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Featuring

FOREST NEWS

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TIGERPAPER
FAO Regional Office for Asia and the Pacific
Maliwan Mansion, Phra Atit Road
Bangkok, 10200, Thailand
Tel: (662) 697-4000
E-mail: fao-rap@fao.org
Website: http://www.fao.org/world/regional/rap/tigerpaper/tigerpaper.htm

Editor: Janice Naewboonnien
Advisors: M. Kashio and P. Durst

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FOREST NEWS

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

Front cover: An adult Saltwater crocodile (*Crocodylus porosus*) taking a sunbath at a muddy bank. The tip of the upper jaw was chipped off in a territorial fight. (Photo: Shingo Onishi)

An adult female Olive Ridley Sea Turtle (*Lepidochelys olivacea*) returned to the sea without laying eggs. (Photo: Onishi)

SITUATION OF LARGE REPTILES IN THE AYEYARWADY DELTA AFTER THE CYCLONE HIT

by Shingo Onishi

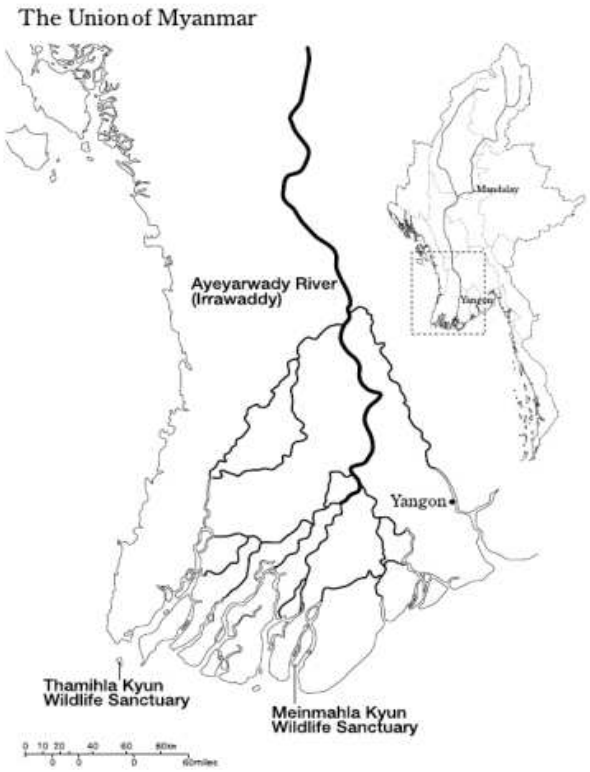
Cyclone Nargis

The devastating cyclone Nargis struck the southern part of Myanmar early in May 2008. The delta area of the Ayeyarwady (Irrawaddy) River was devastated. Yangon, the largest city in Myanmar, was also struck. However, Yangon citizens took action to rescue victims soon after the storm ended. Many relief supplies were donated and voluntary groups delivered them to victims as far and wide as possible.

Some foreign reporters reported that it would be very unlucky and terrible as the rainy season would come soon and the people would have to use rain water. However the local villagers regularly drink, cook, bathe and wash in the natural water from rivers, ponds, wells and rain. Especially, rain water is quite hygienic. Moreover, heavy rain could wash away the water polluted with dead bodies and animal carcasses.

When the author visited Myanmar in July 2008, it was still very difficult to get the permission to visit the stricken area, but governmental organizations, many NGOs and various local groups were energetically trying to support the victims and even foreign visitors were welcome to join any relief works in Yangon.

It was in January 2009 when the author was finally able to visit the Ayeyarwady delta area. The area



was being rebuilt beyond imagination. The main roads were almost repaired and routes of buses and passenger boats were reopened. Markets and stores were full of foods and daily necessities. Large straw mounds were piled up here and there in paddy fields and rice mills were running. Many fishing boats were operating.

However, the disaster was real and these people are definitely survivors. Many of them lost family members, houses and properties, but they had to continue their livelihoods and restart their new lives. Revival activities should not be stopped yet and it is urgent to prepare for the coming cyclone season.

Saltwater crocodiles

There is an area in the Ayeyarwady delta where the aim is to conserve the mangrove ecosystem. This is the Meinmahla Kyun Wildlife Sanctuary (136.70 km^2), located in Bogalay Township, Ayeyarwady Division. "Kyun" means "island" in Burmese. This flat island is one of the large banks of the Ayeyarwady delta and is covered with mangrove vegetation. The Forest Department makes special efforts to conserve Saltwater crocodile (*Crocodylus porosus*) as it is the top predator of the food chain and thus, the symbol of the ecosystem there.

Many trees were felled, bent and broken by the cyclone. The forestry officer assigned to this sanctuary estimates that 70% of the tree crowns on the island were lost. In addition, a tremendous amount of debris drifted ashore from the upper reaches of the river and piled up on the island, as it is located nearby the mouth of the river. The Forest Department started to remove the debris and open channels inside the island. For the most part they did not remove dead and damaged trees or carry out any afforestation. And in fact, many trees are surviving and budding now and natural regeneration looks smooth.

Regarding the situation of the crocodiles, it seemed that they were not so badly affected by the cyclone. The author observed five larger crocodiles between about two and five meters in length (visual measurement) along the channels for six days. And many juveniles could be observed at night. They were staying or floating under tree branches along

the shorelines of channels. Many individuals looked to be less than 50 cm in length, so they were obviously born after the cyclone hit.

Sea turtles

Another significant conservation area is Thamihla Kyun Wildlife Sanctuary (0.88 km^2), located in Ngapudaw Township, Ayeyarwady Division. This is a solitary island located about 10 km offshore the west end of the Ayeyarwady delta. The outer circumference of island is about 4.8 km and the land is a low platform shape, up to 34 meters above sea level, according to the fishery officer assigned to this island.

This island is the native place of two species of sea turtles: 1) Green sea turtle (*Chelonia mydas*) visits the island all the year round; and 2) Olive Ridley sea turtle (*Lepidochelys olivacea*) comes to the island between October and February to lay eggs on the beach. So, the visitors are normally adult females.

The island was hit by the tsunami of the Sumatra earthquake on 26 December 2004, and hit again by the high waves and storm of Cyclone Nargis in May 2008. The fishery officer estimates that sand about 90 cm in thickness was washed away by the storm actions and so the beach was reduced to 40% in width after these disasters. The bedrock was widely exposed on the beach and consequently the turtle egg laying area became narrower.

The fishery officer said that formerly a few mother turtles used to land almost every night. However, during the author's stay, four Green sea turtles and one Olive Ridley sea turtle landed over the course of six nights, and two of them returned to the sea without laying eggs. Thick roots underground were an obstacle to digging the hole for egg laying in one case. And the gravel was rather too large for shaping the hole in another case.

A semi-adult Green Sea Turtle (*Chelonia mydas*) that was caught in a fishing net is tagged before being released back to the sea (Photo: Onishi)

Some experts advocate driving posts into the ground of the beach in order to catch and retain the sand but the author hopes that natural conditions will be left alone and artificial structures should be avoided as much as possible as this island is a sanctuary.

Issues

The Ayeyarwady delta is a densely populated area and an essential part of the country for producing crops and fishery products. Therefore, good relationships between the villagers and government officials are very important for nature conservation. Both of the chief officers for the Meinmahla area and the Thamihla area have been engaged in conservation activities in their areas for more than 10 years and they seem to have the confidence of the villagers.

On Meinmahla Island, cutting down trees and fishing with illegal methods are strictly prohibited. As long as the local people follow the rules, they are allowed to operate small-scale fishing operations inside the island and can be officially supplied with some seedlings and wood, if necessary. However, some fishermen still carry out illegal fishing. For example, some of them put strong insecticide into the upper channel at high tide. Later, they catch the dead and dying fishes at the lower channel at low tide. In this case, crocodiles may be able to escape to the land to avoid poisoning, but they lose their food. Moreover, these fishes will be sold in markets and people will eat them. It is commonly believed by the local people that Meinmahla Island is the home of a powerful spirit who controls the coast and that crocodiles and tigers are its followers. Thus, people seldom hurt crocodiles. Even if somebody is killed by a crocodile, people will believe that he had offended the spirit. However, crocodiles rarely attack humans there.

The Forest Department has confirmed five crocodile breeding spots; two of them are located outside the island. There is evidence that their population may be increasing. Adult males often fight each other over territories, especially in the breeding season. During this period the crocodiles will naturally spread out their territory, and the risk of crocodile attacks will increase. The government and some NGOs are carrying out afforestation activities not far from Meinmahla Island. We have to consider the survival of both people and crocodiles.

On Thamihla Island, there are small barracks and temporary fishermen's huts beside the conservation office. The soldiers stationed there and the fishermen cooperate for turtle conservation. During the author's one week stay, on two occasions fishermen brought in semi-adult turtles that were caught in fishing nets and soldiers found a landed turtle and came to report it to the officer. However, some human activities will inevitably have an impact on the turtles. For example, the large-scale trawl fishing takes about four hours for each operation. It is much longer than a turtle can go without surfacing for air. So, if a turtle is caught in the net, it will most likely not survive. Although circle hooks are obviously safer for turtles than J-hooks, this type of fishing tackle is not widely used yet. These matters are beyond the local fishery officer's control. Moderate administrative arrangements would be expected.

The island is mostly covered by the natural vegetation – a typical example of the maritime forest. However, someone let goats loose on the island and now their population is increasing in the wild. They graze on the lower plants as high as they can reach and thus, will cause serious damage to natural regeneration and bring about soil erosion. At present, the sandy beach is mainly calcareous, which is suitable for laying eggs by the two sea turtle species present. In order to maintain the ecosystem and the composition of the sand, the goats should be removed from the island as soon as possible.

Nature conservation officers may be struggling to carry out conservation efforts within the limited budget. Although 10 guardhouses on Meinmahla Island were collapsed by the cyclone, 6 temporary houses have already been rebuilt and staff are stationed there now. However, there tends to be a shortage of equipment and supplies such as boats, fuel, lights, batteries and so on to use for patrolling and to carry out scientific research such as censuses.

After the cyclone hit Thamihla Island, all of the staff escaped to the mainland. But they returned to the island within three weeks and settled in the temporary offices again. Whenever officers catch

Releasing baby Green Sea Turtles to the sea just after hatching. (Photo: Onishi)

turtles, they attach authorized tags to the turtles and release them. They also collect turtle eggs and transfer them a temporary hatchery in order to prevent their being dug up by poachers or other mother turtles. The baby turtles are released just after hatching. The officers know that the longer the turtles are kept in the breeding pools the greater their survival rate. However, the pools have not been rebuilt yet and operating costs are pending now.

The conservation system for these aquatic animals is rather complicated. For example, the Forest Department registers Meinmahla Island as a sanctuary and arranges the management office and staff for crocodile conservation. However, the Department of Fishery may have the priority to take action for any matters regarding crocodiles outside the sanctuary. Moreover, they operate the crocodile farm for skin production in Yangon. So, the Forest Department has the experience for ecosystem maintenance and the Department of Fishery has breeding techniques.

The Forest Department also registers Thamihla Island as a sanctuary and lists all types of sea turtles as completely protected animals. However, it is the Department of Fishery that arranges the management office and staff there for turtle conservation. Flexible technical and financial cooperation between the departments is expected.

According to interviews with people from various villages, the local people do not seem to have the intention of capturing crocodiles and sea turtles for food. The crocodiles and sea turtles are protected both by the law and some traditional beliefs. However, human activities will surely have an influence on their survival. In particular, water pollution should be a cause for concern. Local people living along the rivers directly use river water for drinking, cooking, bathing and washing, and they throw all kinds of waste away in the rivers. Goods such as synthetic detergents, plastic bags, batteries contain chemicals are becoming more widespread, but a safe disposal system has not been established yet. There are also many mines

containing gold, copper and gemstones in the Ayeyarwady basin, so the influence of toxic substances from chemicals in these goods and mining operations cannot be disregarded. Large aquatic animals such as crocodiles, sea turtles, dolphins and so on are more dependent on natural water sources than humans are. So, their living situation should be the indicator for man's future situation. An analysis of the water quality throughout the great Ayeyarwady River is urgently needed.

About the author: Shingo Onishi is a nature photographer & essayist. His mailing address is: 314 Minatomachi, Iyo-city, Ehime prefecture, Japan 799-3115; E-mail: onishingo@gmail.com

A baby Saltwater Crocodile brought by a fisherman.(Photo: Onishi)

TRANSLOCATION OF RHINO IN ASSAM

by Bishen Singh Bonal, Bibhab Kumar Talukdar and Amit Sharma

The conservation of the Great Indian one-horned rhino (*Rhinoceros unicornis*) is being regarded as the epitome of the conservation movement in Assam. Assam is also regarded as the last stronghold of the Indian rhino with a wild population of over 2,000 rhinos in Assam. Planned conservation initiatives in terms of rhino conservation in Assam led by the Department of Forest made it possible for the rhinos to build up their population to 1,855 in Kaziranga National Park, 68 in Orang National Park and 81 in Pabitora Wildlife Sanctuary. However, losses and subsequent extermination of rhino by poachers were witnessed during periods of social unrest in the early 1980s in Laokhowa Wildlife Sanctuary and in Manas National Park during the 1990s. Although the rhinos were exterminated from Laokhowa and Manas during the social unrest, the land remained under the Forest Department and that is how the concept of the Indian Rhino Vision 2020 came to the forefront during the year 2005. The political solution that came into being in the Manas area included autonomy given to local people in the form of the Bodoland Territorial District Council; the support from the local communities has helped to revive Manas back to its past glories. The Assam Forest Department explored the possibilities of bringing rhinos back to Manas from other rhino habitats in Assam with the International Rhino Foundation, WWF-India and other similar agencies. This would be a step towards Manas regaining its status as a full fledged World Heritage Site, rather than the current recognition as a "World Heritage Site in Danger."

The Government of Assam constituted the Rhino Task Force in June 2005, incorporating conservationists from diverse backgrounds, from government as well as non-governmental organizations, to make the dream drafted under IRV 2020 into reality. The first meeting of the Rhino Task Force was held in November 2005 at Guwahati. The preliminary plan of action was prepared and the budget needed to initiate the work to enable re-introduction of rhinos in Manas National Park and other rhino habitats within the state was estimated. At the first meeting of the Rhino Task Force it was decided to set up two sub groups, namely the Security Assessment Group and the Habitat Assessment Group. The responsibility of the Security Assessment Group (SAG) was to assess the current state of the security and support needed to strengthen the security in Manas National Park, Laokhowa Wildlife Sanctuary, Orang National Park, Burachapori Wildlife Sanctuary and Dibru-Saikhowa National Park where rhinos could be translocated. The responsibility of the Habitat Assessment Group (HAG) was to assess the current state of the habitat in Manas National Park, Laokhowa Wildlife Sanctuary, Orang National Park, Burachaopori Wildlife Sanctuary and Dibru-Saikhowa National Park and whether the sites were still suitable for rhinos.

Accordingly, the HAG made an in-depth assessment of the habitat in the probable release sites, including the existing rhino-bearing areas, and recommended Manas National Park as a priority site for rhino translocation. The salient findings of the HAG are summarized in Table-1.

Similarly, the SAG assessed the security scenario in the probable rhino release sites in Assam and recommended certain measures that need to be adopted for Manas National Park for the first phase of translocation under the IRV 2020. The salient suggestions that were put forward by the SAG are as follows:

1. ***Improving the status of the anti-poaching infrastructure***

- About 12 anti-poaching camps need to be operational in the identified core zone for release of translocated rhinos.

- Manpower redistribution is needed to strengthen the anti-poaching camps.
- Communications equipment (transport as well as wireless networks) needs to be in place and strengthened.
- The southern boundary road, along with some roads inside the Manas NP, needs to be operational.

2. ***Identified encroached areas in the Manas NP under the Bhuyanpara and Panbari ranges should be cleared. This is necessary to maintain the sanctity of the park.***
3. ***An intelligence network should be created immediately for it to become effective within a year's time.***
4. ***Immediate steps must be taken to improve the morale of the staff by providing basic training on legal matters as well as anti-poaching.***
5. ***A strong communications/education programme should be initiated to send clear messages to the communities.***

The Manas National Park authorities took every step suggested to improve the security scenario of Manas and in the meeting of the Rhino task Force held on 23rd November 2007 at the Assam State Zoo, the Field Director of Manas National Park assured the members of the Rhino Task Force that the security scenario had improved and the park was close to being cleared to receive the first batch of translocated rhinos from Pabitora to Manas. Accordingly, the Rhino Task Force constituted a Translocation Core Committee (TCC) on 23rd November 2007 to carry forward the translocation in a timely manner. The mandates of the TCC as envisaged in the Task Force meeting included planning, execution and monitoring every detail involved in capturing, transporting, releasing and monitoring of the rhinos to be translocated from the source PAs to the target PA.

With the improving conditions in Manas and upon identification of potential rhinos to be translocated, the first phase was termed as training-cum-translocation and the decision was taken to translocate four rhinos from Pabitora WLS to Manas NP.

Detail functions and mandates of the Rhino Task Force can be seen in the chart below.

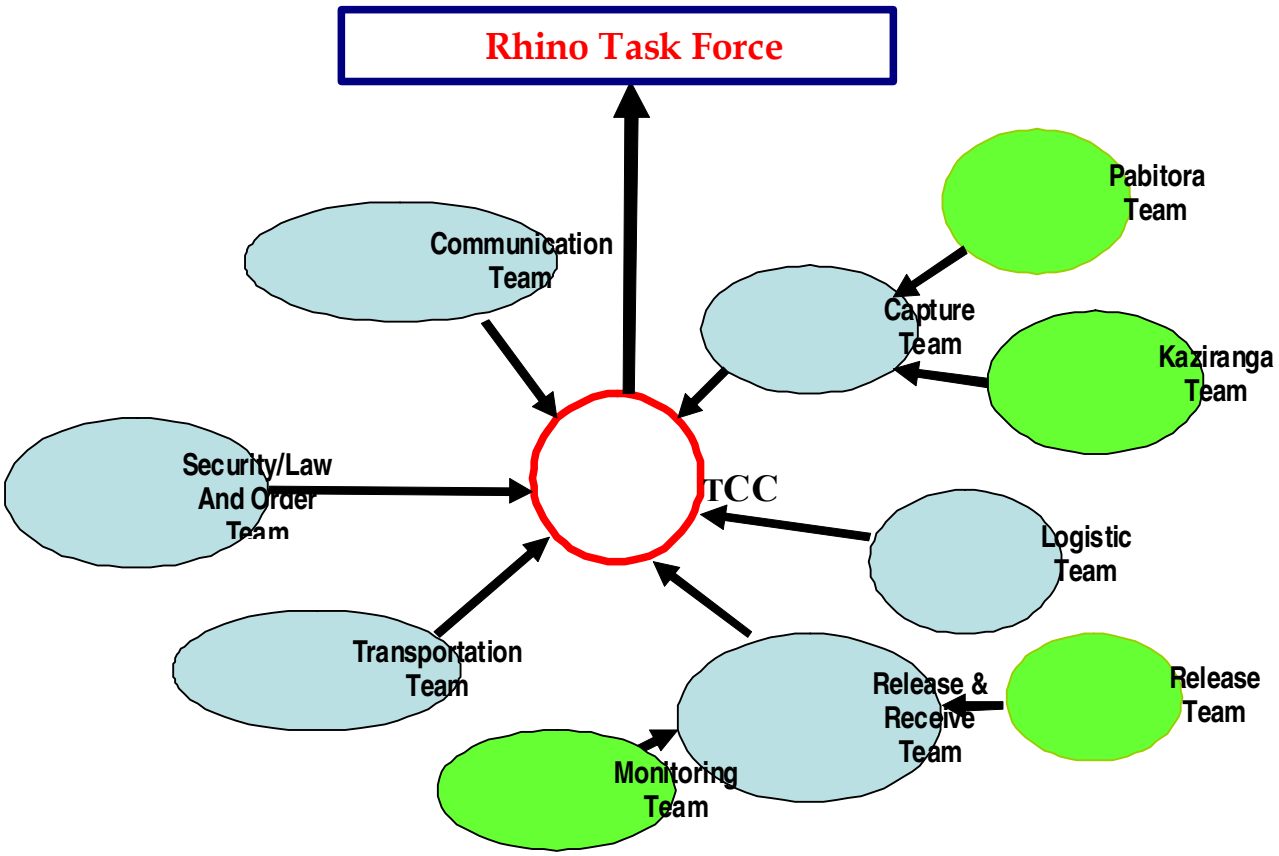


Table-1: Comparative statement of ecology of both target and source PAs

Parameters	Source PAs		Target PAs		
	Kaziranga NP	**Pabitora WLS**	**Manas NP**	**Laokhowa – Burachapori-Kushmara**	**R.G. Orang NP**
Habitat Status for Rhinos	**SUITABLE**	**SUITABLE**	**SUITABLE**	**SUITABLE**	**SUITABLE**
Area	859.33 sq km	38.8 sq km	519.77 sq km	135.71 sq km	78.80 sq km
Rhino population **1999 census** **2006 census**	1552 1852	74 81	- -	- -	46 68
Configuration	alluvial plain	alluvial plain	alluvial terrain and bhabar	alluvial plain	alluvial plain
Vegetation	Tropical moist mixed deciduous forests, Alluvial grassland	Tropical moist mixed deciduous forests, Alluvial grassland	Tropical semi-evergreen forests, Tropical moist and dry deciduous forests, Alluvial grassland	Tropical moist mixed deciduous forests, Alluvial grassland	Tropical moist mixed deciduous forests, Alluvial grassland
Grassland area (%) (Govt. data)	64.02	60.00	46.40	27.92 (Laokho) 62.77(Burachai)	59.70
Wetland area (%) (Govt. data)	7.63	18.00	3.90	12.57 (Laokho) 4.72(Burachari)	12.60
Source of water/wetland	River, Beels, Nallas	Beels, Nallas	Rivers, Ponds, Streams	River, Beels, Nallas	River, Beels, Nallas
Wallowing facility	Adequate	Adequate	Inadequate	Adequate	Adequate
Interference by domestic cattle	Low	High	Medium	High	Medium
Flooding	High	High	Low	High	Medium
Food availability	Abundant	Affected due to domestic cattle grazing	Abundant	Affected due to domestic cattle grazing	Abundant
Succession/ Siltation/ Erosion	Slow succession, Medium Siltation, Medium Erosion	Slow succession, Medium Siltation, Erosion nil	High succession, Low siltation, Low erosion	Ssuccession in Laowkhowa-Low Burachapori-High Medium siltation in both	Medium succession, Low siltation, Low erosion

The translocation operation

The process and activities involved with a translocation can be divided into three distinct stages:

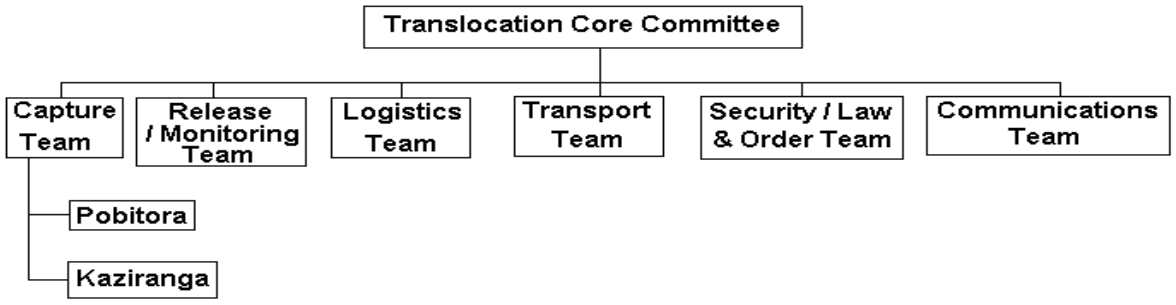
- preparatory / planning stage;
- implementation (capture-transport-release); and
- post-release.

Preparatory stage: The first step in any process involves the detailed planning covering every aspect for successful implementation. For utilizing the benefits of all resources and manpower, the TCC prepared the following lists for the final event:

- Names of officers of the Forest Department, Assam (including retirees) who had prior experience of participating in the translocation operations in Nepal.
- Names of officers of Forest Department, Assam (including retirees) having experience in working in the PA's, especially in rhino-bearing areas.
- Veterinary doctors of Assam who had prior experience of participating in the translocation operations in Nepal, as well as doctors experienced in handling wildlife.
- NGO's in Assam having experience of working with wildlife, especially rhinos.
- Reputed individuals having experience of working in wildlife in Assam, epecially rhinos.
- Reputed individuals in India and abroad having relevant experience of working in wildlife and involved in translocations.
- Institutions of relevance.
- NGO's in India and abroad having relevant experience of working in wildlife and involved in translocations.
- A comprehensive list of trained elephants available with Forest Department of Assam, as well as trained private elephants having experience of working in rhino bearing areas.

After detailed discussions and keeping in view the various activities, seven sub- teams under TCC were formed with pre-identified responsibilities to carry out all activities successfully.

Chart 1 – TCC and sub-teams



Implementation stage: This stage includes locating the rhinos, capturing, transporting and then releasing the rhinos at the destination. Monitoring of rhinos has been going on in wildlife sanctuaries for the last year by the Assam Forest Department and WWF-India. The release site has been made ready by the Park authorities with the support of the IRV partners (WWF, IRF, USFWS and BTC) under the supervision of the TCC. Basic training on monitoring and radio telemetry was also organized for the staff of Manas NP at Basbari.

12-13 February were the initial dates fixed for capture and translocation, but due to the unavailability of drugs in time, the operation had to be postponed. The Task Force rescheduled the dates for 11-12 April 2008 for capture and release in Manas NP. Training in how to attach and operate radio collars was organized at Assam State Zoo using domestic cattle for demonstration.

On 11 April at Pobitora WLS, the area was cordoned off and full security cover was provided by the Assam Police Department and the Central Reserve Police Force (CRPF). The operation commenced at about 4.30 a.m., with the locators being the first unit moving out on elephant back to locate the pre-identified rhinos. After locating the rhinos, the other units viz. veterinarians / darters, radio collar and cordoning teams set off on elephant back to the identified area. The rhinos got alarmed by the approach of too many people on elephant back and escaped from the cordoned site. It was decided to allow only two elephants with the darting team to approach the rhinos and other elephants to be kept at a safe distance. This new strategy was successful and the first rhino, a male aged about 10 years, was successfully darted between Tuplung and Pagladova camp at about 8.30 a.m. and the tranquilized rhino was loaded into the crate. Before crating, all necessary screening and medical care was provided by the veterinary team, recording necessary details as per format and fitting a radio collar on the neck of the rhino. The crate with rhino was loaded onto the truck using a crane and backhoe loader. The rhino was quite aggressive in nature and made all possible attempts to break free from the crate, even after sedation. As this training-cum-translocation was being attempted for the very first time, it took a little more effort and time. By the time the first rhino was placed in the truck and parked in shade it was almost 11a.m. The success of the first attempt made the confidence of the whole team grow and all were now very eager to go for the second one. After resting for about half an hour, the team swung into action to capture the next rhino, which was located in the area between Pagladova and Nekerahabi camp. The second rhino, also a male, about seven years old, was darted at about 12.20 p.m. Following all necessary procedures, this rhino was loaded onto the truck by about 1.30 p.m. The experience of the first capture increased the efficiency of the team manifold with a more systematic approach as the driver of dodger, crane and truck did the job in a synchronized way. An attempt was also made to locate and capture a third rhino, a female, but as it was not successful and in view of the increasing temperature the capture operations were called off for the day at 2.00 p.m. The trucks loaded with the sedated rhinos were parked in shaded areas and the rhinos were watered at regular intervals to keep the animals cool and to protect them from the scorching temperature.

The movement of the rhinos in convoy started from Pabitora WLS at about 6.00 p.m. to Manas NP. It was an emotional moment when the convoy on leaving the Pabitora Wildlife Sanctuary was greeted by a huge number of local people at *Mayang*, who had gathered to catch a glimpse of "their" rhinos about to journey to a new home. The people cheered as the vehicle passed by and also requested to convey a message to the people of Manas to take proper care of the rhinos.

A police escort vehicle led the convoy with the rhinos, and the traffic in cities and towns along the route was regulated throughout the journey by the police to make way for the convoy to pass by. At Khanapara, weighing of the trucks with the empty crates as well as the fully loaded truck was done in order to get the weight of the respective rhinos. One of the rhinos weighed 1,570 kg and second one weighed 1,540 kg. The distance of 240 kms from Pobitora WLS to Manas NP was covered in about twelve hours due to the slow movement of vehicles in the interest of the comfort and safety of the rhinos. The veterinary team kept monitoring the rhinos at regular intervals and water was poured over them periodically to keep them cool. The vehicles in the convoy kept in contact with each other through walkie-talkies. The convoy

of vehicles carrying the two male rhinos stopped at Rangia for food and rest and ultimately reached Basbari, Manas NP at about 5.30 a.m.

The release team under the leadership of FDTP Manas made everything ready for the release and was ready to welcome the convoy with the rhinos at the gate of the park in Basbari. Four ramps were prepared for parking the trucks for the release and the trucks were placed accordingly in two adjoining ramps in the release site near Buraburijhar camp. The door of the first crate was opened for the rhino at about 6.15a.m., but the rhino took almost thirty minutes to come out of the crate to take its first steps in his new home. When the animal finally emerged from the crate it charged and hit a truck containing staffs and observers parked nearby, and then moved southwards into the grasslands. The second rhino did not take much time. Once the door of the crate was opened, it also charged the first truck and moved south-west towards the grassland. It eagerly fed on the grasses and initially moved west and then to the north. By 7.30a.m. both the rhinos had been released into the wilderness of Manas National Park to roam freely in its vast grasslands. Both the released rhinos have been fitted with radio collars and are being regularly monitored using the telemetry equipment.

Post-release stage: This period involves regular monitoring, patrolling and protection of the released rhinos in Manas NP. Regular monitoring of the rhinos in Manas is a continual process under the supervision of FDTP Manas and Deputy FDTM. The monitoring team at present comprises of three units of two frontline staff assisted by home guards and volunteers; the units will be increased with the release of more rhinos.

The patrolling activity has been strengthened and is effective round the clock through the efforts of the frontline staffs with the supporting strength of the Assam Forest Protection Force, Home Guards and Conservation Volunteers.

The rhinos are presently seen to be exploring the areas under Basbari range. The first rhino, designated Rhino1, moved towards the south and is using the areas along the southern boundary near Kasimdoha and Kureebeel. The second rhino, named Rhino2, moved towards the north and is mainly using the area near Charpoli camp. The laceration wounds observed in the rhinos at the time of release are now completely healed and both the rhinos are behaving normally and adapting well to their new environment.

The TCC will be regularly visiting the sites to overall supervise, assess, analyze and make any improvements that are considered necessary and also to utilize these experiences in the next phase of translocations to follow.

Conclusion

The success achieved in the first phase of the training-cum-translocation has strengthened the morale of all the people associated with the process, directly or indirectly. The first batch of two male rhinos translocated to Manas NP from Pobitora WLS is just the first step on the road to success of the IRV 2020 Program and to bring back the lost glory of Manas NP. By March 2009, the plan is to translocate another eighteen rhinos into Manas NP from both Pabitora WLS and Kaziranga NP to make it a viable breeding population in years to come. Hopefully, Manas is showing the way for other potential rhino habitat sites like Dibru Saikhowa, Laokhowa and Burachapori to be prepared for future rhino translocation.

Authors' addresses: Bishen Singh Bonal, Chief Operation Officer, Translocation Core Committee (CCF-M & E, Assam); email: bonalbishan@gmail.com; Bibhab Kumar Talukdar, Member, Translocation Core Committee (Aaranyak); email - bibhab@aaranyak.org; Amit Sharma, Deputy Chief Operation Officer, Translocation Core Committee (WWF-India); email – amitsharma_ghy@sify.com

FEEDING PATTERNS AND DEN ECOLOGY OF STRIPED HYENA (Haeyena haeyena) IN NORTH GUJARAT, INDIA

by Nikunj Gajera, S.M. Dave and Dharaiya Nishith

Introduction

The site occupancy of animals is often determined by the availability of the environmental components necessary for life, including food, water, cover and nesting or den sites. The food habits of animals determine a number of life history strategies such as habitat selection, movement and success of reproduction (Krebs, 1978). The Order Carnivora is well known for its wide dietetic characteristics. Determining the distribution of prey species within the selected habitat of a carnivore is important to understand the essential reasons behind the various strategies it adopts to survive.

The striped hyena (*Hyaena hyaena*) is reportedly the most widespread species known to occur in India. Despite this generalization, its distribution and status are virtually unknown. Although it occurs in many protected and unprotected areas in India, it has not been the focus of systematic ecological research to date, although the current distribution of the striped hyena was reviewed extensively by Mills and Hofer (1998).

The striped hyena has a very wide range extending from east and northeast Africa, through the Middle East, Caucasus region, Central Asia, and into the Indian subcontinent. It is generally considered solitary, but has some social organization.

The striped hyena is predominantly a scavenger; its diet consisting mainly of carrion and human refuses. It scavenges large and medium-sized mammals, such as cattle, camels, goats, sheep and stray dogs; it even eats bones from carcasses if the meat has been picked off. It also supplements its diet with fruit, insects, and occasionally by killing small animals such as hare, rodents, reptiles, and birds. The striped hyena forages principally at night, individually traveling throughout its home range searching for food in no apparent pattern. It also visits established food sites, such as garbage dumps around human settlements, fruit trees, and temporary sites of large kills. Water is consumed every night if it is available, but can survive without water for a long period; hence, it can also survive under desert conditions.

The authors organized the present study to determine the food composition and habitat use through scat analysis and direct encounters as well as sign surveys in the study area. The study area (North Gujarat) comprises a wide spectrum of habitats ranging from arid, semi-arid to dry deciduous forest areas. It was also attempted to compare the food and habitat use in different habitats with respect to other ecological aspects.

Study area

North Gujarat is constituted of four districts, viz. Mehsana, Patan, Banaskantha and Sabarkantha. The area falls in biogeographic zone 4 – the semiarid area and biotic province 4B of the Gujarat-Rajwara. It can be further classified into sub-biotic province 4B3 – the hilly area of Sabarkantha and Banaskantha and 4B4 – the arid lands of Mehsana and Patan (Singh, 2001). The region has two major rivers, viz. Sabarmati and Banas, which irrigate the area. The small but unique and important forest patches of this region are suffering greatly from human activities such as expansion of agricultural land, urbanization, mining, pilgrimage and transport (Nishith, 2008).

The climatic conditions in the region are very diverse in all the districts due to the geomorphology. It is sub-tropical in Sabarkantha and Banaskantha district with three distinct seasons. However, there is considerable variation in temperature between different parts of the district and between the summer and winter months. The monsoon season

begins around the first week of June and lasts until September. The winter months are November to February and summer extends from March to June. The average minimum and maximum temperatures recorded during study period were about 13°C and 40°C respectively.

In the desert areas, i.e. Mehsana and Patan, the climate is semi-arid to arid. The maximum temperatures can climb up to 46°C during summer. The winter months (December-January) experience a minimum temperature of about 5°C. The rainfall recorded was very irregular, extending from July to mid September from the southwest.

Methodology

Habitat and den study

The survey was carried out from January 2006 to January 2007. Direct encounters with animals were recorded in the different habitats. Along with the direct encounters, indirect evidence such as scats, foot prints, dens, etc. were also recorded to document the presence of hyena in different habitats. Using these data, the habitats were categorized as frequently used (F) (more than 60%), moderately used (M) (less than 60% but more than 30%), and rarely used (R) (evidence less than 30%) (Litvaitis *et al*., 1996; Nishith, 2000). Information regarding den locations was obtained from the local shepherds and goatherds and the nomadic Rabaris. The confirmation of dens was made through hyena signs and direct encounters around dens. The identified dens were marked and recorded including the dimensions, surrounding habitat and ground configuration. The status of the dens was confirmed as described by Kuhn (2005). Dens were also checked for the number of entrances and for carcasses of prey. If there were direct encounters with hyena the observations were made throughout the day.

Scat analysis

Scat analysis is the most widely used method for studying the dietary composition of any animal, especially carnivores (Singh *et al*., 1999). The scats are identified by shape, size, texture and color. Hyena scats can be easily differentiated from the scats of other carnivores in the area. The mean scat diameter measured 21.61 ± 0.6 cm. Misidentifications of scats were avoided by choosing den sites for sampling and opportunistic sampling was avoided as much as possible. Most of the scats collected in the field were dry; however, if scats were collected fresh, they were sun dried and stored in polythene zip locks and tagged with collection details like date, time and location. Scats were collected periodically over the seasons spanning the study period.

The food composition of the hyena's diet was studied through analyzing the scats in the laboratory using the standard methods of Korschgen (1980), with some modifications. All the scats were washed and the indigestible components such as fruit seeds, hairs, claws, scales, feathers, bones and insect chitin were separated.

Identification of mammalian species was based on cuticular and medullary characteristics of hairs (Mukherjee *et al*., 1994; Nishith, 2000, Nishith *et al*., 2005). The hairs were separated and washed and slides were prepared by taking cross sections; observations were made under 45X magnification and compared with the reference slides prepared for all the mammals found in the study area.

Table 1: Habitat use by hyena on the basis of direct sighting and indirect evidence

Habitat Type	# Direct sighting	# Indirect Evidence	Total	Status
Dry Forest	7 (53.84%)	76 (61.78%)	83 (61.02%)	F
Saline Desert	4 (30.76%)	33 (26.82%)	37 (27.20%)	M
Mixed Habitat	1 (7.60%)	9 (7.31%)	10 (7.35%)	R
Rural Habitat	1 (7.60%)	5 (4.06%)	6 (4.41%)	R

(F= Frequent, M= Moderate, R= Rarely used)

Table 2: Characteristics of Hyena dens in the study area

No	Habitat Type	# Den Recorded	Average Dimension (ft)			Status
			L	W	D	
1	Saline Desert	02	15	2.5	2.25	Active, one with cubs
2	Dry Forest	17	16.23	3.4	3.36	65% of the dens were active, the rest had been abandoned
3	Mixed Habitat	01	19	4.6	3.4	Active
4	Rural Habitat	00	--	--	--	--

Results and discussion

The distribution and den study showed a wide occurrence of hyena in the study area. As reported by Prater (1971), we found that hyena occurred less frequently in the dense forests. However, mixed habitat and rural areas were also found to have fewer hyena signs. As the area is geographically configured by a plain with heavy deposition of soil by rivers, the boulders which are generally preferred by hyena to construct their dens are virtually absent. Furthermore, the rural habitats are also dominated by agricultural fields, which restrict the animals from preparing dens or using the area.

The diet of the striped hyena is still a matter of some debate. It has been reported to consume a wide variety of vertebrates, invertebrates, vegetables, fruit, and organic wastes of human origin (Flower, 1932; Harrison, 1968; Ilani, 1975; Kruuk, 1976; Macdonald, 1983; Leakey *et al*., 1999). In many areas, striped hyenas have also been reported raiding human graves and carrying away bones (Rosevear, 1974; Horwitz and Smith, 1968; Leakey *et al*., 1999), and fruit and vegetable crop raiding is considered a serious problem in Israel (Kruuk, 1976). The overall reputation of the species, therefore, is that of an omnivorous scavenger. However, in central Kenya, analysis of bone fragments and hairs from faecal samples indicated that hyenas regularly consume smaller mammals and birds that are unlikely to be scavenged.

Striped hyenas have been reported chasing hares, porcupines, bat-eared foxes, domestic cats, cheetah cubs, dikdik, reedbuck, and young gazelles (Kruuk, 1976; Skinner and Ilani, 1979). There is also strong evidence that small livestock (goats and sheep) and dogs are often killed by striped hyenas (Rosevear, 1974; Leakey *et al*., 1999; Kuhn, 2005).

In the scat analysis in present study, the evidence of two to three prey species were found in a scat. However, more than three species were seldom observed. This confirms that hyenas feed on multiple prey species as available in the study area. Hyenas mainly consume smaller sized mammals as prey, followed by arthropods, reptiles and fruits. There was much less evidence of birds found in the hyena's diet compared to other prey species. Among the mammals, 58% of the prey remains were of domestic livestock, followed by rodents (11%), hares (7%) and dogs (2%). The higher percentage of livestock in the hyena's diet shows the dependency of hyenas on domestic animals like goats, cattle, etc. As large carnivores do not occur in the study area, it is presumed that the hyena may kill the calves of cattle or feed on cattle carcasses dumped by the villagers. This is also correlates with the habitat use pattern of hyena; the dry forest patches which are frequently used by hyena also have high grazing pressure by cattle that make them the victims of the predators like hyena.

The study revealed that hyenas in the area mainly consume insects, invertebrates, small vertebrates, and actively hunt small mammals and ground-nesting and/or ground-feeding birds. In addition, they scavenge off carcasses of larger mammals and this activity appears to account for a significant portion of the bones found at the den sites. There

is no seasonal variation in the feeding pattern of hyena.

According to the data collected from the study, open dry forest in the hilly areas is found to be more suitable for hyenas to construct their dens. However, two dens were observed in saline desert located on uplands or islands locally called bets, which are land mass systems in the saline deserts of Kutch (Singh, 2001). These bets are composed of saline grassland and herbaceous cover along with scrub vegetation. They remain above the water level during the monsoon and hence are probably ideal sites to construct dens by the animals like the hyena.

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References

Flower, S. 1932. **Notes on the recent mammals of Egypt, with a list of the species recorded from that Kingdom**. *Proceedings of the Zoological Society of London* 1932: 369-450.

Harrison, D.L. 1968. **The mammals of Arabia Volume II: Carnivora, Artiodactyla, Hyracoidea**. Ernest Benn Ltd., London. 381 pp.

Horwitz, L.K. and P. Smith. 1988. **The effects of striped hyaena activity on human remains.** *Journal of archaeological science* 15: 471-481.

Ilani, G. 1975. **Hyenas in Israel.** *Israel-Land and Nature* 16: 10-18.

Korschgen, L.K. 1980. **Procedures for food habits analysis.** In: Schemnitz, S.D. (Ed). *Wildlife management techniques manual*: 113-128. The Wildlife Society. Washington, D.C.

Krebs, J.R. 1978. **Optimal foraging: decision rules for predators.** In: Krebs, J.R. & Davies, N.B. (Eds). *An Introduction to Behavioural Ecology*: 23-63. Sinauer Associates. Sunderland, Massachusetts. *Journal of Zoology. Lond.* 237:577-591.

Kruuk, H. 1976. **Feeding and social behaviour of the striped hyaena (*Hyaena vulgaris* Desmarest).** *East African Wildlife Journal* 14: 91-111.

Kuhn, B. 2005. **The faunal assemblages and taphonomic signatures of five striped hyaena (*Hyaena hyaena syriaca*) dens in the desert of Eastern Jordan.** *Levant* 37: 221-234.

Leakey, L.N., Milledge, S.A.H., Leakey, S.M., Edung, J., Haynes, P., Kiptoo, D.K. and A. McGeorge. 1999. **Diet of striped hyaena in northern Kenya.** *African Journal of Ecology* 37:314-326.

Litvaitis, J.A., Titus, K. and E.M. Anderson. 1996. **Measuring vertebrate use of terrestrial habitats and foods**. In: Theodore A. Bookhout (Ed.) *Research and Management Techniques for Wildlife and Habitats*. The Wildlife Society, Bethesda, Maryland. Pp. 169-214.

Macdonald, D.W. 1983. **The ecology of carnivore social behaviour**. *Nature, London* 301: 379-384.

Mills, M.G.L. and H. Hofer. 1998. **Hyaenas: Status Survey and Action Plan.** IUCN/SSC Hyaena Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.

Mukherjee, S., Goyal, S.P. and R. Chellam. 1994. **Standardization of scat analysis techniques for leopard (*Panthera pardus*) in Gir National Park, Western India**. *Mammalia* 58: 139-143.

Nishith, Dharaiya. 2000. **A study on the ecology of satellitic lion metapopulation around Gir PA and its Conseervation.** Ph.D. Thesis Submitted to Saurashtra University, Rajkot. 175 Pp.

Nishith, Dharaiya. 2008. **Study on occurrence, distribution and status of some small and rare mammals in the North Gujarat region.** Final Report submitted to Gujarat Forest Research Institute, Gandhinagar. 108 Pp.

Nishith, Dharaiya, Soni, V.C., Singh, M. and P.P. Raval. 2005. **Seasonal changes of food habits of Asiatic Lion and leopard in the Gir Protected Area.** *Wildli. Conservation*

(continued on p.17)

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Res. and Management. A Technical Publication of Wildlife Inst. of India, Dehradun. (40-43)

Prater, S.H. 1971. **The book of Indian animals**. Bombay Natural History Society, Mumbai, India 324 Pp.

Rosevear, D.R. 1974. **The Carnivores of West Africa,** No. 723. British Museum (Natural History), London. 548 pp.

Singh, H.S. 2001. **Natural Heritage of Gujarat.** Published by Gujarat Ecological Education and Research (GEER) Foundation, Gandhinagar. 262 Pp.

Authors' addresses: Nikunj Gajera, Gujarat Institute of Desert Ecology, Mundra Road, New Bhuj, Kachchh (Gujarat) India; S.M. Dave and Dharaiya Nishith, Department of Life Sciences, Hemchandracharya North Gujarat University, Patan (Gujarat) 384 265 –India adinishi@gmail.com

Figure 1: Occurrence of Hyena in different habitat studied

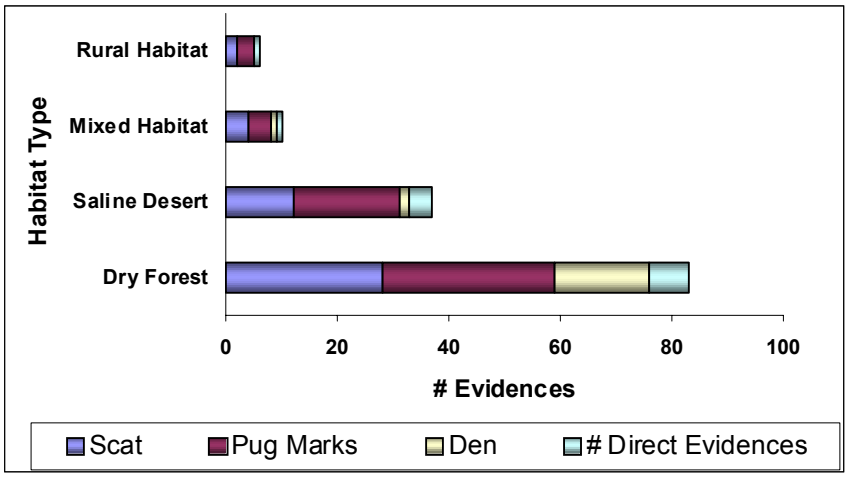
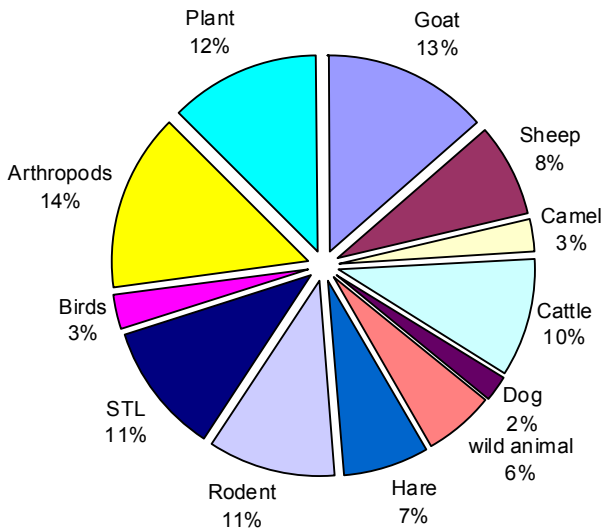


Figure 2 Food Composition of Hyena in scat study



MAMMALIAN DIVERSITY AND MANAGEMENT PLAN FOR JASROTA WILDLIFE SANCTUARY, KATHUA (J&K)

by Sanjeev Kumar and D.N. Sahi

Introduction

Jasrota Wildlife Sanctuary, with an area of 10.04 km^2, is situated on the right bank of the Ujh river in district Kathua, J&K State, between 32^{o}27' and 32^{o}31' N latitudes and 75^{o}22' and 75^{o}26' E longitudes. The elevation ranges from 356 to 520 m. Climatic conditions in study area are generally dry sub-humid. The summer season runs from April to mid-July, with maximum summer temperatures varying between 36^{o}C to 42^{o}C. The winter season runs from November to February. Spring is from mid-February to mid-April. The average cumulative rainfall is 100 cm.

The flora is comprised of broad-leaved associates, namely *Lannea coromandelica, Dendrocalamus strictus, Acacia catechu, A. arabica, Dalbergia sissoo, Bombax ceiba, Ficus religiosa, Zizyphus jujuba, etc.* along with shrubs like *Adhatoda vasica, Lantana camara, Parthenium hysterophorus, Calotropis procera, etc*.

Methodology

The following methods were used for inventory and survey of mammalian species in the study area:

Line transect method

In this method a predetermined transect was traversed either by foot or vehicle. The different mammalian species encountered were recorded. These line transects were used in different habitats to determine the presence or absence of different species in the particular habitats. Sometimes evidences such as burrows, quills, bones, defecation, signs of destruction of habitat were encountered and recorded. These evidences also indicate the presence of particular animals. The spot where such evidences were found is then marked and later surveyed for the presence of the animal.

Roadside surveys

These surveys were made both on foot and by vehicle. These were successful particularly in case of Rhesus monkeys, which can tolerate the presence of humans and allow the observations to be made from close quarters. Counting was done and members of different troops were identified by wounds on exposed parts, broken legs or arms, scars or by some other deformity. Many times, jackals and hares were also encountered during the roadside surveys.

Point transect method

This method was also tried, but did not prove as effective as the line transect method and roadside survey.

Water hole technique

This method was also used for the study of mammals. It was applied more efficiently during pinch periods when water acts as limiting factor.

All the methods were applied during early morning hours and late evening hours, except the water hole technique, which was applied during the noon hours in the summer season.

Indirect methods

The presence of mammalian species was also noted by other signs, e.g., quills of porcupine, scats, presence of hair, bones, pug marks, etc. Villagers and nomads were also interviewed over wide areas regarding the presence or absence of mammals by providing them with the pictorial guides and photographs of different mammals for identification that are likely to be found in the area. For identification and classification purposes,

colourful plates by Prater (1971) and Tikader (1983) proved helpful.

Binoculars (12x50 Super Zenith) were used to record the observations from a distance to avoid any disturbance to mammals.

Observations

Census

The census surveys were conducted for three days from 21 to 23 April 2006 in predetermined transects. Overall, 9 transects were laid down at considerable distances from each other to avoid double counts of the animals. The transects were of variable length (mean length = 2 km) with a fixed width of 80 m. Forty-five observers were involved in data collection, 5 in each transect.

The census began simultaneously across all the nine transects at 5:15 am, and ended depending on the length of transect. The observers walked along the transects at a fixed 20 m distance from each other and each searched 10 m of the transect on both sides. The total number of animals seen, time of their sighting, direction of their movement, etc. were recorded by the observers. The results were calculated and presented in tabular form.

Calculations**:**
Mean length of each transect:
2 km
Width of each transect
0.08 km
Area traversed in each transect:
0.16 km^2
Total area of the sanctuary traversed
0.16 km^2 x 9 = 1.44 km^2
in all the nine transects

Threats to biodiversity in and near Jasrota Wildlife Sanctuary

Lopping and grazing

The rural people practice agricultural and pastoral occupations to earn their living. Quite a good number of cattle, goats and sheep are kept for milk, manure and wool. The uncontrolled increase in the bovine population in the close vicinity of the sanctuary has resulted in excessive biotic pressure on the area. Excessive lopping of *Grewia optiva, Ficus palmata, Acacia catechu, A. modesta, Albizia lebbeck, Bauhinia variegata, Butea monosperma* and *Dalbergia sissoo* is performed for feeding cattle. Both the grazers and browsers owned by the tribals are brought to the forest in the morning and left there for the whole day. These animals are confined to 1 to 2 km inside the sanctuary. The browsers cause maximum damage to the forest ecosystem

Removal of forest floor litter

The leaf litter and worn out twigs of plants are removed from the forest floor as a source of fuel, for heating houses and cowsheds during winter months and as compost. This practice brings about changes in the physicochemical properties of soil. It halts the process of decomposition.

In the Kandi area this practice disturbs the ground water regime, as the thick layer of sponge (litter) is removed periodically. The soils are washed away in gullies during the monsoon months.

Plantations and weed infestation

Plants such as *Eucalyptus lanceolatus*, *Dalbergia sissoo, Albezia lebbeck, Leucinea leucocephala, Eucalyptus* sp. and *Acacia catechu* have been planted within the sanctuary limits, to meet short-term requirements at the cost of long-term ecological damage. *Lantana camara* and *Parthenum hysterophorous* have left no space unoccupied along all national and village roads and along village/forest buffers. The dense growth of these weeds poses a main obstacle in the migration of wild animals, besides deteriorating the soil strata. These plants also draw up moisture from various layers of soil and transport it to the air, thereby rendering the soil stratum dry and affecting the growth of mesophytes. The infestation of *Partheniunm hysterophorous* has become a menace to wildlife, as they fall prey to severe stomach ailments.

Encroachments

Development activities around the sanctuary and the expanding urban sprawl are taking a heavy

toll on the nearby forest fringes and have led to shrinkage of Jasrota forest range.

Pilgrimages within the sanctuary

An ancient temple dedicated to Lord Shiva and Kaliveer attracts thousands of people from adjoining localities and different states. The road and walking tracks for the pilgrimage in the sanctuary have fragmented some portions of the forest. These tracks are used by the people during morning and evening hours, which results in the disturbance of daily schedule or activity of various birds and animals.

Lack of fruit trees

The lack of fruit trees in the sanctuary was noticed during the course of fieldwork. These fruit trees act as a good source for attracting the various bird species.

Scarcity of water

During the course of the survey, no permanent source of water was found in the sanctuary area. Various ponds have existed since time immemorial and some new ones have been constructed in the sanctuary as sources of drinking water. These dry up during the hot season and the animals have to cross the roads or enter the nearby villages to get to the nearby river Ujh to quench their thirst; on the way they sometimes meet accidental deaths and sometimes are hunted.

No proper drainage system

No proper drainage system was found in the sanctuary area. During the course of the survey it was found that during the monsoons when there is heavy rainfall a lot of soil gets eroded.

Interference by Gujjars and Bakerwals

In winter, the Gujjar and Bakerwal tribes migrate from the hills to the sanctuary every year. They stay in the sanctuary and their livestock feeds on the flora available in the sanctuary, thus resulting in a shortage of forage for the resident wildlife. Moreover, it disturbes the free movement of wildlife.

Activity of villagers in the sanctuary area

Activity of villagers in the sanctuary was reported during the course of investigation. Human settlements have also been reported.

Suggestions and recommendations:

- Improvement of habitat
  - Improvement of water resources by creating more artificial water holes to supply drinking water to wild animals throughout the year. The ponds should be lined with cement so that water can be retained for long durations. Also, there should be provision for proper supply of water throughout the year.
  - Rehabilitation of old water tanks by efficient rainwater harvesting and sustainable watershed management practices. Concept of rainwater harvesting should be applied at those places where the natural water of rains can be stored to be used by wildlife.
- Improvement of cover
  - Escape cover for the wildlife can be raised with due care and protection. But to hasten the restoration of cover where it has been excessively depleted, artificial aids such as barbed wire, cattle-proof fences and plantation of thorny hedges like *Zizyphus* sp. should be used to prevent the entry of poachers / hunters and also livestock that compete with the wild animals.
  - Artificial covers with natural looking designs and color that blend with natural surroundings should be set up to provide shelter to wild fauna like *Varanus*, mongoose and porcupine.
- Periodic evaluations of the habitat and wild fauna must be carried out to monitor changes in status of species and also the response of populations to changes in the environment. Counts conducted over a wider area and in different seasons can help to determine the range of a species and its area of local abundance. This will also help to study the complete diversity of the animals and birds (winter migrants and summer migrants).
- Research programs are needed to gather ecological data pertaining to food habits,

reproduction, habitat requirements, population size functions and relationships with other species by studying the wildlife in their natural environment.

- Local people may be encouraged to support the goals of the protected area by giving them training and employment so that they can benefit from the protection of wildlife and regulation of activity within the sanctuary.
- Stringent legal measures should be taken to prevent the grazing of buffaloes by locals. Gujjars and Bakerwals are a major source of destruction of vegetation and disturbance in the sanctuary; their entry into the sanctuary should be strictly restricted.
- A fully equipped veterinary unit should be established to inoculate the cattle entering the wildlife range against diseases like reindeer pest, foot-and-mouth disease and to carry out quarantine and other necessary measures in the event of an outbreak of cattle-borne epidemic.
- Wild fruit trees such as Zizyphus, Guava, Jamun, Fig, etc. should be planted as they attract various bird and other animal species that feed on fruits.
- Tremendous growth of weeds like *Lantana* sp. and *Parthenium* sp. was noticed during the study. Growth of these weeds should be checked at regular intervals as they cause many respiratory and skin problems among wild animals.

Results and discussion

During the survey, 16 species of mammals belonging to 6 orders and 10 families were recorded. Of the mammal species present, Orders Carnivora and Rodentia are represented by 5 species each (31.25%), Artiodactyla is represented by 3 species (18.75%) and Primata, Insectivora and Lagomorpha are each represented by 1 species (6.25%).

A census was conducted in the study area to get an estimation of the populations of different elements. Six species come under the Common category, 4 species are represented in the Rare and Uncommon category and 2 species are Uncommon (Table 1).

An attempt has also been made to determine the conservation status of the mammalian species reported from the study area. Table 2 shows the conservation status of mammals according to IUCN Categorization and Wildlife (Protection) Act, 1972 amended up to 2002.

An effort was made to get an insight into the various problems and drawbacks in the management of the study area, i.e. Jasrota Wildlife Sanctuary, and various suggestions and recommendations have been made for the restoration this important protected area which is the only natural abode of the Chital in whole of the Jammu region.

To conclude, despite its small size the study area appears to support a good and unique assemblage of mammalian fauna. The mammals of Jasrota Wildlife Sanctuary represent 4.3% of the total mammals (372 species) recorded by Hossetti (2002) from India. The observed mammalian diversity in the relatively small study area underlies the importance of this area for biodiversity conservation.

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References

Hosetti, B.B. 2002. **Glimpses of biodiversity.** Daya Publishing House, Delhi.

Prater, S.H. 1971**. The Book of Indian Animals**. Bomb. Nat. Hist. Soc. Third Revised Edition.

Srinivasulu, C and V. Nagulu. 2002. **Mammalian and Avian diversity of the Nallamala Hills, Andhra Pradesh**. *J. Zoos Print.* 17(1): 675-684.

Tikader, B.K. 1983. **A Book on 'Threatened Animals of India'**. Zoological Survey of India, Calcutta.

Authors' address: c/o Dept. of Zoology, University of Jammu, Jammu-180006, India

Table.1: Showing checklist, local status and distribution of mammals in Jasrota Wildlife Sanctuary

S. No.	Name	Local Status
	Class: Mammals	
	Order: Primata	
	Family: Cercopithecidae	
1.	Rhesus Monkey	C
	Macaca mulatta (Zimmermann)	
	Order: Carnivora	
	Family: Felidae	
2.	Leopard	R
	Panrthera pardus (Linnaeus)	
	Family: Canidae	
3.	Asiatic Jackal	UC
	Canis aureus aureus Linnaeus	
4.	Indian Fox	R
	Vulpes bengalensis (Shaw)	
	Family: Viverridae	
5.	Small Indian Civet	O
	Viverricula indica (Desmarest)	
	Family: Herpestidae	
6.	Common Grey Mongoose	C
	Herpestes edwardsii nyula Hodgson	
	Order: Artiodactyla	
	Family: Cervidae	
7.	Spotted Deer	R
	Axis axis (Erxleben)	
8.	Barking Deer	R
	Muntiacus muntjak (Zimmermann)	
	Family: Suidae	
9.	Wild Boar	O
	Sus scrofa Linnaeus	
	Order: Lagomorpha	
	Family: Leporidae	
10.	Rufous-Tailed Hare	UC
	Lepus nigricollis ruficaudatus Geoffroy	
	Order: Insectivora	
	Family: Soricidae	
11.	Grey Musk Shrew	UC
	Suncus murinus murinus (Linnaeus)	
	Order: Rodentia	
	Family: Sciuridae	
12.	Five Striped Palm Squirrel	C
	Funambulus pennanti Wroughton	
	Family: Hystricidae	
13.	Indian Crested Pocupine	UC
	Hystrix indica Kerr	
	Family: Muridae	
14.	House Mouse	C
	Mus musculus (Linnaeus)	
15.	House Rat	C
	Rattus rattus Linnaeus	
16.	Indian Mole Rat	C
	Bandicota bengalensis (Gray & Hardwicke)	

Note: For assigning status to the mammalian species recorded during the study period, the terminology of Srinivasulu and Nagulu (2002) was followed:

C: Common (fairly well distributed and sighted or evidence recorded once a day in the habitat).
UC: Uncommon (well distributed and sighted, or evidence recorded once a week).
O: Occasional (restricted distribution and sighted, or evidence recorded infrequently).
R: Rare (fewer than 10 sightings, or evidence recorded or single sight records)

Table 2: Conservation status of mammals according to IUCN categorization and Wildlife (Protection) Act, 1972 amended up to 2002.

S. No.	Name	Global IUCN Status	Indian Wildlife (Protection) Act
1.	Rhesus Monkey	LR-lc	II
2.	Leopard	VU	I
3.	Asiatic Jackal	LR-lc	II
4.	Indian Fox	LR-nt	II
5.	Small Indian Civet	LR-nt	II
6.	Common Grey Mongoose	LR-lc	IV
7.	Spotted Deer	LR-lc	III
8.	Barking Deer	LR-lc	III
9.	Wild Boar	LR-lc	III
10.	Rufous-Tailed Hare	LR-lc	IV
11.	Grey Musk Shrew	LR-lc	V
12.	Five Stripped Squirrel	LR-lc	IV
13.	Indian Crested Porcupine	LR-lc	IV
14.	House Mouse	LR-lc	V
15.	House Rat	LR-lc	V
16.	Indian Mole Rat	LR-lc	V

LR-lc: Lower Risk-least concern
LR-nt: Lower risk-near threatened
VU: Vulnerable

STATUS OF THE LONG-TAILED GORAL (Naemorhedus griseus) IN THAILAND

by Rattanawat Chaiyarat

Introduction

The long-tailed goral (*Naemorhedus griseus*) is a vulnerable species. The total world population is in significant decline (probably at a rate of more than 30% over three generations, taken in 21 years) because of over-hunting within its range (Duckworth *et al*., 2008). Accordingly, the species is listed by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES, 2009) in Appendix I.

Thailand has recently been identified by IUCN as one of seven key areas for the protection of the long-tailed goral (Duckworth *et al*., 2008). Other areas include China, India, Myanmar, Vietnam, Bangladesh, and the Lao People's Democratic Republic.

Former distribution in Thailand

In Thailand, the long-tailed goral was reported to exist in relatively small herds (Lekagul and McNeely, 1977). A population was first recorded at the headwaters of the Mae Ping River in Chiangmai province (Kloss, 1923).

In 1997, Chaiyarat *et al*. (1999) surveyed (on foot) the protected areas of the western part of Northern Thailand. The surveys indicated that the long-tailed goral was distributed in seven reserve areas: Mae Lao-Mae Sae Wildlife Sanctuary in dry dipterocarp and pine forest of Doi Mon Lium, at approximately 1,265 m above mean sea level (MSL) in Mae Tang district, Chiang Mai Province; Doi Chiang Dao Wildlife Sanctuary in grassland and sub-alpine areas of Doi Luang limestone at approximately 2,100 m above MSL in Chiang Dao District, Chiang Mai Province; Lum Nam Pai Wildlife Sanctuary in mixed deciduous forest of Doi Laung limestone at approximately 850 m above MSL (outside the protected area) in Muang District, Mae Hong Son Province; Mae Tuan Wildlife Sanctuary and Mae Ping National Park in mixed deciduous forest clefts along the Ping River above Bhumibol Dam at approximately 600 m above MSL in Sam Ngao District, Tak Province; Doi Inthanon National Park in grassland on Kiw Mae Pan approximately 2,300 m above MSL in Mae Jam District, Chiang Mai Province; and Om Koi Wildlife Sanctuary on Doi Mon Jong and Doi Lium at approximately 1,400-1,929 m above MSL in Om Koi District, Chiang Mai Province and Sam Ngao District, Tak Province. Other areas where the long-tailed goral has been found in Thailand include the Salawin Wildlife Sanctuary, Mae Hong Son Province (A. Pattanavibool, pers. comm.) and Mae Surin National Park, Muang District, Mae Hong Son Province (Prateep Rojanadilok, Chief of Chiang Dao Wildlife Research Station, pers. comm., 2007).

Habitat and ecology

This species inhabits steep mountainous areas and will sometimes occupy evergreen forests near cliffs, but primarily stays within rugged rocky terrain. Long-tailed gorals are diurnal, and are most active in the early morning and late evening, but can be active throughout overcast days. Group home range size is typically around 40 hectares, with males occupying marked territories of 22-25 hectares during the mating season (Duckworth *et al*., 2008). They typically live in small groups of 4-12 individuals, with older males usually being solitary (Lekagul and McNeely, 1977; Duckworth *et al*., 2008).

At Om Koi, long-tailed gorals mostly utilize grassland, rock outcrops and hill evergreen forest along a deep valley. Long-tailed gorals are commonly solitary but are sometimes observed in pairs or larger groups, especially during the rutting season. They utilize elevations ranging from 1,400 to >1900 m above mean sea level (MSL) during the rainy season (May to October), but have not been found above 1,800 m above MSL during the dry season (November to April), possibly due to the die-off of vegetative cover on the cliffs of Doi Mon Jong (Chaiyarat et al. 1999). Recent observations (dry season, 2009) in Doi Mon Jong did not find any new signs of the long-tailed goral above 1,800 m above MSL, possibly due to the increase of visitor activities in the area.

Forage species

The long-tailed goral diet consists of grasses, leaves, twigs, and nuts (Lekagul and McNeely, 1977). They are both grazers and browsers, mostly feeding on grass, especially in the rainy season. During the dry season, they feed on annual herbs more frequently than during the rainy season, because the quality of forage is lower with less water content than in the rainy season. In addition, some species of grass also die off during the dry season. Thus, long-tailed gorals needs to feed on high quality forage species that have a high water content (Chaiyarat *et al*. 1999).

Threats

The decline in long-tailed goral numbers is believed to be due to over-hunting. These animals are frequently hunted or snared by local people for meat, fur and medicines. Every year 1,200 to 1,300 pelts are harvested each year in Shaanxi Province, China, alone (Zhen, 1984). Besides hunting, deforestation (for logging and cultivation) is the other main threat. Not only does this reduce the area of long-tailed goral habitat, but it also causes fragmentation of habitat. This is especially true in the region surrounding the great lake basins along the Changjiang River, in China (Duckworth *et al*., 2008).

In Thailand, hill tribe people still hunt the long-tailed goral for food and medicine, and use their horns as decorations in their homes. On Doi Mon

Jong, in Chiang Mai Province, they occasionally use fire to burn grasslands in order to hunt long-tailed gorals. Hunting by spotlight occurs in Mae Tuan Wildlife Sanctuary and Mae Ping National Park. Habitat degradation and shifting cultivation occurs in many areas.

The goral sometimes has to compete for forage with domestic animals. Domestic cattle commonly utilize grasslands below 1,500 m above MSL on the flat plains in Doi Mon Jong, Chiang Mai Province. In 1997, more than 300 domestic cattle were recorded feeding on grasses and annual herbs. During the dry season when the grass died-off, the domestic cattle moved higher to feed on grasses and annual herbs within the habitat of the long-tailed goral. During the dry season, the water supply is located downhill and long-tailed gorals share it with domestic cattle. If the domestic cattle have disease, they could possibly pass it on to the long-tailed gorals very easily (Chaiyarat *et al*., 1999). This phenomenon of wild animals sharing water sources with domestic animals occurs in every protected area of Thailand. The number of domestic cattle is dramatically increasing as a result of policies of the government (Chaiyarat and Srikosamatara, 2009). In the current year (2009), the number of domestic cattle in Om Koi Wildlife Sanctuary is estimated to be more than 10,000 animals (Dissakul Thammasanukul, Chief, Om Koi Wildlife Sanctuary, pers. comm.). These animals are also roaming in Mom Jong, an area of long-tailed goral habitat.

A negative influence in Om Koi Wildlife Sanctuary and Doi Inthanon National Park is destructive tourism; the negative effects may cause the long-tailed goral population to become critically endangered (Chaiyarat *et al*., 1999). A current promotion of the Tourism Authority of Thailand is to encourage tourists to visit the "unseen" areas of Thailand. These motivation activities are not linked to the carrying capacity of the area, especially in the dry season, which is a difficult period for wildlife.

Conservation and management

In Thailand, the long-tailed goral is listed as a reserved animal under the Wild Animal Reservation and Protection Act. B.E.2535. The relationship between the long-tailed goral and humans is negative. The negative relationship affecting the long tail goral population is at present on the verge of rendering the long-tailed goral to be critically endangered. Thus, appropriate conservation measures are needed to ensure the survival of their population (Chaiyarat *et al*., 1999).

The way to manage and conserve the long-tailed goral in Thailand is to ensure the long-term survival of the ecosystems in which it occurs. Core areas (sanctuaries) must be protected and local people should be restricted to buffer zones near the sanctuary boundaries. All domestic cattle must be moved out of sanctuaries. Habitat manipulation such as food management, small water source development, artificial saltlicks and corridor improvement must be undertaken to ensure that long-tailed gorals have adequate natural resources as well as exchange among gene pools. 4) The promotion of wildlife and habitat conservation through training and exhibitions should be established for all levels of people, and especially among school students.

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References

CITES. 2009 http://ww.cites.org/index.html

Chaiyaraat, R., Laohajinda, W., Kutintara, U. And J. Nabhitabhata. 1999. **Ecology of the goral (*Naemorhedus goral*) in Om Koi wildlife Sanctuary, Thailand.** *Natural History Bulletin of the Siam Society* 47:191-205.

Chaiyarat, R. and S. Srikosamatara. 2009. **Populations of domesticated cattle and buffalo in the Western Forest Complex of Thailand and their possible impacts on the**

wildlife community. *Journal of Environmental Management* 90(03):1448-1453.

Duckworth, J.W., Steinmetz, R. and R. Chaiyarat. 2008. *Naemorhedus griseus*. In: *IUCN Red List of Threatened Species*. www.iucnredlist.org

Kloss, C.B. 1923. **The goral in Siam**. *Natural History Bulletin of the Siam Society* 6(1):135-136.

Lekagul, B. and J.A. McNeely. 1977. **Mammals of Thailand**. Kurusapha Ladprao Press, Bangkok.

Zhen, Y. 1984. **Storage of economic birds and mammals in Shaanxi Province**. *Chinese Wildlife* 14(3):53-55.

Author's address: Faculty of Environment and Resource Studies, Mahidol University, Salaya, Puttamonthon, Nakornprathom, Thailand 73170 (scrcy@mahidol.ac.th)

REPTILIAN DIVERSITY IN AND AROUND THE MARINE NATIONAL PARK AND MARINE SANCTUARY, GUJARAT STATE

by Raju Vyas and J.N. Patel

Introduction

Today the world is developing very rapidly and people are using more and more natural resources. This is resulting in the shrinkage of many natural ecosystems and wildlife habitats. Therefore, certain natural areas or habitats with good potential are reserved as Protected Areas (PAs). PAs are not only refuges for wildlife but also help to preserve the natural resources for future generations. However, once a PA is declared, the wildlife populations and biodiversity must be assessed in order to wisely manage the area. Therefore, the State Forest Department and Gujarat Ecological Educational Research (GEER) Foundation, Gandhinagar, have initiated a program to measure the biodiversity of PAs in Gujarat State.

Gujarat is bordered by two gulfs, i.e. the Gulf of Khambhat and the Gulf of Kachchh. Both gulfs have their own identity and support a large number of marine flora and fauna. From the viewpoint of biodiversity, the Gulf of Kachchh is richer and the Government of India has declared some parts of the Gulf of Kachchh as the first marine protected area (southern coast). However, the number of species inhabiting this are have not yet been documented, so the GEER Foundation, Gandhinagar, carried out a preliminary survey on the biodiversity of the area. The results presented here on the reptilian fauna are part of those studies.

Study area

The Marine National Park (162.89 km^2) and Marine Sanctuary (457.92 km^2) of Gujarat State are unique marine ecosystems and important protected areas in the country. The entire protected area is located between the south coast of Kachchh district and the north coast of Jamnagar district. It is a complex ecosystem of varied habitats such as marine, coastal, mangrove forest, savanna grassland and dry thorny forest, and is greatly influenced by marine tidal conditions. In all, a total 931.33 km^2, including mangrove forests, is considered as a single marine ecosystem, collectively known as the Marine Protected Area (MPA). This complex habitat also contains 42 islands of various sizes.

Information about the terrestrial reptilian fauna of the MPA is not available from any past relevant literature, except for some scattered information about a few marine reptilian species such as sea turtles and sea snakes (Bhaskar, 1978, 1981a, 1981b; Frazier, 1989; Smith, 1926, 1943; Sharma,

1982; Vyas, 1998, 2005). Therefore, a systematic study was carried out in and around the MPA with the following objectives: 1) to make an inventory of the reptilian fauna of the MPA, especially the terrestrial reptiles on the islands; 2) to provide basic information on the relative abundance of reptilian species; and 3) to identify threats to the reptilian fauna of the MPA.

Methodology

The preliminary inventory was conducted over 40 days of fieldwork from 2000-2002 during a series of visits to a few important coastal pockets and islands. During visits to each island an extensive search was made of all the important microhabitats of the coastal beaches and island habitats for reptilian species. Any dead specimens of marine reptiles found on the beaches were also recorded along with free-swimming reptiles observed in the seawaters. In addition, secondary information was gathered from local fishermen in the surrounding villages, forest personnel and wildlife enthusiasts about the different species of reptiles through interviews.

Snakes and lizards were captured with a hook or snake-stick and bare hands, respectively. All the collected specimens of terrestrial reptiles were examined and carefully identified by using the diagnostic keys of Smith (1935, 1943) and released back into the same habitat. Nomenclatures of all species mentioned in this report followed that of Das (1994, 2003).

Results

A total of 21 species of reptiles belonging to 12 families and 17 genera were recorded during the survey, including 7 species of marine and 14 species of terrestrial reptiles from the study area, which shows the richness of the area.

Marine reptiles: Seven species of marine reptiles were found in the study area, including two species of sea turtles and five species of sea snakes. The Green turtle (*Chelonia mydas*) and Olive Ridley sea turtle (*Lepidochelys olivacea*) were recorded by direct sighting, but there was no direct or indirect evidence of Leatherback turtle (*Dermochelys coriacea*) in the area except for a small piece of plastron of this species that was examined at the office of the Conservator of Forest, Marine National park, Jamnagar. A great number of dead sea turtles and sea snakes were found in different areas of the MPA.

Terrestrial reptiles: Fourteen species of terrestrial reptiles belonging to nine families and 11 genera were recorded from the MPA, including a single species of freshwater turtle, 10 species of lizards and 3 species of snakes. Nine species of reptiles were recorded from the islands, while the venomous Saw-scaled viper (*Echis carinatus*) is quite widely distributed in the MPA and is found in abundant numbers on all the big islands. The second most abundant species is the Snake-eyed lacerta (*Ophisops jerdonii*), which was recorded in many parts of the area. This diurnal lizard is quite common in some areas of sandy beach in very high numbers. The density of this species at Narara Island was 25 per hundred meters, while at the rocky beach of Balachadi it was 5 per hundred meters.

Conclusion and discussion

The present reptile fauna of the MPA consists of 21 species of reptiles belonging to 12 families and 16 genera, including 7 species of marine and 14 species of terrestrial reptiles, which shows the richness and diversity of the area.

A detailed long-term study is needed to determine the cause of death of the sea snakes and sea turtles recorded during the survey. The data of dead turtles from different areas of the MPA shows that a significant number of dead Green turtles are found throughout the year. Olive Ridley sea turtle deaths are lower compared to Green turtle, which may indicate that the Green turtle uses the gulf of Kachchh not only for breeding purposes, but also for foraging. The Green turtle is the only species of sea turtle that extensively feeds on a wide variety of sea vegetation. According to Singh (2002), there are 120 different types of algae and grasses recorded in the gulf of Kachchh that provide a good feeding ground for the Green turtles. The sandy beach of Okha Mandal and 42 remote islands of the MPA, especially Bhaidar, Nora, Chank, Dani, Kalubhar and Pirotan islands, provide good nesting grounds for the sea turtles.

During the survey, all freshly dead turtles were carefully examined, but no injuries were found on the bodies. The large number of dead adult turtles belonging to the two species found in the study area may indicate some kind of threat to the species. A detailed study of those threats is needed. This phenomena of death among sea turtles points to the possibility that perhaps the turtles are dying due to some kind of suffocation. It is possible that the animals are being trapped in the fishing nets, especially of motorized or mechanized gill and trawler nets which have no turtle excluder devices (TED) (Kannans *et al.*, 2004). According to the State Fisheries Department, Jamnagar (unpublished data: 1997-98), about 3,428 fishermen work around the south coast of the Gulf of Kachchh, from 23 centers. They used a large number of fishing gear and nets, which might have a negative impact on the adult population of sea turtles. None of these fishermen are aware of TED and so none have TED facilities. More study is needed in order to form an opinion about this matter.

Murray (1886) and Vyas (1998) recorded seven species of sea snakes from the Gulf of Kachchh. The present record of five species of sea snakes from the MPA is less than earlier records. Two species previously recorded, namely *Hydrophis gracilis* and *Lapemis curtus*, are not listed in this study because it was confined to the north coast of the Gulf of Kachchh.

The terrestrial reptiles inhabit many coastal pockets of the mainland but there are very few reptilian species inhabiting the islands of the MPA, which indicates that the species were brought to the islands through anthropogenic activities or drifted ashore on floating wood during the floods.

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References

Bhaskar, S. 1978. **Notes from the Gulf of Kutch**. *Hamadryad* 4(1):3-6.

Bhaskar, S. 1981. **Sea turtles in Gujarat State, Western India**. Report to the WWF-I, 1-11.

Bhaskar, S. 1981. **Survey of sea turtle nesting beaches on the West Coast of Saurashtra**. Report to the WWF-I, 3pp.

Das, I. 1994. **The reptiles of South Asia, checklist and distributional summary**. *Hamadryad* 19:15-40.

Das, I. 2003. **Growth of knowledge on the Reptiles of India, with an introduction to systematics, taxonomy and nomenclature**. *Journal of the Bombay Natural History Society* 100(2&3):446-501.

Frazier, J. 1989. **Observation on stranded green turtles, *Chelonia mydas*, in the Gulf of Kutch**. *Journal of the Bombay Natural History Society* 86:250-251.

Kannan, P., Venkanandan, S., Rajagopalan, M. and E. Vivekanandan. 2004. **Size composition and morphometry of incidentally caught Green turtles (*Chelonia mydas* Linnaeus) along the Saurashtra Coast, Gujarat**. *Cobra* (58):14-17.

Murray, J.A. 1886. **The reptiles of Sindh**. The Education Society's Press, Bombay, 192 pp.

Sharma, R.C. 1982. **Taxonomic and ecological studies on the reptiles of Gujarat**. *Records of Zoological Survey India* 80:85-108.

Smith, M.A. 1926. **A Monograph of the sea-snakes**. London 130pp., text-figs & pls.

Smith, M.A. 1931. **The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol.I, Loricata, Testudines.** Taylor and Francis, London. 185 pp.

Smith, M.A. 1943. **The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol.III. Serpentes**. Taylor and Francis, London. 583 pp.

Vyas, R. 1998. **The reptiles of Gujarat state: Updated distribution.** *Tigerpaper* 25(1):8-14.

Vyas, R. 2005. **First record of Asian house gecko *Hemidactylus frenatus* (Schlegel) from Gujarat State, Western India.** *Cobra* 60:13-17.

Singh, H.S. 2002. **Marine Protected Area in India: status of coastal wetlands and their**

conservation. Gujarat Ecological Education and Research Foundation, Gandhinagar, Gujarat, India. 62pp.

Authors' addresses: Raju Vyas, 505, Krishnadeep Tower, Mission Road, Fatehgunj, Vadodara-2, email:razoovyas@hotmail.com; J.N. Patel, G/7 Akash Flats, Nr. Gulab Tower, Sola Road, Ahmedabad-61, email: ptl_jyprksh@yahoo.co.ie

Table 1: List of reptiles recorded at Marine National Park & Marine Sanctuary, Gujarat (*species recorded only on mainland; **species recorded on mainland and islands)

No.	Family/Common English Name (Scientific Name)
	Marine Reptiles
	I: Dermochelyidae
1.	Leatherback turtle (*Dermochelys coreacea*)
	II: Chelonidae
2.	Green turtle (*Chelonia mydas*)
3.	Olive Ridley sea turtle (*Lepidochelys olivacea*)
	III: Hydrophyidae
4.	Many-toothed sea snake (*Hydrophis caerulescens*)
5.	Annulated sea snake (*Hydrophis cyanocinctus*)
6.	Bombay sea snake (*Hydrophis mamillaris*)
7.	Yellow snake (*Hydrophis spiralis*)
8.	Pelagic sea snake (*Pelamis platurus*)
	Terrestrial Reptiles
9.	**IV: Trionychidae**
	Indian softshell turtle* (*Lissemys punctata*)
10.	**V: Gekkonidae**
11.	Brook's house gecko** (*Hemidactylus brookii*)
12.	Yellow-green gecko** (*Hemidactylus flaviviridis*)
	Asian house gecko* (*Hemidactylus frenatus*)
13.	**VI: Agamidae**
14.	Common garden lizard** (*Calotes versicolor*)
15.	Lesser agama* (*Brachysaura (=Laudakia) minor*)
	Fan-throated lizard* (*Sitana ponticeriana*)
16.	**VII: Scinicidae**
	Co. Keeled grass skink** (*Mabuya carinata*)
17.	**VIII: Lacertidae**
18.	Indian fringe-toed lizard** (*Acanthodactylus cantoris*)
	Snake-eyed lacerta** (*Ophisops jerdonii*)
19.	**IX: Varanidae**
	Bengal monitor* (*Varanus bengalensis*)
20.	**X: Colubridae**
	Co. Sand or ribbon snake** (*Psammophis leithii*)
21.	**XI: Elapidae**
	Indian cobra* (*Naja naja*)
22.	**XII: Viperidae**
	Saw-scaled viper** (*Echis carinatus*)

Table 2: List of sea turtles found dead during the study on different beaches at Marine National Park & Sanctuary

Date of visit	Location	*Chelonia mydas*	*Lepidochelys olivacea*	*Hydrophis caerulescens*	*Hydrophis cyanocinctu*	*Hydrophis mamillaris*	*Hydrophis spiralis*	*Pelamis platurus*
19/08/00	Poshitra coast	1	0	1	0	0	2	0
14/10/00	Pirotan Is	1	0	0	1	0	0	0
24/11/00	Kalubhar Is	3	0	0	0	1	0	0
06/12/00	Dhani Is	1	0	0	0	0	1	0
07/12/00	Bhaidar Is	1	2	0	0	0	0	1
06/01/01	Panero Is	1	0	1	1	0	0	0
27/01/01	Narara Is	1	1	0	0	0	0	0
12/02/01	Pirotan Is	0	1	0	0	0	0	0
16/03/01	Bet Dwarka Is	1	0	1	1	0	0	1
05/05/01	Poshitra coast	2	1	0	0	0	0	0
06/06/01	Pirotan Is	1	0	1	0	0	0	1
05/12/01	Kalubhar Is	1	2	0	1	0	0	0
07/12/01	Balachai beach	0	2	0	0	0	0	0
19/12/01	Narara Is	1	0	1	0	0	1	1
03/01/02	Kalabhar Is	2	1	1	0	0	1	1
08/03/02	Narara Is	1	0	0	0	0	1	1
08/05/02	Pirotan Is	2	0	1	1	1	0	1
09/05/02	Sanchana beach	1	0	1	1	0	1	1
11/05/02	Kalubhar Is	3	1	0	0	0	0	0
13/05/02	Bhaidar Is	5	2	0	1	0	1	0
14/05/02	Ajad Is	2	0	1	0	0	0	1
		31	13	9	7	2	8	9

List of surveyed coastal beaches and islands of Marine National Park & Marine Sanctuary, Gulf of Kachchh, Gujarat, India

No.	Name of Area	No.	Name of Area
1	Bet Dwarka Is	15	Shiyadri Is
2	Okha	16	Panero Is
3	Dabdaba Is	17	Gandiya Kado Is
4	Devdi Is	18	Rozi
5	Asab Is	19	Dhani Is
6	Man Marodi Is	20	Narara Is
7	Langa Marodi Is	21	Kalubhar Is
8	Leffa Is	22	Pirotan Is
9	Khara Chusana Is	23	Jindra Is
10	Mitha Chusana Is	24	Chhad Is
11	Bhaidar Is	25	Dedeka Mundeka Is
12	Ajad Is	26	Bhains Bid Is
13	Khimra Ghat Is	27	Sikka
14	Garu Is	28	Balachadi

ORDER TESTUDINES: FIRST RECORDED INSTANCE IN SIKKIM

by Ajeya Jha

Introduction

Sikkim, with an area of 7,096 km^2, is the sec ond smallest state of India, located between 27º5'N to 28º9'N and 87º59'E to 88º56'E. Geographically, it lies at the head of the Bay of Bengal, with deep valleys and tall mountains. At its eastern frontier, the Richipangola range forms an ill-defined boundary to separate it from Bhutan. The Kanhanjunga and Singalila ranges separate it from Nepal, and Tibet lies to its north. The state of West Bengal defines its southern boundaries.

Sikkim is a land predominantly alpine in character, offering almost all possible mountain panoramas. The altitude ranges from 300 to 8,580 m. Sikkim is very well endowed with a rich biological heritage, which includes 4,500 species of flowering plants, 450 species of orchids, 36 species of rhododendron, 158 species of mammals, 550 species of butterflies, almost 600 species of birds, 61 species of reptiles and 20 species of amphibians. It is a globally recognized biodiversity "hotspot."

Reptilian fauna of Sikkim

The reptilian heritage of this state is rich, attested to by the presence of 61 species in a geographical area of just 7,096 km^2. However, of the four reptilian orders, namely Testudines, Rhyncocephalia, Crocodylia and Squamata that exist in the world today, only representatives of Squamata (Lizards and Snakes) were believed to exist in Sikkim until recently.

Although 32 species of turtles and tortoises belonging to Order Testudines have been recorded in India, no naturalists or scientists had ever recorded a turtle or tortoise from Sikkim. However, the possibility was first reported in 2003 (Jha & Thapa, 2003). This assertion was based on

consistent information provided by Lepchas, the original inhabitants of this state, that at least one species of land tortoise existed there. As it has been noted that Lepcha information is seldom unfounded, an extensive survey was subsequently undertaken to confirm it. However, the survey did not find any evidence of tortoises. On the basis of geographical possibilities and physical description, the species was envisaged to be *Indotestudo elongata* (Indraneil Das, personal communication).

Failure of the survey to record Order Testudines in Sikkim gave rise to two possibilities. One was that the Lepcha were mistaken in their geographical range and had perhaps noted the tortoise's existence in Siliguri and other adjoining areas which at one point were inhabited by Lepchas and once part of Sikkim. Or alternatively, whatever species of Order Testudines that had once existed in Sikkim had become extinct over the course of time.

First record of Order Testudinidae in Sikkim

In July 2007, two laborers employed to construct a rock garden near Tarey Bhir, located in south Sikkim, adjacent to a rivulet named Khanni Khola, came across a couple of tiny tortoises. These were later identified as belonging to species *Indotestudo elongata* (Blyth) of the Family Testudinidae. This cold-blooded reptile is one of only four land tortoise species found in India. It is legally protected under Schedule IV of the Indian Wildlife (Protection) Act, 1972 as amended up to 2006.

"Fat ruba," its Lepcha name, is indicative of its tendency to live in self-dug burrows ("Fat" means earth). The length of its shell is 120 mm, breadth about 80 mm, and depth about 60 mm. It can be easily recognized by its light brown carapace with black blotches. It depends very largely on vegetation in its diet, but is believed to also eat snails and perhaps other soft creatures. Its mating season coincides with the arrival of the rains. Males have been known to become aggressive towards each other and they attempt to upturn their rivals by shoving them. A female will lay 3-7 eggs in a hole she digs herself. Little information has been collected about its behavior as it generally remains dormant during the winter months. It is most active during the rainy season.

The tortoise is distributed in the Sal forest belt across the Himalaya foothills and is known to be over-exploited for food, especially by tribal people. Today it is best represented in Bihar, especially in the Saranda and Champaran areas. The tortoise is also recorded from West Bengal. Its western-most limits are the Rajaji National Park Elephant Corridor and Simbalwada Wildlife Reserve in Himachal Pradesh, where it has been collected by Wildlife Institute of India researchers, and one unconfirmed record from Nahan, H.P. at c. 650 m altitude (B.C. Choudhury, personal communication).

Conclusion

Recording of an Order for the first time in a geographical location is an important and rare event in the chronicle of its natural history. Sikkim, an intensely rich biodiversity region, acquires further importance by the recording of the Order Testudines in its geographical boundaries. Lepchas need to be recognized for their knowledge of flora and fauna and for providing scientifically authentic information. It is essential to document their knowledge as it will help in making a complete and correct faunal map of Sikkim. Efforts need to be made to identify more specimens of this species and a conservation plan made and implemented to safeguard this Order in Sikkim.

Author's address: Sikkim Manipal Institute of Technology, Majitar, Rangpo, Sikkim 737 136, India.

FOREST NEWS

Vol. XXIII: No. 1 Jan-Mar 2009

World's forestry leaders meet in Rome

The nineteenth session of the Committee on Forestry (COFO) and the first World Forest Week were convened concurrently 16-20 March 2009, in Rome. The overarching theme of the events was *"Forests in a changing world."* The events were well attended by 555 participants, from 129 countries.

Major COFO agenda topics featured discussions on the state of the world's forests, sustainable forest management and climate change, adapting forest policy and institutions to change, FAO's forestry programs and activities, and preparations for the XIII World Forestry Congress. Formal COFO sessions were complemented by several "special events" organized as part of World Forest Week. Discussions throughout the week focused heavily on forests and climate change, various facets of institutional and policy adaptation to change, and forestry in relation to the global economic crisis.

The 2009 edition of the *State of the World's Forests* (SOFO) was released during COFO, under the theme of *"Society, forests and forestry: adapting for the future."*

Related to forests and climate change, discussion stressed that sustainable forest management provides an effective framework for forest-based climate change mitigation and adaptation. COFO recommended that FAO strengthen capacities of member countries to implement sustainable forest management, in accordance with national contexts. Specific to forests and climate change, such support could include assistance in carrying out forest carbon assessments, mainstreaming climate change in national forest programmes, enhancing understanding of the effects of climate change on forests, and implementing effective mitigation and adaptation measures.

COFO noted the economic, political, social, environmental, and technological changes taking place at national, regional, and global levels, and the consequent need to adapt forest policies and institutions. The meeting drew attention to the need for timely changes to make public sector forestry agencies more responsive to the changing needs of societies and to enhance efficiency in the delivery of economic and environmental services. The Committee recommended that FAO facilitate the sharing of experience among countries, particularly through regional and sub-regional reviews and analyses.

The Committee endorsed the new *FAO Strategy for Forests and Forestry*, and appreciated the inclusive process that had been used to draft the strategy, particularly its review by all six regional forestry commissions.

The Committee supported the recommendation of the FAO Panel of Experts on Forest Genetic Resources that FAO prepare a report on the *State of World Forest Genetic Resources,* for 2013, which would serve as a reference for action at national, regional, and global levels.

It was proposed that COFO hold its next session in October 2010.

Meeting of the Bureaux of the Regional Forestry Commissions

A meeting of officers from the six Regional Forestry Commissions (RFCs) and FAO regional and headquarters forestry staff was convened 16 March 2009, prior to the start of the COFO session.

Representatives of each commission presented summaries of ongoing, planned, and recently completed activities. The Asia-Pacific Forestry Commission report highlighted the following recent and ongoing activities:

- Outcome of the twenty-second session of the APFC and the first-ever Asia-Pacific Forestry Week, convened in Hanoi, Vietnam, in April 2008
- Asia-Pacific Forestry Sector Outlook Study
- Asia-Pacific Forest Invasive Species Network
- Regional policy studies on reinventing forestry agencies and removing constraints to private sector investment in forestry
- Continued support for development and implementation of codes of practice for forest harvesting
- Development of the Asia-Pacific Forest Policy Think Tank

Glimpses of developments in Asia-Pacific forestry

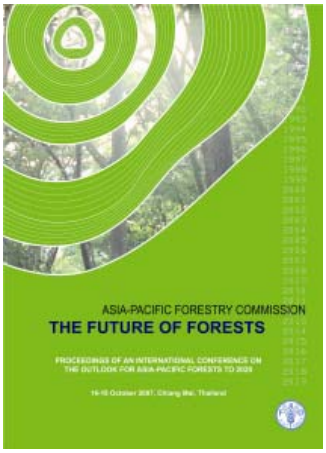
Prepared by Fan Xiaoxie, National Forest Programme Facility Adviser

Forests and forestry in the Asia-Pacific region are being reshaped by the rapid social and economic changes occurring both within and outside the sector and the region. The ever-growing demand for wood and wood products has boosted investments in wood production and processing. The region has become a leader in afforestation and reforestation, although deforestation continues to be a major problem. Several initiatives are underway in support of sustainable forest management. New challenges are emerging, but so are new opportunities.

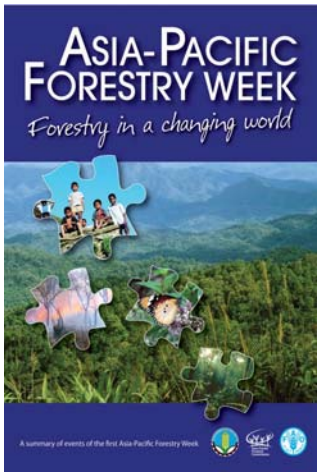
"Glimpses of Developments in Asia-Pacific Forestry" was organized by the Asia-Pacific Forestry Commission (APFC) as a special event during the 19th Session of the Committee on Forestry (COFO) and the first World Forest Week held at FAO Headquarters in Rome, Italy, 16-20 March 2009. Member countries, forestry organizations and initiatives in the region were invited to share information and experiences, and discuss cooperation and collaboration. During the event, participants were briefed on some of the recent developments in the region and various initiatives.

Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, introduced the concept for the Asia-Pacific Policy Think Tank. This initiative will facilitate the sharing of forest policy-related information, knowledge, experience and expertise among countries and institutions in the Asia-Pacific region. Gathering information, improving understanding, influencing policy decisions and building in-country capacity in policy analysis are the core objectives of the Think Tank. The Think Tank also aims to give a stronger voice to Asian perspectives in forest policy. The initiative will function as a highly flexible regional network, initially coordinated by the FAO Regional Office for Asia and the Pacific in Bangkok. In due course, the initiative will expand to become a "network of networks" with various institutions in the region assuming key functions.

Liu Xin, Deputy Director of the APFNet Secretariat, informed the participants about the newly established Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet), which was proposed at the 15th APEC Economic Leaders' Meeting held in September 2007 in Sydney, Australia. APFNet was co-sponsored by Australia and the United States, and was officially launched in Beijing, China, in September 2008. An open organization, APFNet will serve as a platform for members to exchange information and expertise. The network is committed to: i) promoting forest rehabilitation, reforestation and afforestation in the region to increase the regional forest area; ii) strengthening sustainable forest management and improving forest quality in the region (including activities related to climate change mitigation and adaptation response and to increasing carbon sequestration); and iii) improving the productive capacity and socio-economic benefits of forest ecosystems and enhancing biodiversity conservation in the region.



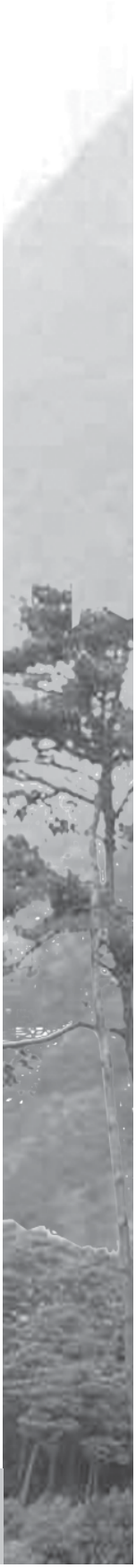
Rowena Soriaga, from the Asia Forest Network (AFN), described AFN's networking strategy "Seeking to Accompany, Seeking Synergy." AFN "accompanies" partners from governments and civil society through sharing stories, revealing trends and patterns, and managing knowledge in a common search for justice and hope. AFN catalyzes learning and synergy through regional and cross-country exchange visits, monitors international trends, informs global mechanisms about local actions, and reviews global recommendations for local action. Current interests and initiatives include: poverty reduction and human security in forestlands; local people and protected areas; partnerships for local development; and governance and forest law enforcement in the context of supporting indigenous peoples' rights and justice. Outputs and lessons from recent AFN activities were also shared.



Dr. CTS Nair, Chief Economist, FAO Forestry Department, Rome, provided an overview of the Asia-Pacific Forestry Outlook Study and some of the general trends and findings from the study. Most of the major steps, including the preparation of the country outlook papers and thematic studies, collection of information and a broad-based consultative process (especially through the International Conference held at Chiang Mai in October 2007) have been completed. Drafting of the sub-regional and regional reports is in progress and early drafts will be discussed during the next meeting of the Scientific Committee scheduled for June 2009. Dr. Nair outlined some of the key points emerging from the preliminary analysis of information, including the following: i) the global economic down-turn will have significant direct and indirect impacts on the forest sector and there is considerable uncertainty about how long this will last; ii) depending on the different situations in Asia-Pacific countries and the differing approaches to managing forest resources, several paths of development are likely; iii) forest area will continue to shrink in most countries, although some gains may occur in a small number of countries; iv) degradation will be a major issue, especially in the more densely populated agrarian economies; v) wider application of sustainable forest management will be a drawn-out process; and vi) although there has been some short-term decline in the demand for wood and wood products, in the long term demand increases will be significant.

Two APFC publications were also released at the meeting: 1) *Future of Forests*; and 2) *Summary of the Asia- Pacific Forestry Week*.

During the discussions, the participants expressed their appreciation for the efforts made by FAO and APFC to bring members and interested partners together and welcomed the new initiatives with the belief that they will contribute to the further development of forestry in the region.



Addressing fire management needs and actions in Southeast Asia

(Photo: Cristal Palmberg Lerche)

Prepared by Petteri Vuorinen Forestry Officer, Fire Management, FAO HQs (Petteri.Vuorinen@fao.org), Pieter van Lierop Forestry Officer, Fire Management, FAO HQs (Pieter.VanLierop@fao.org) and Jim Carle, Chief, Forest Resources Development, FAO HQs (Jim.Carle@fao.org)

Background

The *Fire Management Voluntary Guidelines - Principles and Strategic Actions* set out an international framework of legally non-binding principles and internationally accepted strategic actions, which provide a holistic approach to fire management. They can also be used to support policy reviews, planning and management of fires.

The 18th Committee on Forestry (COFO) (March 2007) and participants at the Asia-Pacific Forestry Week associated with the 23rd Session of the Asia-Pacific Forestry Commission, held in Hanoi, Vietnam, 21-25 April 2008, recommended that FAO should work with members and partners, including the private sector, forest owners and non-governmental and inter-governmental organizations to promote wider understanding and implementation of these Voluntary Guidelines.

In keeping with the recommendations, a regional workshop for Southeast Asia was held 10-13 November 2008 in Pekanbaru, Indonesia. The workshop was organized by FAO in technical collaboration with the Asia-Pacific Association of Forestry Research Institutions (APAFRI). The purpose of the meeting was to present and discuss the Fire Management Voluntary Guidelines, assess and prioritize needs, and prepare an action framework to strengthen fire management policies, planning and practices. The four-day workshop was the final phase of the planning process which started with a national-level, multi-stakeholder orientation process in the participating countries.

Activities and results

Twenty-five senior- and mid-level fire management officers responsible for forest fire management in Indonesia, Malaysia, Thailand, Philippines and Vietnam participated in the workshop. The workshop was assisted by resource persons from the ASEAN Secretariat, The Nature Conservancy (TNC), Asia Pacific Resources International Ltd (APRIL) and the International Tropical Timber Organization (ITTO). There was also a representative from Singapore.

In breakaway country discussion groups, the participants undertook needs assessments based on the Voluntary Guidelines and prioritized problems critical to the fire management sector in their respective contexts. After agreeing on priority needs, the country groups developed 1- to 5-year action frameworks for fire management. These frameworks will form the basis for future fire management projects or program proposals to be promoted by the participants in their countries.

Although the fire management sectors in the five participating countries were very different with regard to the burned area, land tenure, socio-economic context, political engagement, etc., there were common areas that the countries could pinpoint as being most important to address, including the following:

- interaction between fire and climate change;
- fire awareness and education;
- fire and resource management planning;
- fire monitoring and assessment (including ecological effects of fire and fire danger rating systems); and
- linkages between fire and sustainable livelihoods in order to improve fire management in their countries.

The workshop included a one-day field trip to Asia Pacific Resources International Ltd to visit their fibre plantations, conservation forest areas, community development programmes and fire suppression activities aimed at protecting plantation and conservation assets.

Follow-up activities

The importance of follow-up activities was stressed during the last day of the workshop. The workshop was highlighted as only the beginning of the implementation process that will continue during the coming months and years. The participants were given guidance in funding opportunities for technical support, including possible project support through FAO (e.g., TCP, GCP and UTF projects, nfp Facility). The countries were, however, advised to also pursue funding opportunities with governments, international and bilateral agencies, development banks and other donors, NGOs and private enterprises to incorporate integrated approaches to fire management within their projects or programs.

The anticipated outcomes from the workshop and the program of action include:

- greater stakeholder participation;
- more clear and consistent policy, legal and regulatory frameworks; and
- better planning and improved field practices in fire management.

Bioenergy on the agenda of FAO Regional Conference

Prepared by Sverre Tvinnereim, Associate Professional Officer, RAP

As part of the 29th FAO Asia-Pacific Regional Conference, a Round Table debate on bioenergy was held on 30 March 2009 in Bangkok, Thailand. This Round Table was a continuation of discussions held during ministerial meetings earlier that day; several high-level representatives from the member countries participated.

The special attention FAO has given to the theme reflects the importance of bioenergy issues in general, and biofuels in particular, in many FAO member countries. Over the last few years, bioenergy production has been a very hot topic on the international agenda, as conditions related to its impact on food security, climate change mitigation, poverty reduction and natural resources have been discussed intensively.

The exchange of information and perspectives revealed a wide range of bioenergy programs and activities in the region. However, it also became clear that the status and scale of bioenergy

production differs among countries. Indeed, one of the strongest recommendations derived from the discussion was to create mechanisms so that information and knowledge could be dispersed, in order for less developed countries to catch up in the development of the bioenergy sector. Similarly, it was outlined that a "one-size-fits-all" approach would not be productive.

The Round Table discussed various approaches for developing biofuels without imperiling food security. These included agricultural zoning, definition and identification of marginal and degraded lands, as well as clear policies and legislation favoring the use of non-food feed stocks. In this regard, participants noted the advantages of energy crops such as jatropha, the use of surplus molasses from sugarcane and oil-producing algae. The long-awaited "second generation" bioenergy technologies, which are based on lignocellulosic conversion techniques, also inspired the participants with their anticipated characteristics of being more efficient and less land-demanding.

The Round Table recognized FAO's role in the bioenergy arena. It stressed the need for FAO to assist in bioenergy policy formulation and capacity building, and to continue technical work in partnership with other regional and global organizations. And above all, it was stressed that FAO needs to also maintain its focus on food security and rural development when it comes to bioenergy.

Promoting wood-based bioenergy in Asia-Pacific

Contributed by Maxim Loboviko, Chief, Forest Products Service, FAO HQs (Maxim.Lobovikov@fao.org), Peter Schroeder (ITTO consultant) and Tetra Yanuariadi (ITTO)

FAO and the International Tropical Timber Organization (ITTO) jointly organized the Asia-Pacific Regional Forum on Promoting Wood-Based Bioenergy Using Wood Residues and Wastes in Jakarta, Indonesia, 14-17 October 2008. The forum was attended by over 120 participants and distinguished keynote speakers and presenters from Asia, Europe, and North and South America. The meeting was opened by Mr. Emmanuel Ze Meka, Executive Director of ITTO, and Mr. Malam Sambat Kaban, Indonesia's Minister of Forestry.

The forum stemmed from the recommendations of the International Conference on Wood-Based Bioenergy held in Hanover, Germany in 2007 in conjunction with LIGNA 2007 – a leading international event for forestry and wood industries. Following up the results and recommendations of the Hanover conference, ITTO and FAO agreed to convene three regional fora on wood-based energy – in Africa, Asia-Pacific and Latin America. The first wood energy forum took place in Africa in Duala, Cameroon, 2-4 September 2008. The third ITTO/FAO forum is planned to be held in Brazil in June 2009.

The main objective of the forums is to raise awareness on resources, technical and economic perspectives and the potentials of utilizing logging residues and wood-processing wastes for energy generation. ITTO and FAO member countries are expected to develop policies and build capacity to adopt appropriate technologies for more efficient bioenergy generation from wood residues and wastes. This approach should help meet both socio-economic and environmental development objectives at local and regional levels.

The Asia-Pacific forum addressed the current status and policies to develop wood-based bioenergy in Asia-Pacific countries. Country reports were delivered and presented by representatives from Cambodia, Fiji, Indonesia, Malaysia, Myanmar, Philippines, Thailand and Nepal. In-depth technical

presentations were given by Hoi Why Kong (Canada), Peter Schroeder (Germany), Hiras Sidabutar (Indonesia), and Sudrajat (FORDA-Indonesia). The participants formed working groups to discuss the main elements of a "road map" to developing sustainable use of wood wastes and residues for energy generation.

The main conclusions and recommendations of the Asia-Pacific forum fall into three categories: 1) resources and resource information; 2) policies and strategies; and 3) technology development. The recommendations will be integrated in the final report of the three regional fora (Africa, Asia-Pacific and Latin America). The forum concluded with an address by the host country presented by Mr. Boen M. Purnama, Secretary-General of the Ministry of Forestry of the Republic of Indonesia.

For more information about the Asia-Pacific Regional Forum on Promoting Wood-Based Bioenergy Using Wood Residues and Wastes, please visit the website www.itto.or.jp or contact Mr. Peter Schroeder p.h.c.Schroeder@web.de, Mr. Tetra Yanuariadi tetra@itto.or.jp or Mr. Maxim Lobovikov at maxim.lobovikov@fao.org

Bohol town is Philippines' first ANR municipality

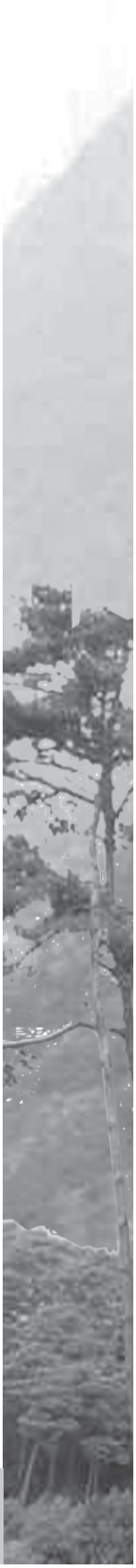
Danao, an interior town of Bohol, in the central Philippines, has been declared the country's first-ever "ANR municipality" through a resolution made by the Sangguniang Bayan (town council).

ANR, short for "assisted natural regeneration," is an alternative approach that is cheaper than conventional reforestation. An emerging technology, ANR helps speed up the growth of young tree seedlings and other plants that lie dormant under the grass, such as the ever-present *Imperata cylindrica*, more commonly known as cogon. Cogon, a highly invasive grass, infests millions of hectares of Philippine forests, suppressing the natural growth of wildings. The grass is also easy prey to both intentional and accidental fires that hinder forest regeneration.

The announcement declaring Danao as the Philippines' first ANR municipality was made by Danao Mayor Louis Thomas R. Gonzaga during a recent ANR training held at the Danao Tourist Accommodation Center. Danao is one of three ANR training and demonstration sites in the country. The two others are in similar cogonal and fire-prone grasslands of Limay, Bataan, and Sto. Tomas, Davao del Norte.

The ANR training envisions empowering a corps of ANR practioners from the Department of Environment and Natural Resources (DENR), NGOs, academe, research institutions, peoples organizations and other stakeholders throughout the country. They are being trained and equipped with the knowledge and skills to help accelerate the application of ANR and demonstrate the simple, low-cost methods for forest rehabilitation. The training forms part of the ANR program jointly run by the ANR-National Coordinating Office of DENR, FAO and the Bagong Pagasa Foundation.

For more information, please contact:
Mr. Paul L. Manalo, Documentation and Media Relations Consultant for the ANR Project (FAO), E-mail: pl_malalo@yahoo.com; or adisa816@yahoo.com; or Forester Emma N. Castillo, ANR National Coordinating Office, FMB-DENR, Visayas Avenue, Quezon City, E-mail: emma_castillo23@yahoo.com.



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National forest monitoring and assessments (NFMAs): meeting evolving needs

Prepared by Mohamed Saket, NFMA (Mohamed.Saket@fao.org)

Beginning in 2000, the FAO Forestry Department has built up a significant capacity to respond to countries' requests for assistance to set up National Forest Monitoring and Assessment (NFMA) systems to support national decision making processes and strategic planning. Forty national and regional workshops on NFMA have been organized, NFMA projects were completed in 9 countries and 10 more projects are currently underway. In Asia, FAO provided support to the Philippines, Bangladesh and Vietnam. Four global expert consultations or technical meetings were convened to adapt the concept and approach of NFMA to meet present needs.

(Photo: Bugi K. Sumirat)

FAO convened an international expert consultation 26-28 November 2008, gathering 34 external experts from 16 countries and 8 international organizations at FAO Headquarters. Asia was represented by India, Indonesia, the Philippines, South Korea and Vietnam. The objective of the meeting was to review FAO's support to NFMA activities in light of the new demands on countries to assess forest carbon, land use and land-use changes, and other reporting requirements.

The rationale for the expert consultation originated from the globally recognized need for improving national forest monitoring systems, as the need for information has never been greater. The demand for forestry-related information comes from a variety of stakeholders at the international, national and local levels. However, few countries in the world today generate systematic data on the changing characteristics of their forest and land resources, and even fewer countries collect and analyze information on the factors that help determine the drivers of change and the effectiveness of public policy in supporting sustainable forest management. FAO estimates that only 15 percent of the forests in developing countries have been covered by regular field-based forest inventories.

With this in mind, increasingly detailed and diverse forest information requirements necessitate continued flexibility from NFMA systems in order to optimally serve all stakeholders. The main objective of the expert consultation was to explore ways to enhance the NFMA program to meet increasing country needs through monitoring forest cover and land-use change and in generating the required information for national planning purposes and international negotiations. Specifically, t*he expert consultation focused on the following objectives:*

- Identify the strengths and weaknesses of the FAO approach to NFMA in relation to monitoring Reduced Emissions from Deforestation and Forest Degradation (REDD).
- Identify the requirements of national and international policy, strategic planning and reporting, and assess the NFMA program's capacity to meet these requirements.
- Provide guidance on how to effectively present and disseminate NFMA's information and results to make them accessible to policy and

decision makers in countries for domestic use and for reporting to international processes.

The Expert Consultation consisted of plenary sessions and working groups. The three plenary sessions addressed: i) information needs; ii) methodology; and iii) information dissemination and packaging. Each of the three themes was addressed at the national level, international level and within the context of the REDD mechanism. Background papers included a technical review of the NFMA approach and statistical methods (E. Tomppo and K. Andersson, 2008); a cost and time analysis of the NFMA approach (Saket *et al.*, 2008); and NFMA's knowledge reference, dissemination and networking (Piazza, 2008).

During the plenary sessions, the participants received a broad understanding of the NFMA approach and process. Country experiences were presented by Zambia on integrated land-use assessment and by Nicaragua on national forest resources monitoring and assessment. Other presentations provided valuable background on current information requirements at the international level, as well as for REDD mechanisms and strategies for data dissemination.

During plenary sessions and within the nine working groups, the participants made numerous recommendations to the FAO Forestry Department and its NFMA program. In the final session of the meeting, the plenary adopted 16 priority recommendations. These recommendations may be organized into four overarching themes:

- Methodological development;
- REDD readiness;
- Policy relevance; and
- Management issues.

The participants actively contributed to a successful expert consultation. The recommendations will help to further improve the approach and methodology of FAO's support to National Forest Monitoring and Assessment so that it can continue to play a crucial role in the field of forest and land use assessment. The relevance of the programme was widely recognized and a continued discussion among experts ensures that it will continue to be an efficient and effective approach in line with emerging needs and responding to countries requests. The Expert Consultation will be followed up by the development of a strategy to involve more countries, especially from Asia, wishing to collaborate with FAO to actively engage in setting up NFMA systems.

More information regarding the Expert Consultation as well as the complete Proceedings and recommendations can be accessed at the following website: http://www.fao.org/forestry/52821/en/

Poplars, willows and people's wellbeing

Contributed by Jim Carle, Chief, Forest Resources Development Service, FAO HQs (Jim.Carle@fao.org)

Background

Poplars and willows account for at least 80 million hectares of natural and planted forests globally (natural forests 90 percent, planted forests 7 percent and agroforestry systems 3 percent). China alone accounts for 85 percent of all poplar and willow resources in planted forests and agroforestry systems. These species are among the fastest-growing trees in temperate regions, are easy to cultivate, and form an important component of forestry and agricultural systems – often for small-scale farmers.

Poplars and willows provide a valuable feedstock to industries for a diverse range of forest products ranging from poles, pulp and paper, panel boards, plywood, veneer, sawn timber, packing crates, pallets, furniture manufacturing and increasingly for bioenergy/biofuel production. They also

provide a range of non-wood products such as fodder for livestock and important medicines.

Poplars and willows can also provide valuable environmental and social services. They provide shelter, shade and protection of soil, water, crops, livestock and dwellings. They play an important role in the phyto-remediation of severely degraded sites, rehabilitation of fragile ecosystems (including combating desertification) and in forest landscape restoration (often integrated with agriculture, horticulture, viticulture and apiculture). As fast growing species, they are particularly effective at sequestering carbon. They create employment, boost exports and contribute to social and economic development and sustainable livelihoods in rural areas. They are also used to beautify urban and peri-urban parks, schools, lakes, waterways, recreational areas and highways as green buffers. Poplars, in particular, are also leading the way in the application of advanced biotechnology, genomic research, molecular breeding and development.

23rd Session of the International Poplar Commission

The Chinese Forestry Society, Beijing Forestry University, Chinese Academy of Forestry and FAO, supported by the Ministry of Agriculture and the State Forest Administration, hosted the 23rd Session of the International Poplar Commission (IPC) and associated events in Beijing, China, 22 October - 4 November 2008. About 300 policy makers, forest managers, forest scientists and academics from public and private institutions, landowners, indigenous people and students with an interest in growing and using poplars and willows attended the meeting. The Beijing session included plenary and concurrent sessions on topical technical issues, and business meetings for the six working parties and sub-committee on registration and nomenclature.

Prior to the 23rd Session, the "Working Party on Harvesting and Utilization" and Nanjing Forestry University hosted a very successful conference in Nanjing, 21-24 October, on "*Engineered Wood Products Based on Poplar/Willow Wood"* that attracted strong support from the private sector, both internationally and from China.

In addition, the 44th Executive Committee Meeting of the IPC was held on the 26 October in Beijing to review IPC and Working Party progress 2004-07, and to guide programs of work for 2008-2011. Progress on the IPC-coordinated book, *"Poplars and Willows in the World: Meeting the Needs of Society and the Environment,"* was also reported.

Study tours

Participants took part in a pre-session study tour, 22-25 October, to the Three North Shelterbelt region in the Naiman Banner of Inner Mongolia, which demonstrated the diverse application of poplar and willow culture in combating desertification in a combination of plantations, shelterbelts and agroforestry systems.

A post-session study tour to Puyang and Siyang Counties and Nanjing Municipality, 31 October - 4 November, highlighted the rich culture of poplars and willows in protecting the embankments along the Yangtze, Huai and Yellow Rivers and their integration into fisheries, horticulture, apiary, livestock, agricultural crops and poultry management. The family-based growing mechanisms and the village-based wood industry supply chains to large private sector wood industries were well adapted to the Chinese rural conditions.

The importance of poplars and willows in beautifying parks, walkways, motorways and public areas around Chinese cities was a highlight. The beautification of Beijing for the 29th Olympic Games was largely based on poplar and willow plantings.

Recommendations

The International Poplar Commission, through the Secretariat, Working Parties and National Poplar Commissions made the following recommendations:

- Strengthen the transfer of science, policy, planning and management knowledge and technology through effective implementation of Phase I of the FAO-Italy supported project *"Poplars and Willows for Sustainable Livelihoods and Land-use*" in the East Mediterranean and Central Asian regions, and assist in preparation of Phase II of the project.

- Recognize the Chinese Academy of Forestry, Beijing Forestry University, Nanjing Forestry University, and the State Forest Administration as international centers of excellence in forestry education, training and outreach, and welcome them into the international networks to transfer knowledge and technology, particularly with regards to the research, development and management of poplars and willows.
- Support networks and partnerships among researchers, academics, policy makers, planners, managers (including the private sector and smallholders) to achieve sustainable management of poplar and willow resources in natural and planted forests, agroforestry systems and trees outside forests, to better integrate forestry and agriculture in more diversified landscapes, with emphasis on developing countries.

For further information please visit the following websites:
23rd Session website: http://www.fao.org/forestry/ipc2008 and http://www.ipc2008bj.com.cn/
IPC website: http://www.fao.org/forestry/ipc

RAP forestry staff movement

Michael Pescott, a national of Australia, joined the RAP forestry group in March 2009 as a Forestry Policy Officer under the Australian Youth Ambassadors for Development (AYAD) Programme. He has been charged with supporting RAPO's various forestry policy related activities over the coming year, including the Asia-Pacific Forest Policy Think Tank, and a number of thematic workshops on forestry activities with policy implications.

Prior to joining the forestry group, Mr. Pescott worked as a freelance forestry consultant specializing in climate change and carbon accounting. He has also worked with the Victorian Parliament's Environment and Natural Resource Committee, Australia, and the Department of Sustainability and Environment, Victoria, Australia. He holds a Bachelor of Forestry (Honours) and Bachelor of Science from The University of Melbourne, Australia.

Marija Spirovska-Kono, a national of Macedonia, joined the RAP forestry group in January 2009 as a consultant. Her main duties include preparation of project proposal for forest invasive species, support meetings and workshops organization and developing the guidelines for the program "Champions of Asia-Pacific forests".

Prior to joining the forestry group, Marija has been working on establishment and management of protected areas in the Balkan region under different programs of the Swiss Development and Cooperation Agency, Pro Natura – Friends of the Earth and trans-boundary projects such as the IUCN Green Belt initiative. She has been working with different stakeholders involved in sustainable management of natural resources in projects supported by the World Bank, IFAD and USAID.

After two years with the RAP forestry group, **Regan Suzuki** has now taken up a new assignment with the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC) in Bangkok.

Alfred John Leslie (5 February 1921 - 24 January 2009)

Alfred (Alf) John Leslie, ex-Director, Forest Industries Division, Food and Agriculture Organization of the United Nations (FAO), passed away peacefully in Te Awamutu, New Zealand on Saturday, 24 January, approaching his 88th birthday. The forestry family will miss him as a dynamic, inspirational forestry icon with boundless energy and wise and considered counsel. He leaves a proud forestry legacy – to aspire for, and apply knowledge, challenge the norms, inspire others, and above all, be accountable for one's own decisions and actions.

Alf was born in Princes Hill, Melbourne, Victoria. He was educated at University High School and accepted a Victoria Forests Commission cadetship to the School of Forestry, Creswick, Victoria (1938-1940).

Alf attended Melbourne University, Australia, and graduated with a Bachelor of Forestry Science (1947-1949). On graduating, Alf was employed by the Victorian Forests Commission as a Field Officer in Mansfield and then Beech Forest in the Otways in Victoria, Australia (1949-1951) then as Wood Superintendent and the Chief Forester with Australian Paper Mills (APM) in Gippsland, Victoria (1951-1958) that gave him a sound field perspective, particularly in plantation forestry. He held posts as Lecturer and then Senior Lecturer at the University of Melbourne, Victoria, Australia (1958-1964) and completed his Master of Forestry Science post-graduate degree. While holding the post as Senior Lecturer, University of Ibadan, Nigeria (1964-1966), he gained a thorough understanding of international forestry, particularly in developing countries. Alf returned to Australia as Officer in Charge, Regional Stations at the Forest Research Institute, Canberra, Australia (1966-1968). Thereafter, he pursued further international challenges and accepted the post as Forest Economist at FAO, Rome, Italy (1968-1974) before accepting the post as Reader, University of Canterbury, Christchurch, New Zealand (1974-1976). He returned to Rome as Director, Forest Industries Division, FAO, (1977-1981) where he served with distinction before retiring. He continued as an active and respected international consultant to FAO and ITTO until 2008.

Alf communicated easily and enjoyed challenging and inspiring young minds as a guest lecturerer at various universities. In recognition of his services to international forestry, Alf was awarded an honorary doctorate in Forestry Science from the University of Melbourne, Australia in 1994. In 2001, he was a recipient of the Commonwealth Forestry Association Regional Medal for his contributions to forestry worldwide. Additionally, in 2007, he was a recipient of the Council of Forest Engineering, International Forest Engineering Achievement Award.

Alf was mentored by his good friend and FAO colleague, Jack Westoby, former Director of the Programme Coordination and Operations Division, Forestry Department, FAO. Together they challenged conventional forestry views of the day. Most foresters' work and forestry writings of the day were concerned with how to do things in forestry. However, Alf and Jack concerned themselves with the why. Their work helped mould modern international forestry policies and challenged younger generations of foresters around the world to do likewise, in their own contexts.

It is a fitting tribute to Alf's contribution to forestry that his family and forestry colleagues from around the globe, are contributing to the Alf Leslie Memorial Fund to establish a grove of trees at Creswick School of Forestry, Victoria, Australia. He planted rich and challenging ideas in the minds of young foresters. Even following Alf's passing, the grove will continue to serve young foresters in their learning.

Source: http://www.fao.org/forestry/54181/en/

Vietnam sees REDD

Prepared by S. Appanah (FAO/RAP) and M. Leppanen (FAO HQs)

The acronym "REDD" stands for "Reduced Emissions from Deforestation and Forest Degradation." A Google search for "REDD" yields approximately 6,640,000 results today. While this is not in the same league as "Global Warming," it represents an important landmark event for forestry, with both being intricately connected as well. As we all recall, the Clean Development Mechanism (CDM) arrangement under the Kyoto Protocol of 1997 practically excluded forestry projects by keeping out forest conservation and deforestation considerations. This, *de facto*, killed the potential role of forests in climate change mitigation – so far, only a few forestry projects have been approved. The mechanism has turned out to be administratively heavy and costly for individual projects.

The situation has since been reversed following the release of the Stern Review in October 2006. The review and later other organizations such as IPCC pointed out that deforestation, including forest degradation, was responsible for around 20 percent of global carbon emissions. You may be surprised to learn that this is much higher than that from the transport industry, which is currently around 13 percent only. The Review concluded that reducing emissions from deforestation and degradation (REDD) could play a significant role in climate change mitigation. Considering its cost effectiveness, REDD would be the mitigation option for now – it will buy us the time now until the world transitions to a low carbon economy.

The Stern Review recommended that the international community should compensate the opportunity costs of alternative land use and for managing and enforcing forest protection. Based on this, in 2007 at the 13th session of the Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC) (also called the Bali Conference), countries adopted a decision to explore a range of actions, identify options and undertake efforts to address the drivers of deforestation. These are called the REDD approaches (Bali Action Plan), and the Parties were mandated to negotiate a post-2012 instrument to provide financial incentives for mitigation of climate change from forest actions in developing countries.

In response to the COP 13 decision, and requests from rainforest countries and encouragement from donors, FAO, UNDP and UNEP have developed the collaborative UN-REDD Programme. The collaborative programme will have two components: (i) assisting developing countries develop and implement national REDD strategies and mechanisms; and (ii) supporting the development of standardized approaches for a REDD instrument that is linked to the UNFCCC. The task of the collaborative programme is indeed complex and extremely challenging. In the first place, the countries' efforts to reduce deforestation and forest degradation have to be successful. They must be actual, lasting, reliable, and the emission reductions measurable with some scientific veracity. The payment structures designed thereof should merit the efforts of the countries as well as deliver incentives for local communities. The demonstrations should give enough confidence to the UNFCCC COP Negotiators to include REDD into the post-2012 regime. You might as well call this forestry's last chance.

In order to get the UN-REDD programme into motion, the Government of Norway provided the first grant in April 2008. Under this "Quick Start" arrangement, nine countries worldwide applied for the pilot scheme. The three Asian countries are Indonesia, Papua New Guinea and Vietnam. FAO, UNDP and UNEP mounted planning missions to all three countries in 2008/2009 to evaluate their REDD "readiness" and what further action would be needed for them to implement the programme. The planning missions looked for the key elements for REDD readiness and gaps among other donor projects and opportunities in the three countries.

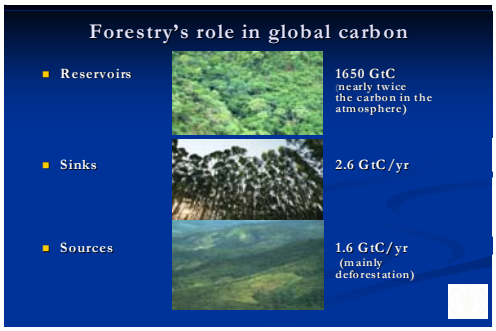
They first looked at the state of the forests, policies and institutions, and the drivers of deforestation and degradation. Next, the missions reviewed the institutional and technical capacity for managing REDD, reference scenarios, basis for forest monitoring, benefit sharing payment systems from national to local levels, and sites where all the related mechanisms can be pilot tested in the field.

Of the three countries, Vietnam appeared to be most advanced on all counts to be ready for a pilot programme for REDD. Following consultation with all stakeholders, a joint programme document was finalized "to assist the Government of Vietnam in developing an effective REDD regime in Vietnam and to contribute to reduction of regional leakage." The UN-REDD Programme Vietnam (2009-2010) will assist the country to develop readiness for an effective REDD regime that will contribute to reducing emissions from deforestation and forest degradation nationally and regionally, and develop the financial mechanisms for sharing benefits with the stakeholders. Support will be provided to improve institutional capacity, mainstream REDD into district-level sustainable development planning and implementation, and improving regional cooperation on trans-boundary leakages mainly by illegal wood trade. The UN agencies are making preparations to initiate the work.

While few would dispute the joint-UN mission's finding of the "REDD-readiness" of Vietnam, some reservations still remain. One question is what would be the advantage for Vietnam, a relatively low carbon-producing country, to engage in REDD? The benefits are not clearly known and there will be transaction costs preparing readiness and implementing the REDD regime. Wouldn't it be better off to pursue the Clean Development Mechanism's afforestation and reforestation opportunities which are likely to come on line post-2012? It is indeed correct to state that in the last decade, Vietnam has actually increased its forest area through a massive reforestation programme. However, its REDD candidacy still applies – the remaining natural forests are under threat from a variety of forces, shifting cultivation being one major immediate causative factor. The other advantage is Vietnam provides an easier template to pilot the REDD programme, as many of the forestry problems are easier to handle. Attempting to pioneer a REDD programme in a difficult environment would be a recipe for possible failure anyway.

The second concern that overhangs testing of REDD programme is the overzealousness on the part of UN to please all parties, from human-rights issues, gender equality, environmental sustainability and questions of equity. When many demands are placed on a pilot programme, the core issues that make REDD workable become obscured and unachievable. It would be preferable to get the basic REDD mechanism going before other demands are placed over it.

And finally, there is the prickly issue of trans-boundary leakage. Vietnam, with its strong reforestation programme, may become a net gainer of carbon, but many of its wood industries are absorbing timber from neighbouring countries, where legality and sustainability remain questionable. In that sense, Vietnam's initiative to bring about REDD readiness would require it to pay attention to the ongoing problems beyond its borders. This may be somewhat problematic, but would be an achievement on the part of REDD if some solutions are forthcoming as result of this joint initiative. The world would be watching Vietnam turning REDD.



ASIA-PACIFIC FORESTRY CHIPS AND CLIPS

INDONESIA REOPENS PEAT LAND TO PALM OIL PLANTATIONS

The Indonesian Government has lifted a year-long freeze on the use of peat land for palm oil plantations. Environmental groups are concerned that renewed clearing of peat land will create large increases in greenhouse gas emissions. To be suitable for palm oil production, peat land must be cleared and drained, thereby releasing CO_2 into the atmosphere. Indonesia's agriculture ministry indicated it has set tighter controls for issuing new permits for palm oil plantations.

– The Guardian –

NEW FOREST PLAN FOR FELLING OF TREES IN GOA

Despite a complete moratorium on tree-felling in government forests, a new working plan for forests in the Indian state of Goa proposes to allow forest thinning in existing plantations and the felling of grown trees. The plan is currently being considered by state-level authorities before being submitted to the central government for final approval. Once approved, the plan will be in force for a period of 20 years.

– The Times of India –

TIMBER PAOCHING PERSISTS IN ISABEL DESPITE CRACKDOWN

Despite efforts by the provincial government to end illegal logging in Isabel, Philippines, tree poachers continue to smuggle contraband forest products according to a local Taskforce on Environmental Protection. The Taskforce recently confiscated some 10,000 board feet of illegally cut trees believed to have originated from the Sierra Madre Forest. The confiscations came following a recent forest stakeholders meeting with the Department of Environment and Natural Resources.

– GMANews.TV –

DEFORESTATION BEHIND TIGER ATTACKS

Conservation group WWF has blamed deforestation and human encroachment into tiger habitats for recent attacks by Sumatran tigers in Indonesia. Six people were killed by the rare tigers in Jambi province in less than a month. The Sumatran tiger is the most critically endangered of the world's tiger subspecies. Conservationists believe that deforestation, killings due to human-tiger conflict and illegal hunting for trade in tiger parts have halved the tiger population on the island of Sumatra since the 1970s.

– Reuters –

MALAYSIA HOPES FOR VPA WITH EU SOON

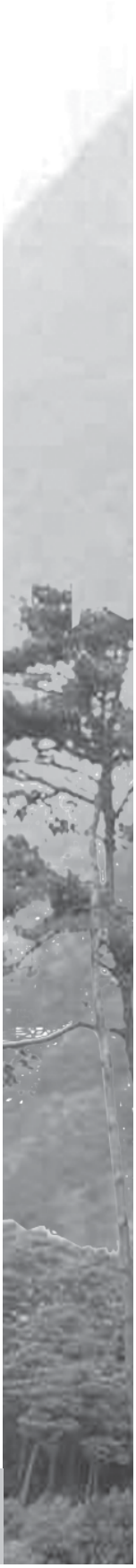
Malaysia hopes to conclude a bilateral voluntary partnership agreement (VPA) with the European Union (EU) this year. The agreement aims to ensure that Malaysian timber exports to Europe are legally and sustainably produced. Under the VPA negotiations, Malaysia has requested the EU give special preference to Malaysian timber products in European markets over tropical timber products from other countries such as Indonesia and African states.

– illegal-logging.info –

CLAIMS INDIGENOUS MALAYSIANS FORCED OFF LAND DENIED

The forestry department of the Malaysian state of Sabah denied claims by the Human Rights Commission of Malaysia that indigenous people living within forests are being forced off their land to make way for private enterprise. Director of the Sabah Forestry Department, Datuk Sam Mannan, indicated that settlements in the region's forest reserves are left untouched under the provision the settlements do not expand. If settlements have to be vacated for whatever reason, he indicated that alternative housing and land is provided for under the Sabah's community forest initiative.

– The New Straits Times –



FAO ASIA-PACIFIC FORESTRY CALENDAR

5-7 May 2009. Kuala Lumpur, Malaysia. ***ASEAN C&I Training Workshop.*** Contact: Masahiro Otsuka, Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4130; Fax: (662) 697-4445; E-mail. Masahiro.Otsuka@fao.org

13 May 2009. Beijing, China. ***Workshop to launch China's 2nd Partnership with NFP Facility.*** Contact: Fan Xiaojie, nfp Facilitator, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4254; Fax: (662) 697-4445; E-mail. Xiaojie.Fan@fao.org

19-22 May 2009. Bohol, Philippines. ***Regional Workshop on Assisted Natural Regeneration.*** 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

26 May 2009. Rome, Italy. ***Advisory Committee on Paper and Wood Products – 50th Session***. Contact: Joachim Lorbach, FOIP, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy; E-mail: Joachim.Lorbach@fao.org

3-5 June 2009. Chiang Mai, Thailand. ***APFSOS Scientific Committee Meeting***. 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

11-12 June 2009. Bangkok, Thailand (tbc). ***nfps for All Workshop***. Contact: Fan Xiaojie, nfp Facilitator, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4254; Fax: (662) 697-4445; E-mail. Xiaojie.Fan@fao.org

16-19 June 2009. ***Workshop to launch partnership between Bhutan and the nfp Facility***. Contact: Fan Xiaojie, nfp Facilitator, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel.(662) 697-4254; Fax: (662) 697-4445; E-mail. Xiaojie.Fan@fao.org

5-7 August 2009 (tbc). Thailand. ***Workshop on removing constraints to private investment in forestry.*** 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

18-25 October 2009. Buenos Aires, Argentina. ***XIII World Forestry Congress***. Contact: Olman Serrano, Associate Secretary General; E-mail: WFC-XIII@fao.org

23-28 August 2010. Seoul, Korea. ***XXIII IUFRO World Congress***. Contact: Secretariat, IUFRO Headquarters;, Mariabrunn (BFW), Haupstrasse 7, A-1140, Vienna, Austria; E-mail: office@iufro.org

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

- Report of the twenty-second session of the Asia-Pacific Forestry Commission (RAP Publication 2008/06)
- Re-inventing forestry agencies. Experiences of institutional restructuring in Asia and the Pacific (RAP Publication 2008/05)
- Forest faces. Hopes and regrets in Philippine forestry (RAP Publication 2008/04
- Reaching consensus. Multi-stakeholder processes in forestry: experiences from the Asia-Pacific region (RAP Publication 2007/31)
- Trees and shrubs of the Maldives (RAP Publication 2007/12)
- Coastal protection in the aftermath of the Indian Ocean tsunami: What role for forests and trees? (RAP Publication 2007/07
- Developing an Asia-Pacific strategy for forest invasive species: The coconut beetle problem – bridging agriculture and forestry (RAP Publication 2007/02
- The role of coastal forests in the mitigation of tsunami impacts (RAP Publication 2007/01)
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- Proceedings of the workshop on forests for poverty reduction: changing role for research, development and training institutions (RAP Publication - 2005/19)
- APFC - The unwelcome guests: Proceedings of the Asia-Pacific Forest Invasive Species Conference (RAP Publication 2005/18)
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- Elephant care manual for mahouts and camp managers (RAP Publication 2005/10)
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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) - 2nd edition
- Bringing back the forests: policies and practices for degraded lands and forests (RAP Publication 2003/14) out of print
- Practical guidelines for the assessment, monitoring and reporting on national level criteria and indicators for sustainable forest management in dry forests in Asia (RAP Publication: 2003/05)
- Giants on our hands: proceedings of the international workshop on the domesticated Asian elephant (RAP Publication: 2002/30)
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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)
- Trees commonly cultivated in Southeast Asia: an illustrated field guide - 2nd edition (RAP Publication: 1999/13)

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