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Featuring

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FOREST NEWS

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Cover: Formosan macaques at Mt. Longevity
Photo: G. Agoramoorthy

Kaohsiung, Taiwan's second largest city, advancing towards Mt. Longevity forest (Photo: G. Agoramoorthy)

TAIWAN'S INDUSTRIAL DEVELOPMENT AND ENVIRONMENTAL CRISIS

by Govindasamy Agoramoorthy and Minna J. Hsu

Introduction

Taiwan lies on the Tropic of Cancer and is separated from the mainland China by a narrow strait, the narrowest portion of which is only 130 km wide. It covers an area of 36,000 km^2 with a population of 23 million people. The landscape is dominated by rugged mountains with a remarkable diversity of fauna and flora. The island rose from the sea floor of the Asian continental shelf approximately 4 million years ago. Taiwan has grown from agricultural backwater status to global technological giant over the last few decades. One of the serious negative consequences of Taiwan's development has been increased pollution and degradation of natural resources. In this paper, we have outlined how Taiwan's rapid economic and industrial development has contributed to environmental problems that affect the natural resources and biodiversity.

Taiwan's biodiversity resources

More than a century ago, naturalist Alfred Russel Wallace was impressed with the ecological beauty of Taiwan and he wrote, "Among recent continental islands there is probably none that surpasses in interest and instructiveness the Chinese island named by the Portuguese, Formosa" (Wallace, 1880). Taiwan certainly is a

biological microcosm and one can travel from a mountain peak to coral reef within just a day. Taiwan harbors about 4,000 species of vascular plants, 61 species of mammals, 400 species of birds, 92 species of reptiles, 30 species of amphibians, 140 species of freshwater fish and an estimated 50,000 insect species, including 400 species of butterflies (Hsu & Agoramoorthy, 1997). Six national parks, 18 nature reserves and 24 protected areas have been designated to safeguard the biodiversity and the protected area covers 440,290 ha, which is 12.2% of the total land area. However, Taiwan's rapid economic and industrial growth has put heavy pressure on the natural environment, especially over the last three decades.

Threats to wildlife and nature

The only mega bat – the Formosan flying fox – was previously abundant on Taiwan's Green Island, but became extinct in the 1990's due to hunting, deforestation and habitat alteration (Hsu, 1997). The island's largest cat – the Clouded leopard –– has not been sighted for two decades and is presumed extinct. The Formosan black bear is seldom seen in the wild (Hsu & Agoramoorthy, 1997). The sika deer that once roamed the coastal plains became extinct in the wild in the 1960's due to intensive hunting and habitat destruction. The mangrove forest is considered to be highly endangered in Taiwan. Despite the existence of national parks and nature reserves to protect biodiversity, pressure on the natural habitat is still intensifying.

To make things worse, large numbers of wildlife have been lately released into the wild by Buddhist and Taoist religious groups, which has alarmed even animal welfare groups. People in Taiwan are estimated to spend about USD5,914,490 a year to set free 200 million wild animals (ranging from insects to monkeys) for religious reasons (China Post, 2004; Agoramoorthy & Hsu, 2005). Taiwan's two major traditional religions, Taoism and Buddhism, stress the importance of doing good deeds during a person's life and returning animals to nature is one of the ways to garner good karma to earn an individual's salvation in the afterlife. The followers of these religions comprise 93% of the total population of Taiwan. Temples usually provide religious services to release animals. Since there is a huge market for this trade, various animals such as birds, fish, snakes, frogs, turtles, insects and monkeys are being captured from the wild by hunters, or purchased from local markets, to be released around the island's rivers, mountains, forests, lakes, and reservoirs.

Although Taiwan enacted the wildlife conservation law in 1989, the enforcement of law has been weak and there is no policy to end the practice of religious freeing of animals, which at present is unregulated. The indiscriminate release of animals will certainly lead to alien invasions of non-native species, which could be catastrophic to the ecological food chain. The authors have recorded about 75 species of exotic birds that are presently found in the wild in Taiwan. This could lead to the extinction of endemic species, hybridism and the irreversible alteration of the genetic makeup of biological communities in Taiwan. The invasion of fire ants and golden apple snails in Taiwan has already created a crisis. Taiwan must act quickly to counter the unmonitored release of wildlife that has been ignored for decades.

Rapid development leads to pollution

Taiwan's Environmental Protection Administration (EPA) estimates that only about 43% of hazardous industrial waste is properly treated. Much of the untreated waste ends up contaminating soil and water via illegal dumping. Based on recent data from 1,000 large industrial firms, the EPA estimates that Taiwan produces over 18 million tons of technological solid waste annually – 1.47 million tons of which are considered hazardous. Only 600,000 tons are treated, while the rest ends up in rivers and landfills.

About 50,000 tons of toxic solvents are produced annually. In July 2000, 100 tons of toxic solvents were dumped into the second longest river – Kaoping – which left 3 million residents in and around Kaohsiung city without drinking water for five days. In Taiwan's largest environmental crime case, prosecutors charged the waste handler of the Kaoping affair for dumping tons of toxic solvents into river systems across the island, a classic example of corporate greed and technological nightmare. Since Taiwan doesn't

have enough secured landfills, it does not have the ability to handle all the toxic waste it produces.

Taiwan's economic growth

Taiwan's economy is robust and ranks as the 17th largest economy in the world. Agriculture contributes only 2% to the GDP, down from 32% in 1952. Only 1% of the Taiwan's population lives below the poverty line. Because of its conservative financial approach and its entrepreneurial strengths, Taiwan weathered the 1998 Asian financial crisis better than many of its neighbors. Exports to China – mainly parts and equipment for the assembly of goods for export to developed countries – drove Taiwan's economic recovery in 2002.

Can Taiwan's development save biodiversity?

With the increasing development of the industrial sector, economic growth and the exploitation of natural resources with the limited conservation activities, the government must take action to decelerate the loss of natural habitats, as well as to regulate the increasing environmental pollution. Experienced scientists are needed in government offices to help make sound environmental management decisions. Senior administrators of the national parks, nature reserves, environmental agencies and pollution control boards should have hands-on experience in managing environmental and biodiversity resources in order to make environmentally-friendly policy decisions.

Can people fit on this small island in harmony with nature? Nobel Laureates Tinbergen and von Wieiszacker stated that wealth and over-consumption contribute to environmental degradation. Mahatma Gandhi once said, "There is enough on this earth to meet everyone's need, but not anybody's greed." At present, humans use about 70% of the world's temperate and tropical ecosystems to produce 98% of their food and all of their wood products. Only 5% of the temperate and tropical land area is uninhabited. Asia and the Pacific region contain 23% of the world's land area, but have 58% of its people. Taiwan is one of the most highly populated islands in the Asia-Pacific region and imports all wood and wood products from overseas, including mega biodiversity countries in Southeast Asia. Rapid development put heavy pressure on the environment even in the United States, where 728 species fauna and flora were reported to be endangered in 1996. Although Europe has added 10 million ha of protected areas since 1982, 52% of the fish, 45% of the reptiles, 42% of the mammals and 86% of the coastlines are still under threat.

Taiwan's industries (303% of GDP) and services sectors (67.9% of GDP) play a major role in the economic development. However, the technological miracle has also created toxic pollution and become a factor in the extinction of species. Taiwan's population grew from 7 million in 1950 to 23 million in 2003, with a density of 638 people per km^2. The population explosion combined with the uninterrupted developmental activities and inadequate enforcement of environmental laws has spawned environmental disasters. Taiwan spends a large sum for national defense, followed by economic development and education, but environmental protection still remains a low priority. We hope that the on-going struggle against environmental destruction and hazardous wastes will contribute to a profound reorientation of Taiwanese environmentalism through the burgeoning "green movement" to shape appropriate policies, sustainable development programs and educational programs to defend the environment from further devastation.

People tend to take the earth's environment for granted, but must realize that human lives depend on the natural environment. Conservation consciousness can come about only through informed, educated and healthy citizens who are able to place environmental conservation into social, political and economic contexts at local, regional and international levels. Balancing economic development and environmental conservation are daunting tasks for future leaders of Taiwan. Thus, environmental education and sustainable development should be the bottom-line for politicians, policy-makers and people from all walks of life.

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SMALL INDIAN CIVETS (Viverracula indica) FACING DANGER IN JAMMU DISTRICT (J&K)

by Rahuk Kait and Deep Narian Sahi

Introduction

Everyone is aware of the value of biodiversity in the present age, but due to increasing populations and advancements in technology, the demands of the people are increasing, and in order to meet these demands the resources are being exploited at a faster rate and biodiversity is declining in the face of constant threats. Development activities affect wild organisms in different ways. The rate of natural extinction was perhaps one species every thousand years, but man's intervention speeded up the extinction rate between 1600 and 1950 to one species every 10 years; currently it is perhaps one species every year (Hosetti, 2002).

Biodiversity plays a number of vital environmental and development roles that are not accorded economic value, but which are crucial to humanity's future (Khan, 1998).

According to Postel (1992), forests are vanishing at the rate of 17 million ha/year – an area about half the size of Finland – and the population is rising at the rate of 92 million people each year.

In terms of the number of species, Majupuria (1990) stated that since 1600 A.C., about 120 species of mammals and 225 species of birds have become extinct, and another 650 species of birds and mammals are in danger of becoming extinct all over the world.

As for India, about 88 mammal species, 55 bird species and 25 reptile species have been categorized as endangered and listed in Schedule I of the Wild Life (Protection) Act, 1972.

This paper explores the effect of anthropogenic activities on the Small Indian civet.

Study area

Jammu District is situated between 74°20 E longitude, 32°27 N and 33°30 N latitudes, at an altitude ranging from 340-410 m above mean sea level. The study area is 2,943 km^2 and is surrounded by Kathua, Udhampur and Rajouri Districts, and Pakistan. Jammu District is comprised of five thesils: Akhnoor, Bishnah, Jammu, R.S. Pura and Samba. It has three physiographic divisions, viz the Jammu foothills, the kandibelt and the level land.

The area has four well-defined seasons. The average rainfall ranges from 100-200 cm. About 20% of the total annual rainfall is received during the monsoon. January is the coldest month and May-June are the hottest.

Study methods

Line transect method: The predetermined transect was traveled by foot or vehicle. Line transects are used in different habitats to record the presence or absence of species. If an animal is observed, the habit and characteristics of the habitat are known.

Roadside surveys: These surveys were made on foot, on motorbike, or by departmental vehicles during the study period. The surveys were made in the early mornings and late evenings when traffic and other disturbances are minimal.

Interviews with locals: Hunters, villagers and nomads were asked about the presence of the particular species. The local status was based on Srinivasulu and Nagulu (2002).

Equipment: 7 x 50 prismatic field binoculars; T-70 camera with zoom lens

Observations and discussion

Diagnostic features

The civet has an elongated and laterally compressed body with short and stumpy legs. The snout is pointed, neck is elongated, and the tail is long, cylindrical and bushy.

There is a transverse black band under the neck, forming a collar. On the back are longitudinal black strips, which are not always continuous. The tail has alternate transverse white and dark bands.

Habits and habitat

The Small Indian civet prefers scrubby forests or bushy grassland. It is not seen in open areas and lives in holes or under rocks. It is a nocturnal animal that feeds on birds, rats, squirrels, fruit and poultry.

Distribution in study area

Civets are found in Akhnoor, Samba, R.S. Pura, Sidhra, Nandeni, Nagrota, Ram Nagar Wildlife Sanctuary, Bantalab and Bishnah.

Negi (1992) reported that the Small Indian civet prefers habitat with tall grasses. Being carnivores, they have a large home range, but due to the human population increases the habitat has been destroyed and fragmented with the construction of roads and settlements (Sanik Colony, Janipur, RoopNagar, Bantalab). Forests are being destroyed for different purposes, leading to the shrinkage of habitat.

In addition, the construction of a railway track has added to the misery of civets and other mammalian fauna through the loss of forest cover and fragmentation of habitats.

Scarcity of water was also found to be a limiting factor in the study area. Most of the wild habitat is of Kandi character and the Jammu foothills lack permanent water bodies. In order to meet their water requirements the animals have to come down to the rivers for drinking water. That the water scarcity is one reason for the decline in the number of civets is evidenced by the two civets found dead in the artificially constructed cemented ponds in the environmental park on the Sidhra bypass road in February 2004 and January 2005. These ponds are nearly 2 m deep, with almost vertical walls containing 30-40 cm of water, which makes it difficult for the civets to climb out after drinking, and thus resulting in their death.

Road accidents

As the result of habitat fragmentation, and due to the dense network of busy roads, the civets frequently meet with accidents when crossing roads. During the study period five civets were found crushed in road accidents in the study area.

Hunting

Civets are killed for their skins by the people of Samba, Akhnoor, Bantalab and Baghe Bahu.

Pesticides

Civets in the vicinity of villages sometimes feed on dead (poisoned) rodents, after which they die.

To summarize, the four main threats to the existence of the animal are as follows:

- habitat loss, deforestation, urbanization, agricultural development, etc.;
- overexploitation for commercial purposes (e.g. for the skin);
- use of poisons (e.g. pesticides, rodenticides, etc.); and
- habitat fragmentation and water scarcity.

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OPHIOPHAGUS HABIT OF COMMON RAT SNAKE (Ptyas mucosus LINNAEUS, 1758) OF SRI LANKA

by D.M.S. Suranjan Karunarathna and M.D. Chandana Asela

Introduction

Common rat snake (*Ptyas mucosus*) belongs to Class: Reptilia, Sub-Order: Serpentes, Family: Colubridae. Common rat snakes are widely distributed throughout Asia, including Sri Lanka (Deraniyagala, 1955; De Silva, 1980). Rat snake is associated with many myths and is well known because of its association with anthropogenic habitats. Common rat snake is diurnal, terrestrial and non-venomous. Known as "Garadiya" in Sinhala, it is the second largest snake in Sri Lanka. Smith (1943) reported a specimen 11 feet and 9 inches long.

Common rat snake generally feeds upon rats, agamids, small birds and their eggs, but there is no record of rat snakes feeding upon other non-venomous snakes. According to De Silva (1990), in Sri Lanka most of the snakes which feed upon other snakes belong to the family Elapidae and in rare cases to Cylindrophidae and Uropeltidae. But De Silva (1975) reported a Forsten's Cat Snake (*Boiga forsteni*) swallowing a Sri Lanka Cat

Snake (*Boiga ceylonensis*) and Ukuwela (2004) reported on the cannibalistic habit of Sri Lanka Cat Snake (*Boiga ceylonensis*). Here we report for the first time an ophiophagus habit in common rat snake in Sri Lanka under captive conditions.

Observation

This event took place in a glass tank, which was 36 inches in length, 15 inches in height and 15 inches in width. The glass tank was arranged with sand, leaf litter and some small logs. There were five species of colubrid snakes (*Amphiesma stolatus, Coelognathus helena, Oligodon arnensis, Oligodon sublineatus* and *Ptyas mucosus*) in the tank that were being kept temporarily until they could be released into suitable habitats. On 15th September 2005, at about12.00 noon, a female juvenile common rat snake (540 mm) was observed feeding on a male sub-adult kukri snake (*O. sublineatus*) (226 mm) for 37 minutes.

The kukri snake was resting under the substratum consisting of soil, leaf litter and several small logs. *P. mucosus* was seen searching for something in the substrate and suddenly it caught the *O. sublineatus* snake by its mid-tail area and dragged it to the surface. After *P. mucosus* started swallowing *O. sublineatus* from tail tip to head, *O. sublineatus* attacked the head and lower neck area of the *P. mucosus*. However, *P. mucosus* was not deterred and completely swallowed *O. sublineatus* in another few minutes. After re-setting its jaw back again *P. mucosus* seen resting in a corner of the tank.

Discussion

There were five species of colubrid snakes in the glass tank and *Oligodon sublineatus* was the smallest of the five. The snout to tail lengths (STL) of the other species were as follows: *Coeloganthus helena* (Daudin, 1803) 710 mm, *Oligodon arnensis* (Shaw, 1802) 280 mm and *Amphiesma stolatus* (Linnaeus, 1758) 395 mm (STL). All five Colubrids are non-venomous snakes. They were kept in a single tank because there were no previous records of ophiophagus habit among these five species. This observation of the ophiophagus habit of the rat snake is recorded for the first time and hence is a significant record. It is important to carry out further investigations on this ophiophagus behavior of the Common rat snake. It is also advisable to keep rat snakes separately in captive conditions to prevent it from preying upon other species.

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MANIPUR BROW-ANTLERED DEER: RED ALERT

by Kh. Shamungon

The Manipur brow-antlered deer (*Cervus eldi eldi*), locally called sangai, is one of the rarest and most endangered deer in the world. Today, this species is preserved in the peculiar floating habitat of Keibul Lamjao National Park (KLNP), Manipur. The dark-brown or dark-chestnut-colored stag measures about 125 cm at the shoulder (the hind measures 100 cm) and weighs about 100 kg. This deer has a crown of antlers; the brow tines are continuous with the main beams, forming graceful arcs. The animal is now on the verge of extinction and if the current trend of habitat degradation continues, it may take two or three decades at the most for this endemic species to disappear.

Three sub-species of brow-antlered deer, i.e. the Manipur sangai (*Cervus eldi eldi* McClelland, 1842), Myanmar's thamin (*Cervus eldi thamin* Thomas, 1918) and Thailand's lamang (*Cervus eldi siamensis* Lyddeker, 1915) are known to occur; the Manipur race is distinguished by its well-developed hairy hind pasterns and smaller curvature of the antlers. Today, a little over 100 heads of sangai survive in the wild, facing all round threats of habitat destruction, poaching and probably a genetic disorder too.

The deer's antler cycle, osteology, devastating habitat structure, reproductive cycle and conservation strategy of the deer were described earlier (Shamungou, 1988-1999).

Protection of sangai

Sangai has been given protection in Manipur for some time now. In 1891, this deer was protected by royal orders. Whoever was proved to have killed one (particularly a doe) drew a heavy fine or suffered heavy punishment (e.g. the chopping off of hands). The Manipur Game Rules of 1931 drawn up by Capt. Harvey (Draft Rules 1916, Manipur State Darbar) gave full protection to the deer. Even then it was being recklessly hunted and as result, sangai was thought to be extinct from the state. However, in the 1950s, a remnant population of the deer was discovered in the Keibul area and that led to the creation of an *in situ* conservation site for the sangai in 1954. In 1977, the area was declared the Keibul Lamjao National Park under the Wildlife (Protection) Act, 1972. Unfortunately, the ecology of the park has been deteriorating since its creation. The Forest Department has felt no serious concern about the state of affairs and thus, the authority is at its lowest ebb and little is prioritized, for which the state administration in Manipur must take responsibility.

Keibul Lamjao National Park

The 40 km^2 KLNP stretches from north to south along the south-eastern corner of Loktak lake (a Ramsar site 288 km^2 at 268.5 water level). The park is demarcated from the lake by the Thanga hills which spread towards the east. The Khordak river originates from this lake and divides the park into eastern and western parts before draining into the Manipur river. The eastern side, which constitutes one-third of the park, is entirely marshy land, and in the western portion there are three hillocks: Pabot, Toya and Chingjao. A 100-200 m wide strip of lowland plays an important role in the ecosystem of the park, providing suitable feeding and breeding grounds for the deer (Shamungou, 1993). This place and the three hillocks are the only areas of hard ground in the entire park on which the

animals can take rest and shelter, especially during the heavy rains and floods. The rest of the park is covered by a thick mat of decaying vegetation known as phumdi. About 150 aquatic and semi-aquatic plants, including 27 economically important varieties, grow on the phumdi (Shymjai, 2000). The phumdi floats about one-fifth above the level of the water. The deer move about in a peculiar way on the phumdi. While walking the deer's hind legs rest on the *phumdi*, with the body being held up almost vertical. Such actions help the animal to proceed without sinking in the quagmire (Gee, 1961). This is the unique feature of the park.

Sangai population

The sangai population in KLNP is precarious indeed. It rose from 18 in 1977 to 162 in 2000. Any event of political expediency or a natural calamity could destroy this small and isolated population or reduce it to such a negligible size that it could never be replenished. During these years the fawning rate fluctuated between 11-57 fawns/100 females (Shamungou, 1990).The human pressures in the Thangbral-yangbi area during the January-March breeding period were the primary cause of the fluctuations. The importance of this area was documented earlier (Shamungou, 1992b). Thangbral-yangbi, Pabot and Toya are ecologically sensitive areas and during the recent past they were at their best to act as centers of activity for the deer. Today, the situation is remarkably changed. Following the Loktak Project, these areas are no longer safe places for rutting activities.

Threats

Under acute human pressure, the habitat of KLNP is being assaulted and the deer are facing a bleak future. The situation is really grim. Currently, the main problems facing the sangai in KLNP are as follows:

- **Livestock:** The sangai competes with cattle and buffaloes for forage. The increasing pressures of domestic animals, mainly in the northern and southern fringes of the park, resulted in the degeneration of the shelter grass. The replacement of desirable forage with unpalatable weed also increased. In addition, the livestock may spread communicable diseases to the wild ranch.
- **Encroachments:** The park's area is gradually shrinking as a result of the ever increasing demands for land by fish farming, agricultural practices, etc. Most of the people living around the park advocate reducing its size to about 10 km^2 or so. For them, a poor farmer living from hand to mouth cannot enjoy the "dancing of sangai" on the floating *phumdi.* They argue that no item in the park should be left to waste, either through burning or decaying. Vegetable collection is primarily done by women or young girls. They are difficult to handle and if caught, they often try to escape by threatening to bring moral charges.
- **Poaching:** Poaching, though formerly not frequent, has accelerated. The three methods of poaching generally practiced are trapping, poaching with rifles (with or without dogs), and poaching by fishermen using phumlen-thangol (a long sickle meant for cutting *phumdi*); the first method is the one used most frequently. Expert poachers who can move surreptitiously sneaking up on the deer by moving through well defined trails among the thickets. The second method is more aggressive and is carried out by armed bands, and as such very difficult to deal with by the unarmed forest guards. The third method is not a regular and determined practice, but it could be committed by any professional fishermen whenever they get an opportunity of locating a deer, particularly a fawn at close range. In the present context, although habitat depletion is feared as a greater threat to the sangai than poaching, any incidence of killing can become a threat, especially to this small population falling below the critical level.
- **Loktak Hydel Project (LHP) :** An important aspect that has come up recently that may have significant ecological ramifications on the park is the multipurpose LHP – a coffer dam across the Manipur river at Ithai aimed at permanently raising

the water level of the lake to 769.12 m for effective hydel power generation. Before the project, the water level of the lake was between 768.9 m and 765.51 m, against the current range between 769m and 767 m (**Fig.2**). This has led significant changes in the ecology of the entire park, thereby endangering the survival prospects of the sangai.

The following issues have emerged in KLNP regarding the causes of habitat deterioration and follow up impacts:

Causes

- Stagnation of high water level due to Ithai barrage;
- Pollution of water by contamination of pollutants from inhabited places, fields etc.;
- Accumulation of decaying organic materials, plastic wastes etc.;
- Obstruction to circulation and flushing actions of water;

Impacts

- Inundation of phumdis in the core zone affecting rutting activities and the fright-flight-run pattern of the deer;
- Reduction in the thickness of phumdi, causing huge sheets to crack into pieces and drift apart;
- Changes in the floral composition, density, and more importantly in the ratio of food and shelter plants;
- Alteration in the water quality, lowering the pH (3.8 in the core area) and oxygen level (2.8 mg/l) and a substantial increase of carbon dioxide (20 mg/l) -LDA,2002;
- Choking off of Ungamen and Khordak channels by phumdis and affecting the circulation of water inside the park.

The habitat degradation that is altering the structure of the grassland and water quality, and reducing the thickness of phumdis is a serious threat.

Grass species	% of occurrence	
	1986	1996
Zizania latifolia	18.3	14.6
Phragmitis karka	14.4	10.2
Saccharum munja	4.7	4.2
Erianthus arundinaceus	1.9	2.3
Learisa hexandra	24.7	32.5
Carex crusiata	3.9	3.1
Oryza perenis	7.7	1.8
Coix lacrima-jobi	4.2	1.6
Capillipedium spp.	11.1	14.2
Others	8.6	15.5

Table 1: Major food and shelter grasses of *Sangai* in 1980s and 1990s.

Sites	Range of *phumdi* thickness (m)
Hourou-phumluk	0.50 – 1.60 (1.17)
Near Toya hillock	1.20 – 2.00 (1.69)
Near Khordak river	0.60 – 1.50 (1.04)
Mayaidak (Thangbral - yangbi)	1.00 – 2.10 (1.87)
Near Pabot hillock	0.75 – 1.35 (1.05)
Figures within brackets indicate mean of five places	

Table 2 : Thickness of *phumdi* in three ecologically sensitive sites in 1990s.

Sangai and Keibul Lamjao

Though sangai previously ranged over a wide area of the state before they were driven into the present wetland area, they have been adapted well there. The development of a hard and horny pastern with well splayed-out hooves enables them to keep their footing on the springy habitat. Their feeding habits, behavioral activities of all kinds – including the reproductive cycle – have all well adjusted to the park's seasonal shifts of forage. However, in the recent past certain behavioral changes among the deer causing them to run out of the park were encountered. During 1999, for example, an escaping deer was captured by the locals with NGOs and released back into the park.

There are three reasons that may be responsible for the aberrant behavior:

- The high level water (769.12 m) caused by the Loktak Project has loosened the system of interlocking grass stolons forming the skeleton of the *phumdi* sheets (2 acres or more wide), causing them to break into pieces by the wind, with or without animals being on it. Perhaps such drifting phumdi pieces had an animal on it and it might have drifted close to the peripheral fish firms or paddy fields, thus providing passage for the deer to escape.
- Human presence, be it for fishing, collecting vegetables, reeds, etc., has created a massive crisis. The deer are frightened, inducing them to make fright-flight-runs. During such a run, the panicked deer may leave the park and take shelter in the nearby villages. Both fire in the phumdi and the higher water levels of the Loktak Project act as negative factors that can alter the vegetation of the park, leading the deer to escape.
- The ever increasing struggle for food and shelter between sympatric species such as hog deer (*Axis porcinus*) and wild boar (*Sus scrorfa*) may cause the sangai or the hog deer to leave the park.

Action needed

Three basic requirements that need to be strictly preserved in KLNP are: 1) to maintain the thickness of the phumdi in the home range area at 1–2 meters; 2) to avoid human presence in the Thangbral-yangbi (breeding ground area) during rutting season; and 3) to preserve the fodder and cover grasses in a proportion of 1:1. During the 1980s, this ratio was approximately between 60% and 40% and today, the shelter grasses are losing ground and they occur in a ratio of 30% against 70% of food plants. The existing conditions favor the luxuriant growth of grasses like *Learsia hexandra* and *Capillipedium* sp. and they occur in many places as monotypic species. Besides phumdi fire, the replacement of fodder grass by weeds and the overgrowth of an exotic paragrass (*Brachiaria mutica*) are other woes afflicting the sangai. A phumdi less than one meter thick is dangerous to the animals as it fails to hold the weight of an adult deer (Shamungou, 1990). But in many places of the park the thickness of the *phumdi* has been reduced to below 1 meter and even to less than 0.50 m, a condition that is truly alarming. At this rate, if urgent and forceful steps are not taken soon, this endemic species and its habitat will soon be wiped out. In this context, therefore, the park should be recognized as being of the highest priority for the conservation of sangai. Also, there is a need to implement strict measures to check the slowly crumbling population structure in terms of sex ratio and others, and the rapidly declining habitat conditions of the park, which is a very unique place for the rare sangai. The following efforts are suggested:

- *Water regime:* The Forest Department (Wildlife Wing), Loktak Hydel Project and Loktak Development Authority can jointly come up with a workable solution to maintaining the water regime of the park. Ring bunds along the Ungamen and Khordak channels and a regulatory shutter at the mouth of Ungamen may be able to channel and check the inflow of water due to the Ithai dam. Not regulating the rising water table has become a matter of grave concern for the survival of the deer.
- *Range extension and improvement of the park:* About 10 hectares of private field in between south western side of the park and the Chingmei hills must be acquired and annexed into the park's territory at any cost. The core area may be enlarged by filling the waterbodies in between Thangbral-yangbi (Home Range Area) and private lands with *phumdis* from Loktak lake. This can provide enough space for a frightened deer to cover its fright-flight run, which normally requires a distance of 400–500 meters in any direction along a stretch, or at intermittent stops (Shamungou, 1988). Permanent cairns can be erected at places along the north western side of the park. Planting of trees like *Salix tetransperma*.

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STUDY OF VEGETATION AND GRAZING IMPACTS ON PHEASANT IN PIPAR RESERVE, NEPAL

by Laxman Prasad Poudyal, Hem Sagar Baral and Philip McGowan

Introduction

Pipar Pheasant Reserve holds five of the eight pheasant species of Nepal (Lelliott and Yonzon, 1980; Fleming *et al.*, 1979). It is an area set aside by World Pheasant Association for pheasant conservation. Though the area has not been officially recognized as a separate reserve by His Majesty's Government of Nepal, it occurs within the boundary of Annapurna Conservation Area in the Kaski district.

Pipar was discovered in 1976 as potential pheasant conservation area, and ecological studies on pheasants were conducted in the late 1970s and early 1980s (Lelliott and Yonzon, 1980; Lelliott, 1981). Since the late 1970s, a series of studies have been conducted in Pipar by various teams (Lelliott and Yonzon, 1980; Tamrakar and Lelliott, 1982; Yonzon, 1982; Picozzi, 1984; Picozzi, 1986; Bhandary *et al.*, 1986; Picozzi, 1987; Howman and Garson, 1993; Kaul, 1995; Kaul and Shakya, 1998; Kaul and Shakya, 2001; Baral *et al.*, 2001; Gyawali, 2004; Paudyal, 2005). The area is an unusual habitat as populations of Satyr Tragopan (*Tragopan satyra*), Himalayan Monal (*Lophophorus impejanus*), Koklass (*Pucrasia macrolopha*) and Blood Pheasant (*Ithaginis cruentus*) overlap in a narrow altitudinal band of around 3000 m in a relatively small area of 2.4 km^2 (Lelliott, 1981). In addition, Nepal Kalij (*Lophura leucomelanos*) is known to occur in lower altitudes of this area and Cheer Pheasant (*Catreus wallichii*) occurs close by Pipar in the west of Kali Gandaki. Picozzi (1987) recorded the occurrence of another three Galliformes: Hill Partridge (*Arborophila rufogularis*), Himalayan Snowcock (*Tetraogallus himalayensis*) and Snow Partridge (*Lerwa lerwa*) in Pipar.

This study yields an ecologically important database on vegetation and the effects of nomadic grazing in the east-facing slope of Pipar known as Pipar Bowl.

Study area

Pipar Reserve lies between 28°22'N to 28°26'N and 83°55'E to 83°59'E in the southern Annapurna region of west-central Nepal. It is located on a steep ridge that falls from the Machhapuchre peak and forms the northwestern part of the Seti River catchment area. It encompasses an area of 35 km^2 and covers an altitudinal range from 1300 m to 4500 m, including Karuwa and Kopuche villages, Pipar, Kalki Danda, Korchan Danda and Khumai Hills. The Seti River bounds the reserve in the east, Khumai and Korchan hill ridges in the west, Sadhu Khola in the north and Karuwa village and Bhajaudi Khola in the south (WPA, 2004).

General descriptions of vegetations and habitat types were made walking along the trail from Karuwa (1300 m) to Pipar pond (3310 m). The detailed study was conducted on Pipar Bowl at a mean altitude of approximately 3100 m. It is characterized by a mosaic of forest, both primary and secondary, small openings, and alpine grasslands.

Vegetation study

Aerial photographs (1992) and toposheets (1996) were used for the general description of habitats. The boundaries between major habitat types and land uses were marked on toposheets from the vantage points offered by the ridges and summits. Vertical zonation was documented by recording the altitude where the vegetation type changed as

observed while trekking through the existing trail to Pipar from Karuwa.

A 750 m transect (T1) which started at 3290 m was taken due north across the Pipar Bowl. At 50 m intervals of 0-750 m from the starting point, 16 plots of 10 m x 10 m size were laid out and 5 quadrats of 1 m x 1 m were laid in each corner and in the center of the 10 m x 10 m plots. Eight further transects (V0, V1, V2,…,V7) were laid running downhill on an easterly compass bearing from this first 750 m transect at distances of 0 m, 100 m, 200 m, 300 m, 400 m, 500 m, 600 m and 700 m. At 30 m intervals on each of these downhill transects, plots and quadrats were outlined as was done in 750 m transect.

Information about trees and shrubs having more than 5 cm diameter, bushes occupying a crown area greater than 1 m^2, droppings of pheasants and the effects of grazing, browsing and trampling by domestic stocks were collected in 100 m^2 plots. Information of woody undergrowth smaller than 5 cm diameter, as well as non-woody ground flora were collected and a visual estimation of the percentage of total plant cover, litter, rock, moss and bare ground in proportion to the total ground coverage was made in 1 m^2 quadrats. Linear measuring tape, nylon strings and bamboo sticks were used to delineate the boundaries of plots and quadrats. A total of 93 plots and 465 quadrats were taken into account for the collection of information of approximately 2.4 km^2 in the sampling intensity of 0.38% and 0.02% respectively. Direct field observations as well as secondary data sources were used to gather information about the type and number of livestock grazing in the area. Herders and villagers were also interviewed.

The data was analyzed using simple statistical tools such as percentage, frequency (total number of quadrates in which particular species /pellets or feathers occur, multiplied by 100 and divided by the total number of quadrates sampled), tables and bar diagrams.

Results and discussion

The area was divided into different zones depending upon the vegetation and the human exploitation features. The forest zones are based on the classification model of Stainton (1972).

1. Human settlement and cultivation (1,300-1,600 m)

There are settlements on either side of the Seti River; in and adjacent to the reserve's boundary at its southern base are terraced fields with scattered houses just below the forest zone. The settlements of Karuwa, Malke, Kabuche, Audi, Sibije and Jyamirebari are inside and Sangdal, Yomu, Bharabhari, Rumja and Mirsa are located adjacent to the reserve. Most of the people are engaged in growing crops and keeping livestock. The major crops are rice, maize, millet, wheat, potato and barley, and the principal livestock are buffalo, cattle sheep, goat and chicken.

2. Mixed forest (1,600-2,500 m)

This type of forest has been described as lower temperate mixed broad-leaved forest in the literature. A great variety of plants occur. Notable species include *Rhododendron arboreum, Tsuga dumosa, Taxus buccata*, and *Quercus lamellosa*. This forest furnishes villagers with firewood, timber, fodder and dead leaves as fertilizer for agriculture purposes.

3. Rhododendron forest (2,500-3,300 m)

Rhodendron arboreum dominates the canopy of vegetation from about 2,500 m up to 3,300 m, which also contains *Quercus semicarpifolia* as a co-dominant. *Alnus nepalensis, Betula alnoides, Acer campbelli, A. pectinatum, Sorbus cospidata* and *Juniperus* are notable species. *Rhododendron barbatum* and *R. campanulatum* are found in upper areas of this zone. The shrub layer is mainly *Arundinaria* species which forms the large stands. Local people practice cutting of ringle bamboo (*Arundinaria* spp) up to 3,000 m.

4. *Betula utilis* forest (3,300-4,000 m)

Betula utilis in association with *Rhododendron campanulatum* and *R. barbatum* dominates the top canopy of vegetation from about 3,300 m up to the tree line. There are large areas of shrubby vegetation dominated by *Berberis asiatica* and *Viburnum grandiflorum*. Ground layer is available for grazing domestic stocks. Nomadic

grazing implies fewer disturbances in terms of vegetation conservation and development.

5. Moist alpine scrub (4,000-4,600 m)

The grasslands are both natural and man-made in origin. Above the tree line, they are mainly naturally occurring alpine meadows up to the limit of the vegetation. Tussock areas also occur frequently. Below the tree line on south facing slopes, burning and grazing have opened and maintained grassy areas. The practice of collecting medicinal plants is common. During our vegetation survey we met 4 crews of 7-8 persons working up and down for Nirmasi (*Delphinium denudatum*) collection through the route of Piper pond.

Floristic composition at Pipar Bowl

Altogether, 78 species were collected in the Pipar Bowl and 67 species were identified as belonging to 51 Genera and 30 Families. The family Rosaceae comprised the maximum number of plant species (12), followed by Ericaceae (7), Compositeae (5), Ranunculaceae (4), Aceraceae, and Poligonaceae (3), Berberidadeae, Betulaceae, Caprifoliaceae, Gentianaceae, Gramineae, Labiateae, Liliaceae, Orchidaceae(2) Amaryllidaceae, Begoniaceae, Calastraceae, Cyperaceae, Dioscoreaceae, Geraniaceae, Hydrangeaceae, Hypericaceae, Lycopodiaceae, Onagraceae, Papilionaceae, Primulaceae, Pteridaceae, Salicaceae, Saururaceae, Smilacaceae and Urticaceae (1).

Though *Viburnum* and *Berberis* bushes were widespread, *Rhododendron* has dominated the upper canopy. The large stands of *Arundinaria* species dominate the shrub layer of the forest on the south- and east-facing slopes. Most of the species described by Picozzi in 1984 were observed in this survey, plus some species not mentioned by Picozzi (1984) were encountered, e.g. *Aconitum spicatum, Adiantum myriosorum, Anemone obtusifolia, Calanthe alpine, Dactilorhiza hatageria, Delphinium altisimum, D. denudatum, Elatostema obtosum, Gentiana speciosa, Hedysarum campylocarpon, Houttuynia cordata, Lilium nepalense, Lycopodium clavatum, Lyonia ovalifolia, Rumex nepalensis* and *Smilicina fusca*.

Rhododendron barbatum is the most frequently available tree species (frequency: 46), followed by *R. campanulatum* (33), *R. arboreum* (29), *Acer pectinatum* (17), *A. campbelli* (13) and *Betula utilis* (10). On the other hand, *Betula alnoides, Cotoneaster affinis* and *Euonymus tingens* are the least available. *Potentilla fulgens* is the most frequently available ground flora (frequency: 43), followed by *Carex cruciata* (30), *Fragaria daltonima* (25), *Rhododendron seedlings* (16) and *Primula glomerata* (9). *Lycopodium clavatum, Artemisia* spp. and *Delphinium* spp. are the least available.

Ground coverage

At the ground level, 36% is covered by ground flora, 23% by litter, 12% by rock, 16% by moss and 13% by bare ground in proportion to the total ground coverage available. From estimates in different transects, plant coverage ranges from 18% to 53%, litter 17% to 30%, moss 10%-24%, rock 0-29% and bare ground 7%-26%.

Grazing pressure

The people living adjacent to the reserve utilize the land of Pipar for livestock grazing and collecting fodder, fuel wood, timber, bamboo and medicinal plants. They consider that grazing in the area is their customary right. Though some threats like invasion by unpalatable plant species, soil erosion, intentional fire, deforestation, haphazard harvesting of NTFPs and disturbances to wildlife are present due to the grazing, there is good news that the grazing has been reduced considerably compared to the past 20 years. Nowadays 17 buffaloes and 300 sheep are grazed in Pipar bowl and its south-facing slope during the summer.

The main reason for the reduction in grazing pressure is that these days the young people from the villages are not willing to bring the livestock to the Pipar for the three months of monsoon, mainly because of the changing living style and their attraction towards the city for earning money. This gradual reduction of grazing pressure will assist the gradual replacement of *Berberis* and *Viburnum* scrub by *Rhododendron* scrub. During the survey

time the authors found *Rhododendron* seedlings frequently available in the area.

Table 1: Comparison of grazing pressure with previous study

Time Period	Buffaloes	Sheep	Herders	Goths	Reference
1983	40	300	6	7	Picozzi, 1984
1994	30	300	5	6	Paudyal, 2005
2004	17	300	2	1	Gyawali, 2004

Pheasant sightings

Himalayan Monal, Blood Pheasant, Koklass Pheasant and Satyr Tragopan were seen during the survey. Calls of Koklass were heard every morning and the call of a Satyr was also heard one morning.

In each transect, the habitat preference of pheasant was determined by recording the occurrence of pheasant faeces and other signs of their presence. During the survey, we found 41 groups of pheasant droppings and 4 groups of feathers. The droppings were frequent in the plots near the water streams.

Vegetation: food for pheasants

Pheasants feed on mosses, leaf litter, grass, buds and shoots, leaves, fruits, seeds, roots, tubers, insects and quartz grains (Yonzon and Lelliott, 1981; Bhandary *et al.*, 1986). Among these, mosses and grass leaves were two main autumn foods in the diet of the forest pheasants at Pipar (Bhandary *et al.*, 1986). The ground coverage of flora, moss and leaf litters is very important for the feeding of pheasants. Among the 67 identified plant species in this survey, leaves of *Arundinaria, Potentilla, Fragaria, Primula, Geranium, Anaphalis, Taraxacum*, ferns, *Carex*, seeds of *Fragaria, Cotoneaster, Smilax, Rubus* and roots of orchids were consumed by the pheasants (Bahandary *et al.*, 1986). The greater the ground coverage of moss, grasses and leaf litters there is, the greater the food available for pheasants. This means that less intervention of humans and domestic stocks in the area is needed.

Conclusion

Pipar represents ecozones extending from sub-tropical near the Seti River, through temperate to alpine grasslands. *Rhododendron, Betula utilis* and Moist Alpine Scrub are the main forest types of this area. *Quercus lammellosa, Q. semicarpifolia, Sorbus cospidata, Rhododendron arboreum, R. campanulatum, R. barbatum, Betula utilis* and *Acer* spp. are the dominant trees in the canopy layer; *Arundinaria* spp., Viburnum *grandiflorum, V. cordifolium, Berberis asiatica, B. chitria, Rhododendron lepidotum* and *Lyonia ovalifolia* are found in the undergrowth and Salmi grass, *Fragaria daltoniana* and *Potentilla fulgens* are the major components of the ground layer.

Grazing pressure and NTFP collection from Pipar has been reduced considerably during the last 20 years. However, Sano Khobang, Thulo Khobang, Pipar Bowl and many highland pastures are still found to be favored spots for grazing. Livestock herders and NTFPs collectors are still using these areas. Disturbances to the wildlife and their being killed by herdsmen and their dogs, undesired fires, deforestation and haphazard harvesting of NTFPs are the major threats currently evident in Pipar. These threats may make the area less favorable for pheasant conservation, in what otherwise is an important pheasant reserve recognized internationally for the long term management of pheasant. We hope that Pipar will be a better habitat for pheasants in the future so that it can maintain a viable population.

Recommendations

A vegetation survey and a study of the food habits and nesting behavior of pheasants should be carried out before summer, when the flowers of the most plants appear to be seen. It will complete the data on what plant species are more important for pheasants.

Alternative employment opportunities should be created for those people who are engaged in herding domestic animals and collecting medicinal plants in Pipar forest. Stall feeding for buffaloes should be encouraged in the adjacent villages.

The area has been set aside as a pheasant reserve by the World Pheasant Association for the conservation of Himalayan pheasants, but it has not been officially recognized as separate reserve by His Majesty's Government of Nepal. The authors recommend that the area should be declared as a strict nature reserve.

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A NEW APPROACH TO CONSERVATION BY ANALYZING NATURAL RESOURCE LEGISLATION

by John W.K. Parr

Introduction

Legislation documents embracing natural resource issues represent bedrock conservation documents. Firstly, each of these legislative documents provides a fundamental framework for how each respective government handles a particular natural resource issue. In more precise terms, each legal document precisely defines the institutional responsibilities in terms of membership, mandate, and functioning. Each document also defines the relationship of these institutional bodies to the key natural resource management issues.

Theoretically, a collection of these documents should show general similarities, in terms of the designated institutional bodies, and the key management issues, and allow for a theoretical model document to be prepared incorporating key institutional bodies and key management issues.

Reviewing different natural resource issues

1.) Protected area legislation:

Between September 1999 and December 2002, 34 pieces of protected area legislation were collated from 22 countries around the world, through requests made to contacts in targeted countries or through the internet. These countries comprised 15 counties in Asia as well as Australia (1999), Bulgaria (1998), Canada (2000), New Zealand (1980), Scotland (2000) South Africa (1976) and the USA (1964). Some draft legislation was also included (e.g. Lao P.D.R.).

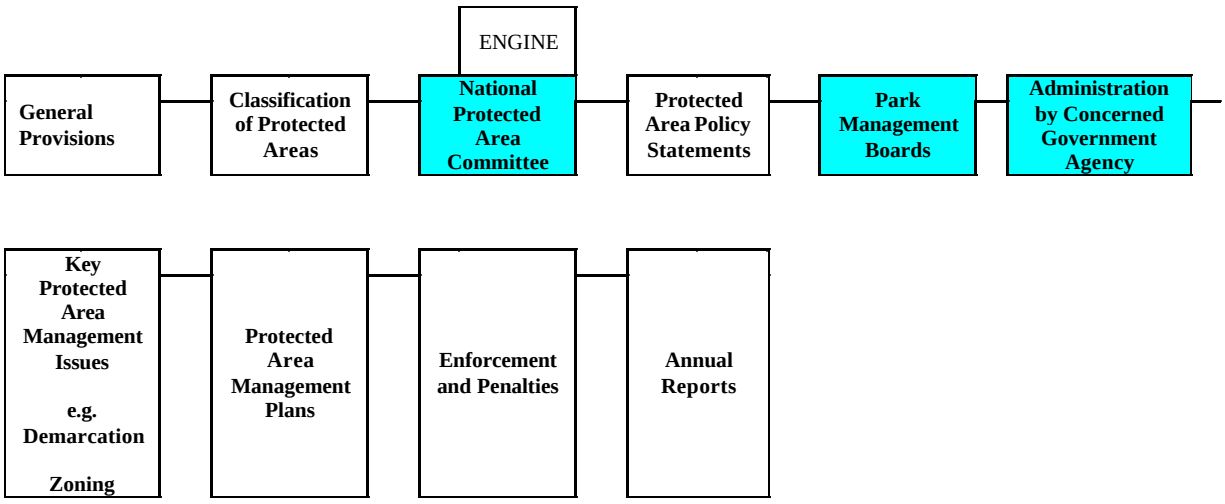
The protected area legislation showed striking similarities. All the legislation documents comprised sections of legal articles. Each section referred either to a key institutional body or a key management issue. Indeed, an individual piece of

legislation could be broken down into segments, superficially taking on the appearance of wagons on a good's train. However, legal frameworks for natural resource management issues are not two-dimensional, or linear, and it may be better to conceive of the legal documents like a spider's web, with institutional bodies or natural resource management issues as nodes at points on the spider's web, with threads linking up between the key nodes.

From analyzing the legal documents for protected areas, three institutional bodies may be identified. These comprise a national protected area committee, best demonstrated by the national park boards or committees in New Zealand (1980) and South Africa (1976); a local level, national park management board or advisory board as prescribed in the Philippines (1992), Sarawak (1990), and Scotland (2000) as well as Wood Buffalo National Park in Canada (2000). In national parks where no communities reside or utilize the natural resources, these site-level management boards appear unnecessary, as reflected in the legislation regarding most parks in Canada (2000), as well as South Africa (1976) and the USA (1964). Thirdly, the laws describe the government agency for administration, as prescribed in virtually all countries, for example in Canada (2000), the Philippines (1992), and the USA (1916). Key natural resources management issues addressed within these laws including policy statements, park management plans, miscellaneous management issues such as zoning and boundary demarcation, and sometimes annual reports.

Figure 1 shows a model law for protected areas based upon analyzing 34 pieces of legislation.

Figure 1. Legal Model generated for Guiding Protected Area Management (both Terrestrial and Marine)



2.) Wildlife Trade Legislation:

During February to April 2004, wildlife trade legislation was collated through e-mailing and an internet web search. A total of 33 pieces of legislation were collated and reviewed, but some 22 pieces of legislation (66 per cent) were so scant in detail that they could not be analyzed. Regarding institutional bodies, the more detailed legislation prescribed both the management authorities and the scientific authorities, as defined in the text of the Convention on International Trade in Endangered Species of Fauna and Flora; Articles I and III (1973). Some laws also prescribe endangered species officers or wildlife protection officers, within a designated government agency. Regarding the natural resource management issues, the wildlife trade laws make reference to

the issuance of permits and certificates (e.g. Trade in Endangered Species Act 1989 of New Zealand), again responding to CITES.

However, not one of the national legislation reviewed prescribes an overarching national body for supervising the management of illegal wildlife trade. This omission precludes the involvement of the law enforcement agencies from the suppression of illegal wildlife trade. Furthermore, not a single piece of wildlife trade legislation reviewed, prescribes the formulation of policies on illegal wildlife trade issues, both internally with the country or regarding international cooperation. Such serious omissions from wildlife trade legislation – which have often been generated in response to the text of CITES – clearly leave the door wide open for illegal wildlife trade to flow within countries, and across international borders.

Despite these weaknesses in the national legislation, a number of countries have responded to the need for an interagency institutional body, providing a central focal point to handle the suppression of illegal wildlife trade. Examples of these institutional bodies are outlined below. However, it is unknown how many of these interagency committees are formally linked by policy statements, or other modus operandi, for sustainable and strengthened liaisoning.

UK Partnership for Action Against Wildlife Crime

In 1994, the United Kingdom commissioned a Wildlife Law Enforcement Steering Group to undertake a review of legislation and procedures covering all aspects of wildlife law policy and enforcement..... The recommendations included the creation of a permanent national committee composed of the CITES Management Authority, the Home Office, The UK Police Forces, H.M Customs and Excise, non-governmental organizations (NGOs) involved in wildlife law enforcement and other bodies. In November 1995, the partnership for Action against Wildlife Crime (PAW) was launched. PAW has created a forum and mechanism that allows a comprehensive, structured and coordinated approach to improving wildlife laws and enforcement in the UK.

Wildlife Task Force in Los Angeles, USA

The Wildlife Task Force is a multi-agency effort to interdict illegal wildlife import and exports. The Task Force, which consists of inspectors and agents from US Customs, the US Fish and Wildlife Service, the Food and Drug Administration and the US Department of Agriculture, was developed by a team of US Customs import specialists to address illegal wildlife trade in general, and the illegal importation of traditional Chinese medicines specifically.

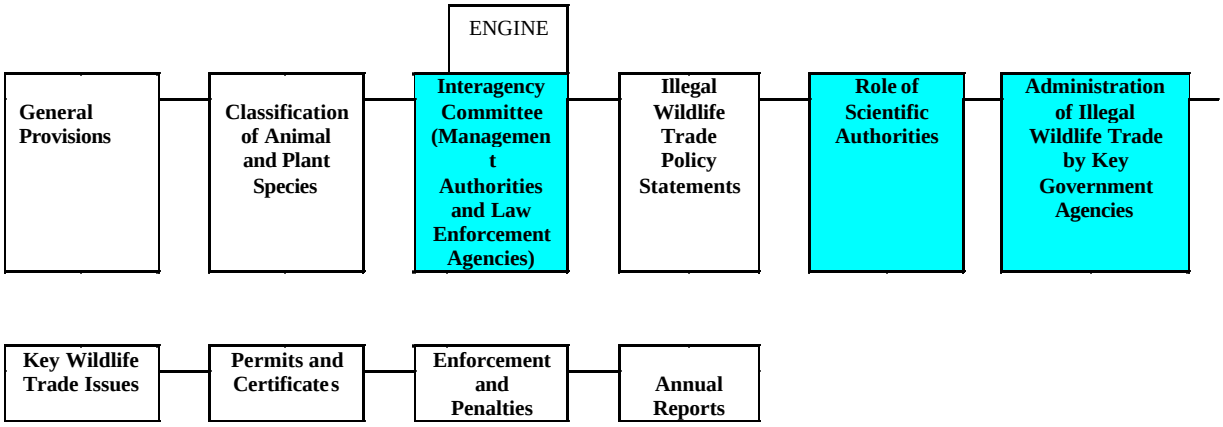
Covenant in the Netherlands

The Dutch Covenant was created in response to a recommendation of a report on wildlife crime in the Netherlands in 1994. This inter-ministerial body, comprised of representatives of the Ministry of Justice, Ministry of Internal Affairs (Police), AID-Ministry of Agriculture and Customs, meets with NGOs to discuss wildlife crime and enforcement. The group was established to rectify a problem within the Netherlands in which the various agencies had competed with one another rather than working together on wildlife trade enforcement issues. Since its formation, the Covenant has co-operated on a number of investigations that have led to significant seizures and prosecutions. The Covenant is simply a mechanism to facilitate co-operation, mutual understanding, sharing of intelligence information and concerted targeting of problem areas in wildlife trade and CITES.

National Coordination Committee (NCC) of India

The Ministry of Environment and Forest of India established the National Coordination Committee (NCC) by governmental order on 28 August 1995. The NCC consists of representatives from 10 different enforcement agencies and an NGO, TRAFFIC, India. The objective of the NCC is to promote effective inter-departmental co-ordination for the control of illegal trade in wildlife and wildlife products in the country.

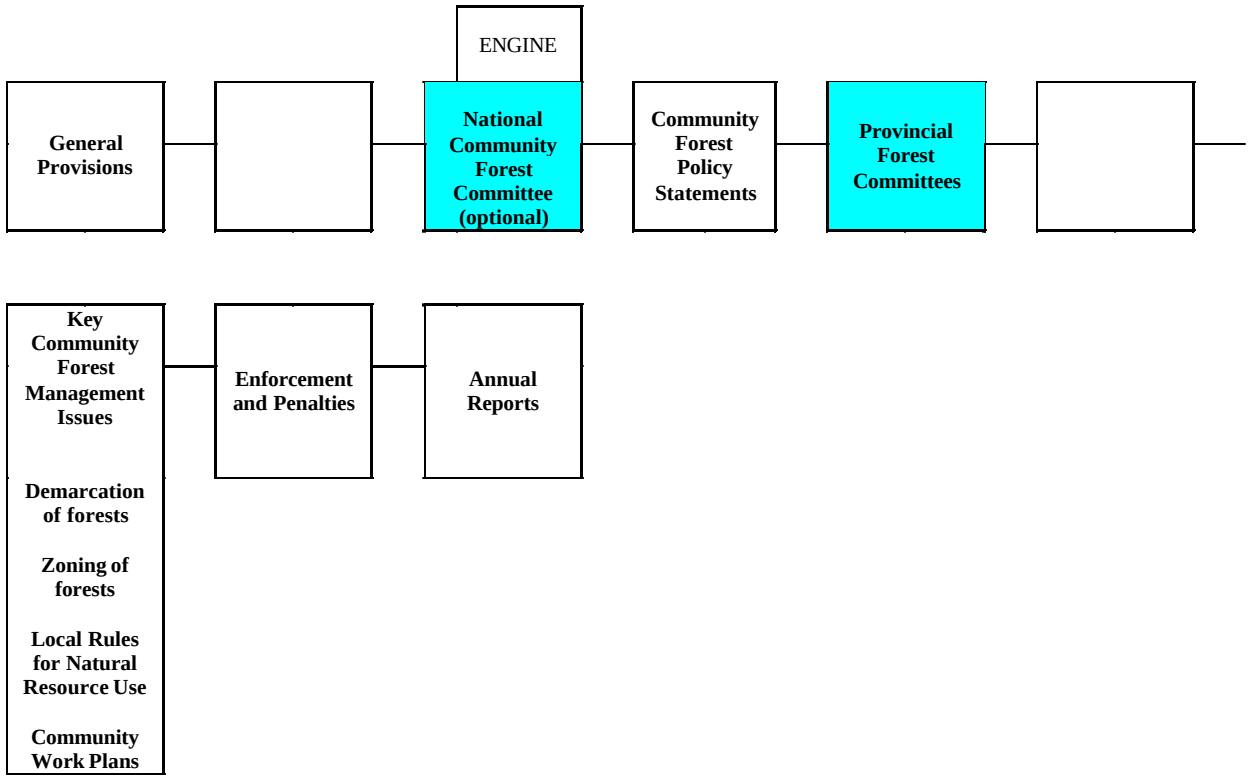
Figure 2. Legal Model generated for the suppression of Illegal Wildlife Trade



3.) Community Wetland Management:

Initial searches on the internet and informal networking suggest that there may be exceedingly few, if any, legal documents in Asia for this natural resource issue, for analysis. Regarding Thailand, there is currently no legislation is in place specifically for wetland management. However, it was possible to modify draft community forestry legislation from Thailand (1996) and Nepal (1993) to prepare a theoretical community wetland legislation, by a simple word change of "forest" for "wetland." The resultant theoretical law prescribes three institutional bodies. The national wetlands committee should largely formulate wetland management policies. The provincial wetland committees should co-ordinate inter-government agency cooperation with the

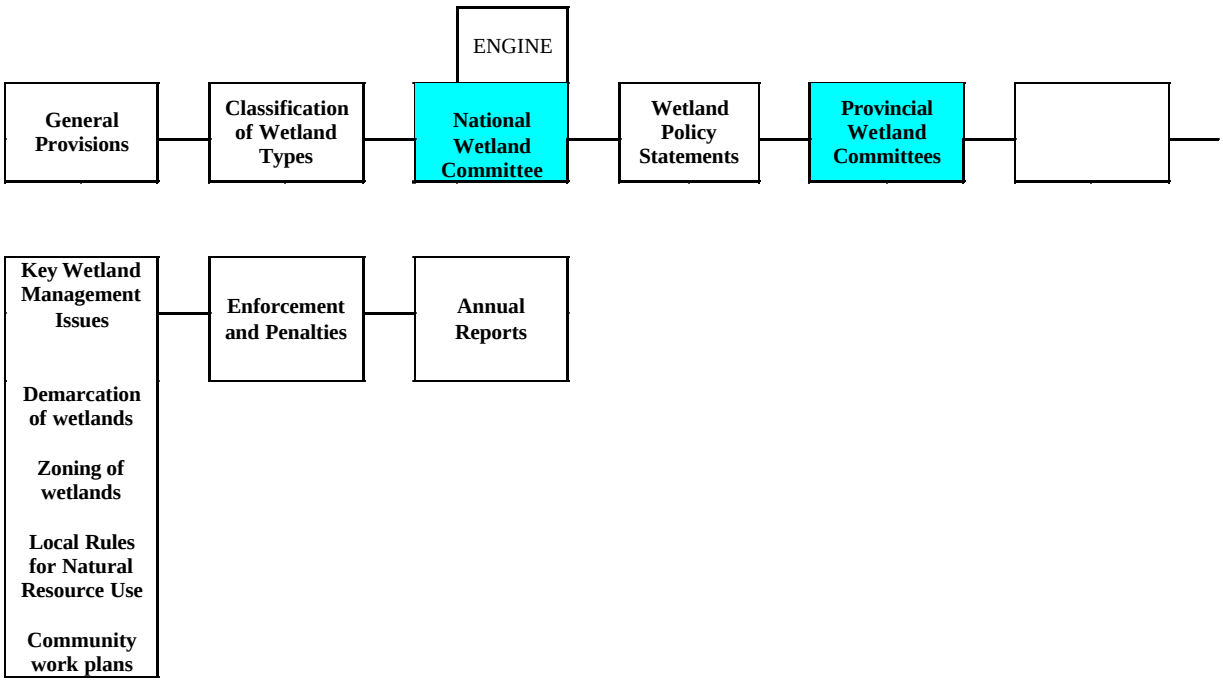
Figure 3. Legal Model generated for Community Forest Management



communities on the demarcation, zoning and drafting of rules for the sustainable management and wise use of wetlands. In addition to this aforementioned involvement, the community wetland committees, which are essentially the communities themselves, should prepare work plans for the sustainable utilization of wetlands at the community level. For application of this law, see below:

Figure 3 and 4 show theoretical laws for community forest management and community wetland management.

Figure 4. Legal Model generated for Community Wetland Management



Case study: Institutions managing natural resources in Thailand

Protected Area Management: The National Parks Committee established under the National Parks Act (1961) and the Wild Animals Preservation Act Committee established under the Wild Animal Reservation and Preservation Act (1992) have no mandate to create policy statements for national park management or wildlife sanctuary management respectively. They play no role in supervising the Department of National Parks Wildlife and Plant Conservation in its day-to-day duties, in management planning, or overseeing any other park management issues (zoning, boundary demarcation etc.). Indeed, a recent analysis conducted by WWF Thailand in 2003 indicated that individual parks only collated information on tourism statistics and monetary issues, and indictments following arrests. There was no flow of information on biological information, on socio-economic aspects, on patrolling regimes, on forest fire outbreaks or reforestation efforts. Indeed, there was no standardized patrolling form within the National Parks Office. Information flow between parks and central headquarters – based upon reviewing annual reports and all relevant documents - was deemed low. This gives some idea of the importance, as well as the impacts of neglecting the appropriate institutional bodies and their role in effective conservation.

Illegal Wildlife Trade: For illegal wildlife trade in Thailand, there is no interagency committee. The only authorized institutional bodies are the management authorities (CITES Units) found within the Department of National Parks, Wildlife

and Plant Conservation, the Fisheries Department and the Department of Agriculture, as well as the scientific authorities. Consequently, there is no formalized liaisoning between the management authorities and the law enforcement agencies regarding the suppression of illegal wildlife trade. Working relationships are very much dependent upon personal relationships, and at locations where the representatives from the concerned agencies have close interactions (e.g. airports and border crossings). Of note, there are no policy statements formally binding agencies in effective collaboration. Consequently, officials from the Customs Department and the Police Department, who are critical in illegal trade prevention, are very loosely engaged.

Community Wetland Management: The National Committee for Wetland Management was appointed by the Thai National Environment Board on 1 July 1993. The main objectives of the committee were to provide guidelines and coordinate action on wetland management. They also handle issues relating to the Ramsar Convention, of which there are only 10 designated sites in the country, representing less than one per cent of the total area of Thai wetlands. Currently, they provide no direction for wetland management for the other 99 per cent of wetlands, covering some seven percent of the country.

Forest Fire Management: Forest fire prevention in Thailand lacks both a legal framework as well as policy arrangements (Ganz, 2002). In 2000, the Forest Fire Control Office was composed of four regional Fire Control Divisions, 15 Forest Fire Control Centers, 64 Provincial Forest Fire Control Stations and 272 Forest Fire Control Units. Upon the reorganization of the Royal Forest Department in October 2002, the Forest Fire Prevention Division was integrated with 21 regional offices within the Department of National Parks, Wildlife and Plant Conservation. Of note, the concept of community involvement, through the Fire Prevention Associations as in the Republic of South Africa: National Veld and Forest Fire Act, 1998, has been omitted.

River Basin Management: Regarding river basin management, 25 river basin committees have been established in each of the river basins within the country. However, their function remains quite loosely defined and poorly understood. The Department of Water Resources has established a pilot project in the Bang Pakong river basin to implement stakeholder processes in river basin management under the new framework. (Hirsch, 2005)

The same scenario is evident for institutional arrangements, legal and policy frameworks, and the key management issues affecting species conservation, offshore fishing, coastal resource management, sustainable energy, and virtually all other natural resource issues.

Testing the theoretical institutions for natural resource issues in Thailand

Protected area management: WWF Thailand identified the national park management board as the key institutional body at the field level; this was not recognized in Thailand. It identified management planning as a key protected area management issue (refer Figure 1). Consequently, the organization developed a project that empowered a national park working group (mirroring the membership of a park management board) to conduct management planning.

In response to these efforts by WWF Thailand, the Department of National Parks, Wildlife and Plant Conservation issued a departmental order on 6th February 2006 establishing protected area advisory boards across the country. On 12th September 2006, the Department of National Parks, Wildlife and Plant Conservation issued a Departmental order to establish a National Park Management Planning Committee to review the entire management planning process in Thailand.

Illegal wildlife trade suppression: WWF Thailand collaborated with the British Embassy in Bangkok and personnel in TRAFFIC, Cambridge and TRAFFIC, Kuala Lumpur to raise the profile of the interagency committee. As a result, DEFRA held a side-meeting at the CITES CoP13 in October 2004 on interagency committee, the first time in its 30-year history. Furthermore, the ASEAN Regional Action Plan on Wildlife Trade has interagency bodies as an integral institutional body prescribed within the plan. Both Interpol and

the World Customs Organization are now becoming increasingly involved at the international level.

Wetland management: WWF Thailand is field testing the community wetland management legislation with a USD 1 million project funded by Danida, from October 2005 to September 2008. The project targets a permanent lake, a seasonally inundated marsh, a section of river plains and a watershed. The initiative involves 69 communities. The project strategy involves the demarcation of the wetland boundaries, zoning of the wetlands and the establishment of local rules regarding natural resource use.

The project has already established provincial wetland committees in the two targeted provinces. The communities are collating information on the fisheries, the aquatic plants, pollution levels, and the waterbirds as a precursor to zoning. The communities in one province have begun demarcating the boundary of the wetlands in collaboration with the Land Development Department and other agencies, with the blessing of the provincial Governor. By comparison, no formal recognition of boundaries has taken place in community forests, despite having been on the conservation agenda for at least 25 years.

Implications for international conservation: The analysis of natural resource legislation identifies key institutional bodies and their relationship to natural resources issues. A number of recommendations arise from this analysis of natural resource legislation.

National legislation for conservation: Legislation for natural resource management issues in developing countries is generally exceptionally poor, a scenario promoted by a lack of faith of the effectiveness of legislation, and a disinterest in legislation by practicing conservationists. However, there are clear arguments that – if the correct institutional bodies are mobilized – the management of natural resources becomes more participatory, and more transparent. These institutional bodies are critical to motivating both government officials and other members of civil society, to improve their performance. Further to this, the written documents – namely the policy statements, the management plans and work plans, and the annual reports become important public documents informing all of achievements made for a particular natural resource issue.

Legislation in some developed countries suggests that the establishment of a national level committee comprising the best expertise in the country is optimal for effective management. However, in protected area legislation throughout Asia, the management of entire protected area estates, covering sizable land areas, is controlled by a single civil servant, who is directly supervised by politicians. The National Protected Areas Systems Act of the Philippines (1992) is arguably the best piece of protected area legislation within all of Asia. However, the absence of a national level protected area committee means that management responsibility is channeled through a single individual within the Department of Environment and Natural Resources, and liable to management short-fallings and political meddling.

Regarding management at the site level, only the Philippines (1992) and Sarawak (1998) have legislation within Asia prescribing park management boards, again a participatory, transparent – and effective – form of management.

Some notable pieces of protected area legislation in developed countries diverge from expected trends. Scotland (2001) did not establish a national level institutional body for directing national park management. Instead, the onus of park management in Scotland has fallen on the shoulders of the individual national park authorities, with 15 of the 25 members being local representatives with the authority to devise their own policies. In short, with the decision-making process predominately localized, it is hard to visualize how the (inter)national biodiversity interest is promoted, against the whims of local concerns. Figure 5 shows the Scottish National Parks Act.

Figure 6 shows how the National Parks Service Act (1916), the Wilderness Act (1964) and the National Parks Service Wilderness Policy of the

United States operates. Both the key institutional bodies - the national level park committee and the local level park management board are absent from the Wilderness Act (1964); though people are absent from their national parks. However, heavy leadership responsibility is placed upon the National Parks Service, which is subject to public scrutiny (e.g. bio-prospecting, snow mobiles in Yosemite National Park). Ensuring quality management is dependent upon public participation and transparency, relating to the publication of new policies, the preparation and approval process of plans and annual reports.

Figure 5. Modified Model generated from National Parks (Scotland) Act 2000.

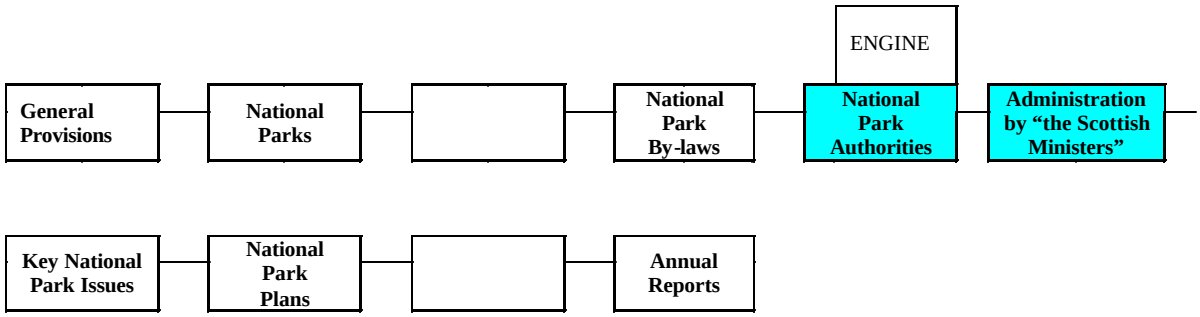
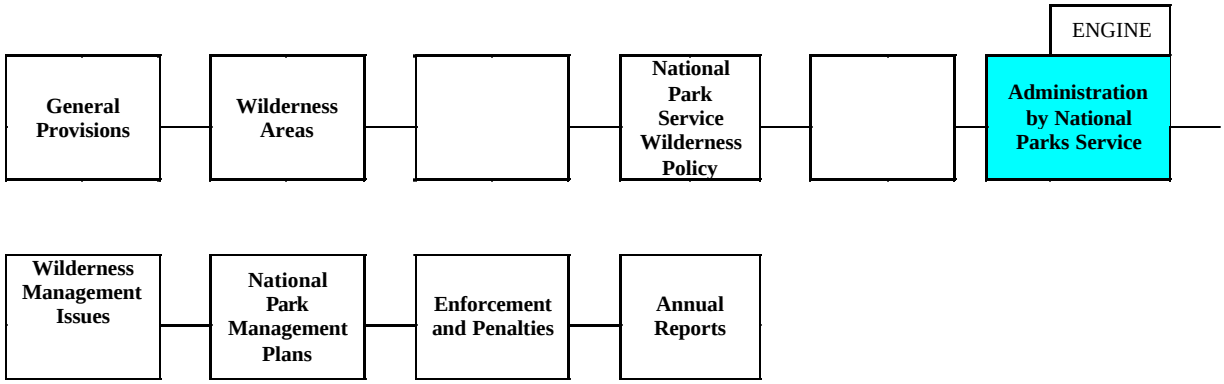


Figure 6. Modified Model generated from the National Parks Service Act (1916), the Wilderness Act (1964) and the National Parks Service Wilderness Policy.



International conventions: Many key international conventions were drafted, when the appropriate institutional bodies and their relationship to the key natural resource management issues that they were designed to support, had not been identified, or even field tested. As such, international conventions may prescribe the wrong, or weaker, institutional arrangements to tackle a particular natural resource issue. Once drafted, and international signatories have endorsed the convention, the ability to adapt the convention can be achieved with varying degrees of difficulty.

The Convention for International Trade in Endangered Species (1973) failed to recognize the significance of the interagency committee, to involve the enforcement agencies (police and customs) and for strong policy formulation, regarding internal and international cooperation. As a consequence, many countries have formulated specialized enforcement bodies to

handle illegal wildlife trade issues. However, these pseudo-institutional bodies unintentionally substitute for the involvement of national police forces, and their nationwide network of officers.

The Ramsar Convention (1971) did not recognize that in developing countries, local communities are the potential protectors of their wetlands, and the sustainable management of wetlands. However, the Ramsar Convention placed waterfowl as the focal point. As a consequence, it has proved extremely difficult to place the correct institutional bodies at the core of the Convention's mandate, for sustainable wetland management. Of equal concern, the failure of the Convention to capture community involvement in wetland management – in developing countries – appears to encourage wetland experts in these developing countries to address other wetland issues arising from the Convention that are easier to grasp, and less controversial (wetland education). It is also uncertain as to whether appropriate policies for wetland management are being promoted, or inhibited, by the text of the Convention.

The Convention on Biodiversity (1992), is one of the most recent conventions in a field of natural resource conservation. Of relevance to the aforementioned analysis of protected area legislation, it has established "a framework of work for protected areas" at its Seventh Meeting of parties in Kuala Lumpur (2002). The programme is very comprehensive and detailed, and its logical to suppose that some recommendations are higher priority than others. Of note, the institutional arrangements are somewhat vague. As a consequence, the international partners who have committed themselves to undertaking this ambitious programme of work would benefit from identifying the key institutional bodies for protected area management and their relationship to key management issues, as a cost-effective approach to effective protected area management.

Poverty alleviation: The rural poor in developing countries are intimately linked with – and heavily dependent upon – their natural resources. Consequently, legislation and associated policies that strengthen community participation in the management and sustainable utilization of natural resources can only be extremely beneficial. Key natural resource legislation includes community forestry laws, community wetland laws, and protected area legislation that establishes park management boards, and their subsequent involvement in the management of buffer zones.

Conservation project implementation in developing countries: National and International conservation organizations prepare project proposals for improving the management of natural resources and mitigating the negative impacts on these resources. However, it is uncertain to what level consideration is given – in terms of project proposal preparation – to the appropriate institutional arrangements for any given project. Only too often, no consideration is given to this matter at all.

As an example, ecoregional planning superficially appears to handle large areas for conservation, has strong marketing and donor appeal, and has communication appeal. However, this planning process suffers from several fundamental weaknesses. Most significantly, the process involves identifying and prioritizing a list of threats for a particular ecoregion, and then generating conservation responses. Unfortunately, there is no logical linkage between the threats and the correct institutional arrangements to mitigate the perceived threats. Thus, there are strong opportunities for creating "pseudo-institutional" bodies in developing countries, which collapse after project termination. Furthermore, ecoregional planning promotes complex, cross-cutting, landscape agendas, and lateral thinking. This is fine for institutional bodies operating effectively in the USA or in European countries. However, ecoregional planning may appear exceedingly confusing to institutional bodies, even in a country as developed as Thailand.

By comparison, the legal analysis approach makes concrete, step-by-step, progress not just at an ecoregional level, but at a magnitude larger – at the national level, in a highly cost-effective approach. The advances either in establishing key institutional bodies, or achieving key natural resource management progress, are uniquely measurable.

Finally, it is notable that the conservationists, and conservation organizations, tend to overlook the importance of institutional arrangements in project formulation. And then they wonder why their achievements melt away following project completion.

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SURVEY OF MUGGER CROCODILE (Crocodylus palustris) IN SIMILIPAL TIGER RESERVE, ORISSA, INDIA

by H.K. Sahu, S.K. Dutta and S.D. Rout

Introduction

The mugger crocodile, (*Crocodylus palustris*) has the widest distributional range compared to any of the Asian freshwater crocodilian species (Whitaker and Whitaker, 1989). Of the 21 species of crocodilians that are found in the warm subtropical and tropical regions of the world, three occur in the Indian subcontinent (Singh, 1999), namely the Gharial (*Gavialis gangeticus*), the Saltwater or Estuarine crocodile (*Crocodylus porosus*) and the Mugger (*Crocodylus palustris*). All three species are found in several natural habitats in Orissa State. The Gharial is found in the Mahanadi River system, the Saltwater crocodile is found in the Bhitarkanika Sanctuary and the Mugger is found in the riverine systems of Similipal Tiger Reserve. Of the three species of crocodilians found in India, the most common and widespread is the broad-snouted mugger crocodile, also known as the Marsh crocodile, which inhabits all kinds of fresh water habitats such as rivers, lakes, reservoirs, hill streams, village ponds and man made tanks (Andrews, 1999).

Results of a survey of Mugger crocodile, conducted in November-December 1979, indicated that the mugger had virtually become extinct in the Similipal Tiger Reserve area (Anonymous, 1999). Hence, the mugger management project in Similipal started thereafter at Ramatirtha near Jashipur to maintain a viable population of the species in Similipal, conduct management-oriented research, and provide muggers for re-stocking elsewhere under the financial support from UNDP, FAO, the Government of India and the state government of Orissa. The initial stocks of 150 young muggers were brought from Tamil Nadu and six of them were retained for captive breeding at Ramatirtha. Over the years, 788 crocodiles have been released into the river systems of Similipal. The present study reveals the population status of muggers in the various river systems of Similipal Tiger Reserve during 2005.

Study area

Similipal is the heart of Mayurbhanj District in Orissa (India), lying close to the eastern-most end of the Eastern Ghats. Located in the Mahanadian

Biogeographical Region and within the Biotic province Chhotanagpur Plateau, it spreads over an area of 2,750 km^2. The whole of the Similipal hill range falls under the Similipal Tiger Reserve and is located between 20° 17' to 22° 10' N latitude and 85° 57' to 86° 47' E longitude (Fig.1). Similipal was declared a Biosphere Reserve in 1994. The highest mountain is the peak of Khairiburu, which is 1,168 m above sea level. Similipal has the richest watershed in the state of Orissa, giving rise to many perennial rivers such as the Budhabalanga, Khadkei, Khairi, Bhandan, West Deo, Salandi, East Deo, Sanjo and Palpala.

Methodology

A survey of muggers in Similipal was conducted during March 2005, to ascertain the status of the species. The direct sighting method was used to count the number of muggers. For this purpose, the entire survey team was divided into two groups, namely Team-A and Team-B. Different river systems were allotted to both these teams. They surveyed the riverside on foot. During the survey, direct sightings, as well as indirect evidence such as tunnels, basking places and scute marks on the ground, were taken into account to count the population of the muggers. The body length was measured by ocular estimation during direct sighting. From indirect evidence, the same could be measured from the tracks of hind paw mark and also from the tail mark. The body length is equal to approximately 14 times the paw length, and approximately 65 times the maximum distance between two lines created by the movement of the tail (Singh, 2000).

Results and discussion

A total of 85 mugger crocodiles were counted in the river systems of Similipal Tiger Reserve. The lengthwise distribution and numbers counted in the rivers are given in Table 1. In West Deo, more crocodiles (50) were counted, followed by Khairi (17), Budhabalanga (13), Khadkei (3) and East Deo (2). In West Deo and Khairi, crocodiles 1-1.5 m in size were sighted, and in Budhbalanga, Khairi and East Deo, crocodiles of 1.5-2 m were observed (Fig. 2). Overall, most of the crocodiles sighted were in the size range of 1-1.5 m, followed by those 1.5-2 m in length; individuals <1 m and >2 m were also found (Fig. 3). It was found that the rivers West Deo, Khairi, Budhabalanga, Khadkei and East Deo have 59%, 20%, 15%, 4% and 2% of the total population of crocodiles respectively (Fig. 4).

More muggers were sighted in West Deo River compared to other river systems because the West Deo River system is confined to the core area of Similipal. In addition, the length of the river is greater in comparison to the other rivers and the anthropogenic disturbances and biotic interference inside the core area is less. Also, the availability of fish is greater in the river. Mugger is the most adaptable of the three crocodilians and has been encountered up to 400 m in clear hill streams, in sewage treatment ponds and in cold deep rivers in the Himalayan foot hills (Whitaker and Andrews, 2003). In Similipal Tiger Reserve, muggers have been recorded at an elevation of 800 m (Sahu and Swain, 2004).

Although East Deo is also situated in the core area, there are fewer deep water areas (locally known as darahs) and fewer basking places for the muggers. In Budhabalanga, the riverbank is steep and rocky and the availability of basking places is less and biotic interference is greater. In Khairi, the population of mugger is found from Jenabil to Jadi darah in the Jenabil to Ransa route. At this locality, the number of muggers is lower in comparison to West Deo, as the riverbed is rocky, which provides less area for the species to bask. However, a detailed systematic study should be made seasonally in order to study the seasonal behavior and ecology of muggers in Similipal Tiger Reserve.

During the 2005 census, 24 crocodiles with body lengths of 1.5 to 2.0 m, and 8 crocodiles with body lengths longer than 2.0 m were sighted. This indicated that 38% of the crocodile population comprised adults. In Tamil Nadu, the wild mugger population is 465, with 52% adults (Andrews, 1999); in Gujarat the population is 492, with 88% adults (Vijaya Kumar *et al*., 1990). In Similipal, a recent survey showed that the population was 85, with a 38% adult population. Although the reasons for the extinction of mugger from Similipal were not clear, one author (Anon., 1999) cites adverse factors such as: 1) fishing using explosives and

nylon nets; 2) use of DDT and other insecticides with an intention to control malaria; 3) fires on the river banks forming nesting sites; and 4) natural effects of activities such as predation and or predation on nests by wild boars and monitor lizards.

Acknowledgements

We are grateful to D. Swain, Field Director, Similipal Tiger Reserve for providing transport, accommodation and scientific assistance during the survey. We would also like to thank all the students of the Post Graduate Department of Zoology and Wildlife and Conservation Biology, North Orissa University, Baripada, for assisting in the collection of field data. Thanks are also due to the field staff of Similipal Tiger Reserve for their help during the survey.

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Table 1: Distribution of Muggers in different river systems of Similipal during 2005.

River Systems	Number of Crocodiles			
	<1m	1-1.5m	1.5-2.0m	>2.0m
WEST DEO	7	24	12	7
EAST DEO	0	0	2	0
BUDHABALANGA	3	2	7	1
KHAIRI	6	10	1	0
KHADKEI	0	1	2	0
TOTAL	16	37	24	8

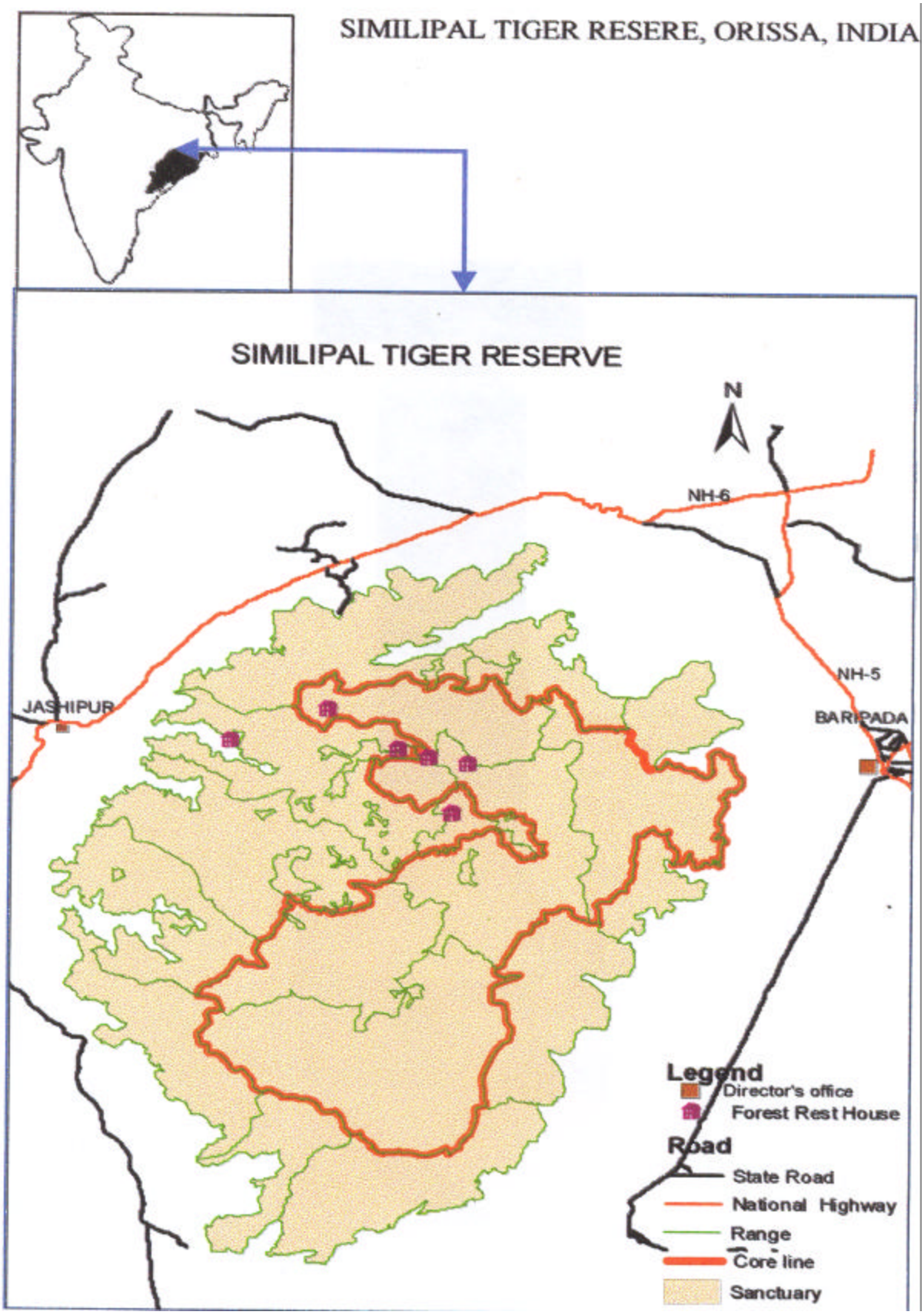

SIMILIPAL TIGER RESERE, ORISSA, INDIA
SIMILIPAL TIGER RESERVE
N
NH-6
NH-5
JASHIPUR
BARIPADA
Legend
Director's office
Forest Rest House
Road
State Road
National Highway
Range
Core line
Sanctuary

Fig.2.Distribution of different size of muggers in river systems of Similipal Tiger Reserve

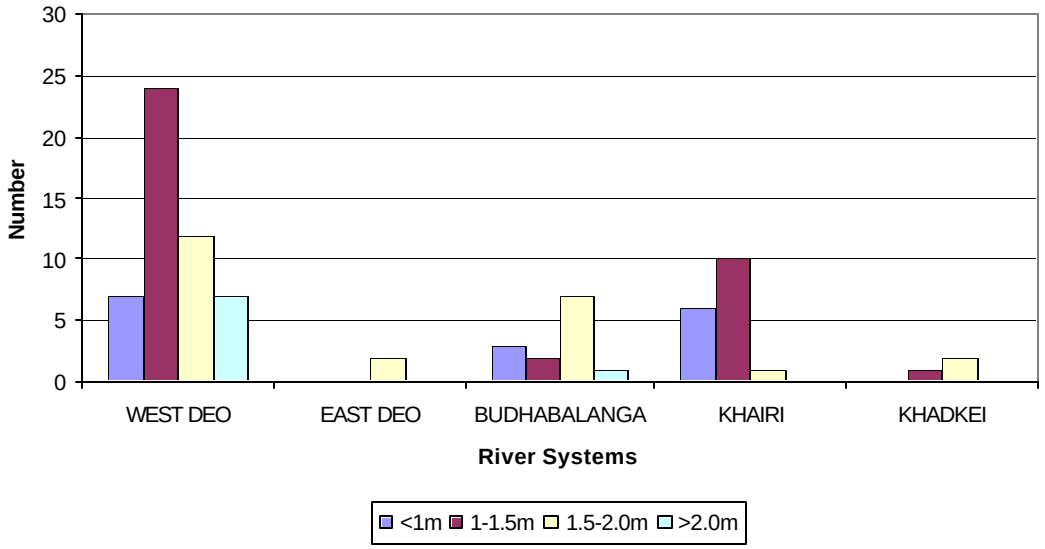


Fig.3. Different size of mugger in river systems of Similipal Tiger Reserve

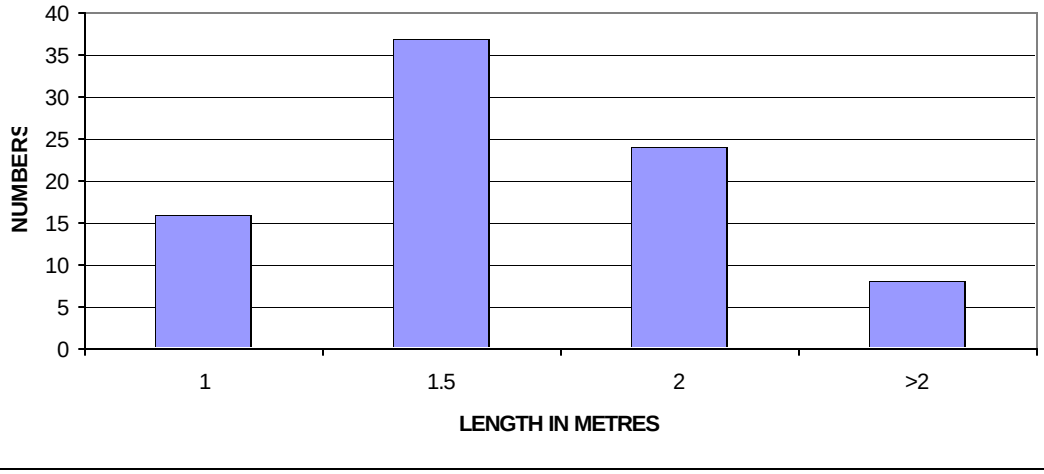
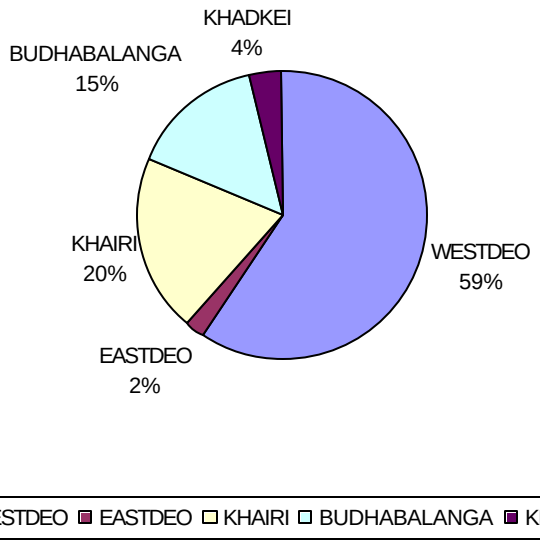


Fig.4. Abundance of mugger in river systems of Similipal Tiger Reserve



FOREST NEWS

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SUSTAINABLE FOREST MANAGEMENT... PUTTING YOUR MONEY WHERE YOUR FOREST IS!

Adequate financing is crucial for implementing sound forest management and the subject of how and who should finance sustainable forest management continues to dominate the national and international dialogue on forests. With government budgets for forest administration falling in many countries and prices for many products in decline, current financial resources for forest management are considered insufficient in many areas. Under the circumstances, a number of innovative financing mechanisms have emerged in recent years alongside more traditional approaches that draw upon domestic budgetary processes, royalties, and donor support.

To further explore the opportunities and experiences in financing forest management, the *Inter-regional workshop on financial mechanisms for sustainable forest management: sharing experiences from Latin America and Asia-Pacific* was organized by FAO in collaboration with the National Forest Programme Facility, the German Agency for Technical Cooperation (GTZ), ASEAN/ReFOP and Tropenbos International. The workshop was convened 20-22 November 2006, in Chiang Mai, Thailand.

The workshop brought together 59 participants from countries in both the Asia-Pacific region and Latin America (Australia, Brazil, Cambodia, China, Colombia, Fiji, India, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Republic of Korea, Sri Lanka, Thailand, and Vietnam). Representatives from international and regional organizations also participated.

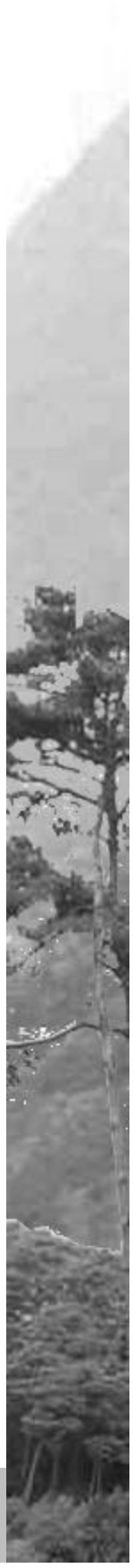
The objectives of the workshop were to:

- share knowledge and experiences related to financing mechanisms in Latin America and the Asia-Pacific region and discuss lessons learned;
- discuss strategies to improve existing financial mechanisms and to implement new and innovative approaches;
- fill knowledge gaps and promote future exchange of information within and between regions; and
- discuss the policy, legal, and institutional reforms needed to capture additional financing for sustainable forest management.

Over the three-day workshop, presentations were made on experiences in financing sustainable forest management in Latin America and Asia-Pacific. Panel discussions addressed interchanges between Latin America and Asia-Pacific on best practices for financing sustainable forest management. Working groups were organized to examine the policy, legal and regulatory, and institutional and procedural impediments to financing sustainable forestry. Finally, a panel was held to discuss proposals for "the way forward."

Workshop results and conclusions

The workshop generated intense discussion on key issues relating to financing sustainable



forest management and provided an excellent opportunity for sharing experiences among participants. Among the conclusions of the workshop were the following:

- Countries can learn much from each other by sharing experiences, but financing mechanisms need to be tailored to specific conditions and situations; i.e. there is no one "magic bullet" to address the problem of forest financing.
- The fundamental issue of financing forest management is simple and straight forward: either forestry has to be commercially viable (that is, it should generate adequate income to support itself) or, if for some reason that this is not possible – especially if the focus is on accomplishing broader social and environmental objectives – then society has to subsidize the management, one way or another.
- Official development assistance – channeled from donor organizations – can serve as a useful catalyst for developing sustainable financing mechanisms, but should not be seen as a long-term solution to financing challenges.
- The private sector should be recognized as the main source of forestry investment in most countries; closer collaboration between governments and the private sector is required to encourage responsible investment and management operations by the private sector.
- Numerous policy, legal, and institutional constraints continue to hinder forest financing. Ironically, while liquidity is currently very high in many markets, financial funds show little interest in investing in forestry, largely due to legal and institutional constraints and long-term risks. Institutional problems largely stem from the dominance of public ownership of forests and the functional and structural rigidities of forestry agencies.
- Much can be done to enhance the environment for forestry investment by ensuring stability and consistency of policies and laws, streamlining bureaucratic processes, revising and eliminating policies and regulations that act as disincentives to investors, and clarifying tenure rights and access to resources.
- More can be done in most countries to secure a larger share of domestic budgets for forestry, but foresters need to learn to be more realistic about the relative importance of the forest sector vis-à-vis other development priorities and to learn the realities of national budgetary processes (i.e. need to learn to "speak the language" of finance).
- In many countries, there is considerable scope for enhancing income from logging and wood production by reducing leakages and improving rent capture.
- There is considerable potential to mobilize local resources, provided the investments are recognized and appreciated for making tangible impacts in the lives of local people, particularly in densely populated developing countries where forestry agencies are increasingly assuming broader responsibilities for rural development. Such efforts can easily tap into micro-credit and in-kind contributions from local communities.
- Much of the forest financing experience, especially in Latin America, has been with private sector financing of large-scale plantation forestry and other reforestation initiatives; experiences in financing the management of natural forests is far more limited.
- In recent years, a great deal of attention has focused on "payment for environmental services" (especially related to watershed management and carbon sequestration). While many of the mechanisms are interesting and innovative, the extent to which they have been successfully adopted and applied is very limited. Many of these approaches appear to be little more than public subsidies, and their efficacy and viability have yet to be fully analyzed.

The way forward – a proposal for action

A central intent in organizing the workshop was to generate concrete proposals for developing, strengthening and enhancing funding mechanisms for sustainable forest management. The workshop recommended several follow-up actions intended to generate greater knowledge and awareness of financing issues and share experiences among countries. Reflecting these recommendations and the results of working groups and panel discussions, a proposal was put forward for a knowledge management initiative on financing

sustainable forest management in Asia-Pacific. The initiative would serve as a mechanism for systematic collection, analysis and dissemination of information and experiences on financial strategies and mechanisms in the Asia-Pacific region. It would also include knowledge management and sharing components as well as capacity-building activities. FAO agreed to pursue options for operationalizing the proposed program, perhaps through a regional Trust Fund project.

RESHAPING FORESTRY TO BENEFIT THE POOR

About a third of the people in the Mekong sub-region live in poverty. A large percentage of the poor live in rural areas and earn a significant proportion of their incomes from agriculture, fisheries, and forestry. Thus, the potential exists for forestry to play a much more important role in reducing poverty. With this in mind, the Asian Development Bank (ADB), along with FAO and the Center for International Forestry Research (CIFOR), initiated a Regional Technical Assistance project (RETA) to examine the potential of various forestry interventions and approaches to contribute to poverty alleviation in the Mekong sub-region.

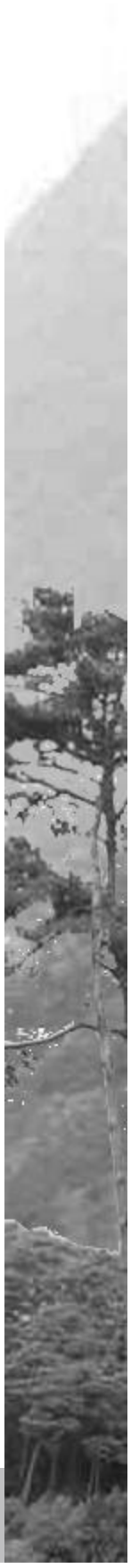
Specific objectives of the project were to:

- review and assess the performance and potential of community and industrial forestry to reduce poverty in the Mekong sub-region (specifically Cambodia, Lao PDR, and Vietnam);
- assess the likely impacts of the changing forest industry investment structure and trade patterns on the potential for forestry-based poverty reduction in the project countries; and
- draw lessons related to conditions under which forest-based activities can improve livelihoods and increase rural incomes – and reduce the vulnerability of forest-dependent communities, especially ethnic minorities and women.

The project consisted of a series of case studies, focusing on community forestry, industrial forestry, trade, and ethnic/minority issues.

In concluding the project, a *Regional consultation workshop – ADB RETA 6115: Poverty reduction in upland communities in the Mekong region through improved community and industrial forestry*, was convened in Bangkok, Thailand, 27-28 November 2006. The workshop brought together 46 participants from Cambodia, Lao PDR, Thailand and Vietnam, to report on the study findings and discuss their implications for improving forestry's potential to contribute to poverty reduction. Results of country case studies were presented, as well as thematic studies on community forestry, industrial forestry and forest products trade. Presentations were also made on the results of forest revenue studies, illegal logging in the Mekong region, and forest-based ecotourism in Lao PDR. Working groups and panel discussions provided opportunity to consider the implications of the studies and possible follow up.

Related to industrial forestry (mainly forest plantations), participants highlighted the need for education and awareness raising, strengthened technical knowledge, empowerment of local communities, and establishment of plantation owners' associations with bargaining power. As noted from experiences in Lao PDR and northern Thailand, diversification and value-added processing are key elements for making plantations financially viable for the benefit of local communities. For example, coffee and



macadamia have been grown successfully in the understory of plantations in Thailand – providing important supplementary income for local people. Value-added processing of products, and packaging with natural materials, can increase profit margins. Forest plantations can also be combined with other agricultural crops such as rice at a larger landscape level to meet the subsistence needs of communities and provide income while the plantations mature.

In considering the implications of forest products trade, the workshop highlighted the difficulty in controlling illegal forest harvesting and trade, and emphasized the need for effective enforcement mechanisms. Providing payments to communities for protecting forest resources has shown some success in Thailand. It was recommended, however, that emerging schemes and trends such as forest certification, carbon trading, and development and trade of biofuels be carefully monitored to assess their potential for providing financing for forest management. The growing potential of ecotourism was also highlighted. The workshop noted the lack of regional approaches in reducing tariffs and harmonizing prices, the generally poor market access for local people, and inadequate timber processing technologies available to the rural poor.

The topic of community forestry was the most intensely debated. Results of the studies revealed that introduced community forestry has generally produced only low to moderate financial gains for communities and has not been effective in lifting people out of poverty – in spite of generally high reliance of communities on forest resources. It was argued, however, that community forestry implementation is very new in Cambodia and other parts of the region, and that more time is needed to assess its performance. As the forestry sector is no longer a significant generator of national income in Cambodia, the government is now promoting community forestry as a mechanism to reallocate forest revenues to local communities.

Similarly, in Lao PDR, the government has been steadily improving legal frameworks relating to community forestry and more time may be required to ascertain long-term impacts. Many models of community forestry are being tested, and the RETA study covered only a sample of them. It is believed by advocates that community forestry can make significant contributions to reducing poverty if approaches and processes are further appropriately refined and applied.

In Vietnam, problems include low demand for forest products and the allocation of degraded forests with limited productivity to communities. It was suggested that pilot schemes of community forestry should be developed and implemented through country initiatives to test strategies and designs, reflecting recommendations that emerged from the RETA studies.

Despite the generally negative findings on the contribution of community forestry in reducing poverty, important lessons emerged. The consensus of the workshop was that community forestry is relevant, but challenges remain to make it more effective. The need to properly coordinate community forestry with other sectors involved in rural development was emphasized.

Other challenges noted by participants included:

- tenure security;
- fair distribution of forestry revenues;
- simplifying the administrative processes; and
- linking rural communities with the whole cycle of forest development.

Finally, it was proposed that ADB supports the preparation of a monitoring and evaluation approach to assess the impacts of improved community forestry policies in the three countries. This would involve: (a) technical assistance to develop the methodology; (b) occasional consultations with authorities in the three countries; and (c) the implementation of another similar study in 2010 to assess policy impacts on a larger scale in the Mekong sub-region.

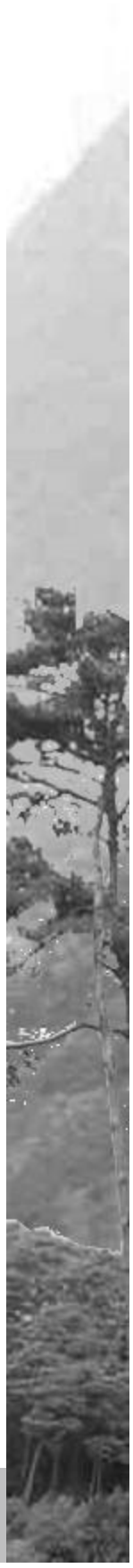
PHILIPPINES INITIATES UPDATE OF NATIONAL COMMUNITY-BASED FOREST MANAGEMENT STRATEGIC PLAN

On 20-22 September 2006 in Manila, Philippines, the first of a series of consultative workshops was held, geared towards the development of a more grounded, practical and forward-looking National Community-Based Forest Management (CBFM) Strategic Plan. The workshop was organized by the Philippine Department of Environment and Natural Resources in partnership with the USAID-EcoGov Project, the UPLB/College of Forestry and Natural Resources (CFNR)-Environmental Justice Project and the International Institute of Rural Reconstruction (IIRR).

Eighty-five participants from multi-stakeholder groups, government agencies, NGOs and financing institutions attended the workshop.

The main output of the workshop was an expanded outline of the major strategies of the second decade National CBFM Strategic Plan. Following the initial workshop, a series of consultations will be held with different stakeholders to update the Strategic Plan, which will also be translated into regional action plans.

The workshop is one of the planned activities under the partnership between the Department of Environment and Natural Resources (DENR) and the National Forest Programme Facility hosted by FAO.



ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY MEETING OF NATIONAL FOCAL POINTS FOR ASIA

The second Asia-Pacific Forestry Sector Outlook Study (APFSOS II) was endorsed by the 21st session of the Asia-Pacific Forestry Commission (APFC), in April 2006. Effective implementation of APFSOS II depends substantially on the involvement and engagement of national focal points, nominated by all but a few of the countries of the region.

The first meeting of national focal points for APFSOS II was convened 31 January – 2 February 2007, in Chiang Mai, Thailand. The meeting was organized by a team of FAO staff and consultants supporting the regional outlook study. Twenty-seven participants attended the meeting, including the national focal points from Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Philippines, Russian Federation, Sri Lanka, Thailand and Vietnam. The focal points for Pakistan, Timor-Leste and Korea were not able to attend.

The objectives of the meeting were to:

- develop a common understanding of the objectives, approaches, and expected outputs of AFPSOS II;

- build a spirit of teamwork, cooperation, and ownership among the APFSOS II national focal points;
- develop and discuss a comprehensive list of major drivers of change in Asia-Pacific;
- identify critical issues that will be the focus for the forestry sector to 2020;
- develop detailed plans for national consultative processes for each country; and
- develop preliminary structures and lists of contents for national outlook reports.

Drivers of change in forestry

Through a participatory process, the meeting participants identified key driving forces of change in forestry in the region anticipated for the next 10-15 years. The major drivers were organized in broad categories as follows:

- **Technology**: Discussions pointed out many potential ways technology may impact forest management, forest resource assessment and wood processing in the future.
- **Environment**: Forest land conversion (driven by events outside the forest sector), forest degradation, links (perceived and real) between forests and natural disasters, illegal logging, logging bans and the impacts of ecotourism are major drivers of change.
- **Social**: Population and demographic changes affect forestry, as do shifting livelihood patterns (including changing agricultural patterns), increasing urbanization, human settlement, population dynamics in the uplands, indigenous people's rights and issues of human rights.
- **Economic**: Economic drivers are seen to be dominant forces in forestry for the coming years. Drivers include: economic growth, increasing globalization and trade, changing benefit-sharing mechanisms, expanding tourism, energy demands, increasing demand for wood and forest services, foreign investment, etc.
- **Political and institutional**: Politics, political and institutional instability (in many countries), general declines in budgets for forestry, institutional reforms (including decentralization and devolution of forest management to local governments, NGOs or communities), changing land tenure systems, governance and forest law enforcement issues are all drivers of change in forestry.

Participants also identified the critical issues in forestry in each of their own countries. The wide diversity of issues reflected the diversity of countries in the region with regard to forestry.

Outlook and scenario-development exercise

The current situation in forestry and the major issues and trends in Asia and the Pacific were presented. The positive and negative impacts of various drivers and trends on forestry were discussed. Key conclusions of the exercises included the following:

- What happens in the forestry sector is largely driven by what happens outside forestry (and often by factors occurring outside individual countries).
- The key challenge for forestry is to adapt policies, institutions, priorities and strategies in anticipation of likely scenarios.
- The key question for forestry now (and in coming years) is, "Who will manage the forests and for what purposes?"

The critical aspects of scenario analysis can be summarized as follows:

- Identify the larger driving forces.
- Focus on the larger system.
- Understand how society and the economy are developing, taking into account the driving forces.
- Identify alternative scenarios.

The meeting worked through various exercises to develop better understanding and appreciation of the scenario-analysis approach. Participants were

invited to consider the key driving forces in their countries, the probable situations likely to emerge, and the sequence of events involved for each scenario.

Conclusions

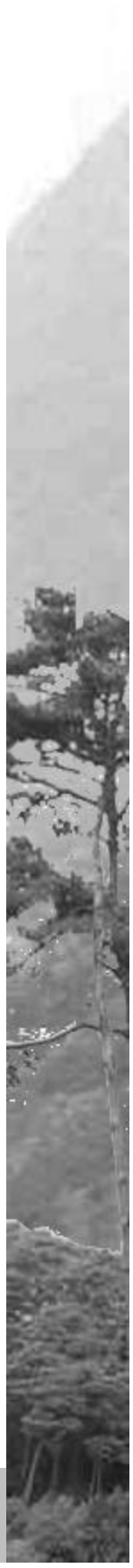
The main outputs of the meeting were:

- identification of the major drivers of change in Asia and the Pacific;
- identification of the key issues in the forestry sector to 2020;
- detailed plans for national consultative processes in each country; and
- preliminary structures and lists of contents for national reports.

Meeting for Pacific Island focal points held in Fiji

A second meeting for focal points from the Pacific island countries was convened 21-22 February 2007, in Nadi, Fiji, by a team of FAO staff, in collaboration with the Secretariat of the Pacific Community (SPC) and Chris Brown (RAPO consultant).

Fifteen participants attended the meeting, including the national focal points from Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Tonga and Tuvalu (the focal points for Australia, New Zealand and Vanuatu were unable to attend). Three participants from SPC, the co-organizer of the workshop, also participated. Participants were mostly senior-level officials, which will hopefully ensure solid support and follow up in all countries.



REGIONAL WORKSHOP TO DEVELOP A PLAN OF ACTIVITIES FOR FOREST MONITORING, ASSESSMENT AND REPORTING

The "Strengthening Monitoring, Assessment, and Reporting (MAR) on Sustainable Forest Management (SFM) in Asia Project (GCP/INT/988/JPN)" was inaugurated in January 2006, funded by the Government of Japan, with a view to developing a globally harmonized forest-related national monitoring, assessment and reporting (MAR) system to contribute directly to the improvement of sustainable forest management (SFM) in the Asia-Pacific region.

The inception workshop organized 24-28 July 2006 in Sapporo, Japan, revealed the necessity for the development of the MAR-SFM project at the regional level, responding to the actual needs and situations in the participating countries. Accordingly, elaboration of a regional umbrella programme (RUP) was presented for consideration with proposals from project countries for national activities on MAR-SFM and the basic principles of the MAR-SFM Project.

The MAR-SFM Project deals with international-/regional-/national-level activities for harmonizing, synergizing, and streamlining the MAR-SFM components. In this respect the workshop helped to shape regional and national programmes and to link them to other programmes of FAO and other organizations.

The workshop aimed to integrate country initiatives into the regional programme (RUP) of the MAR-SFM Project through the formulation of the joint regional umbrella plan of activities (RUPA). The

countries were requested to elaborate proposals for national programmes on MAR-SFM, consolidating their needs. The workshop focused on deliberation of the country proposals in terms of the principles of the project and the availability of the budget, while providing the participants with background information on the project and facilitating their discussions on important issues of the project.

Objectives/outputs of the regional workshop

The main objective of the workshop was to develop a regional umbrella plan of activities under the MAR project for the next 12 months. Specifically, this involved:

- developing a detailed regional plan of prioritized and budgeted project activities (RUPA) based on activity plans by sub-region and country; and
- clarifying the roles and responsibilities of member countries and FAO in implementing this plan.

Twenty-one national representatives (national focal points or their deputies) from 19 countries participated in the workshop. Concepts and programmes of the RUP and guidelines for the development of national networks for MAR-SFM were presented and discussed.

Participants improved their understanding of concepts of MAR and RUP and identified priorities for potential project support. The participants agreed to establish national networks and organize the first meetings as soon as possible. Some issues still need to be further clarified, such as: i) criteria for selecting and approving national programmes; ii) modes of collaboration with member countries; iii) approaches to deal with the differing conditions and needs of project countries; and iv) recognition and utilization of existing informal networks as national networks for MAR-SFM.

DEVELOPMENT OF COMMUNITY FORESTRY IN MONGOLIA

Contributed by Patrick Evans, Chief Technical Adviser

Mongolia is a large country at over 1.5 million km^2, but is sparsely populated with less than 3 million people. The country is dominated by a steppe grassland type of ecosystem, transitioning into the Gobi desert to the south and into forestland to the north. The forests of northern Mongolia cover some 10 percent of the country and are essentially the southern limit of the coniferous Siberian boreal taiga forests. Larch (*Larix sibirica*) make up some 60 percent of the forest cover with Siberian pine, Scotch pine and birch comprising most of the remainder.

The forests of Mongolia are State-owned and are under the responsibility of the Ministry of Nature and Environment. Due to lack of manpower and limited financial resources, protection and management has not been fully established. Unsustainable logging practices, combined with forest fires, have resulted in steady forest degradation and a net deforestation rate of some 40,000 hectares per annum over the past decade. A recent FAO funded project entitled "*Support to the Development of Participatory Forest Management*" has highlighted the potential and need for community involvement in the protection and sustainable management of Mongolia's forest resources.

In April 2007, FAO – with funding from the Government of the Netherlands – initiated a 5-year project entitled *"Capacity Building and*

Institutional Development for Participatory Natural Resources Management and Conservation in Forest Areas of Mongolia." The focus of this project is to develop and implement strategies for the empowerment of local communities for responsible protection and sustainable management of accessible forest resources. The project will emphasize capacity building of government staff and local communities, and development of an enabling institutional framework. Close collaboration will be established with other donors and NGOs in the field. Long-term productive and sustainable management of Mongolia's forestlands is the overall goal – with poverty alleviation and of livelihoods enhancement in local communities being overriding considerations.

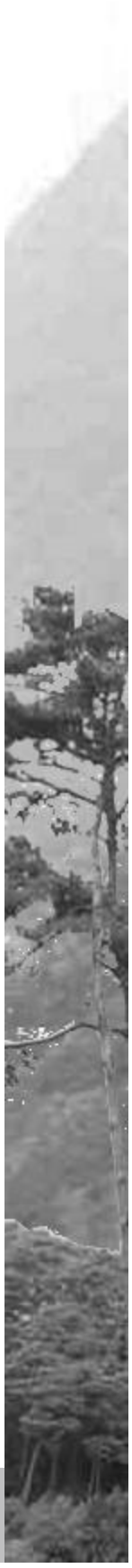
For additional information and update on current status, contact Patrick T. Evans at patrick.evans@fao.org

FAO FORESTRY STAFF MOVEMENT

Ms. Regan Suzuki, a Canadian national, joined RAPO as an Associate Consultant on forestry policies issues in March 2007. Ms. Suzuki has been recruited to work on the establishment of a Forest Policy Network for Asia and the Pacific, among other tasks. Prior to joining FAO/ RAPO, Ms. Suzuki worked in Khon Kaen, Thailand as program officer for CUSO, a Canadian NGO. Prior to this, she worked with the International Development Research Center, conducting research on natural resource management-related conflicts in Southeast Asia. She has also worked with several UN agencies in the region.

Ms. Suzuki obtained a Master's degree in Geography from the University of Waterloo in Canada in 2004.

Mr. Brian Cohen, a U.S. national, joined the RAPO team as an Associate Consultant in March 2007 to assist in the coordination of the Second Asia-Pacific Forestry Sector Outlook Study. Recently in Kenya, he worked with Egerton University in an advisory capacity on a social forestry project to conserve East Africa's largest remaining block of montane forest. Prior to this, Mr. Cohen served three years as a Natural Resource Management Volunteer with the U.S. Peace Corps in northern Benin, identifying and promoting market-based conservation opportunities. He has also worked as a Community Organizer with the Sierra Club on forest protection campaigns and interned at the World Conservation Union's (IUCN's) Multilateral Office in Washington, DC. Mr. Cohen holds a Master of Arts degree in Sustainable International Development from the Heller School for Social Policy and Management, Brandeis University.



Whether man is disposed to yield to nature or to oppose her, he cannot do without a correct understanding of her language.

Jean Rostand

Asia-Pacific Forestry Commission

invites you to join the

INTERNATIONAL CONFERENCE ON

THE FUTURE OF FORESTS IN ASIA AND THE PACIFIC: OUTLOOK FOR 2020

Chiang Mai, Thailand, 16–18 October 2007

Don't miss this unique opportunity to:

- Understand where forests and forestry are heading in Asia and thePacific;
- Listen to leading forestry analysts and practitioners discuss how the forestry situation will evolve in the region;
- Contribute your ideas and perceptions to develop a collective vision of the future for forestry;
- Discuss positive paths for forestry development and what needs to be done to follow them.

Mark your calendar and attend this important event!

OBJECTIVES

- Analyse social, economic, institutional and technological changes in the Asia-Pacific region and their impacts on forests;
- Identify the potential opportunities and likely challenges for forestry in face of changing demands for forest goods and services;
- Assess the options available to address future demands on forests and the priorities and strategies that may be pursued under different scenarios.

Discussions will focus on:

- Changing society—changing forestry;
- Outlook for production, consumption and trade;
- Where forests will be located, how they will be managed and who will use and benefit from them;
- How globalization affects the forest sector;
- Challenges in balancing economic, social and environmental objectives;
- Policy, institutional and technological adaptation for the 21st century.

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For further information, please contact:

Patrick B. Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, THAILAND, **Phone: 66-2-697 4139, E-mail: patrick.durst@fao.org**

FIRST ANNOUNCEMENT AND CALL FOR PAPERS

THE FUTURE OF FORESTS IN ASIA AND THE PACIFIC OUTLOOK FOR 2020

Forests and forestry will have to undergo significant changes in response to economic and social transformations within and outside the region. Recent economic and social changes in Asia and the Pacific are unprecedented, making it the most dynamic region in the world. In a number of countries, the industrial and service sectors continue to grow rapidly, reducing the direct dependence of people on land for their livelihoods. Changes in societal characteristics are altering people's perceptions of how forests should be managed and utilized and environmental functions are gaining increased importance.

It is evident that the nature of demands on Asia-Pacific's forests by 2020 will be very different from what they are today. Increased demand for wood and wood products will continue to place significant pressures on forests within and outside the region, with resulting deforestation and loss of biological diversity. At the same time, increasing prosperity, better educated populations, and demands for environmental improvements, recreation and conservation will increase pressures for forest protection and non-destructive services of forests. Globalization will significantly alter opportunities for forestry, and important geographical shifts in production and consumption of forest products and services are already evident. While increasing wealth and new technologies offer considerable scope for improving resource management, several other factors hinder wider adoption of sustainable forest management. Policies and institutions have, in recent years, undergone changes, but further transformation will be required to adapt to the emerging challenges and opportunities.

It is against this backdrop that the Asia-Pacific Forestry Commission, in partnership with member countries and other international organizations, is conducting the second Asia-Pacific Forestry Sector Outlook Study (APFSOS II) to assess future trends and scenarios for the forest sector in the Asia-Pacific region. This international conference is being organized to strengthen the consultative and capacity-building processes of APFSOS II by bringing together diverse stakeholders and expertise to provide broader perspectives on emerging changes, probable scenarios and their implications for forests and forestry.

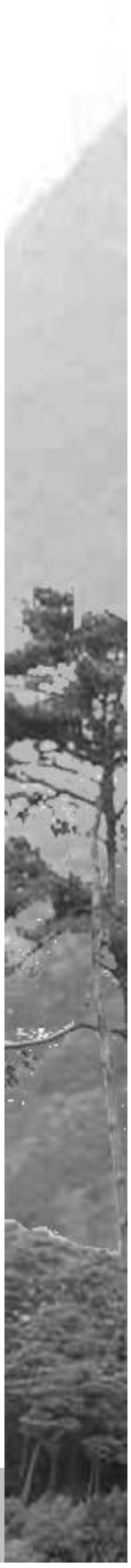
STRUCTURE OF THE CONFERENCE

A keynote address at the start of the conference will provide the larger picture of forests and forestry in the changing socio-economic environment and set the stage for discussion during subsequent sessions. Each of the subsequent sessions will include:

- presentation of a lead paper
- 3-4 short presentations based on selected voluntary papers
- panel discussions on key issues

VOLUNTARY PAPERS

Abstracts (about 250 words) of voluntary papers should be submitted not later than **20 May 2007** and full papers should be submitted not later than **15 August 2007**. Instructions relating to the format and length of the voluntary papers are available from the conference web-site: www.fao.org/.... Authors of proposed voluntary paper that are selected for presentation will be notified by 15 June 2007.



ASIA-PACIFIC FORESTRY CHIPS AND CLIPS

THREE NATIONS AGREE TO CONSERVE THE BIODIVERSE HEART OF BORNEO

Brunei Darussalam, Indonesia and Malaysia have signed a declaration to protect the forested heart of Borneo. The agreement was facilitated by WWF and contributed to financially by the United States. It will conserve and sustainably manage one of the most important centers of biological diversity in the world.

- Environment News Service -

$3 MILLION FUNDING ANNOUNCED FOR OLD-GROWTH FOREST ECO-TOURISM IN TASMANIA

The federal government will provide $1 million to develop a bushwalk in western Tasmania and another $2 million to develop forest-based eco-tourism infrastructure. The establishment of a Forest Conservation Fund was also announced, encouraging private land owners to tender for funding to protect forests with high conservation value.

- Australian Broadcasting Corporation -

ILLEGAL COFFEE CULTIVATION THREATENS SUMATRAN FORESTS

According to an investigation by WWF, coffee illegally grown in an Indonesian national park in Sumatra fills the cups of unsuspecting coffee drinkers around the world. Bukit Barisan Selatan National Park in southern Sumatra is one of the few protected areas where Sumatran tigers, elephants and rhinos coexist. According to the report, small-scale farmers have cleared 45,657 hectares of park land for illegal coffee cultivation, threatening the ecological integrity of the reserve.

- Environment News Service -

GLOBAL STANDARD SET FOR WILD MEDICINAL PLANT HARVESTING

A new standard to promote sustainable management and trade of wild medicinal and aromatic plants was launched at the World Organic Trade Fair in February 2007. More than 400,000 tons of medicinal and aromatic plants are traded every year, and about 80 percent of these species are harvested from the wild. The standard aims to maintain medicinal and aromatic plant resources in the wild by ensuring legal compliance, respecting customary rights, and applying responsible management practices.

- Environment News Service -

JAPAN, WORLD BANK TO SUPPORT COMMUNITY FORESTRY IN CAMBODIA

The Ministry of Economy and Finance, the World Bank and the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC) have signed a grant agreement for "Capacity Building for Sustainable Forest and Land Management" in five rural provinces of Cambodia. The $1.76 million grant, provided by the Government of Japan through the World Bank, will finance a new project to help build capacity of forest-dependent villages as they explore new partnerships with government and NGOs and develop innovative approaches to participatory management of forests and land resources.

- World Bank -

CHINA TO PROMOTE REFORM OF COMMUNITY FORESTRY

China will promote the reform of its collectively-owned forestry system to facilitate the development of participatory forestry approaches that will provide more benefits to farmers and help to lift them out of poverty. The reform aims to transfer operational rights of forests from local governments and forestry administrations to farmers under long-term contracts, while the ownership of forests remains with the government.

- China People's Daily -

BORNEO RAIN FOREST YIELDS NEW SPECIES

Scientists have discovered at least 52 new species of animals and plants in the 220,000 square kilometer rain forest in the center of the island of Borneo, including a catfish with protruding teeth and suction cups on its belly to help it stick to rocks, according to a WWF study. The remote and

inaccessible forests in the heart of Borneo, considered to be one of world's final frontiers for science, are threatened by logging and expansion of palm oil plantations.
- Toronto Star -

NEW ZEALAND ADOPTS NEW TIMBER PROCUREMENT POLICY

Government departments in New Zealand will only buy timber and wood products sourced from legally and sustainably managed forests. Cheaper imports of illegally logged timber products were hurting manufacturers of goods from New Zealand's indigenous timber, such as beech. The new policy would also see a greater push for regional cooperation in the Pacific region to address illegal logging.
- ITTO TTM Report 11:23 -

INDONESIA TO OFFER 17 MILLION HECTARES OF FOREST CONCESSIONS

Indonesia plans to offer some 17 million hectares of logged-over forest concessions to investors interested in developing plantations and agriculture, particularly for palm oil and sugar cane. Environmentalists have claimed that the Indonesian government's new drive to focus on producing biofuels, mainly from palm oil and sugar cane, has come at the expense of rapidly disappearing forests.
- Palmnews -

FOREST CODE ADOPTED IN RUSSIA

Russia's Federation Counsil has endorsed the bill to adopt the new Forest Code. The Code aims to make forest management more effective and encourage investments in the industry. Under the new law, production forests are to be divided into three categories – protected, production and reserve. Forest lands will be held as federal property, while regions will be in charge of their management.
- Kommersant Moscow -

TREE PLANTING TO MITIGATE CLIMATE CHANGE IN NEW ZEALAND

The New Zealand government has unveiled plans for a massive reforestation project as part of its climate change policy. The plans call for spending up to $100 million over five years to encourage landowners to plant more trees, particularly where additional benefits such as erosion control and water quality can be gained. The policy also introduces a tax for converting forests to farms.
- Newstalk ZB/One News -

NEW ORCHIDS FOUND IN PAPUA NEW GUINEA RAIN FOREST

At least eight new species of orchid have been discovered in the previously unexplored parts of the Kikori region surrounding Lake Kutubu in Papua New Guinea. As many as 20 other potentially new orchids are awaiting verification. Papua New Guinea, an internationally recognized biodiversity hotspot, has more recorded orchid species than any other country in the world.
- Environment News Service -

SMOG HITS EMERGENCY LEVELS IN NORTHERN THAILAND

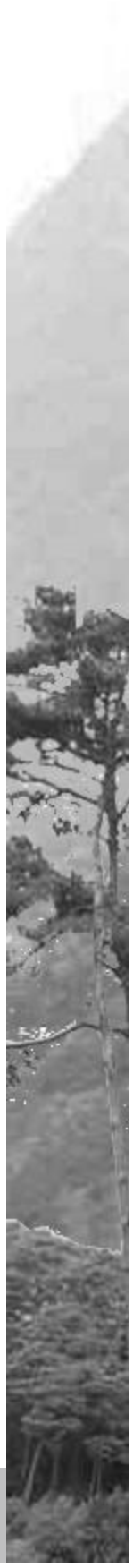
Millions of people are facing health threats from the thick smog caused by out-of-control forest and brush fires in northern Thailand. According to the pollution control department, the levels of suspended particulate matter have reached more than twice the acceptable standard. Smoke from forest fires set by farmers is a regular feature during the dry season in the region, but it has been exacerbated this year by the steady current of cold air blowing from the north.
- Bangkok Post -

PALM OIL PRICES EXPECTED TO RISE THIS YEAR

Palm oil prices are set to jump more than 20 percent by the year's end, driven by European demand for biofuels and Indian imports of edible oil. The growing demand for biofuels is expected to spread from Eurpope to Asia in the coming years.
- Reuters -

THE CLOUDED LEPARD OF BORNEO AND SUMATRA REVEALED TO BE NEW SPECIES

The clouded leopard of Borneo and Sumatra was discovered to be an entirely new species and not the same one found in mainland Southeast Asia, as long believed. Researchers believe that the Borneo population of the clouded leopard likely diverged from the mainland population some 1.4



million years ago. From 8,000 to 18,000 clouded leopards live in the forests of Borneo and Sumatra.
- Associated Press -

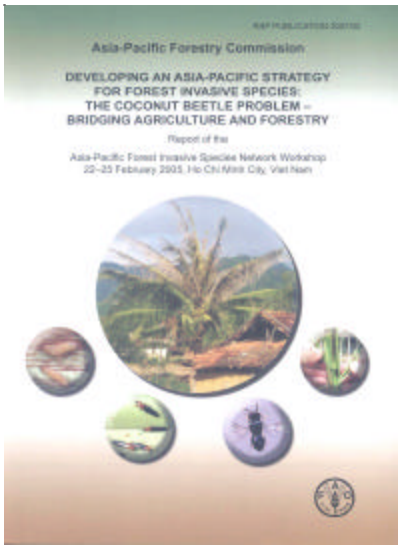
BATTLE TO SAVE TASMANIAN DEVIL FROM EXTINCTION

The Tasmanian devil, a rare carnivorous marsupial found only on Australia's southern island state of Tasmania, faces extinction in 10 to 20 years unless a cure is found for the facial cancer now decimating the population. With half the population of this fierce, black furry animal now wiped out, efforts are underway to establish offshore colonies of healthy devils. Disappearance of the devil will not only have a massive ecological impact, but also a major economic impact on ecotourism.
- Reuters -

NEW FORESTRY PUBLICATIONS

DEVELOPING AN ASIA-PACIFIC STRATEGY FOR FOREST INVASIVE SPECIES: THE COCONUT BEETLE PROBLEM – BRIDGING AGRICULTURE AND FORESTRY

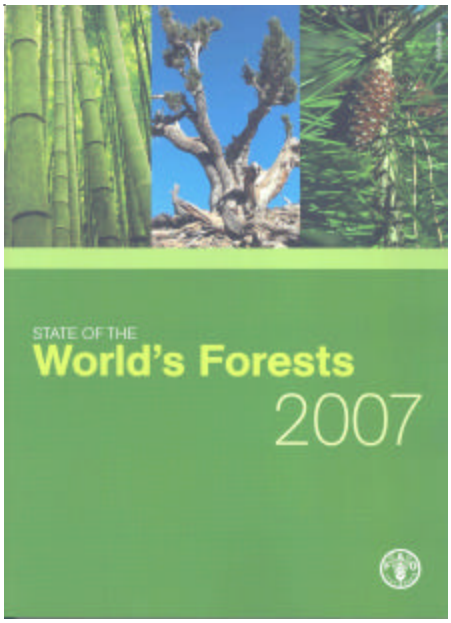
Report of the Asia-Pacific Forest Invasive Species Network Workshop held 22-25 February 2005, Ho Chi Minh City, Vietnam



Recognizing the dangers of invasive species in the sustainable management of forests in Asia and the Pacific, the Asia-Pacific Forest Invasive Species Network (APFISN) was established at the 20th Asia-Pacific Forestry Commission Session held in 2004, in Nadi, Fiji.

In light of the experiences gained in handling outbreaks of invasive species, it is increasingly evident that activities, either in forestry or agriculture, are intricately connected and have profound effects on each other – whether due to the movement of an invasive species into an area or through the remedies to the problem. The active collaboration of both sectors is needed. Thus, APFISN, together with the USDA Forest Service, FAO and the Asia-Pacific Association of Forestry Research Institutions (APAFRI) jointly organized a workshop to share experiences among forestry and agriculture specialists in handling invasive species and to develop an Asia-Pacific strategy to work in a multidisciplinary manner to address how to manage invasive species.

These proceedings represent the results of the workshop and go beyond the coconut leaf beetle problem to look at broader issues of invasive species in the region such as technology transfer, policies, institution building and other integral parts of pest management.

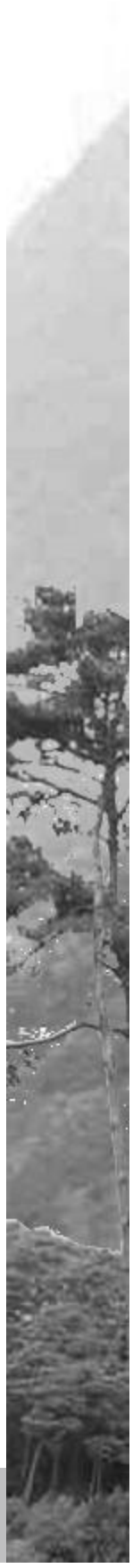


STATE OF THE WORLD'S FORESTS 2007

FAO's biennial *State of the World's Forests* series offers a global perspective on the forest sector, including its environmental, economic and social dimensions. This seventh edition examines progress towards sustainable forest management. Part I reviews progress region by region, each report structured according to the seven thematic elements of sustainable forest management agreed by international fora as a framework for sustainable forest management: extent of forest resources; biological diversity; forest health and vitality; productive functions of forest resources; protective functions of forest resources; socio-economic functions; and legal, policy and institutional framework. Part II presents selected issues in the forest sector. Climate change, forest landscape restoration, forest tenure, invasive species, wildlife management and wood energy are just a few of the subjects covered.

FIRE MANAGEMENT – GLOBAL ASSESSMENT 2006

Fire management is an essential part of sustainable forest management. This publication complements the Global Forest Resources Assessment 2005 (FRA 2005) as an in-depth thematic study on the incidence, impact and management of forest fires in different regions of the world. It was developed from 12 regional papers prepared within the framework of the Global Wildland Fire Network of the United Nations International Strategy for Disaster Reduction. It provides the best estimate of the global fire situation to date and gives a good indication of the scale of the impact of vegetation fires on society, on the economy and on the environment.



FAO ASIA-PACIFIC FORESTRY CALENDAR

24-27 April 2007. Vientiane, Lao PDR. ***Cross-Country Exchange Workshop on Non-Timber Forest Products Enterprise Development: Sharing lessons learned and setting the agenda for the future.*** Contact: M. Kashio, Forest Resources Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4141; Fax: (662) 697-4445; E-mail: Masakazu.Kashio@fao.org

23 April - 4 May 2007. Bangkok, Thailand. ***Forest Policy Short Course***. 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

7-10 May 2007. Kuala Lumpur, Malaysia. ***APFISN Workshop on Developing Invasive Species Management Plans.*** Contact: K.V. Sankaran, APFISN Coordinator; E-mail: sankaran@kfri.org

14-19 May 2007. Sandakan, Malaysia. ***Regional Workshop on Implementing Codes of Practice for Forest Harvesting: TPR Meeting for GCP/RAS/192/JPN project.*** 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

6 June 2007. Shanghai, China. ***48th Session of the Advisory Committee on Paper and Wood Products (ACPWP).*** Contact: Olman Serrano, Senior Forestry Officer, FOPP, FAO Forestry Department, Via delle Terme di Caracalla, 00100, Rome, Italy; E-mail: Olman.Serrano@fao.org

August (tbc). Bangkok, Thailand. ***Fourth Meeting of the Asia-Pacific Forestry Commission Executive Committee.*** 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

3-7 September 2007. Bangkok, Thailand. ***International Conference on Poverty Reduction and Forests Tenure, Market and Policy Reforms.*** Co-organized by RECOFTC, FAO, RRI, Asia Forest Network, Finland Embassy, JICA and the World Bank. Conference website: http://conference.recoftc.org

September 2007 (tbc). Chengdu or Bejing, China. ***APFISN Workshop on Pest Risk Assessments.*** Contact: K.V. Sankaran, APFISN Coordinator; E-mail: sankaran@kfri.org

16-18 October 2007. Chiang Mai, Thailand. ***The Future of Forests in Asia and the Pacific (APFSOS seminar).*** Contact: CTS Nair, Chief, Forest Economics & Policy Division, FAO Rome; E-mail: CTS.Nair@fao.org

22-26 April 2008. Hanoi, Vietnam. ***22nd Session of the Asia-Pacific Forestry Commission.*** 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)

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

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