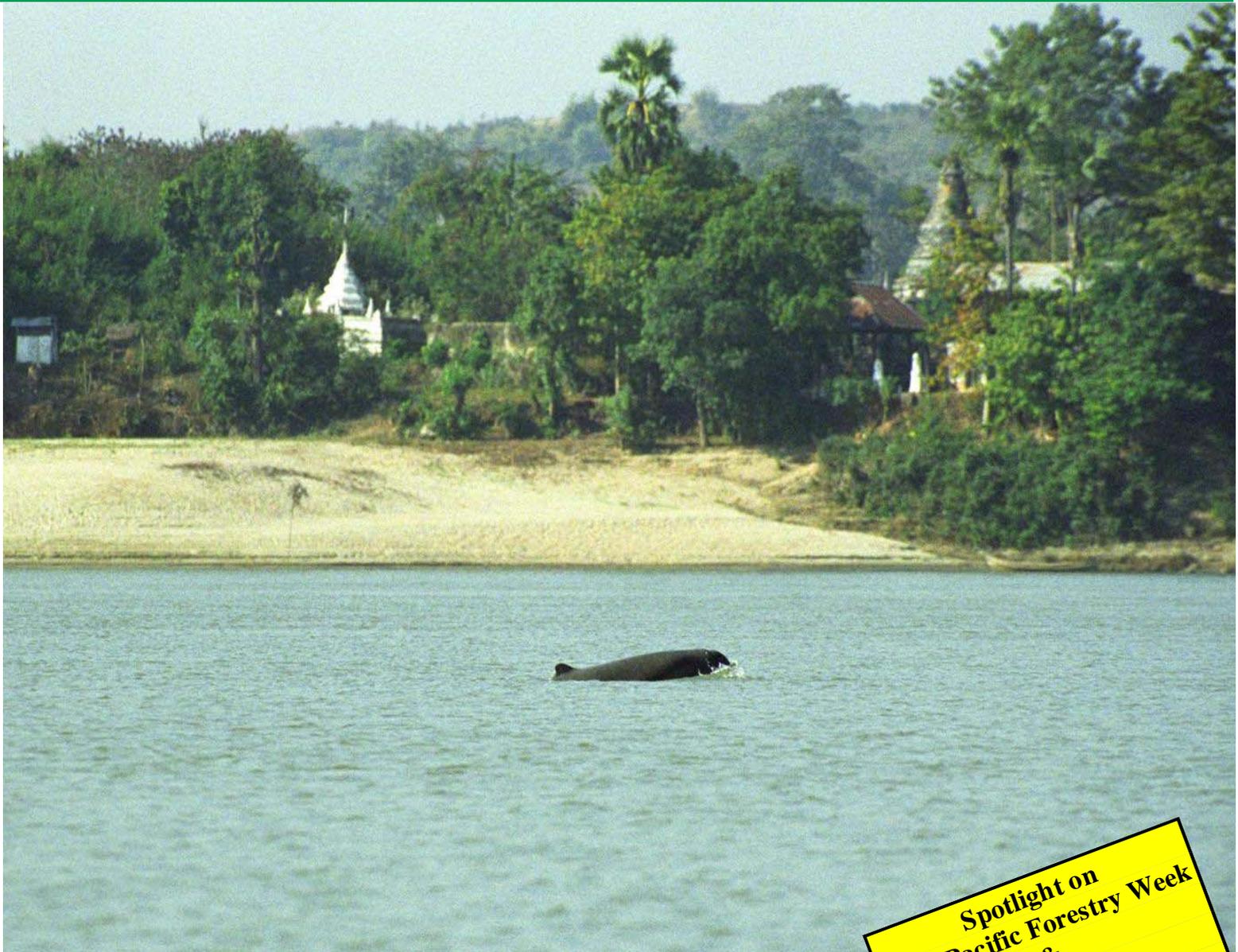




# TIGER PAPER

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*Featuring*

Spotlight on  
Asia-Pacific Forestry Week  
&  
APFC 22

# FOREST NEWS

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## TIGERPAPER



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**Cover:** Irrawaddy dolphin (*Orcaella brevirostris*) off the coast of Myanmar

**Photo:** Shingo Onishi

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*Fisherman casting the net (Photo: Shingo Onishi)*

## MUTUALISTIC FISHING BETWEEN FISHERMEN AND IRRAWADDY DOLPHINS IN MYANMAR

by Shingo Onishi

### Irrawaddy dolphin

There is a dolphin species whose name derives from the Ayeyarwady (Irrawaddy) River of Myanmar, namely the Irrawaddy (Ayeyarwady) dolphin (*Orcaella brevirostris*). This dolphin is generally known to be distributed throughout the coastal areas between Southeast Asia and northern Australia.

I saw dolphins similar in shape and size to Irrawaddy dolphins at the muddy coast of Kawthoung, at the southernmost tip of Myanmar, but could not identify the species. I also heard the breathing sounds of dolphins at night in the delta mangrove area nearby the mouth of the

Ayeyarwady River. Local foresters said that the sound was made by Irrawaddy dolphins and that there was a large population in that area.

The Ayeyarwady River is the largest habitat of Irrawaddy dolphin in Myanmar. The main body of the river flows from north to south through the central part of the country. Several separate populations of dolphins are found along the river.

Apart from the delta area, other populations inhabit the middle reaches of the river, from over 900 km up to about 1,400 km from the mouth of the river, stretching from slightly north of Mandalay to around Bhamo. The altitude ranges from 70-110 m.

In 2004, using the direct count method, the Department of Fishery, Ministry of Livestock & Fisheries, Myanmar and the Wildlife Conservation Society (WCS) estimated the number of Irrawaddy dolphins between Mandalay and Bhamo to total 72 from 13 different locations. The northern part of the area between Kathar and Bhamo is the larger habitat. In addition, there could be about 18 to 20 dolphins in the southern part, i.e., Mingun and Kyaukmyaung (Aung Myo Chit, Coordinator, Irrawaddy Dolphin project, WCS, 2008).

It is said that some dolphins in this southern habitat have a close and unique relationship with the local fishermen. In order to document this relationship I visited several villages between Mingun and Kyaukmyaung and stayed with the fishermen from 27 August to 1 September '07 during the rainy season, and from 7 to 13 January '08 in the dry season.

### Village life

Many villages are permanently settled on sandbanks of the Ayeyarwadyi River around there. Villagers depend on the river water for bathing, washing and cooking and their life cycle depends on the water level of the river. The land area becomes smaller in the rainy season and larger in the dry season. Some sandbanks can be connected with the mainland in the dry season.

Most of villagers make their living farming or fishing or both. Farming can be done only in the dry season when the land area becomes larger. Cultivating usually starts in October. Cattle are used for plowing and cow dung is used as manure. Some people also raise chickens and pigs to supplement their income. The main crops are peanut, maize and various beans, and are usually harvested around March and April. Young people tend to be farmers because they can inherit farming implements and techniques from their parents.

On the other hand, there are many people who are involved in both farming and fishing. They feel that farming is risky and unstable because crops can be damaged by insect attacks, and therefore since fishing is their vocation and farming is a sideline, they can be regarded as fishermen. One fisherman said that he earns two-thirds of his total income from fishing and one-third from farming. There are

also a considerable number of full-time fishermen as well.

### Fishing methods

The local fishermen mainly use three kinds of fishing gears:

#### *a. longline*

Many short strings are hung at regular intervals from a long string as a leader. A fishhook is fastened at the tip of each short string. Then, this longline is extended under the water and both ends are fixed on the riverbed.

#### *b. gill net*

A long, narrow net is attached along a long string. The net is held vertically tense by many lead weights under the water. The net is about one meter in depth and normally about 40 m in width, although some nets can reach about 80 m in width. There are two ways to use a gill net: fixing or floating. In the case of fixed nets, the spread net is fastened to bamboo poles which are firmly planted on the riverbed and left under the water there for a while. In the case of floating nets, the net is gradually paid out into the water from the boat and extended in the river. The end of the net is held by the fisherman on the boat, and the net drifts down the river together with the boat. After a short time, the fisherman hauls up the net. This process is repeated. In this case, the net is called a drift net. The drift net has many floats on the top line and has less lead weights than the fixed gill net.

#### *c. casting net*

The casting net is about 5.5 m in length, with a diameter of more than 10 m when completely spread out. The net is woven of nylon thread by the fisherman and his family. Weaving tools are made of bamboo. It takes about two months to weave one net. Some fishermen said that about 4 kg of thread are used to make one net. Many small lead weights of about 7 kg are fixed along the edge of the net. Thus, the total weight of the net would be more than 10 kilograms. This is why it can only be handled by adult fishermen. When a boy fisherman has reached his late teens, he starts to practice throwing the net. It needs patience and skill to get the knack of spreading the net circularly.

The gill net method is applied when the water

level is higher, from around March to September. The casting net is applied throughout the year. Some fishermen use all methods while others use only one method.

Fishermen usually use fishing boats, which are made of wood and normally about 4 m in length. As the boat doesn't have a screw, the fisherman rows it by wooden oars. When they go fishing, a pair of fishermen commonly rides on a boat. One person stays near the bow and another stays near the stern. To steer the boat at full speed, two persons row in unison. Then, when they are fishing, one person handles the fishing gear and while the other controls the boat. Women also row boats and join the fishing, but the casting net is usually thrown by men.

### **Mutualistic fishing**

When the water level is higher in the rainy season, Irrawaddy dolphins don't approach the fishing boats closely, but neither do they nervously avoid them.

The fishermen said that the dolphins are afraid of gill nets and avoid approaching them throughout the year, but they are not afraid of casting nets. Moreover, some dolphins approach fishing boats and jointly go after fish when the water level is lower in the dry season. One fisherman said that the catch from casting net fishing with dolphins is ten times larger than it without the presence of the dolphins. He also said that he can only catch enough fish for his family's consumption when solo fishing, but can catch enough fish to sell by fishing with dolphins. The fishermen who are able to fish with dolphins are fixed, village by village. The members should be casting net masters and have the knowledge and technique of how to fish with dolphins. Of course, they can fish without the dolphins, but they always expect the dolphins to appear in the dry season.

It is generally said that the dolphin tends to be solitary or travel in small schools in the rainy season, while they tends to form large schools of up to dozens of heads in the dry season. But during my study, the dolphins acted solitarily or in small schools of up to 6 heads in both the rainy season and the dry season. The fishermen can identify

each individual dolphin and predict which dolphin will join them. They even give the dolphins names such as 'Aunty Nape', 'Aunty Side Stripe', 'Aunty Gecko', 'Reddish Guy', 'Yellow Girl', 'Cute Chubby Boy' and so on.

When the fishermen spot dolphins, they approach the dolphins at full speed. Then, the fore fisherman lightly taps a short stick made of wood or bamboo on the gunwale in a quick rhythm, while the rear fisherman mightily hits and splashes the surface of the water with the oar. They do this frequently while they are rowing the boat. According to them, these actions signal the message to the dolphins "Shall we go fishing together?" Actually, these actions can transmit particular sounds and vibrations to dolphins through the water. In addition, fishermen continuously mimic the dolphin's voice.

If the dolphins are familiar ones and they agree to do the fishing together, the dolphins lead the fishing boats. If dolphins swim at full speed, they can easily outdistance the boats and the boats would not be able to follow them. But the dolphins seem to adjust their speed to that of the boats. The dolphins search for a good fishing point and gradually approach it.

The joint activity depends not only on the individual dolphin, but the place also determines whether the dolphins will join the fishing or not. Even if dolphins meet well-known fishing boats, they may consider the conditions. Then, if they judge the conditions are not so good for fishing because the water is too deep or too fast or so on, they may not join the fishermen.

Good fishing points are normally in the shallows. When the dolphins reach the chosen point, they start swimming quickly right and left under the water. This gets fishes to move together. When dolphins start to act so, the fore fisherman stands up on the front upper deck and stretches the folded casting net and hangs it on his dominant arm. When the net is ready to throw, the fisherman knocks the net's weights on the upper deck. This is the final signal to dolphins messaging "We are ready to throw the net." While the fore fisherman is handling the net, the rear fisherman steers the boat.

When dolphins have finished herding the fishes into the small range between dolphins and the boat, a dolphin will suddenly flap the surface of the water with the caudal fin or will suddenly lift up the caudal fin and wave it in the air. This is the signal to fishermen to cast the net. As soon as the dolphin gives this signal, the fisherman throws the casting net. The tip of spread net would reach about to the spot of the fin signal.

Then, the fisherman slowly hauls up the net. While the net is being hauled in, the dolphins gradually approach the boat following the net. The fishermen

say that the dolphins eat the fish that escape from the net. Actually, the body of dolphin under the water cannot be seen because of the muddiness of the water. But their movements can be assumed by the bubbling or rippling of the water.

When the net is completely hauled up onto the boat, dolphins swim away. While the fisherman is unraveling the net and collecting the fish, other boats chase the dolphins to the next fishing point. One after another each boat fishes with the dolphins. The fishing fleets of some villages consist of 8 boats, while in other villages there may be only 2 boats.





*The dolphin flays at the surface of the water with a caudal fin. This is the signal for the fisherman to throw the net. (Photo: Shingo Onishi)*





*The dolphin herds the fish towards the net. (Photo: Shingo Onishi)*





*Fisherman pulling in the net. (Photo: Shingo Onishi)*

By this cooperative method, the fishermen can certainly get a larger catch and the dolphins can easily obtain fish for themselves, and thus both sides receive benefits. This relationship is just like mutualism in the biological point of view. So, I would like to call this fishing method “mutualistic fishing”. The peak period of mutualistic fishing is from October to February.

Concerning the number of dolphins, some fisherman said that about 10 head would join the fishing, while others said that only 5 or 6 head used to join. And some fisherman said that up to 20 head have sometimes joined.

During my stay, I witnessed three schools of dolphins joining the mutualistic fishing. Each time the number was 4 to 6 head in each school. According to the fishermen, each school consists of adult females and young dolphins, both male and female, and they should be related by blood.

I observed some young dolphins occasionally splashing on the surface of the water, and a junior fisherman prepared to throw the net. Suddenly, a veteran fisherman shouted “Don’t throw! It is just

playing.” Knowledge and techniques are definitely being passed on to the next generation of dolphins and fishermen. The oldest fisherman of one village, aged 58 years, said that his parents also used to do the casting net fishing with dolphins. He estimated that this fishing method has been done for more than 80 years, but less than 100 years.

I hypothesize that the beginning of the mutualistic fishing came about when one day some dolphins and some fishing boats were chasing the same target of fishes. The dolphins saw that many fishes were caught by the casting net, but some of them also escaped from meshes of the net and from the gap between the net and the riverbed. The dolphin realized that it would be easier to catch fish if it followed the edge of hauling net and subsequently approached the boats closer year by year. On the other hand, fishermen already appreciated how skillful dolphins were at searching for and gathering fishes. So, they began to work together. The rule is that dolphins lead boats to fishing points and gather fishes and fishermen catch fishes and never hurt or kill dolphins.

## Issues

Dolphins seem to dislike all kinds of motorboats. According to my observation, even while the dolphins were accompanying the fishermen's boats, if some motorboat was getting closer to them, the dolphins stopped fishing for a while. When local boatmen of motorboats notice the mutualistic fishing operation, they change their course and try not to disturb the fishing. But captains of larger passenger boats and cargo boats seem not to care.

Mandalay, the second largest city of Myanmar, is about 10 km south of the southern limit of this dolphin habitat. As the city is the important point of waterborne transportation, the surface and the riverside of the Ayeyarwady River are congested with many boats. Many pleasure boats also sail up to the famous ancient city of Mingun, which is located near the southern limit of this dolphin habitat. All of the fishermen and captains said that dolphins never move downstream lower than Mingun.

Some illegal fishing methods reduce the fish population and also may directly hurt the dolphins. The most terrible fishing method is the so-called "shock fishing". The illegal fisherman uses a powerful battery or generator to send a high voltage electrical current into the water. Then, he collects the shocked fishes. Legitimate fishermen said that one dolphin was electrocuted by this illegal method in 2005. Now, the government is trying to control such illegal actions, but they are still continue secretly.

The reason why fishermen and dolphins can share fish catches is that there are enough fish in the river. Fish can energetically propagate as long as the river water is not too polluted and is filled with nutrition. The nutrition can be constantly supplied by the rich forest of the vast catchment area. If such a balance becomes upset, the fish population will decrease. Then, fishermen and dolphins will be rivals chasing a limited fish stock. Moreover,

the fishermen could begin to chase the dolphins themselves as prey. Some modernized fishing methods can be a factor in upsetting the balance around the river. It is risky to sharply decrease the fish population.

The government lists the Irrawaddy Dolphin in the completely protected animals list. The Department of Fishery, Ministry of Livestock & Fisheries, with WCS, has the system to issue identification cards to cooperative fishermen to request their participation for the conservation of the Irrawaddy dolphin and their joint fishing culture.

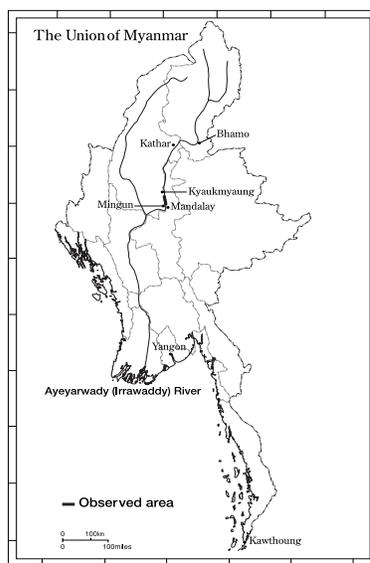
They cooperate in the patrolling, the research and spreading the education program. But some fishermen still won't agree to hold the license. They may not want to be restrained by anybody.

If someone wants to be rich, who can stop it? If someone wants to chose an easier way, who can stop it? We should not think that the traditional fisherman's lifestyle is inferior. Actually, as long as they keep to this fishing style, they can be satisfied with enough fish on a sustainable basis. We should commend the fishermen so that

they can proudly keep on with their own lifestyle.

What I can do now is to introduce this amazing relationship between animals and humans, and to let people notice how noble they are and how harmless to the earth their actions are.

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*Haleji Lake, Thatta, Sindh, Pakistan*

## WETLANDS AND CLIMATE CHANGE

by Muhammad Rais

Earth came into existence and became part of this universe almost four billion years ago; however, it took ages for any life forms to evolve on this planet. The main hindrance was the harsh and unfavorable conditions, e.g., high temperatures, the accumulation of poisonous gases and lack of oxygen in the atmosphere, and ultraviolet radiation from the sun reaching the earth unchecked. Still, the major constraint to the origin, evolution and diversification of life was the unavailability of water. Water totally dominates the chemical composition of all organisms. The ratio of water and solid mass is roughly 70:29% in all organisms. Moreover, at the cellular level water constitutes the same percentage. Seventy-one percent of the earth's surface is covered with water. Most of earth's water is held in the oceans

(97.61%), some is frozen in polar glaciers (2.08%), and some is present as ground water (0.29%). Less than 1% is available in the form of fresh water lakes and rivers. (Kalinin, 1969). But how and where did the water come from? We now know that the earth was continuously burning and carbon dioxide and water vapors were given off as a result of combustion. These were believed to extinguish the fires and deep trenches on the earth's surface were filled with this water. In this manner, wetlands came into existence. Wetlands are those lands that are inundated with surface or ground water with a frequency sufficient to support plant and animal communities whose survival depends on saturated or seasonally saturated soil. The estimated global area covered with wetlands is 12.8 million km<sup>2</sup>.

The very water and wetlands that created favorable conditions for life are now facing many threats, but the major one is “global warming”. The burning of fossil fuels, changes in land cover and land use, etc. have resulted in increases in global temperatures, which inevitably results in changes in the precipitation, the melting of polar ice caps, and rises in the sea level, all of which will have serious implications for the wetlands.

### **Impact of climate change on wetlands**

Alterations in the climatic pattern will have far reaching, deleterious consequences on the health of wetlands and their dependent life forms. Climatic changes may bring about changes in hydrological regimes, in the pattern of evaporation, biogeochemical cycles, the cycling of nutrients and suspended particles.

Without wetlands, the coastal, inland and high altitude areas will all have to bear the consequences equally. As for lakes and streams, a climate change would result in the reduction of the polar ice cover, decreased availability of dissolved oxygen in deep water, and an increase in the frequency of extreme events, e.g., floods in some areas and drought in others.

#### *Effects on wildlife associated with wetlands*

Rises in the temperature increases the duration of hot days. In fact, some wetland-dependent wildlife, e.g., amphibians and reptiles, are sensitive to heat and would find it difficult to adjust to prolonged spells of heat. Some of them have already disappeared, which has disturbed the food chain and is affecting those placed higher in the food chain. Likewise, as parasites are unable to procreate in cold environmental conditions, fewer frost days could increase the incidence of diseases and epidemics to an unprecedented level.

#### *Changes in the ice cover duration and ice thickness*

Higher global temperatures would undoubtedly decrease the ice cover and ice thickness in the polar regions, and non-polar glacial retreat would be favored. Consequently, wildlife in the polar regions such as polar bears, arctic foxes, etc. will

be affected. Moreover, processes regulated by ice cover, for instance, gas exchange with the atmosphere, erosion, nutrient cycles, biodiversity and primary productivity, will be seriously affected.

#### *Effects on fisheries*

It is generally believed, and been proven by some studies, that some fish species respond to higher temperatures by showing rapid growth. Nonetheless, the negative implications of this are seldom taken into consideration, such as that rapid growth demands more food, places to live and the chance of diseases escalates.

#### *Alteration in species abundance, diversity and composition*

Wetland-dependent species that do not have excellent mobility will face extinction if environmental conditions change beyond their tolerable limits. Even those with greater mobility will also be affected; for example, cold water fishes would be restricted in their range while warm water fishes would expand their range.

#### *Ecological succession*

Climate change and higher temperatures favor the replacement of original wetland communities such as swamps and fen peat land communities with other types like bog peat land.

#### *Salt water intrusion*

Rises in the sea level may severely affect the low-lying wetlands. For instance, flood plains and swamps in low-lying regions could be displaced by saline habitat due to the cumulative effects of salt water intrusion, intense rainfall, storm surges, etc. Plant communities that cannot tolerate high salinity and inundation become replaced with mangroves and other salt-tolerant plants.

#### *Altered bird migration pattern*

Changes in the wetlands that could be used as staging, wintering and breeding sites for bird species that migrate continent to continent, and even those migrating within country, will put the birds at risk.

## Conclusion

Climate change and global warming poses a great danger to the wetlands and their dependent wildlife. With each passing day the amount of green house gases being emitted is increasing, which contributes to the rise in the global mean temperature, which in turn causes other deleterious changes in the environment such as prolonged heat spells, fewer cold days, the melting of ice masses, rises in sea level, etc. Now is the time to take action to protect the wetlands and preserve their

values and functions. This could be achieved by developing a comprehensive structural framework at global and regional levels to minimize the emission of green house gases, by restoring peat lands and natural carbon sinks, and by launching a public awareness campaign before it is too late.

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*Hingol National Park, Baluchistan, Pakistan*

## AMPHIBIAN FAUNAL DIVERSITY OF BERALIYA MUKALANA PROPOSED FOREST RESERVE

by D.M.S. Suranjan Karunaratna, U.T. Indika Abeywardena, A.A. Thasun Amarasingha, D.G.

Ramyath Sirimanna and M.D. Chandana Asela

### Introduction

Sri Lanka is a biodiversity hotspot rich in herpetofaunal assemblages (Bossuyt *et al.*, 2004; Meegaskumbura *et al.*, 2002). Favorable environmental factors such as high rainfall and humidity and the high density of undergrowth found in this region support a rich diversity of herpetofauna. A total of 103 species of amphibians have been recorded (De Silva, 1996; Dutta & Manamendra-Arachchi, 1996; Manamendra-Arachchi & Pethiyagoda, 1998; Manamendra-Arachchi & Pethiyagoda, 2001a; Manamendra-Arachchi & Pethiyagoda, 2001b; Manamendra-Arachchi & Pethiyagoda, 2005; Meegaskumbura & Manamendra-Arachchi, 2005) and 87 species belonging to 16 genera are endemic to the island. Among those genera, *Lankanectes*, *Nannophrys*, and *Adenomus* have been considered as relic genera (Manamendra-Arachchi & Pethiyagoda, 2006; Pethiyagoda *et al.*, 2006).

The Sri Lanka amphibian diversity is very high due to the varied geology, altitude, climate, geography and habitats which support a wide distribution. Sri Lanka has various ecological zones, i.e., dry zone, intermediate zone and wet zone. Most of the species are recognized by lowland wet zone rain forest and vegetational floristic region (Bambaradeniya *et al.*, 2003; Gunatillake & Gunatillake, 1990). The Sri Lanka amphibian fauna may also be grouped by their habitats, such as arboreal, burrowing, terrestrial and aquatic. According to the De Silva (1994) and Wijesinghe & Dayawansa (2002), the endemic species belonging to these four groups are found in the wet zone rain forest. Sri Lanka has been fortunate as a fair proportion of their natural habitats are found throughout the wet zone rain forest.

Sri Lanka's natural forest areas still constitute over 12% of the total land area (Tan, 2005). The natural forests in the island are rapidly diminishing as a result of the expansion of settlements and agricultural land, leading to adverse impacts on the rich biodiversity (Bambaradeniya *et al.*, 2003). The loss of natural forests over the past 100 years has led to the extinction of seventeen species of scrub frogs *Philautus* spp. (Manamendra-Arachchi & Pethiyagoda, 2005). One of the biggest drawbacks for conserving amphibian fauna of the country is the lack of knowledge of their distribution and ecology. Therefore, we believe this paper would contribute to and enhance the current knowledge of amphibian diversity within the Beraliya Mukalana Proposed Forest Reserve.

### Study area

The Beraliya Mukalana Proposed Forest Reserve (BMPFR) area belongs to Alpitiya and Niyagama secretariat divisions of Galle District, between the northern latitudes 6°14' and 6°18' and eastern longitudes 80°11' and 80°14' (Somasekaran, 1988). The study area is accessible via the Alpitiya – Pitigala main road in the northern part and the Alpitiya – Waturuvila main road in the southern part (7 km from Alpitiya town junction). The Beraliya Mukalana forest covers 4,639 hectares and falls in the southwestern wet zone. This area has a several small mountains, Atuwagala Kanda being the highest mountain at 540 feet, and the forest area is 400 feet above sea level. The forest reserve receives the southwestern monsoon and the annual rainfall is 3,660 mm and the average annual temperature is 28°C. The BMPFR vegetation can be categorized as lowland evergreen rain forest (Gunatillake & Gunatillake, 1990) and has a rich biodiversity like any other

rain forest in the area. The study area has a rich floristic diversity and its composition is a very good evidence for identifying a primary rain forest (Ashton *et al.*, 1997).

### Methodology

The present study was carried out during 2004 and 2005. A total of 16 days were spent for fieldwork during the two years. General area surveys were carried out in different habitat types within the BMPFR. Surveys were conducted both day and night. All amphibian habitats such as water bodies, under rocks, logs and decaying vegetation, and in trees and bushes for arboreal amphibians were thoroughly searched for the presence of specimens. All collected species were examined carefully and noted down before being released back to the same habitats. The diagnostic keys given by Dutta and Manamendra-Arachchi (1996), Manamendra-Arachchi & Pethiyagoda (1998), Manamendra-Arachchi and Pethiyagoda (2005) and Manamendra-Arachchi and Pethiyagoda (2006) were used for species identification. Basic environmental parameters were recorded at the locations where specimens were collected.

### Results

During the survey, 22 species of amphibians belonging to four families consisting of 14 genera, including 11 endemic amphibian species, were recorded in BMPFR. Species from the endemic genus *Lankanectes*, *Nannophrys*, *Adenomus* were found in BMPFR. Most of the species were recorded during the rainy season, especially in the well-shaded canopy covered areas. Several species were also recorded within the home gardens dominated by Areca-nut plants (*Areca catechu*). Among the 22 species, only one species represented the caecilians.

The most common and abundant species present in BMPFR are: *Bufo melanostictus*, *Microhyla rubra*, *Limnectes limnocharis*, *Euphlyctis cyanophlyctis*, *E. hexodactyla*, and *Hoplobatrachus crassus*. Caecilians were the least abundant (5%). Atukorale's Toad (*Bufo atukoralei*), *Bufo noellerti*, *Philautus cavirostris*, *Polypedates cruciger*, *Polypedates longinasus* and

Yellow Banded Caecilian (*Ichthyophis glutinosus*) are also occasionally found within the forest. Ten species recorded from BMPFR are considered as nationally threatened in IUCN-Sri Lanka's **1999 Red List of Threatened Fauna and Flora of Sri Lanka** national status report.

### Discussion

*Adinomus kelaartii* was observed during both day and night, usually in close proximity to streams. It is a semi-arboreal species and inhabits rock boulders in streams (Manamendra-Arachchi, 2000). They were mostly found at ground level. Three specimens of *Bufo atukoralei* were recorded from a single locality in a home garden habitat. The common house toad *Bufo melanostictus* is a widely distributed and commonly found nocturnal species in the study area. It is mainly seen in cleared or disturbed habitats in home gardens, and rarely found inside the forest. Two specimens were seen inside the forest and 17 specimens were observed outside the forest near decaying logs and with rocky surfaces. *Bufo noellerti* is a terrestrial species and is rarely recorded near human habitations (Manamendra-Arachchi & Pethiyagoda, 1998). We also observed this species in trees about 1m above ground level in wet barks.

Common bull frog *Kaloula taprobanica* is a commonly seen species and it is recorded from human settlements such as in home gardens and agricultural lands. *Microhyla rubra* and *Ramanella variegata* appear to be uncommon in this forest, as they were recorded from a single locality. Their calls were heard near a temporary pool during the rainy season. Many of them were heard calling from the grass. About 13 specimens of Red narrow mouth frog were recorded in this area. Kandamby (2001) recorded 22 amphibian species from Galle District. However, two *Philautus* species were mistakenly identified as these two species are extinct in Sri Lanka. The White-bellied pug snout frog is an uncommon Microhylid frog that was recorded in the survey, and is mostly seen during the night time. Three specimens were recorded in the home gardens under rocks and inside the houses.

*Hoplobatrachus crassus* is the largest of the Sri Lankan frogs and very common in this area. Nine adults and 10 juveniles were seen near the streams. A juvenile with a yellowish green color line on the vertebral area and around the eyes was observed crossing a forest path at night. A smaller percentage was recorded from the paddy field. *Fejervarya limnocharis* is another very common species recorded from the grassland near temporary small ponds, pools and paddy fields. They are seen in large numbers everywhere in the study area. *Euphlyctis cyanophlyctis* and *Euphlyctis hexodactyla* are very common species and were recorded from temporary rain water pools and ponds inside the BMPFR; 24 specimens were recorded from this area. The Sri Lanka wood frog *Rana gracilis* is rare in this area; it is terrestrial or partly arboreal in habit and occasionally seen in small numbers sitting on the sides of the paddy fields and inside the wells. It is active during the night and during the daytime is seen resting under the rocks.

*Rana temporalis* was found in rocky habitats with streams and in the leaf litter in the rain forest throughout the wet zone. *Lankanectes corrugatus* has been recorded on the margins of slow flowing streams, in rocky areas of streams as well as in leaf debris. This species is essentially a sub-montane one, being recorded from the lower foothills. *Nannophrys ceylonensis* was rare and its distribution is restricted to the low country wet zone forest. They were found mainly under boulders and on wet flat rocky surfaces (Cascade habitats). *Rana auratiaca* is a semi-arboreal species which was seen under wet logs and on the leaf litter layer. It was also recorded near slow flowing streams and pools surrounding very damp substrates.

The tubercle shrub frog *Philautus cavirostris* was recorded three times resting inside the monastery lavatory. In addition, this species was recorded in Dediyaigala, Kanneliya in Galle District (Kandamby & Batiwita, 2001). *Philautus hoipolloi* is a common species in this area and the male's call can be heard 1-2m above ground level. The nesting behavior of this species was also documented; 17 eggs were laid in a 1-2 cm hole dug by the female. Common Hourglass Tree Frog *Polypedates cruciger* was frequently recorded

within the human settlements but was not observed within the forest areas. The Chunam Tree Frog *Polypedates maculates* is also recorded from the home gardens. Their calls were heard at night from the trees adjoining the small pools about 10 feet above ground level. A total of 18 specimens were recorded from the study area. *Ichchiophis glutinosus* is very rare in this area; it was found only one time near Deniya Oya. This species is usually found in daytime under big wet logs.

### Conclusions and recommendations

Preliminary indications are that the BMPFR site is of high amphibian diversity interest and importance. However, the survey period was short and it is recommended that similar more long-term surveys be conducted. Habitat loss and deterioration remain the predominant threats to BMPFR amphibian populations. Tree frogs, especially of the genus *Philautus* and *Polypedates longinasus*, show patchy distribution due to their specificity of habitat. The slash and burn technique of shifting cultivation involves the cutting of forest patches for agricultural practices, which destroys the habitat of *Philautus*.

This and other human activities involving cutting of trees will contribute to decline of such arboreal species of anurans. An advantage which has perhaps been overlooked as regards monitoring by members of the local communities is that it helps to raise awareness of the value of species and habitats. If this awareness can be integrated into conservation and management effects, then the likelihood of biodiversity conservation is higher than otherwise might be the case.

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**Table 1: List of Amphibian species recoded from the Beraliya Mukalana Proposed Forest Reserve.** (Abbreviations: TR – Threatened Species and E – Endemic species)

Family and Scientific name	Common name	Status
Family :- Bufonidae		
01 <i>Adenomus kelaartii</i>	Kelaart's dwarf toad	E / TR
02 <i>Bufo atukoralei</i>	Atukorale's dwarf toad	E / TR
03 <i>Bufo melanostictus</i>	Common house toad	
04 <i>Bufo noellerti</i>	Nollert's toad	E / TR
Family :- Microhylidae		
05 <i>Kaloula taprobanica</i>	Common bull frog	
06 <i>Microhyla rubra</i>	Red narrow mouth frog	
07 <i>Ramanella variegata</i>	White-bellied pugsnout frog	
Family :- Ranidae		
08 <i>Euphlyctis cyanophlyctis</i>	Skipper frog	
09 <i>Euphlyctis hexadactylus</i>	Sixtoe green frog	
10 <i>Fejervarya limnocharis</i>	Common paddy field frog	
11 <i>Hoplobatrachus crassus</i>	Jerdon's bull frog	
12 <i>Lankanectes corrugatus</i>	Corrugated water frog	E / TR
13 <i>Nannophrys ceylonensis</i>	Sri Lanka rock frog	E / TR
14 <i>Rana aurantiaca</i>	Small wood frog	TR
15 <i>Rana gracilis</i>	Sri Lanka wood frog	E / TR
16 <i>Rana temporalis</i>	Common wood frog	
17 <i>Philautus hoipolloi</i>	Home Garden's Shrub frog	E
18 <i>Philautus cavirostris</i>	Tubercle shrub frog	E
19 <i>Polypedates cruciger</i>	Common hour-glass tree frog	E / TR
20 <i>Polypedates longinasus</i>	Sharp-snout saddled tree frog	E / TR
21 <i>Polypedates maculatus</i>	Chunam tree frog	
Family :- Ichthyophiidae		
22 <i>Ichthyophis glutinosus</i>	Common yellow-band caecilian	E / TR

## **DRY MATTER AND ORGANIC VALUE OF CUSCUS DIET IN WEST PAPUA**

by Sepus Fatem, Diana Sawen and Matheus St. E. Kilmaskossu

### **Introduction**

One of the endemic animals of Papua is the cuscus. The cuscus is generally well known by society as it is hunted for its meat to fulfill people's nutritional needs. In addition, its fur can be used for many high value ornaments and handicrafts such as bags, caps, hats and purses. However, uncontrolled hunting, rapid development and increases in the human population will endanger the cuscus.

One effort to overcome these pressures is raising cuscus in captivity (cuscus farming). An important factor in successfully raising cuscus is knowing its diet, as the farm conditions should imitate their natural habitat, both the climate and food species. In captivity, the food should be similar to that found in their natural habitat. The cuscus feed on plants that mostly consist of harsh fiber, although they also often feed on small vertebrates such as lizards, insects, etc.

The food value or diet of cuscus is very important and needs to be known, as this can prevent the failure of conservation activities. The correct diet or food is very important for growth and development, e.g. to replace the old dead cells by producing new cells, for reproduction, etc. (Widayati *et al.*, 1996).

Menzies (1991) mentioned that in cuscus farming in Papua New Guinea, cuscus that are fed plants of low harsh fiber content (generally fruits) mostly die due to intestinal ailments (e.g., infections).

Based on the above, the *ex situ* conservation efforts for cuscus should pay more attention to the dietary factors and provide food or feeding plants derived from the native habitat. Therefore, research is needed to determine the nutritional

values (i.e., the dry matter content and organic matter content) of cuscus feeding plants in the northern shore area of Manokwari district, Papua.

### **Research method**

This research study was conducted in Mandopi, Asai, Mubri, and Warbefor in the northern shore area of Manokwari district, and at the Nutrition and Food Laboratory of Livestock of FPPK UNIPA, from November 5-26, 2005. The method used is a descriptive method with field observation techniques, semi-structured interviews and laboratory analyses. Analyses of the organic and dry matter followed the steps referred to in the procedure of Apriyantono, Fardias, Puspita Sari, Sedarwati and Budiyanono (1989). Variables observed and noted were: type of feeding plants, parts of plants consumed, plant structure, and the nutritional values of dry and organic matter.

The observations showed that vegetation diversity is evenly distributed along the northern shore or coastal area of Manokwari district. This includes the cuscus feeding plants. The cuscus feeding plants are easily found as they almost form a forest complex along the coast inlands up to 50 m above sea level. They are found in beach or littoral forest as well as in the lowland tropical rain forest.

About 34 plant species from 28 families are consumed by cuscus. These include 6 agricultural crop/plants and 28 forest plants. The results also indicate that among the two cuscus species that live in this area – Gray cuscus (*Phalanger orientalis*) and Short-tailed spotted cuscus (*Spiloglossus maculates*) – there is no difference in terms of the type of food consumed. The parts of plants being consumed are young leaves or shoots, ripe fruits, husk of fruits and inflorescence.

Fruits are preferred as they have a high content of fiber and water, which favors digestion.

Ripe fruits from 26 plant species and the leaves and shoots from another 8 species are consumed

by cuscus. For some food plants the cuscus only feed on the young leaves or ripe fruits. However, there are other plants of which the cuscus consumes the young shoots and ripe fruits or young shoots and inflorescence.

**Table 1: Plant species and parts of plants consumed by cuscus**

Family	Latin name	Parts of plant consumed
Mimosaceae	<i>Leucaena glauca</i>	Young leaves/shoots
Myrtaceae	<i>Eugenia</i> sp <sup>1</sup>	Ripe fruits
Myrtaceae	<i>Eugenia</i> sp <sup>2</sup>	Ripe fruits
Myrtaceae	<i>Psidium guajava</i>	Ripe fruits
Sterculiaceae	<i>Theobroma cacao</i>	Ripe fruits
Gnetaceae	<i>Gnetum gnemon</i>	Ripe fruits and Young leaves
Combretaceae	<i>Terminalia cattapa</i>	Ripe fruits and Young leaves
Convolvulaceae	<i>Merremia peltata</i>	Young leaves
Fabaceae	<i>Intsia bijuga</i>	Young leaves
Papilionaceae	<i>Pongamia pinnata</i>	Young leaves
Sapindaceae	<i>Spondias dulcis</i>	Ripe fruits and Young leaves
Sapindaceae	<i>Pometia pinnata</i>	Ripe fruits and Young leaves
Lauraceae	<i>Persea americana</i>	Ripe fruits
Zingiberaceae	<i>Globa</i> sp <sup>1</sup>	Ripe fruits
Zingiberaceae	<i>Globa</i> sp <sup>2</sup>	Ripe fruits
Caricaceae	<i>Caricca</i> sp	Ripe fruits
Musaceae	<i>Musa</i> sp	Ripe fruits and Young leaves
Muntingiaceae	<i>Muntingia calabura</i>	Ripe fruits
Anacardiaceae	<i>Mangifera indica</i>	Ripe fruits
Myristicaceae	<i>Horsfieldia globularis</i>	Ripe fruits
Moraceae	<i>Ficus</i> sp	Ripe fruits
Moraceae	<i>Ficus septica</i>	Ripe fruits
Moraceae	<i>Ficus trachypison</i>	Ripe fruits
Moraceae	<i>Ficus macrothyrea</i>	Ripe fruits
Meliaceae	<i>Lansium domesticum</i>	Ripe fruits
Pandanaceae	<i>Pandanus polycephalus</i>	Ripe fruits
Clusiaceae	<i>Calophyllum inophyllum</i>	Young leaves
Clusiaceae	<i>Morinda citrifolia</i>	Ripe fruits
Flacourtiaceae	<i>Flacourtia inermis</i>	Ripe fruits
Aracaceae	<i>Philodendron</i> sp	Ripe fruits
Apocynaceae	<i>Lepinopsis ternatensis</i>	Young leaves
Sapotaceae	<i>Palaquium amboinensis</i>	Young leaves
Sapindaceae	<i>Geniostoma</i> sp	Ripe fruits
Sapindaceae	<i>Nephelium lapaceum</i>	Ripe fruits

Figure 1: Food plants of cuscus



*Pongamia pinnata*



*Philidendron* sp.



*Palaquium ambionensis*



*Pandanus polycephalus*



*Horsfeldia globularis*



*Ficus macrothyera*



*Ficus trachypison*



*Meremia peltata*



*Globa* sp.



*Ficus* sp.



*Calophyllum inophyllum*



*Globa* sp.

## Nutritional value

### Dry matter content

The water content of food is calculated by the difference between the foodstuff's weight before heating and after heating, divided by foodstuff's weight before heating.

The dry matter content of the plant part consumed by cuscus, in this case ripe fruits, ranges from 7.81%-57.78%, while for young shoots it ranges from 14.99%-49.6%. The highest dry matter content is that of Globak fruits (*Globa* sp.) 57.78 % and red Globak (*Globa* sp.) 51.37 %. The ripened fruits usually show a high dry matter content; however, some, like Jambu (*Eugenia* sp.), show a low dry water content.

The high dry matter content of *Globa* sp. is perhaps due to a high carbohydrate content and it can be seen that the fruits are more solid, have a low water content, and taste sweet (can also be consumed by humans). According to Salisbury and Ross (1995), the main component of dry matter is the polysaccharides and lignin of the cell walls, added to the cytoplasm components like proteins, lipids, amino acids, organic acids and certain specific minerals like potassium.

The nutritional status of plants is very much determined by the dry matter content, because dry matter contains much nutrition; thus, dry matter can show which parts of a food plant can be consumed by cattle or wildlife (Subagyo and Kusmartono, 1988). This matches the opinion of Reksodiprodjo (1988), who stated that the dry matter content of a food species determines the nutritional content of the species, where the higher the dry matter content, the higher its organic matter will be.

The dry matter content of young leaves or shoots is sufficiently high as shown by matoa shoots (49.60%). This might be due to the fact that it is in the leaves where photosynthesis occurs and produces a lot of protein and energy. This is in line with Salisbury and Ross (1995), who mentioned that, in general, the leaves contain much more nitrogen, phosphorus and potassium.

### Organic matter content

In a food-stuff analysis, the organic matter content is considered to be the total amount of nutrition, protein, fat, harsh fiber, and energy. Therefore, it does not show or indicate the types of food. This result is derived from the analysis of the ash content after the incineration process.

The organic matter content of forest plants and agricultural plants varies depending on the parts of the plant being consumed. The highest organic matter content is that of globa (*Globa* sp) (52.31%), while for young leaves or shoots it is *Pometia pinnata* shoots (46.6%).

The high organic matter content of *Globa* sp may be due to its solidness. Physically, when the fruit is ripe, the flesh is more compact and not watery. This differs from other fruits which when ripe have a high water content. The dry matter content is parallel or has a linear relation to the organic matter content, which means that if a certain food plant has a high dry matter content, then the organic matter content tends to also be high.

Young leaves or shoots also have a high organic matter content. This might be due to the fact that it is in the leaves where photosynthesis takes place. This fits with the statement of Djoseputra (1992) that in the photosynthesis process, plants will use the carbon from the air to change it into organic matter and distribute it to other parts of the plant.

## Conclusion

The total number of plant species consumed by cuscus in the northern shore area of Manokwari district consists of 34 species from 28 families; 6 families are agricultural plants and 28 families are forest plants.

The highest dry matter content of food plants consumed by cuscus comes from ripe fruit of *Globa* sp (57.78%), while the lowest is from ripe Jambu fruit (*Eugenia* sp) (7.81%). Among young leaves or shoots Matoa (*Pometia* sp) has the highest dry matter content of 49.6%, while the lowest content is from shoots of Kedondong (*Spondias dulcis*) with 14.19 % dry matter content.

The highest organic matter content is found in the fruit of *Globa* sp. (52.31%), while the lowest

organic matter content is found in ripe fruits of *Spondias dulcis* (4.39%). Among young leaves or shoots, *Pometia* sp. has the highest organic matter content of 46.6 %, and the lowest is found in the vine *Meremia peltata* with 4.38 %.

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## COMMUNITY-BASED ECO-TOURISM: A CASE STUDY OF TAMAN SAFARI INDONESIA

by Govindasamy Agoramoorthy

### Introduction

Ecotourism involving wildlife and nature has been considered one of the fastest growing sectors of the tourism industry in recent decades. It has been promoted widely to complement the conservation of highly endangered species and habitats in developing countries in Asia, Africa and South America (Campbell, 1999, 2002). Southeast Asia is considered a major biodiversity hotspot and is known to harbor immense diversity of fauna and flora, including several highly endangered and endemic species (Myers *et al.*, 2000). Thus, sustainable tourism to promote the local economy

and to upgrade the socio-economic status of the rural people is essential so that people can be educated about conservation and hopefully eventually safeguard the dwindling natural resources. In this paper, information is provided regarding the role of a wildlife safari park in Indonesia in promoting sustainable development, education and nature conservation in the community.

### Materials and methods

Taman Safari Indonesia (1992) is a wild animal theme park and was opened in 1986 as the first

open wildlife park in Indonesia. It is located in Cibereum village (Cisarua town, Bogor, West Java), in the northern part of the Gede Pangrango National Park (Harris, 1994). The mountainous terrain was a tea plantation during the Dutch colonial period. The park lies about 80 km from Jakarta city. The cool climate offers relief from the capital's often oppressive heat. Year-round temperatures at the park vary between 18-24° C.

The park displays about 2,300 wild animals and is partly a modern zoo with a back-to-nature theme where animals are allowed to roam freely in spacious exhibits. It also operates a Night Safari (established in 2000) four days a week, and a Safari Trek (established in 2001) that operates daily. Visitors trek through the rainforest for 8 km and it promotes appreciation of nature and endangered species. It is also a conservation center with an emphasis on ensuring the long-term survival of indigenous wildlife. The park serves as a buffer zone for the adjoining Gede Pangrango National Park where wild leopards, Javan gibbons and Javan deer roam freely. The Pangrango Mountain is a World Heritage site.

Taman Safari Indonesia was visited 6 times between 15 November 2004 and 20 April 2005 (4-6 days per visit) to collect data related to wildlife tourism, sustainable community development and conservation education. Data on the number of visitors were pooled from the park's archives. Cibereum village was visited to compile data on the community. A questionnaire survey was conducted and 2,800 visitors were surveyed to gather data on the role of the safari park as an educational institution and to promote sustainable development for the local community. The survey targeted the following basic questions to the visitors: (i) Age of visitors; (ii) origin of visitors (name of village, town, city); (iii) monthly income of visitors; (iv) educational background of visitors; (v) number of visits to the park by visitors per year; (vi) transportation used to reach the park; (vii) best attraction at the park; (viii) reason for visiting the park; (ix) visitors' opinion about animal shows; (x) visitors' opinion about staff and response; (xi) visitors' opinion about the park's environment; (xii) whether or not visitors gained new knowledge about wildlife and conservation; (xiii) whether or not visitors satisfied about their

visit; (xiv) visitors' opinion on future attractions; and (xv) whether or not visitors contribute for conservation in future. The directors of the park were interviewed to collect information using *ad-libitum* sampling (Lehner, 1996) on the contributions of the park to the local community. The questionnaire responses of visitors were analyzed qualitatively (Sudman and Bradburn, 1982).

## Results and discussion

The majority of the visitors to the park belonged to the age group between 31 and 50 years, followed by young adults in the age group 18 to 30 years (37%). This indicates that young and middle-age adults were eager to learn about wildlife in general. People over 50 years and younger individuals below the age of 18 comprised the lowest proportion of park visitors (7% each). The park attracted mostly local visitors (99%) with few foreigners. This may be due to the media coverage of social, ethnic and religious unrest, including potential terrorism, that often discourages foreign tourists to visit Indonesia (Leggat & Leggat, 2004; Simon, 2005). The majority of the local visitors, however, came from Jakarta city (37%), followed by outside the Jakarta area (29%), Bogor (25%), and Bandung. For the urban dwellers of Jakarta and other major cities in Indonesia, pollution is an apparent health hazard (Duki *et al.*, 2003). Visiting the park is usually a day-trip where tourists spend their time in a pollution-free natural environment to view a variety of wildlife and also to learn about animals.

The majority (44%) of the visitors to the park earned on the average USD 100 to 200 per month, followed by visitors earning an average USD 200 per month. Those who earned less than USD 100 per month constituted only 24% of the visitor population. In addition, park visitors generally had minimum education qualifications of senior high school (44%) and university education (35%). This indicates that people from the upper-and middle-class who earn a reasonable income were willing to spend their time and money to visit the park to learn about wildlife and nature. Interestingly, 35% of the visitors had been to the park more than 3-5 times and 91% of them own automobiles. Thus, the park attracts repeat visitors who have a unique

opportunity to learn about wildlife conservation which might eventually promote conservation awareness. Educating visitors about wildlife has in fact increased awareness and contributions towards wildlife conservation in the world (Luck, 2003).

When asked what part of the park attracted the visitors most, the response was mainly the diversity of the animal collection (47%). This was followed by animal shows (29%) and recreational activities (13). A lot of visitors were attracted towards various shows that involve animals such as cowboy shows, dolphin shows, elephant shows and various animals shows. When asked about their interest in such shows the majority responded that they attended the shows to increase their knowledge about wildlife (74%). Although showing animals in zoos and safari parks, especially non-human primates, often involve abuse and animal suffering (Agoramoorthy and Hsu, 2005), the park's animal interaction programs are aimed at educating the public about animal welfare and the urgent need to protect and preserve the dwindling wildlife populations in Indonesia. Some answered that they care about wildlife (15%), while others responded that they would like to contribute to the conservation of wildlife (11%). This indicates that the park in fact is serving as a vehicle to promote nature and wildlife conservation to the local community. It supports the notion that conserving the biological resources of our planet can come about only through informed and educated citizens who are able to place conservation into social, political and economic contexts at local and international levels (Agoramoorthy, 1997). As pointed out by Jacobson (1995), conservation education and communication at all levels are perhaps our only hope for the future to safeguard the diminishing natural resources.

When asked whether they thought the park maintained a clean and garbage-free environment, the majority responded by stating that the park was 'very good' (60%), while others said 'good' (37%) and only 3% stated 'not really good'. It indicates that the visitors perceive that the park maintains a pollution-free natural environment in general, which is essential to educate the local people since cities such as Jakarta suffer environmental degradation and pollution (Duki *et*

*al.*, 2003). 98% of the visitors said that they gained knowledge about wildlife after visiting the park, which indicates that the park serves as an educational institution to spread the nature conservation message. The majority of the visitors (78%) were also satisfied with the money they spent to visit the park to learn about wildlife. When asked what new attractions the visitors would like to see in the future, the responses ranged from improving the animal collection (55%), followed by increase in amusement activities for children (19%), to adding more animal shows for recreation (26%). This indicates that local people want to see a variety of animals in a natural environment so that they can increase their knowledge about the natural history of wild animals.

The park is located near a small village named Cibeureum, adjoining the town of Cisarua near Bogor city. The village has an area of 112,862 ha with 11,674 residents, including 5,954 men and 5,720 women. The safari park has contributed to the sustainable development of Cibeureum village and Cisarua town in general for a decade. It continues to provide social aids each year and also supports educational, religious, public utilities and community programs. The park has a total of 648 employees, of which 305 come from Cisarua District adjoining the park. An additional 88 staff come from Bogor city, while 263 come from other parts of Indonesia. The park assists in the development of religious service houses such as mosques and gives donations and gifts to the local Muslim community during the feast day of Ramadan each year. It also assists the local government and community to build and maintain public roads, streets, street lights, toilets, and security posts. It provides transportation services for the countryside, donates uniforms for public transport drivers and jackets, vests and helmets to motorcycle drivers in the community. Moreover, it supports building new classrooms, renovating school buildings, providing furniture and computers annually to local schools. Students and teachers are allowed to visit the park free of charge. This supports the fact that wildlife tourism involving a safari park can also benefit the local community similar to protected area ecotourism, which is becoming common in developing countries (Heinen, 1993; Fiallo and Jacobson, 1995; Walpole and Goodwin, 2001).

The park receives thousands of visitors during the day and also at the night safari. Many visitors participate in trekking through the natural forest. Since a large number of visitors come to the park both during the weekdays and weekends, it provides an opportunity for the community to sell locally grown vegetables and fruits that can be used as animal feed at the park. Local people also sell handicrafts and souvenirs to visitors and assist in the traffic control of automobiles, clean cars, and also provide parking facilities. During weekends, students find part-time work at the park or in other businesses outside the park. All these activities provide additional income for the local community. Furthermore, the park provides loans to merchants who sell vegetables and fruits through the local Bank of Danamon. The park played a major role in the establishment of the Indonesian Forum for Wildlife Conservation in 1998, which is non-profit agency whose members are journalists, bureaucrats, researchers, entrepreneurs, academicians, activists and officials from both the public and private sectors. The activities include advocacy, conservation campaigns and promoting conservation awareness among public.

Many wildlife species native to Indonesia are represented in the park's collection, including two animals that are only found on the island of Sulawesi. They are the anoa, a dwarf water buffalo, and the babirusa, which appears to have evolved from wild pigs some 30 million years ago. The park serves as a conservation center to breed various local species, including the highly endangered Sumatran tigers and Sumatran orangutans. The park had a total of 35 breeding Sumatran tigers as of 2005 and has a repository of the sperm of seven others for the future use to make sure that inbreeding does not occur. The park has also managed to re-introduce the highly endangered Bali starlings back into the wild. Over a hundred species of wild birds can be seen in the safari park and some fifteen species are classified as very rare and are on the endangered species list. The adjoining forest also harbors one of the rarest primates, the Javan or silvery gibbon, which is considered one of the top 25 highly endangered primates in the world (Conservation International, 2002).

In developing countries, natural habitats have been fast disappearing due to the increase in human population density, continued habitat destruction, agricultural expansion, industrial development, and other man-made disturbances (Cincotta *et al.*, 2000). The tropical islands in Southeast Asia that harbor a vast diversity of natural resources are more vulnerable to habitat destruction leading to species extinction (Agoramoorthy and Hsu, 2001a). This is mainly due to the fact that the Asia-Pacific region has 23% of the world's land area and 58% of the world's population (Agoramoorthy and Hsu, 2001b). If countries such as Indonesia that harbor high human density (121 million people; 914 people/km<sup>2</sup>; (Badan Pusat Statistik, 2004)) need to conserve natural habitats, fundamental changes are necessary to integrate nature conservation through the kind of sustainable tourism that has been outlined in this paper to promote the local economy and to upgrade the socio-economic status of the rural poor.

Tourism as a wildlife conservation and sustainable development tool can be promoted, and from a community perspective it is expected to provide benefits that ultimately enhance local support for the conservation of natural resources (Goodwin, 1996). The results of the study did not reveal any negative attitudes about tourism at Taman Safari Indonesia, but patterns of attitude involving tourism and wildlife conservation may change in the future as tourism develops (Doxey, 1975). Therefore, further studies will be needed in the future to gather quantitative data on the performance of tourism at the safari park in terms of ecological, socioeconomic, and community conservation levels.

In the case of Taman Safari Indonesia, the local community certainly benefits from the park through employment and other benefits to boost infrastructure, including alleviating poverty in the rural village community. Furthermore, the park protects the adjoining Gede Pangrango National Park from encroachment and destruction by local villagers. It also promotes conservation awareness among the rural and urban community in Java, which has a long history of cultivation and deforestation.

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Figure 1. Local villagers and children sell carrots to the visitors to be fed to herbivores at Taman Safari Indonesia



**Table 1: Number of visitors to Taman Safari Indonesia between 2000 and 2004**

Year	No. of Visitors
2000	1,601,977
2001	1,667,206
2002	1,556,264
2003	1,629,243
2004	1,373,965

Table 2: Community organization of Cibereum Village near Taman Safari Indonesia

<b>Community information</b>	<b>Area/Number</b>
Land area	112,862 ha
Human population	11,674
Male	5,954
Female	5,720
Rice field	4 ha
Hill	125 ha
Fish pond	1 ha
Horse	6
Sheep	300
Rabbit	169
Chicken	4,750
Cattle farm	112
Co-operative market	2
Grocery shops	5
Small shops	514
Mini-market	2
Traditional market	2
Recreational park	1
Real estate	1
Hotel	16
Restaurant	5
Car service	6
Motorcycle service	2
Telecommunication	31
Tennis court	16
Badminton court	5
Volleyball court	1
Football court	2
Swimming pool	25
Mosques	17
Small mosques	22
Islamic organizations	22
Church	1
Hindu temple	1
Hospital	1
Clinic	1

## RESIGHTING OF INDIAN OR GREATER FALSE VAMPIRE IN KODINAR, JUNAGADH DISTRICT OF GUJARAT

by L. Muthu Andavan, Manojkumar Pardeshi, Justus Joshua and S.F. Wesley Sunderraj

The Indian or greater false vampire (*Megaderma lyra*) belongs to Family Megadermatidae and is distributed throughout India. It is not uncommon in the Himalayas and deserts, in caves, forests, and near human dwellings with a range extending to Mumbai (Menon, 2003). In Gujarat, this species has been reported to be found in Amdavad district, Banaskantha district (Ryley, 1914), Dangs district, Kheda district and Surat district (Sinha, 1981) and throughout the mainland of India (Baqri, 2000).

The presence of this species in Junagadh district in Gujarat was reported by Brosset (1962), but has not been reported from any part of the forest of this region since then. During our environmental impact assessment survey in the Kodinar area of Junagardh, we sighted 15–25 individuals of greater or false vampire near Tordi village at 6:18 pm between the geographic co-ordinates 20°47' 28.6" N, 70°35' 58.0" E, at 16 m above msl in the cavy sacred grove. The grove was partially surrounded by agricultural land and trees species such as *Acacia*, *Ficus bengalensis*, *F. religisco*, *Prosopis*, etc., and sparse shrub and ground vegetation.

A photograph taken by the authors helped to confirm the identity and presence of this species in this region. Our sighting of the greater false

vampire is the first report of its presence from this region since 1962. It would also be of significance from the biodiversity conservation point of view as this would aid in updating the distribution of this species.

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# FOREST NEWS

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## *Asia-Pacific forestry community gathers for landmark event in Hanoi*

Ever think that you're too small to make a difference in forestry? According to world famous ecologist, Norman Myers, anyone who thinks that has never been in bed with a mosquito! Arguing for both individual and collective action, Professor Myers told the first-ever Asia-Pacific Forestry Week that tropical forests are facing a "super-crisis ...an appalling crisis, one of the worst crises since we came out of our caves."

Dr. Sunita Narain, Director of the Centre for Science and Environment, reinforced Professor Myers views, noting that the extraordinary ecological and social challenges confronting forestry will need extraordinary responses. She pointed out that climate change is heading towards catastrophe

and we have only a small window of opportunity to address the problem – by reinventing the ways we do business and the way we define economic growth.

These two keynote addresses launched a fascinating array of discussions, events and presentations comprising the first-ever Asia-Pacific Forestry Week.

### **The event**

Asia-Pacific Forestry Week was convened in Hanoi, Vietnam, 21-26 April 2008, in conjunction with the 22nd Session of the Asia-Pacific Forestry Commission (APFC). The

main objective of Forestry Week was to provide opportunities for diverse stakeholders and forest managers to share perspectives and seek solutions to the most challenging issues facing forests and forestry in the Asia-Pacific region.

The event attracted over 700 participants, from 57 countries. More than 50 partners supported Forestry Week through financial and in-kind contributions. Thirty events, including four plenary sessions and the 22nd Session of APFC, were organized by FAO and partner organizations as part of Forestry Week.

Coupled with the high level of interest, and excellent local arrangements provided by the Government of Vietnam, Asia-Pacific Forestry Week was proved a great success. By all accounts, it was one of the most significant forestry events in the region in recent years.

### Plenary sessions

Asia-Pacific Forestry Week was officially opened by Mr. Hoang Trung Hai, Deputy Prime Minister of Vietnam. The opening session featured several high-level speakers, including Mr. Jan Heino, Assistant Director-General of FAO's Forestry Department; Ms. Frances Seymour, Director-General of the Center for International Forestry Research (CIFOR); Ms. Sunita Narain, Director of the Centre for Science and Environment; and Professor Norman Myers, Fellow of the Saïd Business School, Oxford University.

Special plenary sessions were organized on three separate mornings of Forestry Week, focusing on: forests and human well-being; forests and climate change; and trade, forest law compliance and governance.

The plenary session on forests and human well-being was organized by the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC), with support from the Asia Forest Network (AFN). Dr. Yam Malla, Director of RECOFTC, opened the session by reminding participants that "forestry is about people." Subsequent presentations analyzed the complexity of poverty dynamics, brought out a range of case studies and provided a synthesis of the issues facing

indigenous groups managing forests under customary law. In summarizing the discussions, Mr. Ken Piddington from the Institute of Policy Studies at Victoria University, concluded that the preconditions for sustainable forest management unfortunately do not exist at the present time, with the exception of isolated cases where circumstances have combined with political will to create effective insulation from the pressure of commercial interests. The following points emerged from the session:

- there is a crucial need to clearly identify and understand the poor (i.e., differentiate socially, spatially and by resource base);
- solutions should target specific groups and arise from the standpoint of the target group;
- rights-based approaches may be even more effective than participatory approaches or consultative processes;
- risk management should be a component of forests and poverty alleviation efforts; and
- support for small-scale forest enterprises and value-adding activities at village levels can be effective in reducing poverty.

The importance of effective governance structures, conducive to equitable sharing of benefits, was stressed throughout the session.

The session on forests and climate change, organized by the Center for International Forestry Research (CIFOR) and FAO, provided a platform for a range of stakeholders to discuss key issues related to climate change mitigation and adaptation. Ms. Susan Braatz, FAO Forestry Officer, introduced the session by stressing that forests are currently high on the global agenda and foresters should be capitalizing on this opportunity. There was a consensus among participants that foresters need to be more actively engaged in developing climate change strategies. It was highlighted that mitigation and adaptation need to be tackled holistically within a broader policy context as well as within existing development and forestry plans. Equitable distribution of rewards will be crucial if opportunities presented by climate change are to effectively contribute to reducing poverty. Participants felt that there is sufficient knowledge about what needs to be done, but pointed to the urgent need to synthesize existing knowledge and implement actions.



The session dialogue on trade, forest law enforcement and governance was organized by the Asia Forest Partnership (AFP), CIFOR, UK Department for International Development (DFID), Institute for Global Environmental Strategies (IGES) and The Nature Conservancy (TNC). The session was brilliantly moderated by Mr. Rico Hizon, BBC Asia Business and Finance Correspondent. Lively and sometimes heated discussions followed presentations representing the perceptions of communities, the private sector and consumer countries. Among the areas of consensus on this controversial topic was the recognition that markets are changing in ways that encourage legal and sustainable forest management and trade. This trend should assist legal producers by excluding unfair competition from illegal producers. The government's role in assisting this process would be to streamline regulations and provide more direct incentives for producers to adopt legal and sustainable production practices. All stakeholders were urged to work together to support accelerated capacity building for both community and commercial enterprises seeking to move towards legal and sustainable production.

### Parallel events

Numerous parallel events organized by partner organizations dealt with various timely topics. Many of the events generated so much interest that late-comers were left standing at the back of the rooms! The pre-Forestry Week and parallel events included the following:

- Pacific Workshop for FRA National Correspondents and Focal Points  
Organizer: FAO
- Risk-based Targeted Surveillance for Forest Invasive Species  
Organizer: Asia-Pacific Forest Invasive Species Network (APFISN)
- Facilitating and Promoting National Forest Programmes in the Asia-Pacific Region  
Organizer: FAO
- The Potential of Bamboo in the Clean Development Mechanism  
Organizer: International Network for Bamboo and Rattan (INBAR)
- TEAKNET Steering Committee meeting  
Organizer: Asia-Pacific Network on Research and Development of Teak (TEAKNET)

- Workshop on NFP Update
- Organizer: FAO
- Workshop on NFP Matrix
- Organizer: FAO
- Meeting of the Regional Model Forests Network
- Organizer: International Model Forests Network Secretariat (IMFNS)
- East Asia Forest Law Enforcement and Governance Meeting
- Organizers: World Bank, Association of Southeast Asian Nations (ASEAN), Philippines Department of Environment and Natural Resources (DENR)
- APAFRI Executive Committee Meeting
- Organizer: Asia Pacific Association of Forestry Research Institutions (APAFRI)
- Book Launches (“Lessons from Forest Decentralization”; “Managing Forest Resources in a Decentralized Environment”)
- Organizer: CIFOR
- REDD: Financing Options and Social Implications
- Organizers: Netherlands Development Organization (SNV), German Technical Cooperation (GTZ), Forest Sector Support Partnership, Viet Nam (FSSP)
- Workshop on Proposed Asia Pacific Universities Forest Education Network
- Organizers: University of Melbourne, Southeast Asian Network for Agroforestry Education (SEANAFE)
- Promoting Responsible Asia Forestry and Trade (RAFT)
- Organizers: TNC, USAID
- Book Launch (“Forest faces: hopes and regrets in Philippine forestry”)
- Organizers: Environmental Science for Social Change (ESSC), FAO
- Forestry Research and Education in a Changing World: Vision for Asia-Pacific Region
- Organizers: Indian Council of Forestry Research and Education (ICFRE), APAFRI
- Café Scientifique: Money does grow on trees!
- Organizer: British Council
- Protected Areas, Equity and Livelihoods



- Organizers: International Union for Conservation of Nature (IUCN), AFN, FAO
- Towards Responsible Management of Planted Forests in the Asia Pacific
- Organizer: FAO
- Disseminating Scientific Information for Policy and Management
- Organizer: International Union of Forest Research Organizations (IUFRO)
- Workshop on Implementing Fire Management Voluntary Guidelines
- Organizer: FAO
- Book Launch (“Payment for environmental services: experiences and lessons in Vietnam”)
- Organizer: World Agroforestry Centre (ICRAF)
- Poverty Reduction through Forestry-related Activities in Asia: A Seminar on IFAD-Supported Forestry-related Programmes
- Organizers: International Fund for Agricultural Development (IFAD), CIFOR, International Centre for Integrated Mountain Development (ICIMOD), ICRAF
- Meeting of National Focal Points: Asia-Pacific Forestry Sector Outlook Study
- Organizer: FAO

### **Innovative features**

There were several innovative and successful features of the Forestry Week that contributed to its success. Daily newsletters with stories and pictures from the previous day’s events and the program for the day were distributed each morning. Professional video recordings of the sessions were made and video clips were uploaded on the Forestry Week website. In addition, a “video collage” of the week was produced and shown during the closing ceremony. A high-profile media person (Mr. Rico Hizon from BBC) moderated one of the plenary sessions as well as the closing ceremony. A Young Professionals’ Essay contest and a photo contest were organized in conjunction with Forestry Week and the winners were invited

to attend the event. Media coverage of the event was excellent, due to several media briefings organized by various Forestry Week partners.

As part of the Information Market, 25 organizations set up organizational displays to share information and highlight their forestry-related activities and projects in the region. More than 50 posters were displayed, as were the 17 winning photographs of the photo contest. Participants found the displays interesting and informative, and appreciated the opportunity to learn about ongoing forestry developments in the region.

One-day field excursions to three different destinations were organized by the Government of Vietnam. Excursion 1 travelled to Tam Dao National Park, which had one of the highest levels of species richness of any tropical forest in its original state. Participants observed park management practices and enjoyed visiting several distinct forest ecosystems within the park. Excursion 2 travelled to Hoa Binh Province, with its large areas of natural and planted forests. The province holds promise for agroforestry production and processing. Participants visited interesting projects on community forestry, forest plantations and watershed protection being implemented in the province. Excursion 3 was a trip to Bac Ninh Province, located in a key economic growth area. Participants appreciated the opportunity to visit various village enterprises producing handicrafts, timber and non-timber forest products.

The video clips from event can be viewed by accessing the website: <http://www.fao.org/forestry/48155/en/>

For a copy of the Forestry Week CD containing the presentations, reports and more from the event, please contact Mr. Patrick Durst (Tel: +66 2 697 4139 ; fax: +66 2 697 4455 ; email: [Patrick.Durst@fao.org](mailto:Patrick.Durst@fao.org))



## *Benefits from Forestry Week Inputs*

A record number of delegates and participants attended the 22<sup>nd</sup> Session of the Asia-Pacific Forestry Commission, held 21-25 April 2008 in Hanoi, Vietnam. The session was convened as the core event of Asia-Pacific Forestry Week, which was a landmark forestry event in the Asia-Pacific region.

More than 250 participants, including delegates from 31 member countries and 7 United Nations organizations; representatives from 3 non-member countries and 36 regional and international organizations attended the session. Ministers from Lao PDR, Nepal and Vietnam participated as well as the Heads of Forestry from 18 member countries.

The objectives of the session were to:

- discuss and assess technical and policy issues and trends of relevance to forestry in the region;
- develop and advance mechanisms for regional and sub-regional cooperation in addressing forestry problems; and
- advise FAO on policy formulation and on priorities for its forestry programmes in the region.

### **Forestry in a changing world**

The Commission noted the growing influence of climate change, threats to food security, escalating energy prices, and increasing demands for water and forest products in shaping forest management policies and land use. Delegates recognized that emerging forestry challenges pose the greatest threats to vulnerable, impoverished, forest-dependent people.

The Commission recognized that rapid change and the emergence of new forestry challenges require new responses from within and outside the forestry sector. The importance of developing multi-sectoral approaches and holistic policies was emphasized as necessary to avoid inconsistencies and conflicts among sectors and within the forestry sector itself.

Delegates agreed that effective engagement of a wide range of stakeholders through participatory processes is necessary to develop practical solutions for the emerging challenges at global, regional, national and local levels.

The Commission requested FAO to provide policy support to member countries in assessing the potential social, economic and environmental implications of biofuels production.

The Commission also requested FAO to give high priority to building and strengthening capacities for the transfer of skills and information, and to promote international and inter-sectoral cooperation and collaboration in developing responses to emerging forestry challenges.

### **Forests and people: challenges and opportunities**

Delegates recognized that people-centered development is increasingly the focus of forestry policies. The Commission further noted that many countries are creating institutional structures that emphasize decentralization, participatory decision making, benefit-sharing mechanisms and empowerment of people who live in and around forests.

The Commission requested FAO to continue providing support for: (i) enhancing community-based forest management and forestry initiatives that help reduce poverty; and (ii) effective implementation of national forest programs.

The Commission requested FAO to: (i) assist countries in developing effective mechanisms, as appropriate, to collect and equitably distribute payments for environmental services; and (ii) develop guidelines to assist countries in developing policies and practices relating to social aspects of sustainable forest management and poverty alleviation.

### **FAO/APFC activities in the region**

Delegates acknowledged the importance of policy-related initiatives and requested FAO's continued support for executive training in forest policy, forestry education networks, the regional forest policy initiative, follow-up to the second Asia-Pacific Forestry Sector Outlook Study, national forest programs, and monitoring, assessment and reporting for sustainable forest management activities.

The Commission noted increased costs associated with implementation of sustainable forest management and requested FAO to study mechanisms that might enable the realization of "green premiums" for sustainable forest management.

The Commission emphasized the importance of activities that maintain and strengthen capacities in forestry agencies and in the broader forestry sector, including local communities, and it urged FAO to maintain a strong emphasis on capacity building.

### **Forests and climate change: adaptation and mitigation**

The Commission recognized the need for a holistic and multi-sectoral approach to effectively address forestry issues related to climate change. It further noted that forest policies and national development plans must be realigned in response to climate change developments. The Commission urged FAO to strengthen efforts to help countries

integrate policies and strategies on climate change mitigation and adaptation into national forest programs (NFPs).

Noting that readiness for reducing emissions from deforestation and degradation (REDD) requires capacity and resources beyond those currently available in developing countries, the Commission requested FAO to: (i) support work on methodological issues related to REDD, including the definition of "forest degradation"; and (ii) assist with REDD-readiness and demonstration activities in developing countries, including technical support and assistance in securing financial resources.

The Commission recognized that lack of information and data, and insufficient analytical capacity, currently constrain countries' abilities to respond to climate change challenges. It therefore requested FAO to: (i) enhance sharing of information and experiences, and to improve access to data, related to forests and climate change; (ii) strengthen countries' analytical capacities, and to assist by summarizing and clarifying the complexities of forest-related climate change mechanisms; and (iii) prepare guidelines for developing national forest climate change adaptation plans.

### **Institutional arrangements and international agreements**

Delegates welcomed the reported progress related to various international forestry agreements and arrangements, including the development of the non-legally-binding instrument on forests, increased linkages with regional forest-related organizations and the multi-year programme of work in the United Nations Forum on Forests (UNFF); the pending entry into force of the International Tropical Timber Agreement 2006; the review of CBD's Programme of Work on Forest Biodiversity; and the United Nations Convention to Combat Desertification's (UNCCD) adoption of a 10-year strategic plan.

### **Trade, forest law compliance and governance**

The Commission emphasized the importance of forest law compliance and acknowledged the negative social, environmental and economic

consequences of illegal logging and associated trade. Delegates recognized the need for all actors (including producers, processors, and consumers) to share responsibilities in addressing illegal forestry activities by jointly developing collaborative modalities, including exchanging information, sharing data and experiences, and facilitating bilateral and multilateral dialogue. The Commission requested FAO to implement a stock-taking review of national forest law compliance and governance activities and initiatives.

The Commission noted the importance of regional processes in forest law enforcement and governance and the limited coordination and slow progress with these processes. The Commission urged member countries and FAO to strengthen discussion and collaborative action to enhance regional and national actions to combat illegal logging and associated trade.

Delegates stressed that combating illegal forestry activities entails significant financial and human costs. The Commission urged FAO and other international partners to assist countries in strengthening capacity and securing financial resources to enable effective implementation of measures to combat illegal logging and improve forest law compliance.

The Commission requested FAO and other international partners to assist member countries in developing and implementing simple and practical tools and mechanisms for combating illegal logging and associated trade, including voluntary forest and chain-of-custody certification (and mutual recognition), legality verification systems, national standards and codes of practice, criteria and indicators for sustainable forest management, and reviews of legislation and governance-related initiatives.

### **Changing roles of forestry agencies**

The Commission recognized that significant changes in the forestry landscape are creating rapidly evolving expectations, necessitating review of forestry agency functions and structures. The Commission requested that FAO assist forestry agencies to review structures, policies and functions

to better align these with new demands, objectives and expectations.

Delegates emphasized that forestry agencies will need to develop capacities to respond to many new challenges related to climate change, including the ability to respond quickly to natural disasters, manage the ecological impacts of climate change, and conduct planning in an atmosphere of increased uncertainty. This will require forestry agencies to develop institutional adaptive capacities and improve coordination with other agencies and institutions.

The Commission emphasized that strong linkages exist between the emerging roles of forestry agencies and the Asia-Pacific Forestry Sector Outlook Study. It urged countries to ensure that the findings of the outlook study are incorporated into strategic planning processes and used to guide reform and re-invention of forestry agencies. The Commission further requested FAO to support member countries in maximizing the use of the findings of the Asia-Pacific Forestry Sector Outlook Study and the APFC study on re-inventing forestry agencies.

### **Information items**

The Commission was informed of the upcoming XIII World Forestry Congress to be held in Buenos Aires, Argentina, 18-25 October 2009; the ongoing process to formulate a new FAO Strategy for Forestry; launch of the Forest Resources Assessment 2010 (FRA 2010); and upcoming FAO publications, including *State of the world's forests 2009* and *State of the world's forest genetic resources* (2013).

### **Other business**

The Commission welcomed a report on the establishment of the *Asia-Pacific Network for Sustainable Forest Management and Forest Rehabilitation*, endorsed at the APEC Economic Leaders' Meeting in September 2007, in Sydney, Australia. The network will address challenges on forests and climate change, and promote sustainable forest management in the region.

The Commission also recognized the revised modalities of the United Nations Forum on Forests to facilitate enhanced linkages with regional forest-related organizations, and the opportunity to enhance input from regional forest-related organizations into the Multi-Year Program of Work agenda items to be discussed at the eighth session of the United Nations Forum on Forests (UNFF8).

Recognizing the importance of professional forestry education in developing skills for sustainable forest management and forest policy analysis and

development, the Commission welcomed the establishment of the Asia-Pacific Universities' Forest Education Network and urged FAO and member countries to promote investment in forestry education and to support collaborative efforts such as this network.

#### **Date and place of the next session**

The Commission noted with appreciation the offer of the delegation from China to host its twenty-third session.



*During Forestry Week numerous parallel events were organized by partner organizations. Following are summaries of some of the events.*

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#### **Protected areas, equity and livelihoods**

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A one-day workshop on Protected Areas, Equity and Livelihoods (PAEL), was held 25 April, jointly hosted by IUCN, the Asia Forest Network (AFN), the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC), and FAO. Close to 100 participants joined the workshop. The main purpose was to feed into the ongoing work of the global Task Force on PAEL by providing insights and highlighting key issues relevant to the social implications of managing Protected Areas in the Asia-Pacific region.

The workshop was divided into four main sub-sessions, focusing sequentially on: (i) an overview of the Task Force and case studies highlighting some of the main issues related to PAEL; (ii) lessons learned from relevant projects in the Asia-Pacific region; (iii) potential policy options and tools for managing protected areas (PAs) in an equitable and socially sustainable way; and (iv) general recommendations on the best ways of addressing the challenge of incorporating equity and livelihood concerns in the management of PAs.

#### **Proceedings**

##### *Sub-session one – An overview of PAEL*

Mr. Ronnakorn Triraganon, of RECOFTC, provided background information on the PAEL Task Force, and highlighted the urgent need to integrate PA management into broader sustainable development objectives and ensure that equity and poverty concerns are properly addressed.

Linkages between PA management and sustainable development objectives were further elaborated by Ms. Nguyen Thi Yen of IUCN Vietnam, who drew from experience in Vietnam to highlight general limitations to pro-poor PA management, such as limited contribution of PAs to poverty reduction, unequal distribution of costs and benefits, and limited market access for marginalized communities.

Modesto Ga-ab, member of the Applai Sub-Tribe and Planning & Development Officer for the Besao Municipal Government in the Philippines,

discussed constraints to equitable and socially sustainable implementation of PA management, and advocated multi-stakeholder partnership processes that fully recognize the cultural diversity of PAs.

In the open forum following the three presentations, participants debated various opportunities for a more pro-poor management of PAs. The issue of compensation to local communities was often seen as being complex, and risked being highly inequitable unless sufficiently equitable participation was assured. Eco-tourism in PAs was presented as an opportunity, but it was cautioned that large-scale enterprises could potentially marginalize local communities. The issue of land rights was also evoked as a significant hurdle to the equitable distribution of benefits from PAs management.

*Sub-session two – Lessons learned: Strategies and methods*

The second sub-session began with a presentation by Dr. Kadi Warner (IUCN) on the problem of “paper parks” and “paper partnerships” in the Greater Mekong Subregion (GMS). Dr. Warner revealed findings from three case studies that bore witness to the cost to local livelihoods of the ongoing degradation of PAs in the GMS. Lessons learned from these experiences highlighted the urgent need to bring closer attention to the underlying institutional factors that undermine the effective and sustainable management of PAs.

Professor Shanta K. Hennayake (IUCN) drew from experiences with the “Strengthening Voices for Better Choices” (SVBC) initiative in Sri Lanka to show that effective and sustainable forest governance arrangements are a necessary condition for the enhancement of local livelihoods. He highlighted strategies to build trust among key stakeholders as a critical element of equitable and socially responsible PAs management planning. To achieve the requisite level of trust for effective governance arrangements in the Knuckles Conservation Zone, the SVBC project set up an office at the project site and ensured that project staff were present to meet with community members and answer any questions about the project 24 hours/day. The project also employed local youth in the initial research component as a mechanism to build trust. He also noted the important role of the private sector in supporting small-scale entrepreneurial activities.

Mr. Ho Manh Tuong, of the Vietnamese Forest Inventory and Planning Institute (FIPI), discussed the integration of local communities in the establishment of PAs, showing how they were effectively included in the consultation process while acknowledging their limited participation in the ensuing conservation activities.

The open discussion with the participants focused on the relationships between PA managers and local communities. The existing “disconnect” between PA policy and practice was often mentioned as a reality in the Asia-Pacific region, where local communities are often unaware of existing restrictions and regulations.

*Sub-session three – Policy options and implementation tools*

Dr. Arvind Anil Boaz of the South Asia Co-operative Environment Programme (SACEP) discussed regional collaboration in environmental management. He highlighted efforts to control illegal trade in wildlife and emphasized how such efforts can help empower local communities and provide livelihood opportunities.

Kimberly Marion Suiseeya (IUCN, Lao PDR) discussed various policy interventions for a more sustainable approach to managing PAs in Lao PDR, including participatory management, sustainable financing and clarifying the current management system by designating specific management categories to different PAs depending on the appropriate conservation objectives.

David Huberman (IUCN) presented “Payments for Ecosystem Services (PES)” as a potential tool for integrating conservation objectives into rural development. Mr. Huberman stressed the importance of having incentive-based instruments fit into a broader landscape-level strategy of sustainable development that fully addressed the “equity-efficiency” trade-off.

Grace Villamor (CI/ICRAF) elaborated on the use of economic incentives by discussing how optimizing the delivering of ecosystem services could help to conserve biodiversity in multi-functional landscapes.

The issue of participation was the central topic of the open discussion. What exactly is participation? What is its purpose? Different approaches to increasing participation in decision-making related to land-use and PAs, as well as the value of participatory processes were questioned and discussed. It was generally acknowledged that there was a need to bring the focus down to the household level to address problems such as elite capture and equitable benefit sharing (e.g. gender inequality).

#### *Sub-session four – Recommended actions*

In the final session, the discussion highlighted key issues to be addressed by the PAEL Task Force. Firstly, the urgency of action was emphasized. The sustained loss of biodiversity despite the increase in PAs in the region was seen as an indication that PAs could become “dinosaurs” (as illustrated by the widespread existence of “paper parks”). On the livelihoods side, the urgency of action was seen as being no less significant, demonstrated notably by the fact that most of the Millennium Development Goals are highly unlikely to be achieved. It was acknowledged that PAs were currently in a period of crisis, and that new approaches and initiatives were needed to ensure

that PAs are not merely expanded, but enhanced and made consistent with the livelihood needs of local communities.

One potential avenue discussed for generating new opportunities for local livelihoods in PAs was to encourage greater private sector involvement, although it was acknowledged that such interests risk undermining the equitable sharing of conservation benefits. On the subject of equity, it was strongly stated that this is a very context-dependent issue, and cannot be addressed through a “one-size-fits-all” approach. PES and new opportunities through carbon finance were also seen as potential opportunities for the pro-poor management of PAs. However, without proper recognition of traditional land tenure and ownership systems, such incentive-based mechanisms were seen as being “out of reach” for many local communities.

The workshop acknowledged that many local communities wish to preserve biodiversity simply because they depend on it for their livelihoods, and it was generally agreed that greater empowerment at the local level could go hand-in-hand with wider conservation efforts.




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### ***Potential of bamboo in the Clean Development Mechanism***

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The International Network for Bamboo and Rattan (INBAR) held a session on the potential of bamboo in the Clean Development Mechanism (CDM) on 21 April. Over 110 participants attended the session and six speakers gave presentations, which were followed by a brainstorming discussion session.

Presentations included:

- *Promote bamboo for CDM.* Lou Yiping (Programme Director, Environmental Sustainability Programme, INBAR)
- *Bamboo dominated secondary succession after shifting cultivation in Northern Lao PDR: opportunities and constraints in the context of forest management and carbon mitigation.* Bernhard Mohns (GTZ-Laos)

- *Bamboo plantations and their potential for CDM in the northern mountainous region of Vietnam.* Dr. Ha Trn Thi Thu (Forestry University of Vietnam)
- *Bamboo – Value-added products.* Dr. C.N. Pandey (Indian Plywood Research and Training Institute)
- *Bamboo research and development in the Philippines.* Aida Lapis (Environment Research and Development Bureau, Philippines)
- *The next steps.* Andrew Benton (Manager, Networking and Partnerships Unit, INBAR)

Outputs

- The workshop recommended that INBAR and partners proceed with development of its

network of CDM partners, leading to specific partnerships for implementing “bamboo in the CDM” projects. It confirmed that a technical advisory group should be established, and that this would report to the CDM workshop in Beijing in late 2008.

- A better and broader understanding of the feasibility of bamboo for CDM was gained through presentations and discussion at the workshop.
- Awareness was raised and interest stimulated to develop pilot bamboo projects for CDM among the stakeholders.
- Potential interested partners were surveyed through questionnaires, which will form the basis for developing the technical group and pilot project network.
- The workshop increased awareness of stakeholders in the bamboo sectors in the Asia-Pacific region.




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### *Disseminating scientific information for policy and management*

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Over the past several years, the International Union of Forest Research Organizations (IUFRO) has implemented a number of initiatives that aim to promote interactions between forest science and policy, and the dissemination of scientific knowledge to forest stakeholders. Towards this end, a one-day seminar was organized by IUFRO at the first Asia Pacific Forestry Week in Hanoi, Vietnam, on 25 April 2008. The event was made

possible through generous funding by the Korea Forest Research Institute (KFRI) and contributions from various members of the Collaborative Partnership on Forests (CPF).

Professor Don K. Lee, President of IUFRO, informed participants about IUFRO's current involvement in three global initiatives promoting the interaction between forest science and forest

policy and management. These initiatives are: (a) Capacity Building on Science Policy Interfacing; (b) Joint CPF Initiative on Science and Technology; and (c) the Global Forest Information Service (GFIS) initiatives. The program of the seminar was organized in three sessions based on these initiatives.

#### *Session 1: Capacity Building on Science Policy Interfacing*

The need for sound scientific information in the development of public environmental and forest-related policies at the local, national and international levels has grown significantly in recent years. So, too, has the need for such information within the private forestry sector and among non-governmental organizations, whose role in the development, sustainable management and conservation of forest resources in all regions of the world is steadily increasing in importance. Although it is commonly accepted that scientific information is indispensable for policy and management, linking substantive knowledge and authoritative political decision making is a chronically difficult task. The IUFRO Task Force on the Science Policy Interface has compiled a best practices guide on "Effectively working at the interface of forest science and forest policy." These guidelines are available online on the IUFRO website at <http://www.iufro.org/publications/series/occasional-papers/>. Based on the work of this Task Force, IUFRO's Special Programme for Developing Countries (IUFRO-SPDC) has developed a training module on science-policy interfacing for scientists and research managers in developing countries in Africa, Asia and Latin America. The aim of this training is to provide concepts and methods for researchers on how to plan, conduct, and organize research activities, so that results can more quickly and easily be transformed into usable information for problem-solving and policy-making. Over the past three years several training workshops have been organized in all three regions and the demand for such training continues to remain high.

#### *Session 2: Joint Initiative on Science and Technology*

Since 2001, IUFRO, through its Special Project on World Forests, Society and Environment (WFSE), has been actively involved in global networking focusing on the broad interrelationship

between forests, society and the environment. The WFSE network shares scientific knowledge and participates in forest-related policy processes, synthesizes research findings on topics of global and regional importance and publishes the results in books, scientific synthesis reports and policy briefs. The core group of WFSE is composed of 9 leading research institutions coordinated by IUFRO.

Over the past four years, the work of IUFRO at the international level has intensified significantly with representations of IUFRO in sessions of the United Nations Forum on Forests (UNFF), the Convention on Biological Diversity (CBD), and the Framework Convention on Climate Change (UNFCCC). One of the results of these efforts is a new Joint Initiative of the Collaborative Partnership on Forests (CPF), coordinated by IUFRO. This Joint Initiative supports international forest-related processes by assessing available scientific information and by producing reports on forest-related issues of high concern. The main principles of the work of the Joint Initiative include the incorporation of scientific results generated by experts from all regions of the world, the assessment of existing information without conducting new research, and communicating effectively with policy makers at the right time (<http://www.iufro.org/science/science-initiative/>).

#### *Session 3: Global Forest Information Service (GFIS)*

The third session of the IUFRO event focused on the Global Forest Information Service (GFIS). GFIS, an IUFRO-led CPF Initiative, provides the framework for sharing forest-related data and information through a single gateway. The main objectives of this session were to: a) introduce the GFIS concept; b) invite current information provider partners from the regions to share their experiences with GFIS; c) invite new potential partners to discuss their expectations of global information sharing; and d) demonstrate under real world conditions how easy it is to create the necessary information feeds (RSS) and link them to the GFIS gateway at <http://www.gfis.net/>.

The presentations made during this session can be downloaded from the IUFRO website at <http://www.iufro.org/science/gfis/>.

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## *Money does grow on trees!*

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The British Council organized a series of events to raise awareness of climate change issues, in support of the Asia-Pacific Forestry Week.

### **“Climate Cool” booth**

The British Council managed a booth during Forestry Week to promote the Climate Security activities by the British Council in the East Asia region. The British Council’s new regional project is called “Climate Cool” and will be run in 12 countries in the Asia-Pacific region. To help run this booth and draw attention to the regional nature of the project, the British Council invited five young delegates from Indonesia, Thailand, Korea and Japan who are members of the British Council’s

Asian Young Leaders Climate Forum, founded last year in Bali, Indonesia, during the IPCC Convention on Climate Change. Visitors to the booth were able to talk to the five young delegates and learn more about what young people are doing in other countries in the region.

### **Money does grow on trees!**

Science Café panel discussions on the theme of Climate Change with the discussion “Money does grow on trees!” took place at the National Convention Centre on 24 April. The discussion focused on the link between forests and global warming and how forests can help to provide solutions to global warming.



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## *Asia-Pacific universities forest education network*

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Another of the side events of Forestry Week was a workshop held on 23 April on the proposed Asia-Pacific Universities Forest Education Network. The meeting was attended by more than 50 representatives of institutions from 12 countries and 7 international organizations. The objectives of the workshop were as follows:

- To identify major issues facing the development of forest education in the Asia Pacific region;
- To discuss potential solutions to these issues;
- To discuss the development of a formal network of tertiary forest education institutions, how it might operate, what kind of resources would be required to make it effective and where these might come from; and
- Decide on next steps and future actions.

### **Issues and outcomes**

Workshop participants identified the following common key issues of concern:

- The need for universities to become more internationally connected and to develop international collaboration;
- The need for curriculum review and updating to reflect current forest management challenges;
- Declining student interest in forestry as a study option (the exception being Republic of Korea, where there were many students but few jobs in forestry or land management);
- The increasing cost to students and institutions of education;
- The need to more effectively link teaching with industry needs and making graduates employment-ready;
- The need to more effectively link and reinforce the research-teaching-policy chain;

- More effectively maintaining and utilizing university forests; and
- Incorporating general educational goals (e.g., creative thinking, ICT, research skills) into professional forestry programs.

It was agreed that a formal network of tertiary forest education institutions should be pursued, but there were varying opinions about whether or not the network should be developed separately from related existing networks (e.g., APAFRI, SEANAFE), noting the advantages and disadvantages of both options.

The following top priorities for collaboration were identified:

- Sharing of information on curriculum, teaching development activities and library resources and staff expertise
- Exchange arrangements for staff and students
- Development of benchmarking, peer review and common standards (perhaps a 'state of forestry curriculum' report)
- Joint teaching programs for specialist subject areas
- Joint research activities
- Promotion of forestry as an exciting and innovative career option
- Proposals to fund specific actions

The importance of keeping the curriculum relevant and enhancing links with "the industry" were also emphasized. Toward this objective, the following were stressed:

- Frequent curriculum review, involving other institutions and external partners
- Mechanisms for linking graduates with employers
- Further development of internships and industry placements.



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## *National Forest Programmes in Asia and the Pacific*

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Co-organized by the National Forest Programme Facility and the FAO Regional Office for Asia and the Pacific, a workshop on “Facilitating and Promoting National Forest Programmes in the Asia-Pacific Region” was held 20 April, in Hanoi, Vietnam, as a parallel event of the Asia-Pacific Forestry Week. The main objective was to bring together all national focal points of the Facility partner countries in the Asia-Pacific region to share experiences on national forest programmes (nfps) and to discuss the role of the Facility in these processes. Twenty-five participants attended the workshop, including 11 National Focal Points from partner countries.

Presentations were made by experts from IUFRO, GTZ and the Facility staff, providing background information on nfps and guidance on these processes. Through a facilitated debate, issues were clarified, information exchanged, lessons learned and recommendations formulated. The Facility Focal Points from China, Indonesia, Mongolia, Pakistan and the Philippines made presentations about their nfp processes and the roles of the Facility therein. The major outputs and impacts of the Facility support are summarized as follows:

### China:

- Public participation is promoted through application of testing tools/approaches
- Information flow and sharing between global experiences and national practice is enhanced through establishment of a website on China Sustainable Forestry Management
- The results of various studies on land tenure contributed greatly to improve institutional and tenorial arrangements in the stake-owned and collective forest areas of China

### Indonesia:

- Community-based forest management (CBFM) is developed in several regions
- Forestry Long-Term Development Plan 2006-2025; Forestry Mid-Term Development Plan 2005-2009; Master Plan Forest and Land Rehabilitation are developed
- Forestry management becomes more transparent

- Vision, mission, policy, plan, and program of forestry development for SFM at national and sub-national levels are more harmonized and supported by stakeholders

### Mongolia:

- National capacity on the sustainable use of forest resources for income generation and rural development has been strengthened
- The institutional set-up of the forest administration is reviewed for improvement
- Awareness on the possibility to form natural resources user groups is increased

### Pakistan:

- Strategy is established for public-private partnership in Pakistan’s forest sector
- “National Vision 2025 for Forest Biodiversity Conservation – A Strategy for Action” is developed
- A forum for forest policy analysis, formulation and monitoring its implementation has been established
- Awareness on forestry issues is increased and a communication strategy on forestry and related issues is developed

### Philippines:

- Community-based Forest Management (CBFM) Strategic Plan and Regional Plan are developed by stakeholders, with wider sense of ownership
- Enhanced participation of all stakeholders, particularly NGOs, as the Government’s partners in undertaking the whole planning process and also sharing of financial resources in key activities
- CBFM contributes to attain the goals and objectives of the Forestry Sector Master Plan, which identified CBFM as a cross-cutting concern, and to achieve the goals of the MDG

The key recommendations from the partner countries to the Facility regarding priorities and areas for future actions and improvement include the following:

- Establish networks among partner countries, while enhancing cooperation with national and international partners, stakeholders and donors

- Strengthen capacity building of human resources through training
- Clarify the procedure for continued Facility support
- Promote participation of NGOs in both decision making and policy implementation process of forest related matters
- Collect base line data for evaluating the achievements of the nfp process and to continue the monitoring and evaluation during the whole process.




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### ***Global Forest Resources Assessment (FRA 2010)***

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FAO is conducting a series of sub-regional and regional workshops as part of the preparatory work for the country reporting to the Global Forest Resources Assessment 2010 (FRA 2010). The workshops are in response to requests by many National Correspondents (NCs) to increase FAO's support and capacity building at sub-regional and regional levels.

The regional workshop for the Pacific region was held at the National Convention Centre in Hanoi, Vietnam, as a pre-event to Asia-Pacific Forestry Week (21-26 April 2008). The workshop was jointly organized by the FAO Forestry Department in Rome, the Secretariat of the Pacific Community (SPC), and co-funded by the Strengthening Monitoring, Assessment and Reporting on Sustainable Forest Management in Asia (MAR) Project.

Eighteen participants from 11 countries attended the meeting, including National Correspondents (NCs) and focal points for the FRA 2010 country reporting process.

#### **Workshop objectives**

The main objectives of the workshop were to provide technical assistance and guidance to ensure high-quality reporting for FRA 2010, through:

- detailed discussions on the 17 National Reporting Tables, including the process of identification, selection and documentation of national data and data sources;

- ensuring the correct application of processes of data transformation, estimation and forecasting to generate information for FRA categories and reference years;
- ensuring consistency among different tables;
- identifying problems and data gaps, if any, for each of the 17 tables in each participating country and suggesting ways to address these; and
- seeking clarifications and additional information from countries on their draft reports.

#### **Content**

The first session was dedicated to introductory presentations on the workshop, including organization of the workshop, presentation of the FRA 2010 reporting process and reporting methodology. Participants were also briefed on the FRA 2010 remote sensing survey. After the introductory presentations the participants presented the current status of their country reports and problems or data gaps they face.

The remaining sessions of the workshop were dedicated to clarification and discussion on the 17 national reporting tables and on addressing information gaps and how to handle various technical issues related to the reporting and the reporting tables. Many of the issues identified by the countries were clarified during the meeting, and the remaining issues were forwarded to the FRA secretariat to be clarified and included in the

“Frequently Asked Questions” on the FRA website. The “Guidelines for country reporting to FRA 2010” and “Specifications of National Reporting

Tables” were also presented in detail, as were references to relevant thematic studies carried out in FRA 2005.



The Steering Committee of Teaknet met on 21 April 2008, in Hanoi, Vietnam. The meeting was attended by 18 participants. One of the major issues discussed was the proposed relocation of the Teaknet Secretariat. It was agreed to seek confirmation of the Kerala Forest Research Institute’s willingness to host the Secretariat and provide the needed support, including space, material and staff-time, to manage it. The Forest Department of Myanmar will continue to be the Referral Centre for natural teak management. The Ministry of Forestry, Myanmar, will endorse the above decision and provide full support by sending the relevant documents/constitution, bylaws, etc. to the new host, for a smooth transition.

Dr. K M Bhat, Teaknet Coordinator Designate from Kerala Forest Research Institute, gave a detailed presentation on the activities and initiatives to be taken after the establishment of the Teaknet Secretariat with support from FAO/RAP. The major activities envisaged in the program include:

- Collection of all literature pertinent to the teak development and dissemination of relevant information by publication of quarterly newsletters/information bulletins and abstracts of applied research findings to cater to the needs of international stakeholders;
- Facilitation of the organization of training programs on teak cultivation, management and processing for value-added products;
- Development of a database/directory on international teak resources, price and trade trends, including a directory of teak experts/researchers and scientific literature/world teak bibliography on the website.

- Facilitate the exchange of expertise among the countries/institutions which are members of the network.
- Facilitation of the exchange of genetic material/wood samples, as well as improved planting stock for plantation trials;
- Organize a regional/international seminar at the end of Phase I (after 3 years);
- Identification of country-level coordinator and focal points;
- Publication of news bulletins (electronic and hard copy) and information dissemination; and
- Formation of Working Groups and coordination of collaborative studies in critical areas, and holding of international review meetings.

### **Composition of the Steering Committee**

Discussion was held on the composition of the Steering Committee to represent different sectors for supporting TEAKNET activities. The general consensus was that the membership may be expanded to accommodate the supporting donor agencies, active NGOs of teak development concerns, the private sector, and other teak-growing regions such as Latin America, subject to the approval by FAO.

### **Support from donor agencies to TEAKNET**

A number of options for securing funding to support TEAKNET were discussed. Preliminary expressions of support were indicated by the International Tropical Timber Organization (ITTO), Japan International Cooperation Agency (JICA), the Danish Centre for Forest, Landscape & Planning (DANIDA), FAO and others.

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## ***Asia-Pacific Forestry Outlook Study: making progress***

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### **APFSOS: Where are we now?**

It is almost one and a half years since the Asia-Pacific Forestry Sector Outlook Study (APFSOS) was launched with a view to outline what the future holds for the sector in the context of the larger changes. Steady progress has been made since its inception and a number of important steps completed. Country outlook papers prepared through a consultative process involving all the key stakeholders form the foundation of the study. Nearly half of the 30 countries participating in the study have prepared the draft outlook papers. These outline the current status of forests and forestry, the driving forces and emerging scenarios, what may lie ahead in the future and what can be done to improve the situation. Other countries have also made substantial progress and their outlook papers are expected within the next 1-2 months.

Thematic studies on topical cross-cutting issues are another important component of the outlook study. These synthesize the current state of knowledge and indicate how the issues may unfold in the future. Topics for the thematic studies include: demographic changes in the Asia-Pacific region, macro-economic trends, forests and poverty alleviation, indigenous people and forests, future of non-wood forest products, agriculture-forest interface issues, trends in wood energy use, globalization in the forest sector, etc. Of the 20 topics identified at the start of the study, eight have been completed and another 8 are in progress. The remaining are in the initial stages of implementation. A number of these studies have been undertaken by young professionals in the region, providing an opportunity to tap the upcoming talents in the region.

*The International Conference on the Future of Asia-Pacific Forests*, organized in Chiang Mai, Thailand, in October 2007, was another milestone in the study process. More than 250 people attended the conference and about 65 papers covering different aspects of forests and forestry were presented. This provided a unique

opportunity for a wide range of stakeholders to articulate their views about the emerging future.

### **What next?**

The Asia-Pacific Forestry Week, held in Hanoi, Vietnam in April 2008, provided an opportunity for a broad-based discussion on emerging changes and their implications on forestry in the Asia-Pacific. The very theme of Forestry Week, "Forestry in a changing world", aimed to draw attention to the need to better visualise how the future is unfolding and to prepare the forestry community to understand, adapt to and shape the future. During Forestry Week the Asia-Pacific Commission discussed the emerging issues and the progress made in the implementation of the outlook study. Also, a meeting of the national focal points was held to discuss the development of sub-regional and regional scenarios, drawing upon the scenarios identified in the country outlook papers.

### **APFSOS products and follow up activities:**

The main products from APFSOS include one overview regional outlook report and 4 sub-regional outlook reports. Preparation of these reports will be commencing soon and after thorough peer reviews these are expected to be available by April 2009. Production of these reports is just one step in the pursuit of helping the forest sector to adapt to the future. A number of follow up measures, particularly aimed at mainstreaming the findings in the national forest programme, are envisaged. Substantial efforts are also required to improve the strategic planning capacity in the forest sector.

### **The challenge**

Understanding the larger changes is probably the most critical step in describing the future of forests and forestry. However, we are dealing with continuous changes and events have been unfolding fast since the launch of the study. We have seen a significant escalation of fuel prices and a consequent scaling up of efforts to produce biofuels. The report of the IPCC and the follow

up discussions on climate change have brought forestry to the center stage with an opportunity for playing an important role through reducing deforestation and forest degradation. Volatility in the financial markets, plus the woes in the US housing sector, is affecting the world's economy as a whole. Recent months have seen an escalation of food prices, largely reflecting the past neglect of the agriculture sector. While some of the changes tend to have short term impacts, others may have

much longer term impacts, including shifting the path of development. The impacts of these and other potential developments will be assessed to provide probable scenarios of forestry development in the region.

For more details about APFSOS, please contact:

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## FAO ASIA-PACIFIC FORESTRY CALENDAR

10-12 June 2008. Dili, Timor-Leste. ***FNPP Project Wrap-up Workshop “Promoting Sustainable Forest Management, National Economic Development, and Poverty Reduction in Timor Leste.”*** Contact: S. Appanah, NFP Advisor for Asia and the Pacific, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4136; Fax: (662) 697-4445; E-mail: Simmathiri.Appanah@fao.org

25-27 September 2008. ***International Symposium on Sustainable Forest Management.*** Beijing, China. Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

14-18 October 2008. Beijing, China. ***23rd Session of the International Poplar Commission.*** Contact: Jim Carle, Senior Forestry Officer, FOMR, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy; E-mail: Jim.Carle@fao.org

18-21 November 2008. Kuala Lumpur, Malaysia. ***2nd International Plantation Industry Conference and Exhibition (IPiCEX 2008).*** Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

25-29 November 2008. Islamabad, Pakistan. ***29th FAO Regional Conference for Asia and the Pacific.*** Contact: B.K. Nandi, Secretary APRC, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4143; Fax: (662) 697-4445; E-mail: Biplab.Nandi@fao.org

March 2009. Rome, Italy. ***Committee on Forestry (COFO) - 19th Session.*** Contact: Douglas Kneeland, Chief FOEL and Secretary COFO, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy; E-mail: Douglas.Kneeland@fao.org

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

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- 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)
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- What does it take? The role of incentives in forest plantation development in Asia and the Pacific (RAP Publication 2004/27)
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- 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) - 2<sup>nd</sup> 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)
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- Proceedings of the International Conference on Timber Plantation Development, 7-9 November 2000, Manila, Philippines
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- 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 - 2<sup>nd</sup> edition (RAP Publication: 1999/13)
- Code of Practice for forest harvesting in Asia-Pacific (RAP Publication: 1999/12)

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