghats.
Rusty spotted cat	Not known	Little or no data available on the species distribution in the Eastern Ghats.
Leopard	Habitat destruction Road kills Hunting	Lack of adequate funds for leopard conservation.
Tiger	Habitat destruction	Too many people and very little natural tiger habitat left.

Table 3: Other wildlife species documented in the region during the study period.

Species	Common name	Hunted for
<i>Manis crassicaudata</i>	Indian pangolin	Scales
<i>Axis axis</i>	Chital	Meat
<i>Cervus unicolor</i>	Sambar	Meat
<i>Muntiacus muntjac</i>	Barking deer	Meat
<i>Paradoxurus hermaphroditus</i>	Palm civet	Skin
<i>Hystrix indica</i>	Porcupine	Meat
<i>Lepus nigricollis ruficaudatus</i>	Rufous tailed hare	Meat
<i>Macaca radiata</i>	Bonnet macaque	Meat
<i>Sus scrofa</i>	Wild boar	Meat
<i>Presbytis entellus</i>	Hanuman langur	Not hunted
<i>Vandeleuria oleracea</i>	Long tailed tree mouse	Meat
<i>Golunda ellioti</i>	Indian bush rat	No data
<i>Funambulus palmarum</i>	Three striped palm squirrel	Meat and Skin
<i>Funambulus pennanti</i>	Five striped palm squirrel	Meat and Skin
<i>Anathana ellioti</i>	Indian tree shrew	Meat
<i>Viverricula indica</i>	Small Indian civet	Scent gland secretion
<i>Canis aureus</i>	Jackal	Pest
<i>Lutra lutra</i>	Common Indian otter	Skin and Meat
<i>Tetracerus quadricornis</i>	Four horned antelope	Meat
<i>Tragulus meminna</i>	Mouse deer	Meat
<i>Ratufa indica</i>	Giant squirrel	Meat

**Barking deer - rare but highly prized for its meat. (Photo: Shekar Kolipaka)**

also found among the ungulates. The slopes of the Eastern Ghats supported various species of ungulates. However, the frequency rates of encountering individual species varied. The four horned antelope (*Tetracerus quadricornis*) was recorded just once and the Chital deer (*Axis axis*) was only found in some pockets where it has been introduced and special protection is offered. Signs of the presence of the mouse deer (*Tragulus meminna*) were recorded most often (tracks and droppings) and further evidence of its presence was confirmed by the sale of the animal's meat in the markets. The interviewed hunters did not seem to have a particular species targeted before they left for the hunt; instead, they shot or trapped at random. However, if signs and tracks revealed the regular occurrence of a large herbivore like the sambar deer (*Cervus unicolor*) in their area, then they would methodically set lures (salt licks) to capture the animal. Civets are another species that was specifically hunted. The palm civets (*Paradoxurus hermaphroditus*) were more visible outside human settlements and close to the trails, but the same was not true of the Small Indian civet (*Viverricula indica*) which preferred denser, undisturbed bush. Both species were sighted an equal number of times during the study. Three individual sightings each of the Palm civet and Small Indian civet during 8 (7.5 km) night walks in the Kambala konda sanctuary were reported.

Like most carnivores, small wild cats naturally occur in low densities (pers comm. Dr. Shomita Mukherjee) and are hard to sight because of their cryptic and secretive nature. Their presence in an area cannot be detected except by a chance sighting or if they have developed a habit of raiding human settlements. Hunting, trapping and dog-related mortalities may have a drastic influence on wild cat populations, and due to their secretive nature the effects could remain unseen. It has been observed in Central India that some species of wild cats have completely disappeared from areas where they were known to exist earlier (India caracal project; (Shekhar, 2002).

Unsystematic, random killing of wildlife species by the ever-growing tribes and villagers of Eastern Ghats will have a drastic impact on the wild-

life. Hunting in Western Ghats was not found to be compatible with large carnivore conservation (Hunting for sustainability, 2003).

The species sightings and records of their presence may have been high in this study because of the diverse forest types surveyed. The study did not attempt to understand the populations of individual species, firstly because of lack of adequate knowledge on the site occupancy of the species in the region and secondly because it was not an objective of the study. Hence, estimates of populations or the densities of species in this region remain unclear.

The presence of the Rusty spotted cat (IUCN-VU) could not be established during the study period because no sightings were reported. However, the species was recognized by a group of hunting tribes (who hunt with dogs) and they refer to it as *Namala pilli* (meaning cat with white stripes on its forehead) in their local vernacular. The status and distribution of this species remains unclear. At least for now, the locals seem to know more about the species than the scientific community. This has to change if we are to ensure the survival of the species in the Eastern Ghats.

References:

- Champion, H.G. & Seth, S.K. 1968. **A revised survey of the forest types of India.** Government of India Press, Delhi.
- Pullaiah, T. and D. Muralidhara Rao. 2002. **Flora of Eastern Ghats: Hill Ranges of South East India: Vol. 1: Ranunculaceae—Moringaceae.** New Delhi, Regency, vi, 340 p.
- Henschel, P. and J. Ray. 2003. **Leopards in African Rain forests survey and monitoring techniques.** Wildlife Conservation Society Global Carnivore Program 2003.
- Prater, S.H. 1988. **The book of Indian mammals,** Bombay Natural History Society publication.
- Robinson, J. and Bennett, E. 2000. **Hunting for sustainability in the tropical forests.** Columbia University Press.

Shekhar, K.S. 2001. **India Caracal Project**.
M. Phil thesis, Indian Institute of Forest Management, Bhopal India.

Shekhar, K.S. 2002. **Status of small wildcats in Central India**, *IUCN CAT News* Spring, 36:16-18.

Websites

IUCN. 2004. **Red List**. <http://www.redlist.org/>

IUCN Species Accounts. <http://lynx.uio.no/catfolk/sp-accts.htm>

Taxonomy of Animals, adopted from the CAMP workshop 2003, Zoo Outreach Organisation, India. www.zooreach.org

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MORE ON THE INDIAN CHAMAELEON IN ARAVALLI HILLS

by Sunil Dubey



Tigerpaper Vol.31:No.3 contained the report "Discovery of the Indian chamaeleon in the Aravalli Foothills of Rajasthan (India)" by Shalini Gaur. One of the *Tigerpaper* readers, Mr. Sunil Dubey, a Lecturer in Environmental Studies at

Pacific College Udaipur, wrote to inform us of a sighting of the Indian chamaeleon 25 years earlier in the same area by Dr. Raza H. Tehsin in November 1979, as reported in the *Times of India*.

POPULATION STATUS AND HABITAT USE OF BARASINGHA (*Cervus duvauceli duvauceli*) IN ROYAL SUKLAPHANTA WILDLIFE RESERVE

by Nabin Gyawali and S.R. Jnawali

Introduction

Swamp deer or barasingha (*Cervus duvauceli*) (Cervidae family) is one of the endangered species endemic to the Indian sub-continent (Schaller, 1967; Schaaf, 1978). Among the three recognized species, *Cervus duvauceli duvauceli* (the northern sub-species) is found in Nepal (Ellerman and Morrison-Scott, 1951; Sankaran, 1989). Until the last century, barasingha were widely distributed in areas of suitable habitat throughout the northern Indian Gangetic plains and the lowlands of the southern Himalayas. Now, however, Barasingha populations are restricted to a few isolated pockets, mainly due to habitat alteration, habitat fragmentation and illegal hunting. Today, an estimated 5,000 individuals remain in the wild, mostly in protected areas of Nepal and India (Wemmer, 1998). At present, only two populations of *Cervus duvauceli duvauceli* are known to survive in Nepal, each one isolated from the other. Of these, the Royal Suklaphanta Wildlife Reserve (RSWR) contains the world's largest population (Hensaw, 1994). A little over 90 animals are reported to be present in the Royal Bardia National Park (RBNP) in mid-western Nepal (Parajuli, 2000). The present study aims to generate some data, especially about the population status and habitat preference of barasingha in RSWR, which will be helpful in conservation endeavors on its behalf.

This paper deals with the current status and distribution of the barasingha population within the reserve and its habitat preferences.

Study area

Royal Suklaphanta Wildlife Reserve is located in the far western lowland of Nepal (28°45'16" to 28°57'23"N and 80°06'04" to 80°21'40"E) and encompasses an area of 305 km². The Reserve is

bordered by the Mahakali River in the west and the Nepal-India border in the south. The Reserve extends up to the Syali River in the east and to the crest of the Churia hills in the northeast corner (DNPWC, 2000). The area extends from the flat lands in the south to the Churia hill range in the north and contains many different ecosystems (Velde, 1997).

The vegetation in the reserve is of the sub-tropical type and consists of three forest types: i) Sal forest (*Shorea robusta*); ii) riverine forest; and iii) Khair-Sisso forest (*Acacia catechu-Dalbergia sisso*) (Thapa, 2003). Grasslands are established on the riverbeds and there are also previously cultivated fields and phantas. The grasslands in the riverbeds are dominated by tall grass species such as *Saccharum spontaneum* and *S. bengalensis*. The phantas are dominated by *Imperata cylindrica*, *Vetivera zizanooides* and *Desmostachia bipinnata*.

The Reserve is famous for hosting the largest populations of barasingha, tigers (*Panthera tigris tigris*) and wild elephants (*Elephas maximus*) in Nepal (DNPWC and PPP, 2000). Other protected wildlife species found in the Reserve include Bengal florican and hispid hare (*Caprolagus hispidus*). A newly established sub-population of rhinoceros (*Rhinoceros unicornis*) also occupies the southern section of the Reserve.

The present study was concentrated in Suklaphanta and nearby forest areas of the southwestern section of the Reserve.

Materials and methods

The population status of barasingha was determined by using the direct ground count method.

The count was conducted during April and May 2003. Barasingha congregate annually in greatest numbers on the newly burned grasslands of Suklaphanta between February and April (Schaaf, 1978). This made it possible to obtain a reliable total population count. Counts were made in the morning before 10.00 hrs and in the evening after 16.00 hrs. Vehicles used in the counting would cruise along the grasslands and over forest roads until herds of barasingha were spotted and then the count was made using binoculars. Large herds (>1,000) were split to make counting easier. During the total count, elephants were also used to search all potential barasingha areas in the reserve, including areas formerly occupied by barasingha.

The group size was estimated by using the method described by Martin (1977). The total number of barasingha observed during the study period was divided by the total number of groups observed. The mean of the two-month's group size gave the average number of animals per group.

The distribution of barasingha was determined by direct observation. The geographic locations of observed groups or individuals were recorded using a global positioning system (GPS).

Habitat preference was determined by using the fecal pellet observation through the line-plot transect method (Wegge, 1976). Ten meter square ($r=1.78m$) circular plots were laid along each transect and the presence or absence of pellets was recorded for each plot. Habitat preference was calculated by using the following formula (Pokharel, 1996):

$$\text{Habitat preference} = \frac{\text{Pellets present (\% in each habitat)}}{\text{Total pellets present (\% of all the habitat types)}} * 100$$

Results and discussion

Population status

The present study revealed a minimum of 1,607 individuals in RSWR – all of which were recorded

in grassland patches in Suklaphanta. The population trend in the area is shown in Table 1.

Table 1: Population of barasingha in RSWR

Year	Estimated number	Source
1968	1,250	Byrne (In: Bhatta & Shrestha, 1977)
1976	1,000	Schaaf
1994	1,850	Hensaw
2003	1,607	Present study

The total number of barasingha recorded in the present study (1,607) indicates that there has been a decline in the barasingha population since the previous census. The decrease in numbers might be due to poaching during the state of emergency in 2001/2002. However, no poaching incidents were recorded during the study period. In addition, high predation pressure might have also affected the population growth as the number of large predators has increased over the years. Predation has been identified as the key factor in limiting wild ungulate populations in two South Asian reserves, i.e. Gir Forest Sanctuary (Berwick, 1974) and Kanha (Schaller, 1967). Barasingha was found to be the main diet for the tigers in Dudhwa National Park (Singh, 1978). Since RSWR harbors a significant tiger population of 19 individuals (Regmi, 2000), one of the highest density tiger populations in Nepal, one can easily assume the relatively higher predation pressure on barasingha.

Sex composition of the population

Among the 1,607 animals observed in the Reserve, 30.6% were adult males and the remaining 69.3% were females and calves. Schaaf (1978) recorded adult males up to 32.7% of the total count (lower than the female population) in 1976 in RSWR. Based on sex ratio and past trends, the higher proportion of females and calves indicates the increasing population in RSWR. However, its increase would also depend on several factors other than the sex ratio.

Group size

Barasingha were seen to congregate in Suklaphanta during the study period (April-May), forming herds of varying sizes. The average group size observed in the present study was 278.7 animals per group during the hot, dry season and is shown in Table 2.

Table 2: Group size of barasingha observed in RSWR

Month	Total no. of groups	Total no. of barasingha	Mean group size	Range
April	14	4,178	298.4	3-1,213
May	16	4,183	261.4	7-1,010
Total	30	8,361	287.7	

The herd size of 298.4 animals seen during April decreased to 261.4 during early May. The herd size ranged from 3 to 1,213 animals. The largest group size was recorded during the first week of April. The formation of such large groups occurred when forage conditions improved in the short grasslands during April-May after controlled burning. It was observed that the herd size never remained constant, indicating a loose social structure. Many individuals were found to readily join and split from the groups. The only stable relationship was between mother and calf.

Distribution

During the study period (hot, dry season), almost all groups were observed exclusively in the open grassland in the southern and western sides of Suklaphanta along the Nepal-India border. Most of the time, the herds were confined to around the old Suklaphanta post and near Purano Tal (lake) in Suklaphanta.

The congregation of barasingha in Suklaphanta was mainly due to the availability of new grasses during the study period. Schaaf (1978) and Moe (1993) also recorded barasingha concentrations in open grass patches when new sprouts of grass species were available. The congregation could be for rutting too. At Kanha National Park, Schaller (1967) observed the congregation of barasingha in the

meadow during the rutting season; however, no such evidence was noted during the present study.

Habitat preference

Pellets of barasingha were sighted in five different habitat types in the main study area. Plots with the highest proportion (52.8%) of pellets were recorded in the short grassland, whereas the lowest proportion was recorded in the marsh (14.25%). Among the five different habitats used by barasingha, short grassland was most preferred (HP value of 37.65%), followed by wooded grassland (HP value 27.14%). The lowest HP values were for riverine forest (10.79%) and marsh (10.15%). Pokharel (1996) also found similar results in Bardia where phanta (open short grassland) was most preferred and moist riverine forest had the lowest HP value. The habitat preferences are given in Table 3.

Table 3: Habitat preference value for different habitats

Habitat types	Total no. of plots	Plots with pellets	HP
SGL	70	37	37.65
TGL	15	3	14.25
WGL	21	8	27.4
RF	33	5	10.79
Marsh	7	1	10.15

Note: SGL: short grassland; WGL: wood grassland; TGL: tall grassland; RF: riverine forest

The highest preference for short grassland might also be attributed to the availability of preferred food plants such as *Imperata cylindrica*, *Saccharum spontaneum* and *S. bengalensis* (Schaaf, 1978; Pokharel, 1996) and waterholes. In addition, deer species, and in particular barasingha, tend to favor open areas over close tall grassland to avoid the risk of predation. Barasingha also showed a high preference for wooded grassland. They favored this habitat for resting during the hot daytime hours. The infrequent use of riverine forest by barasingha could be explained by the scarcity of water, as well as preferred food plants.

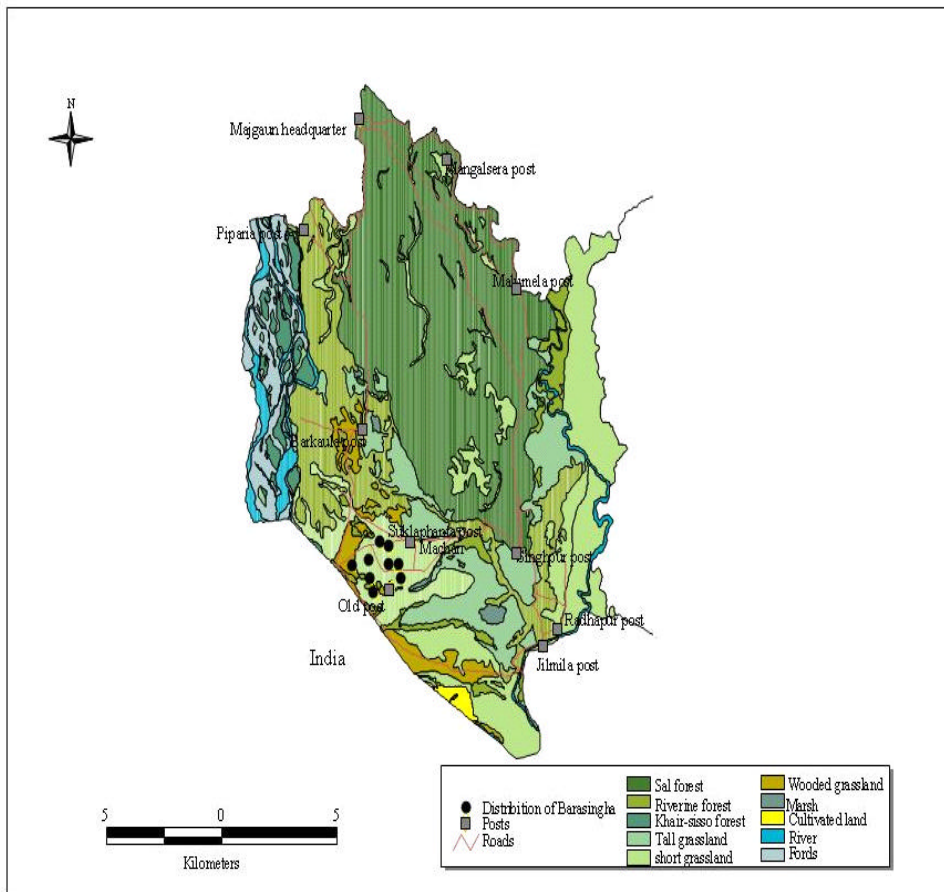


Figure: Distribution map of Barasingha in Royal Suklaphanta Wildlife Reserve

Barasingha showed the lowest preference for marsh areas. Tall grasses like *Narenga porphyrocoma* and *Phragmites karka* dominate this habitat, which gives less suitable escape cover for the barasingha.

Conclusions

With the establishment of Royal Suklaphanta Wildlife Reserve in 1976, and with the subsequent management system put in place, the population of barasingha has been increasing steadily, even though the present study shows a slight decline in the population since the last census done in the mid-1990s. A total of 1,607 animals were counted inside RSWR. Barasingha were basically observed in the open short grassland areas of Suklaphanta, congregating to form large herds. Poaching, tiger predation and habitat alteration have been found to be the main causes for declines in the barasingha population. Among the five habitat types where barasingha were found, the barasingha showed the

highest preference for open, short grassland. Forested areas were mostly avoided. Wooded grasslands were also a preferred habitat over tall grassland, riverine forest and marshes.

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References

- Berwick, S.H. 1974. **The community of wild ruminants in the Gir Forest ecosystem**, India. Ph.D. dissertation, Yale University, USA.
- Bhatta, D.D. and T.K. Shrestha. 1977. **The environment of Suklaphanta**. Curriculum Development Centre, Tribhuvan University, Nepal.

- DNPWC and PPP. 2000. **Royal Suklaphanta Wildlife Reserve Management Strategy Framework**. Department of National Parks and Wildlife Conservation and Park People Programme, Kathmandu, Nepal.
- Ellerman, J.R. and T.C.S. Morisson-Scott. 1951. **Checklist of Palearctic and Indian Mammals**. British Museum (Natural History), London. 810 pp.
- Hensaw, J. 1994. **The barasingha, or swamp deer, in Suklaphanta Wildlife Reserve, Nepal**. *Oryx* 28(3):199-206.
- Martin, C. 1977. **Status and ecology of the barasingha (*Cervus duvauceli branderi*) in Kanha National Park (India)**. *J. Bombay Nat. Hist. Soc.* 72(1):60-132.
- Moe, S.R. 1994. **Distribution and movement pattern of deer in response to food quality and manipulation of grassy habitat: A case study with emphasis on Axis deer (*Axis axis*) in lowland Nepal**. Ph.D. thesis. Agricultural University of Norway. 112 pp.
- Parajuli, K. 2001. **Ecological assessment of Swamp deer with particular emphasis on the conservation problems of the same in the western lowland of Royal Bardia National Park**. Project Report, B.Sc. Kathmandu University, Nepal.
- Pokharel, C.P. 1996. **Food habit and habitat utilization of swamp deer (*Cervus duvauceli duvauceli*) in the Royal Bardia National Park, Nepal**. M.Sc. thesis. Tribhuvan University, Nepal. 38 pp.
- Regmi, U.R. 2000. **Status of Tiger (*Panthera tigris*) and Livestock depredation in Royal Suklaphanta Wildlife Reserve, Nepal**. M.Sc. thesis. Agricultural University of Norway. 51 pp.
- Sankaran, R. 1989. **Status of Swamp deer (*Cervus duvauceli duvauceli*) in Dudhwa National Park (1988-1989)**. Bombay Natural History Soc. Technical Report No.14.
- Schaaf, C.D. 1978. **Population size and structure and habitat relation of the barasingha (*Cervus duvauceli duvauceli*) in Suklaphanta Wildlife Reserve, Nepal**. Ph.D. thesis. Michigan State University, USA. 370 pp.
- Schaller, G.B. 1967. **The Deer and the Tiger**. University of Chicago Press, Chicago, USA. 370 pp.
- Singh, A. 1978. **The status of the Swamp Deer (*Cervus duvauceli duvauceli*) in the Dudhwa National Park**. In: *Threatened deer*. Pp.132-142. IUCN, Morges, Switzerland.
- Thapa, R. 2003. **Study on Habitat Structure of Royal Suklaphanta Wildlife Reserve, Western Lowland, Nepal**. Draft. B.Sc. thesis. Institute of Forestry, TU, Pokhara.
- Velde, P.F. 1997. **A status report of Nepal's wild elephant population**. WWF Report. Kathmandu, Nepal.
- Wegge, P. 1976. **Terai Shikar Reserves. Survey and management proposals**. FAO, NEP/72/002, Field Document No.4:1-78.
- Wemmer, C. (editor). 1998. **Deer Status Survey and Conservation Action Plan**. IUCN/SSC Deer Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. 106 pp.

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THREATENED MAMMALIAN FAUNA OF ANDHRA PRADESH INDIA

by C. Srinivasulu

Introduction

Andhra Pradesh is India's fifth largest state, with an area of 275,068 km². It encompasses a great part of the Deccan Plateau, sloping down to the Bay of Bengal. It is bordered by Orissa and Madhya Pradesh to the northeast, Maharashtra to the north, Karnataka to the west, Tamil Nadu to the south, and the Bay of Bengal to the east.

Andhra Pradesh has a forest cover of 63,814 km², which is 23.19% of the total geographical area of the state (ICFRE, 1995). This places Andhra Pradesh in fourth position in India in terms of forest cover. The principal forest types are: tropical dry deciduous forest (5A/C1), southern tropical thorn forest (6A/C1), southern tropical moist deciduous forest (3B/C2), littoral forest (4A/L1) and tidal swamp mangrove forest (4B/TSL).

The state is broadly divided into three regions, namely, Telengana (northern region), Coastal Andhra (eastern region) and Rayalseema (southern region). Telengana occupies 45.80% of the geographical area and has 25.43% of the forest cover, while Coastal Andhra occupies 30.67% of the geographical area and has 21.06% of the forest cover. The Rayalseema region occupies 25.53% of the geographical area and has 22.30% of the forest cover. All 23 districts in the state have forests of one or more types.

Andhra Pradesh has 4 national parks and 20 wildlife sanctuaries. The wildlife sanctuaries cover an area of 11,346.54 km² and the national parks cover 525.1 km², or 4.12% and 0.19% of the total area of the State respectively.

Threatened mammalian fauna

The mammalian fauna of Andhra Pradesh is represented by a total of 73 species (Srinivasulu, 1999). Forest Department documents and pro-

tected area and district management plans carry accounts of the mammalian diversity recorded in their respective areas. Scientific literature (Subba Rao *et al.*, 1982; Kishan, 1990; Subba Rao *et al.*, 1994; Rao, 1996; Nagulu *et al.*, 1998; Nagulu *et al.*, 1999; Nagulu *et al.*, 2000), though meager, carries accounts of mammalian distribution in selected areas. However, there is a lack of information concerning the present status of threatened mammalian species. This paper attempts to present the status, habits, distribution, threats and general notes of selected threatened mammals of the state. The status accorded to each of the species follows Molur *et al.* (1998): EN=Endangered; Vu=Vulnerable; LRnt= Lower risk near threatened. Rodentia and chiropterans were not included in the present account.

Anathana ellioti (Waterhouse, 1850) Indian (Madas) Tree Shrew

[Primates: Tupaiidae]

Terrestrial, arboreal and diurnal in habit, inhabiting scrub jungle and dry deciduous forested tracts. Fragmented populations. Threats include habitat loss and fragmentation and road kills. Found distributed throughout the State. Sizeable populations restricted to forested tracts along the Godavari River. Status: LRnt

Bos gaurus (Smith, 1827) Gaur (Indian Bison)

[Artiodactyla: Bovidae]

Terrestrial, inhabiting dry deciduous forested tracts along the Godavari River. Fragmented populations. Recorded from Kawal, Eturnagaram, Kinnerasani and Papikonda wildlife sanctuaries. Threats include disease, livestock competition and habitat loss. Status: Vu

Canis lupus palopus (Sykes, 1831) Indian Wolf

[Carnivora: Canidae]

Terrestrial, inhabiting dry deciduous forested tracts, thorny scrub, grassland patches and cultivated areas. Population is rapidly depleting and threats in-

clude habitat loss and poisoning, as they are notorious for being sheep- and goat-lifters. Status: LRnt

***Cuon alpinus dekhanensis* (Pallas, 1811) Asiatic Wild Dog**

[Carnivora: Canidae]

Terrestrial, inhabiting dry deciduous forested tracts and teak mixed bamboo forests. Population patchily distributed throughout the State. Surviving well in Kawal, Pakhal, Nagarjunasagar Srisailam, Gundla Brah-meshwaram and Sri Venkateshwara wild-life sanctuaries. Threats include habitat loss, human interference (poisoning) and disease. Status: LRnt

***Elephas maximus* (Linnaeus, 1758) Indian Elephant**

[Proboscidae: Elephantidae]

Terrestrial, inhabiting dry deciduous forested tracts. Recorded from Kaundinya Wildlife Sanctuary, and represented by a resident migrant population in Chittoor District that has dispersed well into the adjacent Cuddapah District in recent times. Another population is found in Srikakulam District where they seasonally and intermittently migrate from the adjacent state of Orissa. Threats include habitat loss and fragmentation, man-animal conflicts, human interference, disease and genetic isolation. Status: Vu

***Felis chaus* (Schreber, 1777) Jungle Cat**

[Carnivora: Felidae]

Terrestrial, crepuscular and nocturnal, inhabiting dry deciduous forest and scrubland. Threats include habitat loss and fragmentation. Distributed throughout the state, but commoner in northern districts. Status: LRnt

***Felis silvestris* (Schreber, 1715) Desert Cat**

[Carnivora: Felidae]

Terrestrial, crepuscular and nocturnal, inhabiting dry deciduous forest. Only a few sight records exist. The author has recorded it from Kawal Wildlife Sanctuary, Eturnagaram Wildlife Sanctuary, Mahadevpur Forest (Karimnagar District), and there is also a report of its sighting from Nagarjunasagar Srisailam Tiger Reserve (K. Thulsi Rao, pers. comm.). Threats include habitat loss, fragmentation and hybridization. Status: LRnt

***Hyaena hyaena* (Linnaeus, 1758) Striped Hyena**

[Carnivora: Hyaenidae]

Terrestrial, inhabiting dry deciduous forest, scrublands and open forest. Population patchily distributed throughout the state, but rapidly depleting due to habitat loss and fragmentation, and poisoning. Status: LRnt

***Loris tardigradus* (Linnaeus, 1758) Slender Loris**

[Primates: Lorisidae]

Arboreal, inhabiting tropical dry deciduous forest, scrub jungle and orchards. Threats include habitat loss and fragmentation, and hunting. Found in the southern districts of Chittoor, Nellore and Cuddapah. Status: LRnt

***Lutra lutra* (Linnaeus, 1758) (Eurasian Otter)**

[Carnivora: Mustelidae]

S.A. Hussain of the Wildlife Institute of India, Dehradun, reported that he examined a Eurasian otter skin from Manjira Wildlife Sanctuary in 1991 (pers. comm.). No further reports of its occurrence within the State. Status: Not evaluated

***Lutra perspicillata* (I. Geoffroy Saint Hilaire, 1826) Indian Smooth-coated Otter**

[Carnivora: Mustelidae]

Semi-aquatic, inhabiting larger reservoirs, rivers and estuaries. Threats include habitat loss, over-fishing, increased pollution levels, and deaths due to net entanglements. Distributed patchily along the Godavari and Krishna river basins. Status: Vu (IUCN International criteria)

***Manis crassicaudata* (Gray, 1827). Indian Pangolin**

[Polidota: Manidae]

Terrestrial, fossorial and nocturnal in habits, inhabiting scrub and dry deciduous forests. Rapidly dwindling in number. Threats include habitat loss and killing. Patchy distribution throughout the State. Status: LRnt

***Melivora capensis* (Schreber, 1776) Ratel**

[Carnivora: Mustelidae]

Terrestrial, fossorial and nocturnal, inhabiting dry deciduous forested tracts. Rapidly dwindling in number. Threats include human-induced distur-

bances and habitat loss. Found mostly along the Eastern Ghats and in forested tracts along the Godavari River. Status: LRnt

***Melursus ursinus* (Shaw, 1791) Sloth Bear**
[Carnivora: Ursidae]

Terrestrial and arboreal, inhabiting dry deciduous forests. Surviving well in the protected areas and adjacent reserve forests of the State. Threats include habitat loss and killings as a result of increased bear-human conflicts. Status: Vu

***Moschiola memmina* (Erxleben, 1777) Mouse Deer**

[Artiodactyla: Tragulidae]

Terrestrial, inhabiting dense dry deciduous and semi-moist deciduous forests. Population rapidly dwindling due to loss of habitat and hunting. Distributed along the high forests of the Eastern Ghats, especially along the Nalamalla Hills in Nagarjunasagar Srisailam (right bank) and Gundla Brahmeshwaram wildlife sanctuaries, and Seshachalam Hills in Sri Venkateshwara National Park and Wildlife Sanctuary. Status: LRnt

***Panthera pardus* (Linnaeus, 1758) Leopard**
[Carnivora: Felidae]

Terrestrial and semi-arboreal, inhabiting dry deciduous and scrub forests. Well represented throughout the State, yet patchy in distribution. Threats include habitat loss and fragmentation, electrocution, hunting and poisoning. Status: Vu

***Panthera tigris* (Linnaeus, 1758) Tiger**
[Carnivora: Felidae]

Terrestrial, inhabiting dry deciduous forest tracts along the Godavari River basin and on the Eastern Ghats up to the Nalamalla Hills. Population fast depleting. Threats include loss of habitat, electrocution, poisoning, prey base depletion, and trade-related activities. Status: EN

***Petaurista phillipensis* (Elliot, 1842) Large Brown Flying Squirrel**
[Rodentia: Scuridae]

Arboreal and nocturnal in habit, inhabiting dry deciduous hill forests. Highly patchy distribution. Populations rapidly dwindling due to loss of habitat and killings. Distributed along the Eastern Ghats. Status: LRnt

***Prionailurus bengalensis* (Kerr, 1792) Leopard Cat**

[Carnivora: Felidae]

Terrestrial to semi-arboreal and nocturnal in habit, inhabiting mixed deciduous and moist deciduous hill forests of the Eastern Ghats. Highly patchy distribution, especially along the Nalamalla and Seshachalam Hills. Populations are rapidly dwindling due to loss of habitat and killings. Status: LRnt

***Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) Rusty-spotted Cat**

[Carnivora: Felidae]

Terrestrial to semi-arboreal and nocturnal in habit, inhabiting scrub to dry deciduous forests, especially along the Godavari River basin area. Recently, it has been reported from Nalamalla Hills (Thulsi Rao *et al.*, 1999) in the Eastern Ghats. Highly patchy distribution. Probably rapidly dwindling in number due to loss of habitat and road kills. Status: LRnt

***Prionailurus viverrinus* (Bennett, 1833) Fishing Cat**

[Carnivora: Felidae]

Terrestrial to semi-arboreal and nocturnal in habit, inhabiting scrub jungles, wetlands, marshy areas, tidal creeks and mangroves. Patchy distribution along the coastal wetlands and mangroves of Godavari and Krishna. Rapidly dwindling in number due to loss of habitat. Status: Vu

***Ratufa indica centralis* (Erxleben, 1777) Indian Giant Squirrel**

[Rodentia: Scuridae]

Arboreal in habit, found in mixed deciduous forests along the Godavari River basin and the Eastern Ghats. Populations highly fragmented and on the decline due to loss of habitat and hunting. Status: Vu

***Tetracerus quadricornis* (Blainville, 1816) Four-horned Antelope**

[Artiodactyla: Bovidae]

Terrestrial, inhabiting dry deciduous tracts of Telengana region and all along the forested tracts of the Godavari River. Threats include increasing human disturbance, loss of habitat, livestock pressure, and poaching. Status: LRnt

***Viverricula indica* (Desmarest, 1804) Small Indian Civet**

[Carnivora: Viverridae]

Terrestrial to semi-arboreal and nocturnal in habit, inhabiting scrub jungles, dry deciduous forests and near fringe villages. Distributed throughout the State. Populations in decline due to loss of habitat and hunting. Status: LRnt

***Vulpes bengalensis* (Shaw, 1800) Bengal Fox**
[Carnivora: Canidae]

Terrestrial in habit, inhabiting scrub jungles, dry deciduous forest, grasslands and agro-ecosystems. Distributed throughout the State. Populations are under threat due to loss of habitat and poisoning. Status: LRnt

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References

FSI. 1991. **The State of Forest Report. 1991.**

Forest Survey of India, Government of India, Dehradun, India.

ICFRE 1995. **Forestry Statistics. 1995.** Indian Council of Forest Research and Education, Dehradun, India.

Kishan, V. 1990. **Ecology, behaviour and management of elephants in Andhra Pradesh context.** In: Karunakaran, C.K. (Ed.) *Proceedings of the Symposium on ecology, behaviour and management of elephants in Kerala.* Thiruvananthapuram, 23-24 Feb-

ruary 1990. Wildlife Wing, Kerala Forest Department.

Molur, S. Nameer, P.O. and S. Walker. 1998. **Report of the Workshop "Conservation Assessment and Management Plan for Mammals of India (BCPP – Endangered Species Project)".** Zoo Outreach Organization, Conservation Breeding Specialist Group, India. Coimbatore, India. 176 p.

Nagulu, V., Srinivasulu, C. and V. Vasudeva Rao. 1999. **Status of otter in southern Indian States: An updated report – 1999.** In: Hussain, S.A. (Ed.) *ENVIS Bulletin: Wildlife and Protected Areas*, Mustelids, Viverrids and Hesperitids of India. 2(2):71-73.

Nagulu, V., Rao, Vasudeva, V. and C. Srinivasulu. 2000. **Wildlife Heritage of Deccan.** In: Gupta, H.K., Parasher-Sen, A, and D. Subramaniana (Eds.) *Deccan Heritage.* Indian National Science Academy & Universities Press, Hyderabad. pp.35-76.

Nagulu, V., Rao, Vasudeva, V. and C. Srinivasulu. 1988. **Biodiversity of select habitats in Eastern Ghat region of Andhra Pradesh.** In: *The Eastern Ghats, Proceedings of the National Seminar on the Conservation of Eastern Ghats*, Visakhapatnam. March 24-26, 1998. EPTRI, Hyderabad and Andhra University, Visakhapatnam. pp.6-35

Nagulu, V., Rao, Vasudeva, V., Satynarayana, D. and C. Srinivasulu. 1998. **Otter records and otter conservation perspectives in Andhra Pradesh.** *IUCN Otter Specialist Group Bull.* 15(1):31-37.

Rao, C.N. 1996. **Status report of elephants in Andhra Pradesh.** In: Daniel, J.C. and H.s. Datye (Eds). *"A Week with Elephants" – Proceedings of the International Seminar on the Conservation of Asian Elephant.* June 1993, BNHS, Bombay. Bombay Natural History Society and Oxford University Press. pp.94-96.

Srinivasulu, C. 1999. **List of mammals of Andhra Pradesh.** Unpublished Report. 20 pp.

Subba Rao, M.V., Krishnamurthy, D. and K. Kameswara Rao. 1982. **Present distribution of Gaur *Bos gaurus* in Andhra Pradesh.** In: *Proceedings of the Seminar on Resources, Development and Environment in the Eastern Ghats.* Andhra University Press.

Subba Rao, M.V., Subba Rao, V.V., Krishna, A.B.M. and P.S. Raja Sekhar. 1984. **The mammalian resources in Papikonda Re-**

serve Forest (West Godavari District, Andhra Pradesh). In: Subba Rao, M.V. (Ed.) *Forest, Wildlife and Environment.* pp.143-148.

Thulsi Rao, K., Sudhakar, D., Vasudeva Rao, V., Nagulu, V. and C. Srinivasulu. 1999. **Rusty-spotted Cat *Prionailurus rubiginosus*, A new record for Nagarjunasagar Srisailem Tiger Reserve, Andhra Pradesh.** *J. Bombay Nat. Hist. Soc.* 96(3):463-464.

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National parks and wildlife sanctuaries of Andhra Pradesh

No.	Name	District	Area (km ²)
<u>National Park</u>			
1	Sri Venkateshwara National Park	Chittoor and Cuddapah	352.62
2	Mahavir Harina Vanasthali	Ranga Reddy	4.09
3	Mrugvani	Ranga Reddy	3.6
4	Kasu Brahmananda Reddy	Hyderabad	1.42
<u>Wildlife Sanctuary</u>			
1	Nagarjunasagar-Srisailem#	Mehbubnagar, Nalgonda	3,568.00
2	Gundla Brameshwaram	Prakasam, Guntur and Kurnool	1,194.00
3	Kawal	Kurnool and Prakasam	893
4	Pakhal	Adilabad	879
5	Eturnagaram	Warangal	803.35
6	Kolleru*	Warangal	675
7	Kinnerasani	West Godavari	655.41
8	Papikonda	Khammam	591
9	Pulicat	Nellore	500
10	Sri Lankamalleshwara	Chittoor	464.42
11	Kaundinya	Chittoor	374.7
12	Coringa	East Godavari	235.7
13	Krishna	Krishna and Guntur	194.81
14	Pranahita	Adilabad	136.06
15	Pocharam	Medak and Nizambad	130.13
16	Siwaram (Lanja Madugu)	Adilabad	36.29
17	Manjira	Medak	20
18	Nelapattu	Nellore	4.58
19	Rollapadu	Kurnool	6.14
20	Sri Venkateshwara	Chittoor and Cuddapah	173.94

Also notified as a tiger reserve

* The area of the sanctuary depends on the water spread area

NEW WILDLIFE SANCTUARIES IN ASSAM IN NORTH-EAST INDIA

by A. Choudhury

Three new wildlife sanctuaries were notified in Assam, north-east India in June 2004. Each is known for different species of wildlife, as well as for their overall biodiversity values.

Amchang Wildlife Sanctuary (79 km²) is located near Guwahti, the capital city of Assam. Three small reserve forests, i.e. Amchang, South Amchang and Khanapara, constitute this sanctuary. Amchang is easily accessible from Guwahati city. This area was recommended for the first time for the protection of its isolated elephant (*Elephas maximus*) population (Choudhury, 1985) and later for its gaur (*Bos gaurus*) population and because of its proximity to a growing metropolis (Choudhury 2002). The slow loris (*Nycticebus coucang*), Assamese macaque (*Macaca assamensis*), Rhesus macaque (*Macaca mulatto*), capped langur (*Presbytis* (= *Trachypithecus*) *pileata*), and hoolock gibbon (*Hylobates* (= *Bunopithecus*) *hoolock*) are the main primates that have been recorded in the sanctuary. The presence of two more species – the stump-tailed macaque (*Macaca arctoides*) and pig-tailed macaque (*Macaca nemestrina*) – has also been reported, but needs confirmation. A few tigers (*Panthera tigris*) occur in the area and leopards (*P. pardus*) are found all over. Among the lesser cats, the presence of leopard cat (*Felis bengalensis*) and jungle cat (*F. chaus*) has been confirmed. Small carnivores recorded so far include the large Indian civet (*Viverra zibetha*), small Indian civet (*Viverricula indica*), common palm civet (*Paradoxurus hermaphroditus*), grey mongoose (*Herpestes edwardsi*), common mongoose (*H. auropunctatus*), crab-eating mongoose (*H. urva*), Eurasian otter (*Lutra lutra*), and smooth Indian otter (*Lutrogale perspicillata*). Occasionally, stray rhinos (*Rhinoceros unicornis*) from the nearby Pabitora Sanctuary come to the fringe of this sanctuary. Wild pig (*Sus scrofa*), sambar

(*Cervus unicolor*) and muntjac (*Muntiacus muntjak*) are also found in the sanctuary area.

Among the threatened bird species, there are records of the occurrence of Greater Adjutant stork (*Leptoptilos dubius*) and White-backed vulture (*Gyps bengalensis*).

Barail Wildlife Sanctuary (326 km²) is located in Cachar District of southern Assam. This area was recommended for the protection of its overall biodiversity – with special focus on primates (Choudhury 1988, 1989a,b). Seven primate species are found in the sanctuary, i.e. slow loris, Assamese macaque, stump-tailed macaque, pig-tailed macaque, rhesus macaque, capped langur and hoolock gibbon. Tiger, leopard and clouded leopard (*Neofelis nebulosa*) have been recorded in the area. Among the lesser cats, leopard cat and jungle cat are common, while there is a single record of fishing cat (*Felis viverrinus*) from near the Meghalaya border. Temminck's golden cat (*F. temminckii*) was also recorded, but reports of marbled cat (*F. marmorata*) need confirmation. Asiatic black bear (*Ursus thibetanus*) and Malayan sun bear (*U. malayanus*) are still found in the sanctuary despite poaching pressure for their bile. Binturong (*Arctictis binturong*), large Indian civet, small Indian civet, common palm civet, Himalayan or masked palm civet (*Paguma larvata*), spotted linsang (*Prionodon pardicolor*), grey mongoose, common mongoose, crab-eating mongoose, Eurasian otter, smooth Indian otter, gaur, serow (*Capricornis sumatraensis*), wild pig, sambar and muntjac are also found in the sanctuary.

Among the threatened birds, there were records of Lesser adjutant stork (*Leptoptilos javanicus*) at the edge of the plains, Rufous-necked hornbill (*Aceros nipalensis*) and Beautiful nuthatch (*Sitta formosa*). Near-threatened birds found in the

(Continued on page 17)

(Continued from page 16)

sanctuary include Great Pied Hornbill (*Buceros bicornis*) and White-cheeked Hill Partridge (*Arborophila atrogularis*). The area is hilly and mountainous, and the main vegetation type is tropical wet evergreen (rain forest) in the lower elevations and subtropical broadleaf in the higher areas.

Dihing-Patkai Wildlife Sanctuary (111 km²) consists of Upper Dihing (west block), Joypur and Dirak reserve forests in Tinsukia and Dibrugarh districts of eastern Assam. This area was recommended for the protection of primates, of which seven species are found (Choudhury, 1989b), and for its population of White-winged Wood Duck (*Cairina scutulata*) (Choudhury, 1996). The primate species that occur here are similar to those found in Barial Wildlife Sanctuary. Tiger, leopard, clouded leopard, leopard cat and jungle cat have also been recorded. Temminck's golden cat was sighted on a number of occasions in Upper Dihing (west block) and Joypur reserve forests, while one was killed and the meat sold in adjacent Deomali in 2003. There is also a record of a marbled cat that was killed at the Joypur-Arunachal Pradesh border in the late 1990s. Binturong, large Indian civet, small Indian civet, common palm civet, Himalayan or masked palm civet, small-toothed palm civet (*Arctogalidia trivirgata*), grey mongoose, common mongoose, crab-eating mongoose, Eurasian otter, smooth Indian otter and small-clawed otter (*Aonyx cinereus*) are all present in the sanctuary. Gaur, serow, wild pig, sambar and muntjac are also found.

Threatened birds which were recorded include White-bellied Heron (*Ardea insignis*), Lesser Adjutant Stork, Rufous-necked Hornbill and Beautiful Nuthatch. Near-threatened birds include Great Pied Hornbill, Brown Hornbill (*Anorrhinus tickellii*) and White-cheeked Hill Partridge. The

terrain is covered with low hills and flat plains; the main vegetation type is tropical wet evergreen (rain forest).

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References

- Choudhury, A.U. 1985. **Elephants in trouble.** *The Sentinel*, 21 July.
- Choudhury, A.U. 1988. **Priority ratings for conservation of Indian primates.** *Oryx* 22:89-94.
- Choudhury, A.U. 1989a. **Campaign for Wildlife Protection: National Park in the Barials.** *WWF-Quarterly* No.69.10(2): 4-5.
- Choudhury, A.U. 1989b. **Primates of Assam: their distribution, habitat and status.** Ph.D. thesis. Gauhati Univ. 300pp+maps.
- Choudhury, A.U. 1996. **Survey of the White-winged wood duck and the Bengal florican in Tinsukia dist. & adjacent areas of Assam and Arunachal Pradesh. The Rhino Foundation for Nature in NE India, Guwahati.** 82pp+maps,illus.
- Choudhury, A.U. 2002. **Big cats, elephant, rhino and gaur in Guwahati.** *The Rhino Foundation for Nat. in NE India Newsletter* 4:16-19.

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CRANE BREEDING IN BANNU, NORTH WEST FRONTIER PROVINCE, PAKISTAN

by M. Nawaz & Y. Nawaz

Introduction

Bannu is a beautiful agricultural area in Pakistan's North West Frontier Province (NWFP). There are many undiscovered wetlands in Bannu which are not on the record because most of them are situated in the tribal areas adjoining with Afghanistan's Paktia Province.

Of the 15 existing species of cranes, two species, i.e. Common crane (*Grus grus lilfordii*) and Demoiselle crane (*Anthropoides virgo*) visit Pakistan. The author conducted a survey of crane hunters in Bannu during September-October 1995, March 1996 and 2001-2003 to study the trapping and breeding of these cranes.

The study

About 1,000 crane hunters and trappers were counted in Bannu District. Most belonged to the Banochi and Wazir tribes, although a few were from the Marwat and Mahsood tribes. Each crane hunter possessed at least 2 or 3 pairs of cranes; some had up to 6 pairs. The birds are kept in special large wooden cages and are trained as decoy or call birds.

Both *Grus grus lilfordii* and *Anthropoides virgo* breed very well in this area. During the breeding season they are free to roam the fields, gardens and houses. The total number of breeding pairs of common crane was 50, while 20 Demoiselle crane nests were built in the graveyards or in the far corners of the houses. The egg-laying period is from the first week of April to the first of June. Copulation takes place once a year and usually two eggs are laid, which hatch after 29-30 days. The chicks are precocious and are fed grasshoppers and wheat flour in the initial days. During this time the mortality rate is very high; whether this is due to coccidiosis needs investigation. As

the chicks grow older they feed on wheat, maize, rice and small bits of bread.

If the chicks become infected by diseases, the practice of the local people is to dose them with septran and adoxelin. In addition, carthorms are also given to both the chicks and the adult birds throughout the year to keep them healthy.

More than half of the breeding stock flies away every year after the completion of their primary feathers.

Hunting and keeping cranes is considered to be a sign of prosperity in this area. The call birds are very highly priced, from Rs.10,000 to Rs.50,000 per pair (US\$168-US\$840) and are used for hunting. Birds trapped during the hunting season are either distributed among the VIP's or eaten by the parties during the hunting days in the field. They are never sold in the market.

Suggestions

According to interviews with crane hunters, the common cranes are lesser in number compared to Demoiselle cranes and have been declining over the last few years. According to the hunters' estimates, the migratory ratio passing over Pakistan is 5:7.

Between October 2001 and March 2003, 2,000 birds were trapped or shot in the field, which is less than recorded in earlier records. So it is time for the crane hunters to learn about the importance of these birds in the wild as well as in captivity. Conservation education can be easily applied. Pamphlets, articles or booklets written in the local languages about the importance of wildlife and conservation can accomplish this to some extent.

Providing opportunities for captive breeding to the local crane breeders can also help the situation, and improvement and research in the present breeding techniques are also needed. An investigation of the types of diseases that affect the birds and the proper treatment and control can also reduce the amount of early deaths among the chicks. Hunters should be encouraged to start captive breeding of cranes by providing them with funds and teaching them scientific techniques.

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References

- Landfried, S. 1982. **Crane Hunters in Pakistan.** *The Brolga Bugle*, ICF Newsletter.
- Nawaz, M. 1984. **Migratory Cranes in Pakistan.** *Tigerpaper* 11(4):17-20.

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YOR NGONE - TIGER TRAPPER

by Lic Vuthy

Yor Ngone was born in Khan Khav village, Baray commune, Triang district, Takeo province (Takeo province is located in the southeastern part of Cambodia). He moved to Banlung, a town in Ratanakiri province, northwestern Cambodia, in 1968 after the encouragement of the Sangkum Reah Nyum policy (1954-1970). Yor Ngone went to Ratanakiri accompanied by his young wife. Now 57 years old, he has moved around and lived in several places, but all within the Ratanakiri province. He has 9 children, most of whom work at similar jobs as Mr. Ngone, which includes fishing and collecting non-timber forest products.

A few years after he settled in Banlung, Yor Ngone got a job as fisherman. During his fishing career he traveled to many places, wherever he could find fish. He went to Sre Pork, Se Kong, and Se San rivers. Along each river he became familiar with many locations.

Because of his experience in the area, he was asked to join the bushmeat supply hunting team of the rubber plantation organization in Ratanakiri province immediately after the Khmer Rouge took power in 1975. At first, Mr. Ngone was not inter-

ested in hunting large animals such as banteng and gaur at all. After a while, however, he tried his hand at it and became an expert shot. He was part of the bushmeat supply hunting team during the Khmer Rouge regime from 1975 till 1979. Of the bushmeat targets, he preferred to kill banteng or gaur because they can provide much more meat at one time. However, he and his team killed also other animals ranging from barking deer up to elephants. He used to hunt in O So and within the Prey Khiev areas of Lomphat (which has been a Wildlife Sanctuary since the 1960s). According to Mr. Ngone, elephant meat used to be supplied to the organization too.

For another few years after the Khmer Rouge was out of power, Mr. Yor Ngone continued being a bushmeat supplier to the new rubber organization in the same province. He increased his hunting range up to the southern part of Prey Khieve – called Thmone forests. He continued his career of bushmeat supplier up to 1984, when the organization stopped employing him. He stayed on in Trapeang Chres village, Kone Mom district, Ratanakiri province until 1985 as a farmer.

He moved to Ibu village, Sdao commune Sesan district, Stung Treng Province in 1986. From that year, he became a private hunter, particularly for tiger. He kept crops, the same as other villagers/farmers in his district, but he left for the jungle as soon as possible after the work in the rice field was done.

Mr. Ngone had used wire-traps to capture tiger and other medium-size animals since 1987. From time to time Mr. Ngone would travel from his village to as far away as the Cardamom Mountain range (southwestern Cambodia), Dang Rek mountain (northwestern country), and up to Virachey (tri-border: Cambodia, Lao, and Vietnam), the Dragon-tail sites. He used to visit the eastern parts of the Sre Pork river areas, Monduliri province during the last three years. Specific locations that he mentioned are:

- Ratanakiri province: Voeng Say, O Takok, Andaung Meas, and O Tang-O Leav areas
- Stung Treng province: Phnom Kala Poh and Phnom Thom
- Preah Vihear province: Prey Preah Roca, Chhep district
- Monduliri province: Lomphat areas, areas along Sre Pork river, and Yang Por site
- Banteay Meanchey province: Prey Sa Ark, Phnom Poal, Toeuk Khmao of Trapeang Pra Sat district
- Koh Kong province: Russey Chrum, Toeuk Khmao through mountain range
- Pausat province: Bam Boak, Kbal Tea Hean, and Veal Veng district areas
- Kampong Chhnang province: Khdol and within Oral mountain range
- Kampong Thom province: Phnom Chy, Prey Long, and Phnom Khsach Sor areas
- Kratie province: Kandır mountain range areas.

Some of the main species that he estimated he had killed during his hunting career include:

- Elephant, around 30 individuals (He recalled that in 1997 he killed one elephant with 12.5 kg of ivory in Preah Vihear province. The ivory was sold at about US\$240 per kilogram.)
- Tiger, at least 19 individuals
- Leopard, more than 40 individuals

- Asiatic Black Bear, up to 3
- Sun Bear, about 40
- Hog badger, about 10
- Banteng and gaur – between 500 to 800 individuals during the Khmer Rouge regime.

Mr. Ngone reported that tigers still occur in their range inside Cambodia. According to him, tiger could be present in the Stung Treng, Ratanakiri, Monduliri, and Preah Vihear range. He estimates that the total number of tiger could be up to 100 individuals country-wide. However, he would not estimate the number of tigers in southwestern Cambodia because he never saw any whenever he was there. He went to Cardamom mountain range because his friends told that there are tigers in this area.

Although he realized that he was committing unlawful activities, he continued trapping in order to make money. However, Mr. Yor Ngone signed a warning contract with the Species Program, WWF Conservation Cambodia on 16th August 2004. He signed up after more than four years of pursuit by conservation groups such as CWRP/FA, WildAid/FA, and the Species/WWF Team. He promised to stop trapping tiger and other wild animals. He is willing to join the conservation team, if he is accepted, because he realizes that the tiger population has been drastically reduced. However, if hunting pressure, at the current stage, could be cracked down on, the tiger population could be safeguarded, he said.

The Species Program, WWF Cambodia Conservation Program, along with other local and international NGOs, has been working for the conservation and management of wildlife, including tiger and elephant, since 1998. Currently, they are investigating one of the tiger ranges in Phnom Prich Wildlife Sanctuary, where Yor Ngone said he used to see tiger footprints. With the permission of the Department of Nature Conservation and Protection, Ministry of Environment, 20 rangers have been recruited for the PPWS. The rangers used to be non-timber forest product collectors and ex-hunters of the areas. The Species Team believes that Mr. Yor Ngone would follow other ex-hunters to join the conservation team.

Besides working in Phnom Prich Wildlife Sanctuary, the Species Team is closely collaborating with the Forestry Administration to monitor trade in wildlife – particularly tiger and elephant. There are four provincial forestry counterparts and six communal counterparts working for the Species Project in Mondulhiri, Krite, and Stung Treng prov-

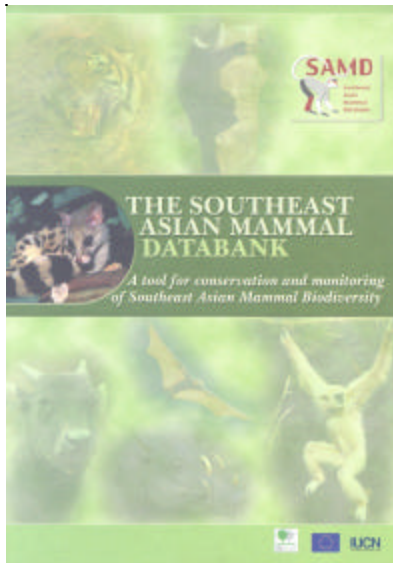
inces. The species project is now assisting the Srepok Wilderness Area Project in terms of species work such as survey techniques. SWAP is one of the WWF projects assisting the Forestry Administration to manage the Protection Forest Areas in Mondulhiri province.

The author is working part time for WWF Cambodia and part time for the Forestry Administration, MAFF. For further information, please contact Lic Vuthy and the Species Team at: vuthywwcam@everyday.com.kh

THE SOUTHEAST ASIAN MAMMAL DATABANK

The SAMD project

Information about species has become a prerequisite for moving towards a more sustainable use of natural resources, many of which are threatened with extinction. The Southeast Asia Mammal Database (SAMD) project offers the opportunity for combining the knowledge of the scientific and conservation community with the power of the latest GIS-based modelling technology, resulting in detailed distribution maps of the Southeast Asian mammals.



Project partners

The project is funded by the European Union and the Istituto di Ecologica Applicata (IEA) and is being implemented in collaboration with the IUCN Species Survival Commission.

SAMD objectives

The objective of the project is to provide a high-quality data set on Southeast Asian mammals for conservation management.

Outputs

The project will provide:

- A databank, based on the IUCN Species Information System (SIS), containing information on distribution, taxonomy, ecology, level of threat and conservation status of the mammals of Southeast Asia.
- Habitat suitability models describing the potential distribution pattern of the species within the extent of occurrence, in relation to the main environmental factors.

Who will use SAMD

The information is freely available on the internet (www.ieaitaly.org/samd). It will be of benefit to:

- Government agencies involved in natural resource and biodiversity management, development policy, implementation of international agreements.
- Non-governmental conservation organizations (local, regional, international)
- Scientists, wildlife managers and educational institutes.

CENSUSING TIGER AND LEOPARD IN SIMILIPAL TIGER RESERVE - 2004, ORISSA, INDIA

by *D. Swain, H.K. Sahu and B.K. Parida*

Introduction

India contains nearly 65% of the global population of tigers. During the last few decades, the populations of this magnificent animal have dwindled at a perilously fast pace (Das and Sanyal, 1995). The tiger's survival ultimately hinges on the people who live in the periphery of the tiger areas (Seidensticker and Hai, 1983). This paper presents the actual census work carried out for tiger (*Panthera tigris*) and leopard (*Panthera pardus*) in Similipal Tiger Reserve of Orissa, India – one of the nine tiger reserves initially established in 1973.

Study area

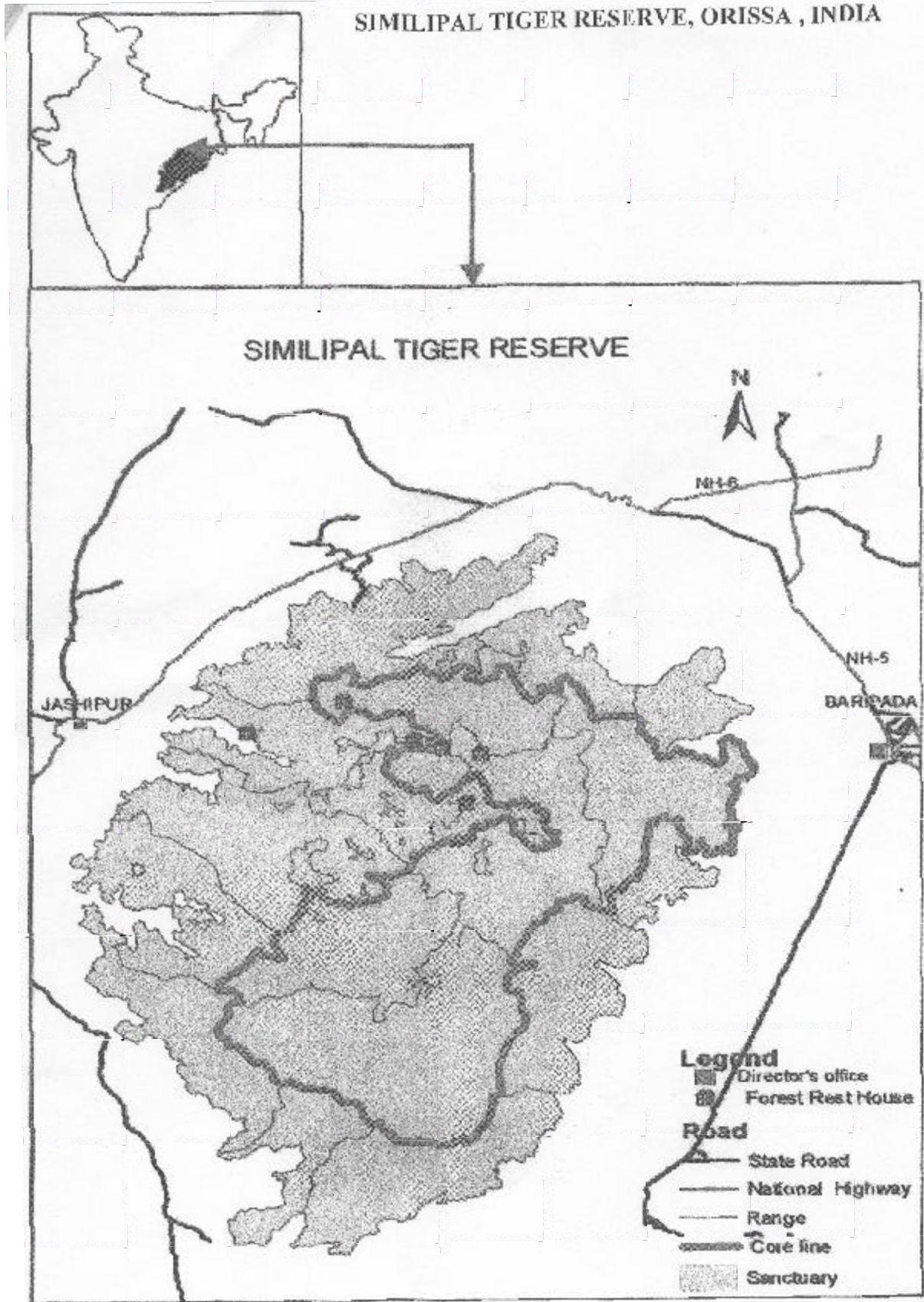
Similipal is a densely forested hill-range in the heart of Mayurbhanj District in Orissa, lying close to the eastern-most end of the Eastern Ghats. Located in the Mahanadian Bio-geographical Region and within the biotic province of Chhotanagpur Plateau, it spreads over an area of 2,750 km². The whole Similipal hill-range comes under Similipal Tiger Reserve between latitudes 20°29' to 22°09' N and longitudes 86°04' to 86°37' E. The highest mountain is the peak of Khairiburu, which rises 1,168 m above sea level. Similipal has the richest watershed in the state of Orissa, giving rise to many perennial rivers like the Budhabalanga, Khadkei, Bhandan, West Deo, Salandi, East Deo, Sanjo and Palpala. Due to the uniqueness of its flora, fauna, forests, landscape, waterfalls and tribes, Similipal was declared a Biosphere Reserve in 1994.

Methodology

The whole count (pugmark census) method was used to estimate the populations of tiger and leopard in 2004 in Similipal. Preparations started

in December 2003 with a training program for the staff. The actual census was conducted from 5-10 January 2004. The month of January was selected because the weather is usually dry and cool, and the census work can be carried out unhindered. In addition, during this month the forest undergrowth is still very dense, thus limiting the tigers' movements.

Roadsides, riverbanks and dry streambeds were searched for tiger pugmarks. Tigers normally walk along jeep-able roads, footpaths, animal tracks and other such routes. It is not easy to spot pugmarks in Similipal as the ground is hard soil or rocky. Therefore, along probable routes of tiger movement, the ground has to be prepared to make it suitable for registering pugmark impressions. This is done by using pug impression pads (PIPs). Fifty-one census units were selected in the census area. In each unit a few census routes were selected and along each one PIPs were laid out in such a manner that at least one should record the pugmarks of a tiger that walked along the route. Each PIP is laid out at such points that a walking animal cannot avoid it. If there are large stones, trees or bushes on the sides of the route, then the animal is almost compelled to keep to the middle of the road and thus leave its pugmarks on the PIP. On jeep-able roads when there are two tracks, the animal normally keeps to either one of the tracks. At cross roads and at the beginning of other roads, 3 to 4 PIPs are laid down 50-100m apart from each other. Further on after about 500-1000m, another cluster of 3 to 4 PIPs is laid out. Keeping in mind the importance of a route, the above number or pattern of PIPs can be increased or decreased. In order to lay down a PIP, the leader of a census unit needs the assistance of 2-3 other helpers. The equipment needed includes two pickaxes, a fine mesh wire-net (100 x 75 cm)



designed to function as a swing to sieve the soil, two wire brushes, etc.

Where the route is narrow (e.g. 50 cm in width), it is wiped with the brush, removing small pebbles, and a fine 1-2 cm layer of fine dust is spread over it. In other cases, the entire width of the road is dug up 15-20 cm deep and the soil is beaten to dust and then sieved through the fine mesh swing.

The census was carried out over six days. During this period each PIP was checked at least twice (e.g. on days 1 and 4 or days 2 and 5). In a tiger pugmark there are impressions of the paw and four toes. The paw is trilobed at the back. While walking at normal speed the impression of the front pug gets overlapped by the impression of the hind pug. While walking at a slower or faster speed, the impression of all four pugs – left-right, front-hind – are visible in a tiger track. For any tiger, the front pugmark is larger and appears squarish. For a male tiger, the length and width of a hind pugmark is almost equal, but for female tigers the length and width of the hind pugmark differs by about 1.5 cm. The pugmark of an adult leopard is similar in size and appearance to that of a tiger cub. But the stride of a leopard is longer than the stride of a tiger cub. The stride of a leopard is above 90 cm (average 100-130 cm) and that of a tiger cub is less than 90 cm (average 70-90 cm). The pugmarks of a young leopard appear similar to that of a lesser cat. Generally the pugmark of a mother can be seen near the pugmarks of the cub.

The diagram of a pugmark is drawn on a tiger tracer. The tracer consists of a clear transparent glass (30/25 cm) fitted to a wooden frame 2 cm wide on all sides. The tracer is gently placed over the pugmark taking care not to touch the mark. A sketch pen is used to trace the pugmark on the glass of the tracer. By blowing gently on the glass, the surface is moistened and a sheet of tracing paper is carefully placed over the glass. Using a thumb, the tracing paper is gently pressed along the line drawing in such a manner that the traced figure is transferred onto the tracing paper.

If the pugmark is fresh, the pad and toe impressions will appear very clear. In an older pugmark

left some days back the features will have indistinct or blurred lines. Where possible, the estimated age of the pugmark (how many days) should be recorded. The stride is also measured. If there is one hind left and one hind right impression, the distance between the two (measured from the toe end of the pads) is doubled to get the stride measurement. When all four pugmarks are seen, then the distance between any two pugmarks is measured. If the measurement is more than 30 cm, then the stride is about three to four times more than this.

After all the information has been collected in a pre-designed proforma, the plaster cast of a good impression is prepared. First, a thin layer of plaster powder is dusted over the impressions. Using sand, sticks, cardboard or strips of paper, a rigid boundary is placed around the pugmark. In a 1 liter mug, about 200 ml of water is filled. To this, plaster of paris powder is added gradually with constant stirring until a thick solution (not paste) is made. This is gently poured over the pugmark. After about 15-20 minutes, when the plaster has hardened, the name of the unit leader, date, place, serial number of the plaster and other such information are written down and the plaster is carefully lifted out.

Results and discussion

During the survey, a total of 306 pugmark tracings were collected from different ranges and divisions, out of which 247 tracings were collected from the core area of Similipal Tiger Reserve and 59 from the buffer area. Tiger pugmarks were traced for 41 males, 57 females and 34 cubs. Likewise, 81 male, 73 female and 20 tracings of leopard pugmarks were collected.

An analysis of the tracings was made taking all the evidence and measurement data on pugmarks of tiger and leopard as mentioned in the guidelines of Singh (1999). During the census a total of 101 tigers were counted, including 28 males, 41 females and 32 cubs. This is higher than the number recorded in previous censuses and shows an increasing trend.

At the same time, a total of 127 leopards was counted, including 44 males, 64 females and 19 cubs. The leopard population also displays an increasing trend from 1989 to 2004.

Censusing tigers and leopards is necessary to objectively evaluate the success or failure of management interventions, to establish benchmark data that can serve as a basis for future management, and to develop a body of empirical and theoretical knowledge that can potentially improve our predictive capacity to deal with new situations (Karanth *et al.*, 2002). The traditional pugmark census technique (Choudhury, 1970, 1972; Singh, 1999) was followed in the present study because it is the quickest, most cost effective and easy to understand by the field staff. It is widely used in various tiger reserves in India in spite of the biological and statistical weaknesses reported by Karanth (1987) and Karanth *et al.* (2002).

Acknowledgments

The authors would like to thank the students and lecturers of the post-graduate Department of Wildlife and Conservation Biology, North Orissa University, Baripada, their assistance in collecting data from the field. Thanks are also given to the field staff of the forest department for their help during the census. Dr. L.A.K. Singh imparted training for the census and guidance during the analysis of pugmarks. We would also like to acknowledge the overall support received from the Additional Principal Chief Conservator of Forests (Wildlife) and the Chief Wildlife Warden, Orissa.

References

- Choudhury, S.R. 1970. **Let us count tigers.** *Cheetal* 14(2):41-51.
- Choudhury, S.R. 1972. **Tiger census in India. Part I and Part II.** *Cheetal* 15(1):67-84.
- Das, P.K. and P. Sanyal. 1995. **Assessment of stable pug measurement parameters for identification of tigers.** *Tigerpaper* 22(2):20-26.

- Hazarika, A.A. 1997. **A report on tiger census conducted in Dibrusaikhowa Sanctuary and a prospective Tiger Reserve in upper Assam.** *Tigerpaper* 24(1):14-16.

- Hazarika, A.A. 2002. **A preliminary survey on the status of tigers (*Panthera tigris*) in Dibrusaikhowa Biosphere Reserve.** *Tigerpaper* (29(1):17-21.

- Karanth, K.U. 1987. **Tigers in India: A critical review of field censuses.** In: R.L. Tilson and U.S. Seal (Eds.) *Tigers of the World: The biology, biopolitics, management and conservation of an endangered species.* Noyes Publications, Park Ridge, N.J., U.S.A. pp.118-133.

- Karanth, K.U., Nichols, J.D., Sen, P.K. and V. Rishi. 2002. **Monitoring tigers and their prey: Conservation needs and managerial constraints.** In: K. Ullas Karanth and J.D. Nichols (Eds.) *Monitoring tigers and prey: A manual for researchers, managers, and conservationists in tropical Asia.* Centre for Wildlife Studies, Bangalore. pp.1-8.

- Seidensticker, J. and A. Md. Hai. 1983. **The Sundarbans Wildlife Management Plan: Conservation in the Bangladesh Coastal Zone.** IUCN, Gland.

- Singh, L.A.K. 1999. **Tracking tigers: guidelines for estimating wild tiger populations using the pugmark technique.** WWF Tiger Conservation Programme, New Delhi.

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ICHTHYOFAUNA OF BELLANWILA-ATTIDIYA SANCTUARY AND ITS ENVIRONS IN COLOMBO, SRI LANKA

by H.G.S. Maduranga

Introduction

Despite its small size (65,610 km²), Sri Lanka is recognized as one of the biodiversity hotspots in the region. The fresh water ichthyofauna is represented by 107 species which occur in the rivers and fresh water bodies. Many of them are salt-water dispersants (Pethiyagoda, 1991). Of the fish that spend a considerable portion of their lives in fresh water, 74 indigenous species and 20 introduced species have been identified (Jayaweera & Maduranga, 2002). Nearly 40% of the indigenous species are endemic to Sri Lanka. The number of the fresh water fish species continues to increase with the discovery of new species. Two new species – *Monopterus desilvai* (Bailey & Gans, 1998) and *Stiphodon martenstyni* (Watson, 1998) – have been recognized. Thus, the Sri Lankan ichthyofauna is very diverse and supported by a wide range of aquatic habitat types such as, rivers, reservoirs, shallow ponds, flood lakes, paddy fields, estuaries and wet zone coastal swamps (Pethiyagoda, 1991).

One of the important wet zone coastal swamps is the Bellanwila-Attidiya marsh, whose ichthyofauna was first discussed by Nalinda (1988). Those marshes represent one of the few wetlands left in the vicinity of Colombo – the capital city of Sri Lanka. These marshes provide a habitat for a large number of fauna, including fresh water and a few brackish water fish, and for a number of waterfowl, both resident and migratory. The area is included in the Directory of Asian Wetlands prepared by IUCN in 1989 and was declared a sanctuary under the Fauna and Flora Protection Ordinance by Gazette Extraordinary No. 620/0 of 25 July 1990 (Gunawardana, 1991).

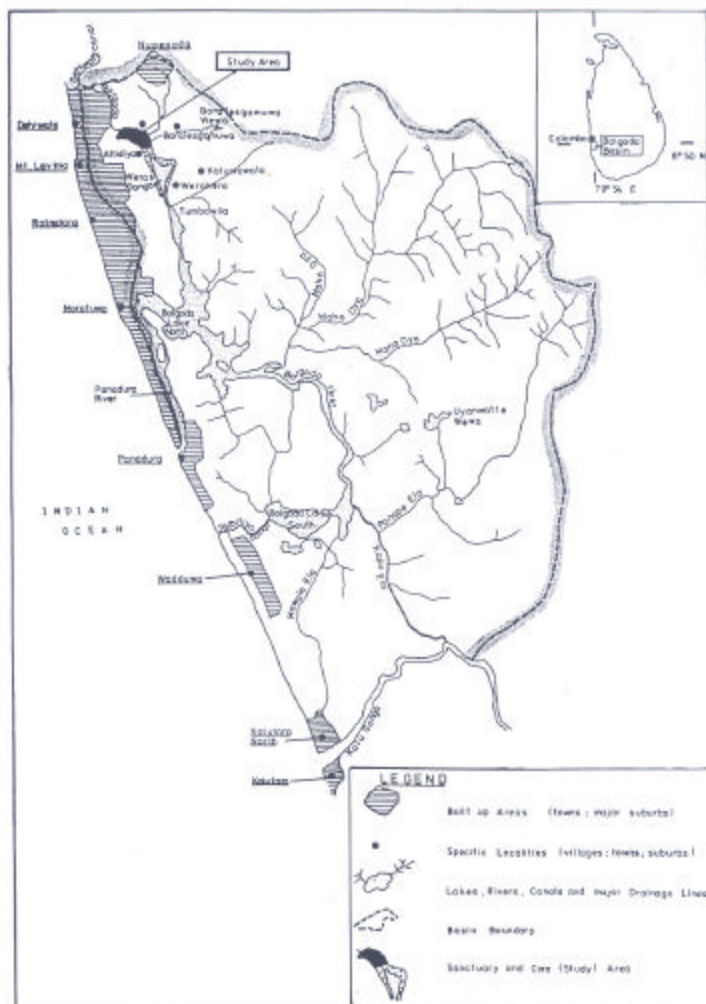
This highly productive marsh supports a large number of plants and animals, including ichthyofauna.

Only a few research studies on ichthyofauna have been carried out in the area; therefore, the present study was carried out to provide additional information on the fishes of the Bellanwila-Attidiya Sanctuary. Unfortunately, while the study was being carried out, the marshes were facing severe threats such as aquatic pollution, habitat loss and land reclamation, to name a few. Immediate conservation measures must be taken in order to protect the fauna and flora, including the ichthyofauna, of the sanctuary.

Study area

The Bellanwila-Attidiya Sanctuary is situated within the upper catchment of the Bolgoda River basin. The core study area is roughly 1-2 km x 0.5 km (or nearly 60 ha), with a mean elevation of 0.6 m (MSL). The study area lies at the intersection of latitude N6°60' and longitude E79°54'. The area is situated in the low country wet zone and has a tropical monsoonal climate. The mean annual temperature is approximately 27°C. Average annual rainfall for the study area is 2,500 mm (Wetland Site Report, 1993).

The study area consists of several habitat types which can be categorized under both lentic and lotic ecosystems (Odum, 1959). The lentic (standing water) part of the ecosystem is represented by shallow fresh water ponds, marshes, seasonally flooded grasslands and paddy fields. The lotic (running water) component is mainly represented by irrigation canals. The survey was expanded to the surrounding areas of the sanctuary to include a man-made reservoir near the site, surrounding canals, drainage system and paddy fields. The vegetation of the study area is mainly composed of reeds such as *Rhynchospora* spp., *Eleocharis* spp., and grasses such as *Brachiara* spp. and *Bacopa* sp., which grow extensively along the



fringes of shallow areas. The water surfaces are covered with *Salvinia molesta*, *Eichornia crassipes* and flowering ornamental species such as *Nymphaea* sp. and *Nelumbo nucifera* (Goonatilake, 1994).

Materials and methods

Data was collected from the study site during a number of irregular visits between October 1999 and December 2002. Data on fish was collected from the catches made by fishermen using cast nets, hooks, ropes and gill nets. In addition, fishes in shallow areas were sampled by using small trawl nets and hand nets. The distribution of the fishes was studied and sampled mainly in the Bolgoda canal, small drainage systems and shallow waters in the marsh. Based on the fishes that were caught, their relative abundance and distribution within the study area were recorded.

Results

A checklist of the fishes from the Bellanwila-Attidiya Sanctuary is given in Appendix I. This wetland system is a highly productive ecosystem with diverse communities. It supports a high biodiversity and the study confirms the presence of at least 32 species of fishes, including 4 that are endemic, 7 introduced species, and probably one new species.

Discussion

Of the 107 species of freshwater fishes recognized in Sri Lanka (Pethiyagoda, 1991), 32 (almost 30%) are recorded from the Bellanwila-Attidiya Sanctuary. They belong to 13 families from 7 orders. The most common species are Tilapia (*Oreochromis mossambicus*), Nile Tilapia (*O. niloticus*) and Tank Cleaner (*Hypostomus plecostomus*), all of which were introduced. The shallow areas of the marsh are dominated by Silver Barb (*Puntius vittatus*), Horadandiya (*Horadandiya*

atukorali) and Dwarf Panchax (*Aplocheilichthys parvus*).

Populations of some species are rapidly increasing with seasonal floods and tides. Some estuarine species such as Tarpon (*Megalops cyprinoides*) and several fresh water species such as the Silver Carplet (*Amblypharyngodon melettimus*), Swamp Barb (*P. chola*) and Scarlet banded Barb (*P. amphibious*) are known to migrate seasonally upstream from the Bolgoda Lake to the study area (see map). A single *Puntius* spp. – probably a new species – was observed from the study area. A previous study also mentioned the presence of two “new” *Puntius* spp., including the above species from the same locality (Goonatilake, 1994). Some of the large Barb species such as Olive Barb (*P. sarana*) and Long-snouted Barb (*P. dorsalis*)

are popular as food fish in the area. The smaller *Puntius* species are important as baits in the capturing of larger carnivore fishes.

Among Bagrids, the Striped Dwarf Catfish (*Mystus vittatus*) is still common in suitable habitats, but two other species have now become very rare. The Long Whiskered Catfish (*M. gulio*) is used as food fish when captured. Walking Catfish (*Clarias brachysoma*) is an endemic which is also edible. This fish migrates to shallow areas during the seasonal floods, reaching even flooded home gardens (probably for spawning). It is easily captured by villagers and is also an easy prey for many domestic animals. Stinging Catfish (*Heteropneustus fossilis*) is still abundant in the Bolgoda canal and used as food fish. On the other hand, this species forms a bigger portion of the diet of aquatic birds such as Kingfishers, Herons and Cormorants.

Glass Cleaner or Scavenger (*Hypostomus plecostomus*) was accidentally introduced to the area in the early 1990s, but today represents one of the commonest species in the Bolgoda canal. Full-grown specimens (TL ~30 cm) are numerous in the Bolgoda canal, while smaller specimens are found in the shallow areas. The high population density of the fish may affect the indigenous fauna of the Bolgoda canal and also the local fisheries activities. This fish has no value as food fish, but smaller specimens are collected for the aquarium trade.

Dwarf Panchax (*A. parvus*) is mainly found in the coastal fresh and brackish waters, less commonly inland within the first peneplain. It is very tolerant of salinity (Pethiyagoda, 1991). In the Bellanwila-Attidiya Sanctuary, it is widely distributed in the shallow areas of the marsh. Day's Killfish (*A. dayi*) is an endemic species restricted to a few river basins of the low country wet zone. In the past, the species was much more common in the study area than it is today.

Several Poecilids have been recorded from the area by previous workers (Gunawardana, 1989; Goonatilake, 1994). The present study reveals the presence of only one widely distributed species,

i.e. Guppy (*Poecilia reticulata*), which is native to the West Indies and parts of Central America, and was introduced to Sri Lanka from 1928 to 1945 in an effort to control the mosquito larvae by the anti-malaria campaign (Pethiyagoda, 1991). Now, the Guppy maintains high populations in the area, mainly along the drainage system and small canals.

Orange Chromid (*Eetroplus maculatus*) and Green Chromid (*E. suratensis*) were very common in the study area about 15 years ago, but today, both species seem to be either extinct or extremely rare in the area. The present survey was unable to record even a single specimen of either species, although Goonatilake (1994) had reported both species from the Attidiya Lake and in the Bolgoda canal. A possible reason for this rapid decline of the populations of indigenous cichlids could be the increased competition from the introduced *Oreochromis* species or the water pollution of the Bolgoda canal.

The two introduced cichlids in the Bolgoda canal (*O. mossambicus* and *O. niloticus*) occur in high densities. The fingerlings and juveniles of both species invade marshy areas. Both species are regularly harvested by local fishermen for human consumption. Additionally, Snake Skin Gourami (*Trichogaster pectoralis*) has established large populations in both Bolgoda canal and in the shallow marshy areas. It is also fished and eaten by people. Between 1999 and 2000, Siamese fighting fish (*Betta splendens*) used to be commonly found in the study area, mainly in the shallow banks of Bolgoda canal. This may be due to an accidental introduction of the fish into the ecosystem. Several colored varieties and wild forms were recorded. The colorful specimens were collected for the aquarium trade on such a large scale that the fish has become very rare in the study area.

Of the three species of channids recorded during the study, the Smooth-breasted Snakehead (*Channa orientalis*) is endemic and is mainly distributed in small drains and shallow areas of the marsh. The Murrel (*C. striata*) is a delicacy as a food fish in the area. They are mainly found in shallow marshy areas with dense reed beds.

In addition to the ichthyofauna recorded, there are other species yet to be identified. Deraniyagala (1952) states that Dehiwala paddy fields (including the Bellanwila-Attidiya marsh) were one of the main habitats of the Blind Eel (*Ophisternon bengalense*). However, none of the workers could record its presence lately in the study area. But a single specimen of the species was collected at Pepiliyana (adjacent to the sanctuary) by the roadside on the Dehiwala-Pepiliyana road (Fernando & Priyadarshana, 1997). Goonatilake (1994) recorded some other salt water dispersants from the area including Common Glass Fish (*Ambassis commersoni*) and Upside-down Sleeper (*Butis butis*).

An analysis of the past data on ichthyofauna of the area shows a clear decline of the species richness of the indigenous species, in contrast to the pattern shown by the introduced species. Species evenness also follows the above relationship. Nowadays, the Bolgoda canal is dominated by a few introduced species such as Tilapia (*O. mossambicus*), Nile Tilapia (*O. niloticus*) and Tank Cleaner (*H. plecostomus*). Only a few indigenous species such as the Stinging Catfish (*H. fossilis*), Climbing Perch (*Anabas testudineus*) and Spotted Snakehead (*C. punctata*) survive in the Bolgoda canal. There may be several reasons for the decreasing diversity of indigenous ichthyofauna in Bolgoda canal and the introduction of exotic species could be one of them.

Hardy exotic species are rapidly increasing and utilizing the available resources such as food and breeding grounds in the absence of natural enemies (i.e. predators) to control populations. The increase in the population size of exotic species may exacerbate the competition from the indigenous fishes for the same resources. In general, introduced exotic species are more successful in such competitions, driving the indigenous species to extinction. In the case of *O. mossambicus*, Maitipe & De Silva (1985) recognized it as a species of high resilience and fecundity. It is able to breed throughout the year and withstand a high degree of pollution and utilize almost all available sources of food (Pethiyagoda, 1994).

The Tank Cleaner (*Hypostomus plecostomus*) continuously disturbs the muddy substrate, causing several problems to indigenous fishes. It causes feeding problems for substrate feeders and leads to the removal of benthic flora by producing an unstable substrate. This in turn causes breeding problems among the egg layers and also increases the turbidity of the water, causing breathing problems for most of the fish.

Water pollution is another major threat to the survival of fishes. Household garbage, industrial waste and sewage are directly dumped into the Bolgoda canal and shallow marshy areas. The degree of water pollution in the Bolgoda canal was high enough to destroy entire populations of weak fishes such as Horadandiya (*H. atukorali*). The level of aquatic pollution adversely influences the breeding of indigenous species, and thereby contributes to the decline in populations.

In addition, habitat loss due to the reclamation of lands and destruction of vegetation, adoption of some unsustainable fishing methods, leaching of pesticides into the water from adjacent paddy fields and cultivations are some of the other major threats to the long-term survival of the ichthyofauna of the Bellanwila-Attidiya Sanctuary. According to Pethiyagoda (1994), a few endemic fishes have a strong association with still-water habitats and some of these are essentially marshland species, hence the conservation of wet zone coastal swamps, such as the Bellanwila-Attidiya Sanctuary, is essential for the survival of the ichthyofauna of Sri Lanka.

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References

- Bailey, R.M. and C. Gans. 1998. **Two new Synbranchid fishes, *Monopterus roseni* from peninsular India and *M. desilvai* from Sri Lanka.** Occasional papers of the Museum of Zoology, The University of Michigan, USA.
- Deraniyagala, P.E.P. 1952. **Coloured Atlas of some Vertebrates of Ceylon, Vol-I (Fishes).** National Museum of Sri Lanka, Colombo.
- Fernando, R.H.S.S. and T.G.M. Priyadarshana. 1997. **A recent record of the rare Swamp Eel *Ophisternon bengalensi* (Synbranchidae).** *Sri Lanka Naturalist* 1:(Nos.3&4), Young Zoologists' Association of Sri Lanka.
- Goonatilake, W.L.D.T.P.T.S. de A. 1993. **List of species of Attidiya Lake and Marsh.** (unpublished)
- Goonatilake, W.L.D.T.P.T.S. de A. 1994. **A preliminary ecological site report – Attidiya Lake and Marsh.** (unpublished)
- Gunawardana, J. 1989. **Fish species listing for Bellanwila-Attidiya Marsh.** Society for Environmental Education. Technical memo. Field survey summary (unpublished). Department of Wildlife Conservation.
- Gunawardana, J. 1991. **Checklist of the Birds of the Bellanwila-Attidiya Sanctuary.** Ceylon Bird Club, Colombo, Sri Lanka.
- Jayaweera, S. and H.G.S. Maduranga. 2002. **Checklist of the Fresh Water Fishes of Sri Lanka.** (unpublished)
- Maduranga, H.G.S. 1998. **Observations on some migratory shorebirds visiting the Nedimala Marsh.** *Sri Lanka Naturalist*, 2:(No.4). Young Zoologists' Association of Sri Lanka.
- Maduranga, H.G.S. and B.J. Herath. 1999. **A preliminary study on the fauna of Nedimala Marsh with the Checklist of the Fauna of Study Area.** (unpublished)
- Mendis, A.S. and C.H. Fernando. 1962. **A Guide to the Fresh Water Fauna of Ceylon.** *Bulletin No.12*, Fisheries Research Station, Department of Fisheries, Ceylon.
- Nalinda, M.A.K. 1988. **Checklist of the Fishes (Pisces) of the Bellanwila-Attidiya Marshes.** Occasional Paper 3, Young Zoologists' Association of Sri Lanka.
- Odum, E.P. 1959. **Fundamentals of Ecology.** 2nd Edition, W.B. Saunders Company, USA.
- Pethiyagoda, R. 1991. **Fresh Water Fishes of Sri Lanka.** Wildlife Heritage Trust of Sri Lanka.
- Pethiyagoda, R. 1994. **Threats to the Indigenous Fresh Water Fishes of Sri Lanka and Remarks on their Conservation.** *Hydrobiologia*, 285. Kluwer Academic Publishers, Belgium.
- Watson, R.E. 1998. ***Stophodon martenstyni*, a new species of fresh water Goby from Sri Lanka (Teleostei:Gobiidae: Sicydiini).** *Journal of South Asian Natural History*, 3. Wildlife Heritage Trust of Sri Lanka.
- Wetland Site Report and Conservation Management Plan – Bellanwila-Attidiya Marsh.** 1993. Central Environmental Authority/Euroconsult, Ministry of Environment and Parliament Affairs, Sri Lanka.

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Appendix-I: A Checklist of the Fishes in the Bellanwila-Attidiya Sanctuary**Order: ELOPIFORMES****Family: Megalopidae**

- 1) Tarpon (*Megalops cyprinoides* Broussonet, 1782). Rare, salt water dispersant

Order: ANGULLIFORMES**Family: Anguillidae**

- 2) Level-finned Eel (*Anguilla bicolor* McClelland, 1844). Rare, nocturnal

Order: CYPRINIFORMES**Family: Cyprinidae**

- 3) Silver Carplet (*Amblypharyngodon melettinus* Valenciennes, 1844). Rare, but common in seasonal floods
- 4) Flying Barb (*Esomus thermoicos* Valenciennes, 1842). Uncommon, endemic (?)
- 5) Horadandiya (*Horadandiya atukorali* Deraniyagala, 1943). Abundant in shallow areas
- 6) Scarlet banded Barb (*Puntius amphibiis* Valenciennes, 1842). Rare, but common in seasonal floods
- 7) Red side Barb (*Puntius bimaculatus* Bleeker, 1863). Common, especially in shallow areas
- 8) Swamp Barb (*Puntius chola* Hamilton, 1822). Rare, but common in seasonal floods
- 9) Long snouted Barb (*Puntius dorsalis* Jerdon, 1849). Common

- 10) Filimented Barb (*Puntius singhala* Valenciennes, 1844). Previously common, but now very rare; endemic

- 11) Olive Barb (*Puntius sarana* Hamilton, 1822). Scarce, used as food fish

- 12) Silver Barb (*Puntius vittatus* Day, 1865). Abundant in shallow areas

- 13) Barb (new *Puntius* sp.). Scarce, endemic (?)

- 14) Striped Rasbora (*Rasbora daniconius* Hamilton, 1822). Uncommon

Order: SILURIFORMES**Family: Bagriidae**

- 15) Long-whiskered Catfish (*Mystus gulio* Hamilton, 1822). Uncommon, but can be seen especially in seasonal floods; food fish

- 16) Yellow Catfish (*Mystus keletius* Valenciennes, 1839). Uncommon, but can be seen especially in seasonal floods; food fish

- 17) Striped Dwarf Catfish (*Mystus vittatus* Bloch, 1794). Common

Family: Clariidae

- 18) Walking Catfish (*Clarias brachysoma* Gunther, 1864). Uncommon, but can be seen especially in seasonal floods; popular food fish; endemic

Family: Heteropneustidae

- 19) Stinging Catfish (*Heteropneustus fossilis* Bloch, 1797). Abundant in Bolgoda canal

Family: Loricariidae

- 20) Tank Cleaner (*Hypostomus plecostomus* Linnaeus, 1758). Adults abundant in Bolgoda canal, juveniles in shallow areas; introduced

Order: CYPRINODONTIFORMES**Family: Aplocheilidae**

- 21) Day's Killfish (*Aplocheilus dayi* Steindachner, 1892). Uncommon, especially found in shaded shallow areas; endemic
- 22) Dwarf Panchax (*Aplocheilus parvus* Raj, 1916). Abundant in shallow marshy areas.

Family: Poeciliidae

- 23) Guppy (*Poecilia reticulata* Peters, 1859). Abundant; introduced

Order: PERCIFORMES**Family: Cichlidae**

- 24) Tilapia (*Oreochromis mossambicus* Peters, 1825). Abundant in Bolgoda canal; introduced food fish
- 25) Nile Tilapia (*Oreochromis niloticus* Linnaeus, 1766). Abundant in Bolgoda canal; introduced food fish

Family: Anabantidae

- 26) Climbing Perch (*Anabas testudineus* Bloch, 1795). Common in Bolgoda canal; food fish

Family: Belontiidae

- 27) Spike-tailed Paradisefish (*Pseudosphromenus cupanus* Cuvier, 1831). Common in shallow, marshy areas
- 28) Snake-skin Gourami (*Trichogaster pectoralis* Regan, 1910). Abundant in Bolgoda canal; introduced
- 29) Three-spot Gourami (*Trichogaster trichopterus* Pallas, 1777). Uncommon; introduced

Family: Helostomatidae

- 30) Kissing Gourami (*Helostoma temminckii* Valenciennes, 1831). Uncommon; introduced; larger specimens used as food fish

Order: CHANNIFORMES**Family: Channidae**

- 31) Smooth-breasted Snakehead (*Channa orientalis* Bloch & Schneider, 1801) Common in shallow areas; endemic
- 32) Spotted Snakehead (*Channa punctata* Bloch, 1794). Uncommon; popular food fish
- 33) Murrel (*Channa striata* Bloch, 1793) Common, especially in shallow areas with dense reed cover; popular food fish

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RESPONDING TO THE TSUNAMI DISASTER: FAO'S ACTIVITIES

Background

The earthquake and subsequent tsunami that swept across the Indian Ocean on 26 December 2004 will be remembered as one of the worst human tragedies in history. The natural disaster took more than 200,000 lives and shattered the livelihoods of some five million people in Southeast Asia and East Africa. Parts of Bangladesh, India, Indonesia, Kenya, Maldives, Mozambique, Myanmar, Seychelles, Somalia, Sri Lanka, United Republic of Tanzania, Thailand and Yemen were affected.

The international community has responded with an unprecedented outpouring of public and private donations for disaster relief. The United Nations estimates that a total of US\$6.3 billion has been pledged, committed or contributed, of which nearly US\$1 billion is in response to the Flash Appeal launched by the United Nations on 6 January 2005. The Flash Appeal reflects the efforts of some 40 United Nations agencies and non-governmental organizations (NGOs) to plan and implement a strategic, efficient and coordinated emergency relief response for the initial six month period. The sectors covered by the appeal include coordination, food, health, water and sanitation, shelter, education, economic recovery and infrastructure, agriculture, environment, and protection of human rights.

FAO's overall response to date

Within a week of the disaster, FAO committed US\$ 1.5 million for needs assessments and recovery support in Indonesia, the Maldives, Sri Lanka and Thailand. As part of the UN Flash Appeal, it called for an additional US\$26.5 million to support recovery efforts in the most severely affected countries — Indonesia, the Maldives, Myanmar, Seychelles, Somalia and Sri Lanka, and US\$2.5 million for regional activities in partnership with the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

The majority of people affected by the disaster were involved in agriculture and fisheries or were employed in associated enterprises. FAO rapidly fielded experts to assess the damage and losses to agriculture and fisheries, and to assist the governments in the planning and coordination of early recovery in these sectors. More recently, FAO has fielded staff and consultants for similar assistance in the forest sector.

In all, the Organization has deployed several staff and over 70 international and regional experts in various areas of expertise to assist affected countries. It has recruited emergency coordinators for Indonesia, Maldives and Sri Lanka and a regional coordinator to provide necessary

coordination within FAO and with key players. FAO is also providing direct assistance to farmers and fishers in the form of boat repair kits and engine parts for fishing boats, fishing nets and other gear, seeds and farming tools, and repair of irrigation and drainage infrastructure, among other things. FAO's role in delivery of inputs is particularly important in the case of specialized equipment and in affected areas not adequately served by others.

It has become apparent that FAO's main comparative advantage and most essential role in rehabilitation efforts, as perceived by many affected countries, partners and donors, is in providing technical guidance, technical specifications and coordination in the areas of fisheries, agriculture and forestry and its related cross-cutting programmes (nutrition, land tenure, etc.). Coordination among actors within countries is crucial, as the unprecedented level of donations and number of actors poses a serious risk of oversupply and inappropriate and fragmented assistance for recovery. FAO is also working to enhance cooperation, coordination and communication at regional level. In early March, FAO's Regional Office for Asia and the Pacific organized two workshops on regional coordination in the tsunami response in the fisheries and forest sectors (see below). At the international level, FAO supports a coordinated approach through participation in the UN Flash Appeal. FAO has also held two briefings at Headquarters for Permanent Representatives to FAO of affected and donor countries.

FAO is also playing a role in information collection and dissemination. It maintains a website that provides continually updated information on FAO's analysis of the evolving situation and response (<http://www.fao.org/tsunami>). Linked to this, are FAO's three technical tsunami websites – for agriculture, fisheries and forestry, which provide more detailed information.

FAO has also prepared a Tsunami Atlas, which includes satellite images, topographic and thematic maps and statistics (<http://www.fao.org/tsunami/environment/maps.html>). The FAO Tsunami Atlas

is well advanced for Indonesia and Sri Lanka and work is under way for the other affected countries.

In order to ensure that its tsunami response is internally well coordinated, FAO has set up two task forces, at technical and management level, consisting of all relevant departments of the Organization. These meet on a regular basis. Weekly conference calls are held between Headquarters and FAO Representations in Indonesia, the Maldives and Sri Lanka and with the Regional Office for Asia and the Pacific in Bangkok. In addition, an interdepartmental technical group has been formed to facilitate a coordinated approach to integrated coastal area management.

Activities in the forest sector

FAO has embarked on various forest-related activities to date, including providing technical support in the field, developing a programme for FAO's support to affected countries, encouraging cooperation and coordination among countries and organizations involved in the tsunami response, and collecting and disseminating relevant information.

Although many of the necessary interventions in the forestry sector will begin later, as part of the rehabilitation phase, FAO has begun to identify elements of its assistance programme. It has developed a broad framework for its support to the tsunami response in the forest sector based on information provided by staff in the FAO Representations and field teams in the affected countries and from various other sources. This will be further refined when more information becomes available, national plans for reconstruction emerge, and after technical expertise for programming can be fielded. The main objective of a mission currently under way in Sri Lanka is to develop the outlines of FAO's programme for rehabilitation assistance in the sector.

The Forestry Department has launched a tsunami website (<http://www.fao.org/forestry/tsunami>). It provides information on the forest-related issues,

country information on needs assessments and response, news releases and clippings, and links to useful technical information.

FAO is in contact with many regional and international organizations concerning tsunami needs assessments and response, with a view to encouraging collaborative activities and a coordinated response. With regard to this, the FAO Regional Office for Asia and the Pacific convened a regional coordination workshop in Bangkok on 7 and 8 March, which brought together parties involved in post-tsunami forestry assessment and rehabilitation work. About 40 representatives from af-

ected countries, regional and international organizations, NGOs, and donor countries attended. Participants exchanged information on the impacts on forest ecosystems and forest resources in tsunami-affected areas, shared plans for forest-related actions in rehabilitation and reconstruction efforts; and discussed mechanisms for collaboration and joint activities in forest-related rehabilitation efforts within the region. The report of the meeting will be made available on the Forestry Department tsunami website (<http://www.fao.org/forestry/tsunami>).

REGIONAL COORDINATION WORKSHOP ON REHABILITATION OF TSUNAMI-AFFECTED FOREST ECOSYSTEMS: STRATEGIES AND NEW DIRECTIONS

FAO organized a regional coordination workshop on *Rehabilitation of tsunami-affected forest ecosystems: strategies and new directions*, 7-8 March 2005, at the FAO Regional Office for Asia and the Pacific in Bangkok, Thailand. In convening the workshop, FAO responded to a need for exchange of information on existing and planned impact and damage assessments, rehabilitation and reconstruction activities related to forests and trees and for strengthening coordination and collaboration of national, regional and international agencies involved in forest rehabilitation and management of tsunami-affected areas.

The workshop brought together 15 government representatives from 7 countries, i.e. Indonesia, India, Malaysia, Maldives, Myanmar, Sri Lanka, and Thailand (Bangladesh's participant could not attend) affected by the 26 December 2004 tsunami in Asia. They were joined by about 30 representatives of international, regional and sub-regional organizations, including non-governmental organizations. The workshop provided participants the opportunity to share information, collectively assess initial findings related to rehabilitation needs and opportunities, share plans and proposals for

future rehabilitation work, and develop mechanisms for collaboration and joint activities.

The overall goal of the workshop was to strengthen and enhance rehabilitation efforts in the tsunami-affected areas to provide for a better future for people living in coastal areas.

The objectives of the workshop were to:

- exchange information and knowledge related to the impacts on forest ecosystems and the effective rehabilitation of forest ecosystems in tsunami-affected areas;
- strengthen coordination and collaboration of national, regional and international agencies involved in forest rehabilitation and management of tsunami-affected areas; and
- develop a mechanism for coordination and action to be taken at the regional level to support the rehabilitation of tsunami-affected forest ecosystems and to address other forest-related issues in the rehabilitation and reconstruction phase.

After a welcome by Mr. He Changchui, FAO's Assistant Director-General and Regional Repre-

representative for Asia and the Pacific, and an introduction to the workshop by Mr. Patrick Durst, Senior Forestry Officer FAO Regional Office for Asia and the Pacific, four invited speakers set the scene. The topics of their presentations included: the role of mangroves and other vegetation in protecting against tsunamis and tidal surges; the role of trees and forests in integrated coastal zone management; assessment of the impacts of the tsunami on coastal vegetation; and assessment of wood use and needs for reconstruction.

During an open forum, participants from seven tsunami-affected countries described rehabilitation and reconstruction activities related to trees and forests. They highlighted overall rehabilitation approaches taken in their respective countries and the role of forests and trees in the overall plans, ongoing and planned activities, key challenges to be addressed, and the potential role of, and expectations from strengthened regional coordination from a national perspective.

Many international, regional and sub-regional organizations have responded to the relief and rehabilitation needs since the disaster. Representatives of several organizations at the workshop outlined ongoing and planned activities. In addition, several speakers presented ideas for better coordination at national and regional levels.

Critical issues raised at the workshop

Recognizing that situations vary country to country, participants raised the following issues:

- There is a need to further assess the effectiveness of mangroves and other coastal vegetation in protecting coastal areas from major natural disasters.
- Where coastal vegetation was severely affected, more precise impact assessments are needed, which also consider the characteristics of the sea bottom close to the coastline.
- A rigorous analysis of the factors influencing the protective function of coastal forests is needed and guidelines need to be developed to assist countries that plan to establish greenbelts and other forests for (mainly) protective purposes.
- Rehabilitation/reforestation efforts must be carefully planned and implemented and the forests subsequently managed properly. Full stakeholder (from different levels and sectors) involvement is necessary in this process to ensure success.
- Problems preventing cost-effective methods of rehabilitation of coastal forests include insufficient technical knowledge, limited human resources and capacities for implementing rehabilitation activities, and ambiguous land tenure and unclear demarcation of land.
- Initiatives aimed at rehabilitation and management of coastal forests for protection purposes must be linked to socio-cultural and economic needs and aspirations of local people. Protection forests also require management and many production forests, if properly managed, can also fulfill protection functions.
- There is a critical need for sound technical information on workable practices for rehabilitating coastal forests, suitable sites for planting, and proven approaches for involving local people in decision making, planning and implementation. Policy makers and the donor community also require solid advice to avoid “quick fixes,” with potential negative consequences, and to ensure that their decisions and assistance enhance sustainable development.
- Integrated coastal area management is particularly challenging because of the tremendous diversity of livelihoods that depend on fisheries, aquaculture, tourism, forestry and agriculture. Long-term rehabilitation should focus on creating sustainable livelihoods and restoring productive use of coastal resources. Integrated approaches to coastal zone management need to balance ecological, social, cultural and economic considerations, and the importance of community participation and adequate governance. Inter-sectoral cooperation and coordination are needed as well as appropriate policy formulation and strategic planning mechanisms to balance trade-offs among different, and often conflicting, interests.
- Detailed calculations of the wood needs for reconstructing infrastructure have yet to be carried out in most places. In some countries,

wood demand may be met from domestic sources. There is a risk of over-exploitation of local forests (some of them protected areas) to meet the wood demand for reconstruction. In some cases, large quantities of wood will have to be imported.

- Some donor countries are offering to export wood to affected countries. Care must be taken to ensure that wood used for reconstruction has the necessary characteristics to meet specific needs and is adequately treated to ensure durability. Some species may also not be acceptable for socio-cultural reasons. The potential of using salvage wood and alternative construction materials, such as bamboos, needs to be further explored.
- Conflicting demands for use of the affected lands (green belts, aquaculture, agriculture, tourism, residential and industrial sites) are causing controversies and tensions in a number of locations, especially where land titles and tenure arrangements are ambiguous. In some cases, “land grabbing” has particularly affected poorer sections of society.
- Although several countries have passed zoning laws, prohibiting development of coastal areas within a certain distance of high-water marks and beachfronts, in general law enforcement requires strengthening.
- The international community has helped countries with emergency relief and early response assistance, impact assessments, development of rehabilitation plans, and wood needs assessments. NGOs have raised substantial funds to assist in tsunami rehabilitation efforts and are moving quickly with delivering assistance. There are tremendous needs and op-

portunities to improve effectiveness of efforts through improved coordination and the provision of relevant information in a timely manner.

Recommendations

The participants recommended that a regional partnership to foster collaboration and coordination of forest-related initiatives in rehabilitation efforts in the tsunami-affected countries should be established. The proposed partnership would address the current needs and challenges presented by the tsunami disaster and would include affected countries, international and regional organizations, NGOs, research organizations, and other stakeholders as well as donors supporting the partnership. The objective would be to support a forestry response to the tsunami that is cost effective, comprehensive, technically sound and developed within the context of integrated coastal area management and sustainable livelihoods.

The functions of the partnership would be the following:

- provide access to information;
- furnish technical knowledge, expertise, guidelines and tools;
- support capacity building; and
- strengthen partnerships, coordination arrangement and access to financial resources.

“Does any crime against nature draw down a more dreadful curse than that of stripping mother earth of her covering?”

– Champollion –

PROGRESS IN IMPROVING FOREST HARVESTING IN ASIA

In recent years, society has become increasingly concerned over the fate of forest resources in the Asia-Pacific region. In fact, the public has started to demand that forest harvesting be carried out in ways that limit damage. Responding to concerns over the environmental and the economic impacts of poor forest harvesting, many international and national organizations, and government agencies have formed partnerships and are pooling their resources to build consensus and strengthen capacities to reduce the negative impacts of logging.

Enhancing Sustainable Forest Harvesting in Asia (GCP/RAS/192/JPN) is one such effort. Launched in 2003 and supported by a grant from the Government of Japan, FAO is executing the three-year project in collaboration with Lao PDR, Myanmar and Viet Nam. Each of the three project countries is at various stages of applying improved forest harvesting, and there is plenty of scope for learning from each other.

From 31 January – 3 February 2005, FAO and the Lao Department of Forestry organized the first Tri-Partite Review (TPR) and Regional Project Advisory Committee (RPAC) Meeting of the project in Vientiane, Lao PDR. The meeting was followed by a field trip to a test and demonstration site in Khammouane Province. While the TPR involves traditionally only representatives of the donor, project countries and FAO, the RPAC meeting opened its doors to everybody with an interest in sustainable forest management.

Efforts in improving forest harvesting continue to attract considerable interest and a variety of organizations sent representatives to present, listen and discuss. The Tropical Forest Foundation, the Sarawak Timber Association, the Tropical Forest Trust, the Indochina Office of the Worldwide Fund for Nature and the Sustainable Forestry and Rural Development Project were all represented and

greatly enhanced the sharing of experiences, especially the ones not directly related to the project. All the presenters convinced the audience that progress towards achieving sustainable forest management in Asia is being made. At the same time, the consensus remains that achievements come about only slowly and that some steps forward are unfortunately followed by some steps backwards. This is mirrored by the progress in the three project countries. Overall good progress has been made in Lao PDR and Myanmar in a number of aspects, particularly with respect to training. The importance of proper awareness about the importance of sustainable forest management and reduced impact logging (RIL) has been recognized in both countries. Raising awareness through different means remains high on the agenda, to ensure that political commitment is continuously built. In the implementation of project activities, Viet Nam is a step behind the other two countries as a result of starting later.

Conducting effective training

There is broad agreement that currently forest operators at all levels are inadequately prepared to improve harvesting and reduce impacts. Capacity strengthening is therefore a major component of the project.

Participants noted that, among all the training activities conducted, the on-the-job training conducted in Lao PDR in pre-harvest inventory, tree location mapping and road and skid trail alignment was most effective. Involvement of villagers and logging companies through field-level meetings in Lao PDR provided an interesting lesson. Such lessons can be extended to other project countries as developing strong linkages with communities and the private sector is an important element for the success of the project, and essential to achieve sustainability.

The initial training needs assessment conducted in the project countries indicates the need for developing capacities for training of trainers. The importance of proper planning for effective training was addressed during a workshop organized in September 2004. The preparation of carefully-targeted training programs and strategies will require more attention. Driven by a collaborative spirit, several resource persons from outside the project (e.g. Tropical Forest Foundation, WWF, Sarawak Timber Association) offered assistance in training forest workers. The project needs to make good use of such opportunities.

Awareness raising

Bringing about change does not only require skill development. It needs the right attitude and appreciation of the benefits of sustainable forest management. This is easier said than done, as all participants confirmed.

Awareness raising is the other major component of the project. The project countries have all taken several steps in raising awareness about the code and RIL through in-country meetings and media activities. However, more efforts need to be made in reaching out more effectively to decision makers to obtain their support not only for project activities but, more importantly, for better forest management. To meet this challenge, field days will be organized for policy makers and key stakeholders to visit demonstration sites. Participants also suggested that the project newsletter that is published in English be complemented by newsletters in local languages.

Field visit

The Department of Forestry organized a field trip to visit a test and demonstration site in Naphakeo Village, Khammouane Province. The participants observed the demonstration of pre-harvest planning, tree mapping, tree marking and directional felling. The demonstration of directional felling provoked an interesting debate on the felling and utilization of (partially) hollow trees.

When the scarf or undercut was completed, the tree feller noticed that the tree was hollow and upon consulting with a superior officer it was decided not to cut the tree. This decision does not only have occupational safety and silvicultural implications. The tree, with an estimated dbh of about 150cm, most likely contains a considerable amount of solid wood. It could be used by local people who would be in the position to produce a significant amount of sawnwood and other products and generate much needed income. However, the existing logging quota cannot be exceeded. During the course of the project, this will have to be looked into more closely. The more complete use of tops and branches by local communities in Viet Nam is similarly on the project's agenda. Through such approaches, the project can make direct links to poverty reduction.

Want more information?

There are a number of ways to keep abreast of what is happening in the project and the project countries. The easiest is to subscribe to the regional project newsletter. *An assessment of current logging practices* (Field document 1) and *Training needs assessment* (Field document 2) inform on particular aspects in the project countries. To get on the mailing list, to obtain the documents or to receive the report of the TPR/RPAC meeting, plus a CD with all the presentations, please contact Patrick Durst (Patrick.Durst@fao.org).

For the latest information you can contact the Project Coordinator, Patrick Dugan (patdugan@mozcom.com) or the project counterparts in Viet Nam, Ms. Pham Minh Thoa (mthoa-dfd@netnam.vn), in Lao PDR, Mr. Oupakone Alounsavath (dofadm@laotel.com), or in Myanmar, U Khin Zaw (khinzawsfh@myanmar.com.mm).

INTRODUCING RILSIM IN VIET NAM

The demand for a user-friendly tool for calculating the costs of alternative logging practices (e.g. conventional logging and reduced impact logging) and systems appears to be increasing. Since the release of the second version of RILSIM (**R**educed-**I**mpact **L**ogging **S**IMulator) in October 2004, the software has been downloaded more than 400 times. Hundreds of copies of the software and the user's guide have also been distributed by mail.

The demand for training in the use of RILSIM is also on the rise. A number of training courses throughout the region are planned for this year. The first one was held in Ho Chi Minh City, Viet Nam, on 28 February and 1 March 2005. Twenty-three participants from various government institutions, harvesting companies, the Tropical Forest Trust and the Indochina Office of the Worldwide Fund for Nature attended the training course that was jointly conducted by Gary Man of the USDA Forest Service and Thomas Enters of FAO's Regional Office for Asia and the Pacific.

The earlier training courses, held in Sarawak and Sabah, Malaysia, in November 2003, had a duration of only one day each. The new course has been extended to two days to provide more time for practical experiences with the software, and to introduce a practical example comparing RIL with conventional logging and a case study that the trainees are supposed to conduct with only minimal guidance.

The workshop as a whole was judged by most participants as "very good", although the need for translations reduced the speed with which instructions could be provided. Despite this handicap, most participants learned how to use the software quite easily.

Any software that can calculate costs, benefits, revenues and net present values can only be as good as the available data or input. The lack of reliable data continues to be a problem. This is no more evident than with regard to equipment. The software developers assumed that most equipment, such as chainsaws, bulldozers and trucks, have a predetermined lifespan. For example, rubber-tired skidders are judged to have an expected useful lifespan of between 7,000 to 10,000 operating hours, depending on terrain conditions. Tracked skidders can be operated a bit longer, and the useful lifespan of excavators can be twice as long.

In many operations in Asia's tropical forests, the lifespan of equipment appears to be indefinite. In fact, some equipment may make excellent additions to any museum on forestry. Hence, many participants had difficulties in grasping the concept of depreciation, which is a measure of the decline in value of an asset over time. For training purposes, it is probably necessary to develop examples with the equipment cost close to zero, but with much higher running and maintenance costs. While this would probably better reflect the reality of forest harvesting in many countries of the Asia-Pacific region, the next question is whether maintenance costs are known.

A very useful aspect of RILSIM is that it stimulates those people who usually are not confronted with thinking in terms of costs to look at these issues more closely. Participants clearly started to appreciate RILSIM when they understood that it can also be used to calculate cost increases due to new government regulations such as environmental impact assessments or the introduction of buffer zones, in other words, to simulate anticipated changes. The positive response translated into a request for a second training course in Ha Noi later this year. Further training courses are also planned for Fiji, Indonesia, and Myanmar.

NATIONAL FOREST PROGRAMMES — SUPPORT FROM THE FACILITY

The National Forest Programme Facility (in short, Facility) has been providing support for the development and implementation of national forest programmes (nfp) for about three years. The number of countries that benefit from the Facility continues to expand. In January 2005, the Steering Committee of the Facility extended partnerships to an additional six countries: Viet Nam, Zambia, Nicaragua, Kyrgyzstan, Palau, and Armenia. Support is now provided to 42 countries. The number of sub-regional organizations that have a partnership agreement doubled to four, which includes the Secretariat of the Pacific Community, based in Suva, Fiji.

There continues to be some confusion about what nfps actually are. In fact, it is very simple. Governments in the Intergovernmental Panel on Forests (IPF) agreed to use the term “national forest programme” to describe a wide range of approaches to sustainable forest management at national and sub-national levels. Hence, it is a framework for country-led processes to formulate, implement and coordinate related policies, strategies, plans and actions in a participatory manner.

But perhaps it is not so simple, especially if you are told that nfps should be seen as cyclical, continuous, long-term and iterative processes. Admittedly, many definitions only add to the confusion. Let's therefore turn to a small selection of activities that are currently funded or planned in partner countries of the Facility. The purpose of providing the examples is dual. First, it is hoped that they will increase the understanding of what nfps are all about, and what can be done to further and implement them. Second, we provide contact details of nfp focal points, so that more information can be requested directly from the source. Let's check out a couple of examples:

Pakistan

The Ministry of Environment has proposed a series of activities geared at increasing the involvement of civil society and other economic sectors in forestry, raising the awareness of all forestry stakeholders on important forestry issues and providing up-to-date information on forestry issues through different media.

During the first year of the three-year partnership, one activity is directed at the establishment of a forum, for forest policy analysis, formulation and monitoring its implementation. The basic objective of the forum is to institutionalize the provision of inputs from a variety of stakeholders into policy-making, increase the involvement of stakeholders in monitoring forest policy implementation, and assist the Ministry of Environment in its policy-related tasks. Terms of reference for the preliminary work have been drafted and national organizations are currently called upon to express their interest in the activity by providing proposals.

For more information on the nfp in Pakistan please contact Dr. Bashir Wani (wani48@hotmail.com).

Philippines

The Department of the Environment and Natural Resources (DENR) intends to develop a new implementation strategy for its Community-Based Forest Management (CBFM) Programme. Since 1995, CBFM has been the main strategy for achieving sustainable development of the country's forest resources and social justice. By 2004, the CBFM Programme covered nearly 6 million hectares and involved about 700,000 families. The progress made since 1995 looks impressive. Yet, the DENR is convinced that it can do better and that the contribution to poverty reduction should

be larger. It therefore called upon a number of non-governmental organizations to help it look into constraining factors and provide practical recommendations for key stakeholders involved in the programme. This translated into research at six CBFM sites and a series of workshops to build a consensus and consolidate the long list of recommendations into a manageable number that can be addressed by the implementation strategy. The final synthesis of the six studies was published in January 2005.

For a copy of the report or more information on this activity, please contact Ms. Remy Evangelista (cbfmpremy@edsamail.com.ph) or visit www.fao.org/forestry/nfp, where you will find copies of the study reports on the Progress page.

Secretariat of the Pacific Community (SPC)

In most of the Pacific Island countries and territories (PICTs), forests and trees support the livelihoods of the many rural people through the provision of diverse products and services. Most of these contributions do not appear in financial accounts and their real contribution tends to be underestimated by relevant stakeholders, especially Ministries of Finance, Economic Planning and Development, Budget Allocation, Prime Minister's Offices and the Public Service Commissions. In particular, many such stakeholders do not appear to be aware of the potential implications of further degradation of the countries' forest resources.

SPC aims to raise awareness of the contribution of forests and trees to poverty reduction, the environment and sustainable development of PICTs through a regional workshop and related activities during the second half of 2005, as well as national workshops at a later date. In particular, SPC and the SPC/GTZ-Pacific German Regional Forestry Project, a partner in organizing the regional workshop, aim to raise the participants' understanding and perception of:

- the role of forests and trees in livelihood strategies;
- the potential contributions forests and trees can make to alleviate poverty;

- the provisions of forests and trees to environmental stability; and
- cross-sectoral policy effects and the importance of multi-stakeholder processes in programming, planning and implementation.

The regional workshop will be organized for policy makers and planners from key government departments and other relevant stakeholders. The indoor sessions will be complemented by field visits, a feature on SPC's regional TV magazine "Pacific Way", newspaper articles and the production of a CD for wide distribution.

If you would like to learn more about this particular activity and SPC's support to sustainable forest management and national forest programmes throughout the Pacific, please contact Mr. Sairusi Bulai (SairusiB@spc.int).

Similar (as well as some that are quite different) activities are being carried out throughout the Asia-Pacific region, with and without support from the Facility. Even if not directly stated, they are part of this process called "nfp." So, it's not that difficult after all, is it?

For more information on nfps in the Asia-Pacific region and/or the National Forest Programme Facility, please contact:

Mr S. Appanah, NFP Advisor for Asia and the Pacific, Bangkok, Thailand. Tel: 66-2- 697-4136; Fax: (66-2) 697-4445; EM: simmathiri.appanah@fao.org

or

Mr. T. Enters, NFP Facilitator, Bangkok, Thailand: Tel: 66-2-697-4328; Fax: (66-2) 697-4445; EM: thomas.enters@fao.org

ASIA-PACIFIC FORESTRY CHIPS AND CLIPS

LARGE FIRES CREATED AUSTRALIAN DESERT?

A recent study published by Australian and American researchers suggests that settlers who came to Australia some 50,000 years ago set fires that may have triggered cataclysmic weather changes that turned the country's interior into the dry desert it is today. Using computerized global climate simulations, researchers showed that if there were some forest in the middle of Australia, it could lead to a monsoon with twice as much rain as the current pattern. Fossil evidence shows that birds and marsupials that once lived in Australia's interior would have browsed on trees, shrubs and grasses, rather than the desert scrub environment that is there today. It also shows large charcoal deposits most likely caused by widespread fires, dating to the arrival of people.

– Source: Reuters –

NUMBER OF FIRES IN CHINA INCREASED IN 2004

According to the director of forestry, the number of forest fires in 2004 increased from the previous year, although the total area affected had decreased. The Chinese government has been working to enhance its ability to control forest fires by investing some 300 million yuan (US\$36.28 million) to initiate 46 key high-tech projects for the forecast, supervision, prevention and control of forest fires.

– Source: <http://www.chinaview.cn> –

ECOTOURISM IN INDIA AFFECTED BY THE TSUNAMI

The Pichavaram mangroves, billed as one of India's most enchanting seaside forests, are suffering as a result of the tsunami. The groups of

tourists and school children that used to visit the forest are no longer coming. Tamil Nadu officials admitted tourism in this southern Indian state has fallen by as much as 30-40 percent as a result of the December 26 tsunami. This has serious consequences for the local population that earn a living from the tourism industry.

– Source: Indo-Asian News Service –

WEST BENGAL TO RECEIVE WORLD BANK FUND TO COMBAT NATURAL DISASTERS

West Bengal will receive Rs 176 crore (approximately US\$40.2 million) from the World Bank in the next five years to implement the National Risk Mitigation Project to combat natural disasters such as the December 26 tsunami. The project, is part of the World Bank's programme to reduce the impact of such disasters in all 13 coastal states in the country, and was originally aimed at streamlining the early warning system against cyclones. The project will include the construction of coastal embankments, link roads and shelters for cyclone and disaster-hit people and preservation of mangrove forests, all of which are designed to help reduce the impact of such catastrophes in the future.

– Source: <http://www.newkerala.com> –

INDONESIA ASSESSES THE DAMAGE WROUGHT BY THE TSUNAMI

As the people of Indonesia's Aceh province try to rebuild lives shattered by the tsunami disaster, officials have commenced assessing the environmental damage to the coast which bore the brunt of the giant waves. According to an initial assessment by the UN Environmental Programme, the waves damaged 25,000 hectares of mangroves, some 29,200 hectares of coral reefs and 120 hectares of seagrass beds. Government experts and United Nations officials say it could take years and hundreds of million of dollars to restore the environmental damage to these marine ecosystems.

– Source: AFP –

SOURCING TIMBER FOR ACEH RECONSTRUCTION

According to initial estimates, some 4 to 8 million cubic metres of logs will be needed for the reconstruction effort in Aceh over the next five years. Greenomics Indonesia, a policy research institute, and WWF, the global conservation organisation, are advocating that alternative foreign sources of timber should be explored so as not to create further financial burdens for the Indonesian government. They propose that some of the aid already pledged by donors for the reconstruction of Aceh should be made in the form of timber.

– Source: <http://thestar.com.my> –

TIMBER PROCESSOR SHUTTING ITS DOORS

About 150 people have lost their jobs after a timber processing company in New Zealand announced that its three plants will close. The Tanner Group's two mills in Kaitaia and Coromandel and a timber manufacturing plant in Thames, will be closed over the next four months. Increasing costs and the strong New Zealand dollar have been blamed.

– Source: <http://tvnz.co.nz/> –

INDONESIA TO REPLANT MANGROVES IN TSUNAMI DEFENSE

Indonesia plans to replant huge swathes of mangrove forest along its vulnerable coastline to help provide a buffer against possible future tsunamis. Some 600,000 hectares of mangrove across the country have been earmarked for rehabilitation, with some 30,000 in Aceh alone. Following the December disaster a number of Asian nations have taken a new look at their struggling mangroves. Malaysia has called for mangroves to be protected from coastal development.

– Source: <http://www.planetark.com/> –

WORK COMMENCES ON CHINESE BIODIVERSITY COLLECTION

Work has commenced in China to build a repository that will house samples of its biodiversity. It is hoped that the centre will become one of the largest collections of its kind in the region, and also a first-class research centre. The centre will be based at the Kunming Institute of Botany and will include some 19,000 species. Eventually the centre will also house some 200,000 samples of seeds, DNA banks, a collection of living plants and specimens of animals and micro-organisms. The building is to be completed in 2006; however, it will take some 10-15 years to collect all the specimens.

– Source: *SciDev.net* –

INDIAN MODEL LEGISLATION ON NON-TIMBER FOREST PRODUCE IN PREPARATION

Model legislation for adoption by states is being prepared, which will recognize the rights of weaker sections working in the forests, in respect to non-timber forest produce. The objective of the legislation is to safeguard the legal rights of tribal communities over mineral and water resources and to protect their livelihoods. The draft National Environmental Policy is intended to be a guide for environmental protection throughout the country, while protecting the livelihoods of the rural poor.

– Source: *Team India* –

INDIAN PAPER GIANT BILT TURNS TO FARM FORESTRY FOR PULP

To reduce the cost of landed wood, many paper companies such as Ballarpur Industries Limited (BILT), are turning to farm forestry close to the processing plants for pulp. BILT is supplying farmers with seedlings (eucalyptus, acacia and casuarina) and providing buyback support for the plantations, which are mainly established on degraded forestland. The company is currently working with

some 12,000 farmers and has established about 40,000 hectares of plantations. The use of farm forestry helps companies comply with Government policy ceilings on land ownership.

– Source: *SIFY.com* –

HIGH-TECH SOLUTION TO ADDRESS ILLEGAL LOGGING

The Indian state of Kerala is resorting to high-tech methods in order to crack-down on the illegal logging of its remaining sandal wood resources. The Forest Department is planning to implant micro-chips in the trees, which will enable the trees to be tracked by satellite. The micro-chips will enable the Department to track the trees if smugglers try to smuggle them out of the area.

– Source: *The Independent* –

CHINESE FOUNDATION ESTABLISHED TO PROTECT WOODLANDS

The Chinese government has established a new foundation to manage a fund for the protection of forests. Under the initiative, anyone working with the forests under this scheme is entitled to 5 yuan (US\$0.60) per mu (1 hectare = 15 mu) of woodland they manage and protect. Some 27 million hectares of forest are eligible for funding under the initiative. Ninety percent of the money is intended to compensate for the costs of afforestation, while the rest is to be set aside for controlling forest fires, diseases and pests.

– Source: *chinadaily.com* –

NEW WEAPON IN THE FOREST FIRE-FIGHTING ARSENAL

A Vietnamese scientist has developed a powder that can be used in fighting large forest fires. The powder changes into a liquid at temperatures higher than 100°C when coming into contact with the flames. The liquid boils and releases carbon dioxide, which extinguishes the flames. A layer of

the porous powder then forms on the surface of the burning object preventing it from catching fire again.

– Source: *Vietnam News Agency* –

VILLAGERS TO PROTECT FORESTS IN THAI RESERVES

The Thai government is planning to abort its plan to evict 10,866 villages in 70 provinces from reserved forest zones, and assign them a conservation role instead. Under the scheme, the government will redraw the forest zones to exclude villages that were already permanent settlements prior to establishment of the reserves. Each village will form a resources and environmental committee that will be empowered to fight forest encroachment and poaching. The government plans to allocate some 1.5 billion baht (approximately US\$39.5 million) from 2005-2008, to assist the villages in protecting their respective forest zones.

– Source: *The Nation, Bangkok* –

CARTER HOLT HARVEY TO SELL ONE-THIRD OF ITS FOREST ASSETS IN NEW ZEALAND

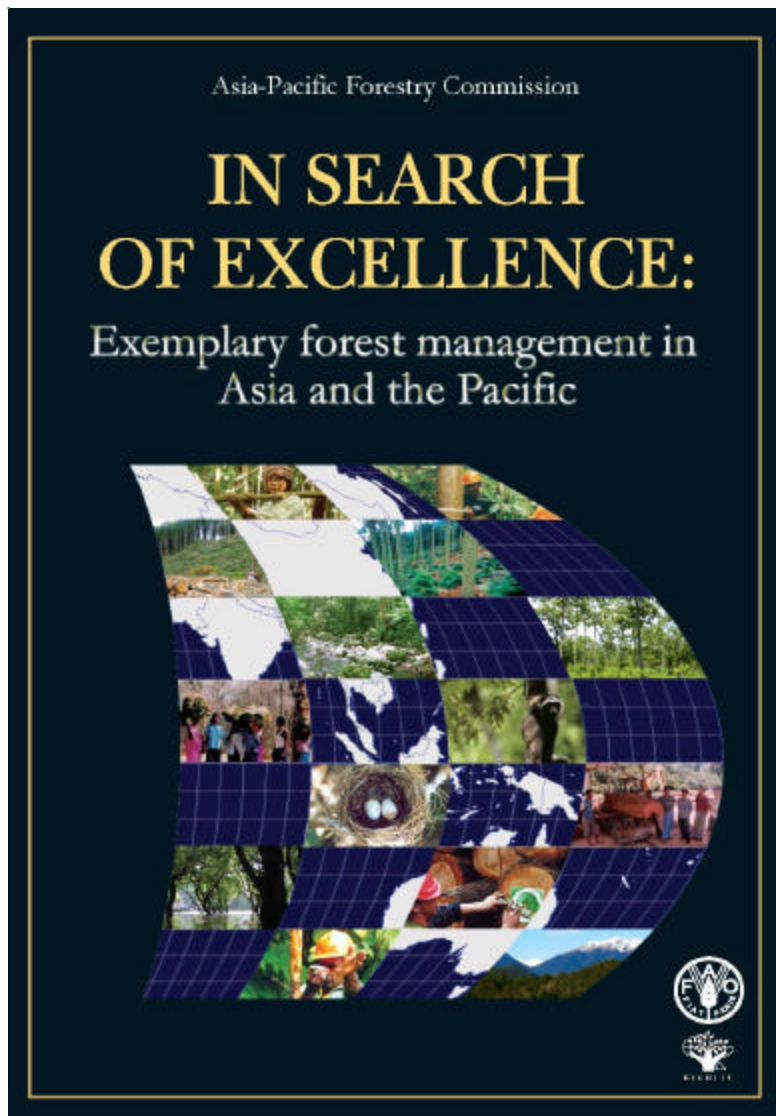
Wood products company Carter Holt Harvey has started the process of selling 95,000 hectares of its forest estate. The company plans to retain around 220,000 hectares. Large pension funds are considered to be the prime contenders for the purchase, with potential bidders including the US-based Hancock Natural Resource Group and the Harvard Management Company, both of which have bought large New Zealand forest estates in recent years. A strong New Zealand dollar and poor log prices have spurred many companies to exit forest ownership and concentrate on more lucrative timber processing and marketing.

– Source: <http://tvnz.co.nz/> –

NEW RAP FORESTRY PUBLICATIONS

IN SEARCH OF EXCELLENCE: EXEMPLARY FOREST MANAGEMENT IN ASIA AND THE PACIFIC

RAP Publication 2005/02



“Nothing sells like bad news,” and reports of rampant forest destruction in Asia and the Pacific provide ample merchandise for headline-hungry media purveyors and a receptive public. But is the situation really as bad as portrayed? Are there perhaps more positive and inspiring stories to be revealed?

In search of excellence: exemplary forest management in Asia and the Pacific shatters the myth that there is no positive forestry being practiced in the region. This book celebrates the triumphs of forest managers, farmers and local communities in balancing the range of socio-economic and environmental demands made on forests. In

doing so, it reveals monumental accounts of innovation, perseverance and dedication from across the region — stories that should inspire and motivate others to redouble their efforts to protect and effectively manage the region’s spectacular forests.

This publication reflects the outcome of an ambitious initiative of the Asia–Pacific Forestry Commission (APFC) with the same title. The initiative was coordinated by the FAO Regional Office for Asia and the Pacific and the Regional Community Forestry Training Centre for Asia and the Pacific (RECOFTC). A widespread call for nominations identified 172 forests in 21 countries that were perceived to be “well-managed.” After careful vetting, 28 forests were selected for detailed case study analysis. The result is a kaleidoscope of ideas, approaches, inspiration and perspiration that tell the stories of people dedicated to building sustainable livelihoods through careful management of their forests.

STATE OF FORESTRY IN ASIA AND THE PACIFIC — 2003

RAP Publication 2003/22 (REPRINT)

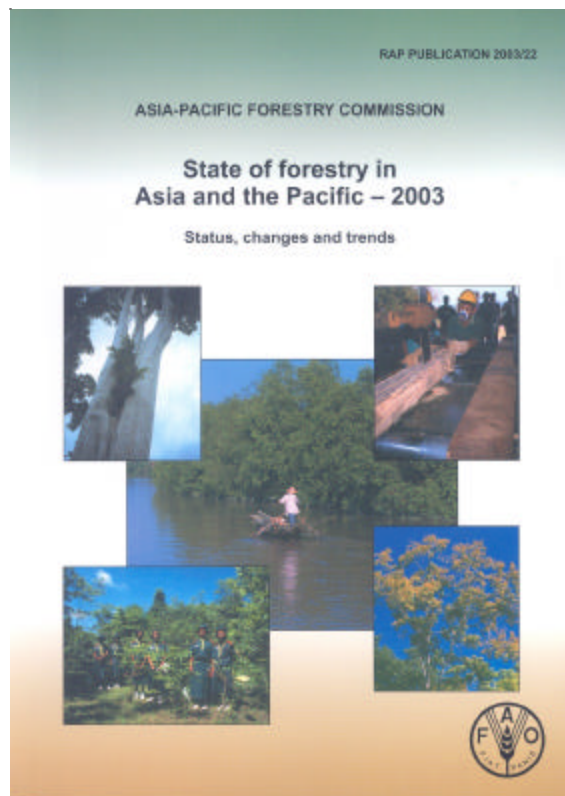
Highlighting a diversity of management approaches that have proven particularly innovative and successful in meeting challenges, the publication reaches out to foresters, policy-makers, planners and anyone interested in the future of forestry in Asia and the Pacific. This publication also marks a significant step forward in FAO's and RECOFTC's efforts to bring its forestry literature closer to the general readers who are less familiar with the technical aspects of forest management, but no less concerned about the fate of the region's forests, natural resources and rural people.

The Asia-Pacific region is characterized by diversity and rapid change. These attributes are reflected in the forestry sector, where the rapid evolution of social, economic and environmental issues means policies, legislation, institutions and the broad forestry community are being challenged to cope with constantly shifting goals and expectations.

This publication provides a broad status report and overview of developments in forestry in the region during the past several years. It has been prepared to inform and update policy makers, for-

estry officials and others interested in recent developments in the region's forestry sector.

Popular demand for the first edition of this publication quickly exhausted stocks. FAO is therefore pleased to announce that a revised 2nd edition of this publication has been produced with reformatted text and many new photographs.



FAO LAUNCHES NEW ONLINE NEWSROOM

On 7 January 2005, FAO launched a newsroom dedicated to forest issues on its website.

The newsroom, intended for journalists and others with a specific interest in FAO's work in forestry, has links to press releases and other news items as well as feature stories on forestry field projects and in depth articles focused on specific forestry issues.

The FAO Forestry Newsroom also has links to information useful to the media such as FAO's country information website, maps and graphs,

contacts information, fact sheets on the work of FAO's forestry department, and a search engine. In the near future the visitor will have access to the FAO forestry photo database via the newsroom.

The FAO Forestry Newsroom is found at: <http://www.fao.org/forestry/newsroom/en/news/index.html>

This press release was issued by the Media Office at the Food and Agriculture Organization of the United Nations (FAO, www.fao.org).

FORESTY CALENDAR

11-12 April 2005. Makassar, Sulawesi, Indonesia. **National Workshop on National Forest Programmes, Region Sulawesi.** Organized by the South Sulawesi Coalition Forest Konstan under the partnership between Indonesia and the National Forest Programme Facility. Contact: T. Enters, NFP Facilitator, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4328; Fax: (662) 697-4445; E-mail: Thomas.Enters@fao.org

26-27 April 2005. Suva, Fiji. **Launching the partnership between the Secretariat of the Pacific Community and the National Forest Programme Facility.** Contact: T. Enters, NFP Facilitator, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4328; Fax: (662) 697-4445; E-mail: Thomas.Enters@fao.org

6-8 June 2005. Kuala Lumpur, Malaysia. **National Workshop-Developing a National Forest Programme for Malaysia: Process, Planning and Implementation.** Contact: S. Appanah, NFP Adviser, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4136; Fax: (662) 697-4445; E-mail: Simmathiri.Appanah@fao.org

7-8 June 2005. Koror, Palau. **Launching the partnership between Palau and the National Forest Programme Facility.** Contact: T. Enters, NFP Facilitator, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road,

Bangkok 10200, Thailand; Tel. (662) 697-4328; Fax: (662) 697-4445; E-mail: Thomas.Enters@fao.org

26-28 July 2005. Kota Kinabalu, Sabah, Malaysia. **Symposium on Tropical Rainforest Rehabilitation & Restoration – Existing Knowledge and Future Directions.** Co-organized by: FAO RAP, World Wide Fund for Nature (WWF), Yayasan Sabah and the Sabah Forestry Department. Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org. More information about the symposium can be found on the following website: www.forestrehabsymposium.com

8-13 August 2005. Brisbane, Australia. **XXII IUFRO World Congress.** Contact: The Congress Manager, PO Box 104, RBH Post Office QLD 4029, Australia; Tel: +61(0) 7 3854 1611; Fax: +61(0) 7 3854 1507; E-mail: iufro2005@ozaccom.com.au

September 2005 (tentative). Bangkok. **APFC Executive Committee Meeting.** Contact: P. Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

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

- 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)
- Report of the 20th Session of the Asia-Pacific Forestry Commission (APFC), 2004 (RAP Publication: 2004/09)
- Forests for poverty reduction: can community forestry make money? (RAP Publication: 2004/04)
- State of Forestry in Asia and the Pacific – 2003: status, changes and trends (RAP Publication 2003/22)
- Advancing assisted natural regeneration (ANR) in Asia and the Pacific (RAP Publication 2003/19) - 2nd edition
- Community forestry – current innovations and experiences (CD-ROM included)
- Bringing back the forests: policies and practices for degraded lands and forests (RAP Publication: 2003/14) **out of print**
- 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)
- Report of the 19th Session of the Asia-Pacific Forestry Commission (APFC), 2002 (RAP Publication: 2002/21)
- Selected indicators of food and agriculture development in Asia-Pacific Region, 1991-2001 (RAP Publication: 2002/19)
- 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)
- Asia and the Pacific National Forest Programmes Update 34 (RAP Publication: 2000/22)
- 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
- Asia-Pacific Forestry Towards 2010 - executive summary of the Asia-Pacific Forestry Sector Outlook Study (RAP Publication: 1998/22)
- 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)

For copies please write to: *Senior Forestry Officer for Asia and the Pacific,*
FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand.
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