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Featuring

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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 n eeds 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: *Rescued wooly necked storks (Photo: Courtesy of Rohit Singh)*

BIRD SEIZURES IN THE EASTERN PLAINS LANDSCAPE OF CAMBODIA

by Rohit Singh and Pin Chanratanak

Confiscated lesser whistling ducks

Introduction

The Eastern Plains Landscape (EPL) is located in Mondulkiri Province of eastern Cambodia and lies at the core of the Lower Mekong Dry Forest Ecoregion. It supports one of the largest extents of lowland forest in South-East Asia and is globally significant for conservation of large mammals, water birds and vultures (Gray *et al*., 2010; Gray *et al*., 2011; Seng *et al*., 2003).

The Eastern Plains Landscape supports several globally endangered species including Indo-Chinese tiger (*Panthera tigris)*, banteng *(Bos javanicus)*, Eld's deer *(Cervus eldi)*, and Siamese crocodile *(Crocodylus siamensis)*. The landscape also shelters 370 bird species (T. Gray, WWF, pers. com) including the globally endangered white-shouldered ibis *(Pseudibis davisoni)*, giant ibis *(Pseudibis gigantea)*, green peafowl *(Pavo muticus)*, red-headed vulture *(Aegypius calvus)*, slender-billed vulture *(Gyps tenuirostris)*, white-rumped vulture *(Gyps bengalensis)* and white-winged duck *(Asarcornis scutulata)*. The biodiversity of the landscape is under threat due to uncontrolled logging, hunting, land clearing and other unsustainable harvesting of natural resources (WWF-Cambodia, 2012).

Trapping for food, plumes and the international and local trade in live birds is the second major cause behind the decline of bird populations in South East Asia (Nash, 1993). Bird trade for meat as well as pets is a threat to avian diversity in the landscape (WWF-Cambodia, 2012). This article is based on the avian species confiscated by the WWF-supported government law enforcement teams from January 2010 to June 2012.

Table 1: Birds confiscations in the Eastern Plains of Cambodia (January 2010-June 2012)

S.no.	Species	Numbers	IUCN status	National conservation designation
1	Pompadour Green Pigeon *(Teron pompadora)*	102	Least Concern	Common
2	Thick-billed Green Pigeon *(Teron curviscostra)*	21	Least Concern	Common
3	Imperial Green Pigeon *(Ducula aenea)*	14	Least Concern	Common
4	Sarus Crane *(Grus antigone)*	01	Vulnerable	Rare
5	Wooly necked Stork *(Ciconia episcopus)*	04	Least concern	Common
6	Lesser Adjutant Stork *(Leptoptilos javanicus)*	01	Vulnerable	Common
7	Red Jungle Fowl *(Gallus gallus)*	01	Least Concern	Common
8	Green Peafowl *(Pavo muticus)*	03	Endangered	Rare
9	Lesser Whistling Duck (*Dendrocygna javanica*)	150	Least Concern	Common

Study area

WWF has been actively providing support for enforcement activities in the landscape since early 2006. Currently, WWF is supporting all three enforcement teams in the landscape, i.e., Mondulkiri Protected Forest Enforcement Team, Phnom Prich Wildlife Sanctuary Enforcement Team, and the Mobile Enforcement Unit. The Mondulkiri Protected Forest and Phnom Prich Wildlife Sanctuary cover 43% of the area of Mondulkiri Province (5,950 km^2). These two protected areas are part of a larger complex that includes Lomphat Wildlife Sanctuary and Seima Protected Forest in Cambodia and Yok Don National Park in Vietnam. These protected areas contain a large diversity of habitats ranging from hilly evergreen to open dry dipterocarp forest.

Methods

There are three enforcement teams, consisting of 65 field rangers working in the landscape to control illegal activities. These teams patrol in both protected areas as well as outside these two protected areas across Mondulkiri Province. Every small seizure/confiscation is recorded in the MIST (Monitoring Information System) database. Teams also gather information on the purpose of trapping, method of trapping, trade routes and market prices through interviewing offenders. Further information was gathered through discussions with informants who are ex-traders and ex-hunters.

Results and discussion

The teams rescued 297 individual birds of 9 species during 8 different operations (Table 1). Most of the birds were confiscated during the monitoring of wildlife trade routes in the landscape. These trade routes are the main exit and entry points in the forest. All the confiscations were made during night monitoring of the trade routes. The reason behind this is that most of the illegal wildlife transportation takes place during night time.

Additionally, a few birds were rescued from illegal captivity. These included cranes, storks, and peafowl that had been kept illegally as pets in nearby villages and the provincial town.

After every confiscation, traders and hunters were interviewed to gather additional information on the bird trade in the landscape. It was found that pigeons are used for the wild meat trade while sarus cranes, peafowl, and storks are kept as pets by local villagers. However, informants suggested that ultimately, some of these species also end up in the wild meat trade.

In regard to trapping, different methods are used for different species, but most species are trapped using nets and snares. While all confiscated pigeons, for instance, were trapped with nets, bigger species such as storks and cranes were taken as chicks from the nest.

The cost differs from species to species and also varies with the type of market. Pigeons, which are mainly sold locally in the villages, are sold at lower prices in comparison to ducks, which are sold at higher prices in town markets. The price of the captive bird also varies with the species and type of buyer. Sarus cranes can be sold for up to USD 25 per bird.

The Forestry Administration Law and Protected Area Law of Cambodia provide protection from any commercial trade to all species listed in Table 1. However, the legislation permits hunting of common species for subsistence by local indigenous communities.

The enforcement agencies have insufficient information on trade, as well as limited capacity and human resources to effectively monitor the subsistence trade. Therefore, many traders are involved in commercial trade under the cover of subsistence hunting. The legal action against the hunting of common species is very weak, which does not create enough deterrent to criminals. The current species conservation list of Cambodia reflects neither the population status of Cambodia's flora and fauna nor the internationally recognized status of Cambodian species as prepared by the IUCN. Therefore, there is a need to update the species list. At the same time, there is also a need to improve legal action to create sufficient deterrent to wildlife traders, such as higher fines and arrest.

Acknowledgements

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ECOTOURISM FOR (NATURE) CONSERVATION AND DEVELOPMENT

by Kamal Thapa

Introduction

Nepal's history of conserving wildlife and nature dates back to 1959 from the fertile valley of Chitwan, north of Rapti River, with the declaration of Mahendra Mriga Kunja (Mahendra Deer Park). Further, in 1963, the area to the south of Rapti was declared a Rhino Sanctuary. Finally, in the year 1973, the then Royal Chitwan National Park (currently Chitwan National Park) was established as the first national park in the country with the inclusion of both the existing park and sanctuary within the jurisdiction of Chitwan National Park (Rijal, 2001). However, the establishment of the park alone did not curb the poaching problem of mega vertebrates like tiger and rhino; therefore, a battalion of the Nepalese Army was deployed (Rijal, 2001). This was the formal initiative in nature conservation in Nepal. Today, country has a well maintained network of protected areas (PAs) consisting of 10 national parks, 6 conservation areas, 3 wildife reserves, 1 hunting reserve and 12 buffer zones comprising 35% of the total geographical region. Tens of thousands of people are directly or indirectly benefitted by the buffer zone (BZ) programme (Paudel, 2011).

The National Park and Wildlife Conservation Act (1973) paved the way and provided the legal foundation for the establishment of protected areas. However, in some places, conflicts were experienced during the establishment of protected areas. This was due to the fears of local people that the traditional resource use rights might be revoked. National park and wildlife areas often require a people-free environment in order to maintain their wilderness. In some areas, for the establishment of PAs, local people who had long inhabited the area were translocated. This occurred during the establishment of Rara National Park and Shukla Phanta National Park. Conversely, Himalayan national parks such as Sagarmatha National Park, Langtang National Park, and other conservation areas allowed the local people to reside within their jurisdiction. The initial idea of the establishment of PAs was to protect the parks from the local communities (Sharma, 1999). This former way of thinking was found to be detrimental to the sustainable management of protected areas. Often there was the struggle and competition between park authorities and local villagers for the resources. As there were no other livelihood opportunities, local villagers heavily relied on the park resources for grass, fodder, fuel wood, grazing of their livestock, plus timber for construction. Furthermore, human injuries (even leading to human death), crop damages and livestock depredations suffered by the villagers from the wildlife of the adjacent park further aggravated the problem and led to park/people conflicts. As 80% of the total population of Nepal is involved in subsistence agriculture (Koirala, 2008), rearing livestock and agricultural farming is inevitable in almost all geographical regions. Therefore, the damages to farm and livestock directly relate to their livelihood.

For the successful management of any type of protected area, the integration of the local people residing in or around the protected areas in policy formulation, decision-making and cost-benefit sharing, is crucial. For example, the success of community forestry management in Nepal can be attributed to the participation of local people in decision making and cost/benefit sharing. Moreover, the community forestry programme involves the principle of equity together with the conservation and management of forest resources. The same principle can be applied to the buffer zone group and forests in order to get the people's support for the sustainable

management of protected areas. However, the protected areas should not be treated as production areas to meet the villagers' requirements of fuel wood, fodder, timber and so on, as the PAs are set aside for the conservation of rare, vulnerable or endangered biodiversity and to preserve the wilderness. Rather, it should be the buffer zone (community) forests, which can be regarded as impact zones, where the people can go to meet their requirements. Revenue generated from the PAs from tourism activities and commercial exploitation of park resources should be shared by the national government and the local people. This is guaranteed by the National Park and Wildlife Conservation Act (1973), which contains the provision that 30%-50% of the park revenue should be shared with the buffer zone people. Local villagers are the watchdogs for the conservation of protected areas and they are the ones to bear the cost of protected areas. However, they often face significant problems of livestock depredation and crop damage due to the wildlife of PAs.

Recently, ecotourism has proven to be an alternative livelihood strategy for the people living in and around the PAs. A study carried out in Sundarbans National Park, India, revealed that the households participating in the tourism activities have less land per capita on average (5.9 Katha) in comparison to the households not participating in tourism activities (7.9 Katha) (Note: 1 katha = approximately 338.6 m^2), and a low literacy rate among adults. But the per capita monthly expenditure on food and non-food items and expenditure on education per child is higher in tourism-participating households then non-participating households (Guha and Ghosh, 2007). Therefore, tourism can provide a strong foundation for nature conservation and development by offering alternative livelihood options.

(Eco) tourism and protected areas

Tourism has been viewed as the smokeless industry in the global market which contributes significantly to the foreign currency exchange and Gross Domestic Product (GDP) of any nation. Countries like Nepal, where there are very limited opportunities for the export businesses, can benefit a lot by promoting tourism, as the natural and cultural resources of its territory can be marketed as a tourism asset. World Travel and Tourism Council (WTTC) research for Nepal shows that in the year 2011, the total contribution of the travel and tourism business in the GDP was 8.8%, well above its own prediction of 6.7%. Similarly, tourism has a direct contribution of 4% of the total GDP, whereas its total contribution to employment was 7.7% and its direct contribution to employment was 3.3% for Nepal (WTTC, 2012). Despite the economic contribution of tourism, careful planning and management is obviously needed to mitigate any devastating effects of tourism to the destination community and hosts.

Nepal, being a landlocked country and squeezed in between the two neighboring giants of India and China (Tibet), boasts a wide array of natural and cultural attributes which have helped it establish itself on the global tourism map, and making it a country to visit at least once in a lifetime. The presence of more than 100 ethnic groups and 90 spoken languages, the traditional local customs and rituals along with unique lifestyles and values offer ample opportunities to prospective tourists to taste a Nepali hospitality uniquely its own. Unlike mass tourism, ecotourism promotes environmentally friendly tourism activities which involve the appreciation of nature and at the same time contribute to the host community with economic incentives. Ecotourism is more than nature-based tourism; therefore, the involvement of natural components and/or appreciating nature do not reflect ecotourism at all. The international ecotourism society advocates ecotourism as a form of tourism that involves responsible travel to natural areas, that conserves the environment and improves the well being of the local people. Therefore, taking this definition of ecotourism, most of the tourism activities of Nepal such as wildlife tourism or birding (Chitwan National Park, CNP), trekking tourism (Annapurna Conservation Area, ACA, Langtang National Park, Sagarmatha National Park) etc. can be considered as ecotourism. Other types of tourism activities such as mountaineering, cycling, honey hunting, rafting, bungee jumping, paragliding and so on that demands some physical stamina can be projected to nature-based tourism or adventure tourism, but not necessarily ecotourism. As these forms of adventure tourism are based on nature's

wilderness, they do not significantly contribute to the destination economy in a participatory way. In the fiscal year 2009/2010 the total number of visitors in Nepalese protected areas was 349,195. Among them, international visitors accounted for 193,875, SAARC visitors 21,167 and national visitors 134,153. Similarly, the revenue generated from protected areas accounted to NRS. 13,54,28,459.1 (Equivalent to US$ 1,529,099.043)1 in the year 2009/2010 (DNPWC, 2009). (Exchange rate of 1 US $ = NPRs 88.5675 as per 23 July, 2012 @ 22:20 CET (www.xe.com))

Ecotourism for development

As stated earlier, ecotourism focuses both on the conservation of the environment and supports the local economy via consumption of locally available food and accommodation. This helps to reduce the leakage of tourism expenditure. There has been much more discussion among the pundits of tourism planners, policy makers and development specialists on how to diversify the tourism product besides traditional mainstream tourism destinations in order to distribute tourism benefits in every corner of the country. In the light of exploring possible tourism destinations by the government agencies, the concept of ecotourism might be the viable option. This will help to reduce the number of visitors to the old destinations which have experienced crowding and instead will help to market the new product. Promoting tourism means not only the tourists in the destinations with pre-determined itineraries, but also provides a chance for the local people who are directly or indirectly involved in the industry to benefit. Ecotourism has a symbiotic relationship with conservation and development. For example, the successful model of the Annapurna Conservation Project (ACAP) has been developed and widely recognized because of ecotourism. Had there not been ecotourism, the ACAP might not get the international recognition that it has today. The integrated conservation and development philosophy has been a success only due to the presence of ecotourism. Trekking tourism has greatly contributed to the project via tourist entry fees and to the local community through their payments for the hospitality service, and in return the villagers gain the development in their community. Development activities in partnership with ACAP personnel brought about sustainable conservation in the region that led to adopting similar principles in other conservation areas such as Kanchejunga and Manaslu, namely putting people first. The same concept has been applied to other PAs, such as CNP, to promote ecotourism which in return brings benefits of both nature conservation and sustainable development. The declaration of an impact or buffer zone around the PAs allows the local community to channel the 30-50 % of the total income received back from the park authority to their villages to be used in several development and conservation actions. Kumrose and Baghmara community forest in the buffer zone of CNP has done exemplary work to prove how ecotourism can contribute to the development of their society. The increase of several charismatic ungulates and mega vertebrates in the buffer zone community forest, and increase in the forest cover also showcases the biodiversity conservation. Local people residing around the park boundary also benefit from the park resources. For instance, people in CNP extract resources such as grasses, reeds and shrubs that yield binding materials worth US $605,831 (including labor cost), whereas the net contribution (excluding labor cost) was US $325,166 in 1989 (Sharma, 1991, cited in Oli, 1999). This is the quantification of the resources collected during the 10 days open park period.

Recently the concept of village tourism has evolved in the tourism history of Nepal. Tourists staying in or near the traditional unspoiled villages to experience the rural Nepali way of living can also be considered to some extent as part of ecotourism. This form of tourism also contributes to environmental improvement, helps to experience rural life styles and an appreciation of the local culture. Rural tourism in Briddim (Rasuwa), village tourism in Ghalegaon (Lamjung) and Sirubari (Syangja) has already proved how village tourism can contribute to rural development by providing economic activities in the villages. The untapped potential of Nepalese culture can be marketed in an innovative and entrepreneurial way. The mountain development award won by Sirubari and Briddim from the Nepalese government is an indicator that reflects how ecotourism or village/ rural tourism can contribute to the sustainable development of Nepal.

Conclusion

Nepal has shown exemplary work in the field of nature conservation and protected area management. It has been able to set aside 23.35% of the geographical coverage as protected areas and the people's participation in biodiversity conservation has been adopted as a key working principle. With the growth of environmentally conscious tourists worldwide, protected areas have experienced an increase in the number of visitors, both national and international. This makes the protected areas a new ecotourism destination. The income generated from the park visitations can be used for the development and management of protected areas and can be ploughed back into the community for development activities as per the national park act. It will also help to reduce the dependency on the central government for a regular budget for protected area management.

Though the Nepalese history of tourism goes back many years, it gained rapid momentum in Nepal only after the first ascent of Mount Annapurna in 1950 by Maurice Herzog and Renhold Mesner. Further, the successful ascent of Mount Everest in 1953 by Tenzing Norgay Sherpa and Edmund Hillary gained international attention and led to international travelers coming to Nepal for adventure purposes, especially nature-based tourism. Undoubtedly, for a fragile country like Nepal, tourism, if managed correctly, can be a blessing for economic development and poverty alleviation, but tourism promotion without doing the homework can lead to the tragedy of the commons for those living in the fragile ecosystem.

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PRINCIPAL DIET ANALYSIS AND HABITAT SUITABILITY MAPPING OF ROYAL BENGAL TIGER IN PARSA WILDLIFE RESERVE

by Amir Maharjan

Introduction

The tiger (*Panthera tigris*), the largest of all living cats and Asia's largest predator (Seidensticker & McDougal, 1993), is widely considered to be one of the most charismatic species on Earth. The tiger is now listed as endangered on the International Union for Conservation of Nature (IUCN) Red List (2007) and despite extensive conservation efforts this iconic species continues its relentless decline (IUCN, 2007).

The Royal Bengal tiger (*Panthera tigris tigris*) is a sub-species of tiger, numbering 3,176-4,556 individuals, found in Bangladesh, Bhutan, Myanmar, China, and Nepal. (TCAPN, 2008-2012). It is one of the world's most magnificent mammals, is highly endangered and faces extinction in the near future if the present trend of poaching and habitat degradation continues (DNPWC/MoFSC/GoN 2007). Therefore, tiger is in Appendix I of **CITES** (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and Appendix I of IUCN's **Red Book**. In Nepal, the species is listed as protected under the National Parks and Wildlife Conservation Act 1973 (DNPWC/MoFSC/GoN 2007).

Tiger are specialized predators of large ungulates. A single tiger has to kill and eat about one deer-sized prey animal, every week, just to survive through a full year. A tiger makes 40-50 kills a year, representing approximately 3,000 kg of prey (McDougal *et al*., 1998).

In Nepal, specifically, the tiger preys upon a wide variety of prey species, including Sambar (*Cervus unicolor*), Spotted deer (*Axis axis*), Hog deer (*Axis porcinus*), Barking deer (*Muntiacus muntjak*), Wild pig (*Sus scrofa*), etc. The Sambar is the most preferred prey species (Seidensticker *et al*., 1993). Based on a comparison of prey occurrence, spotted deer – a medium-sized tiger prey species – is dominant among the ungulates in the Terai Landscape (Shrestha, 2004). Sometimes domestic livestock like cow, goat, buffalo, etc. are also preyed upon in fringe habitats.

Objectives

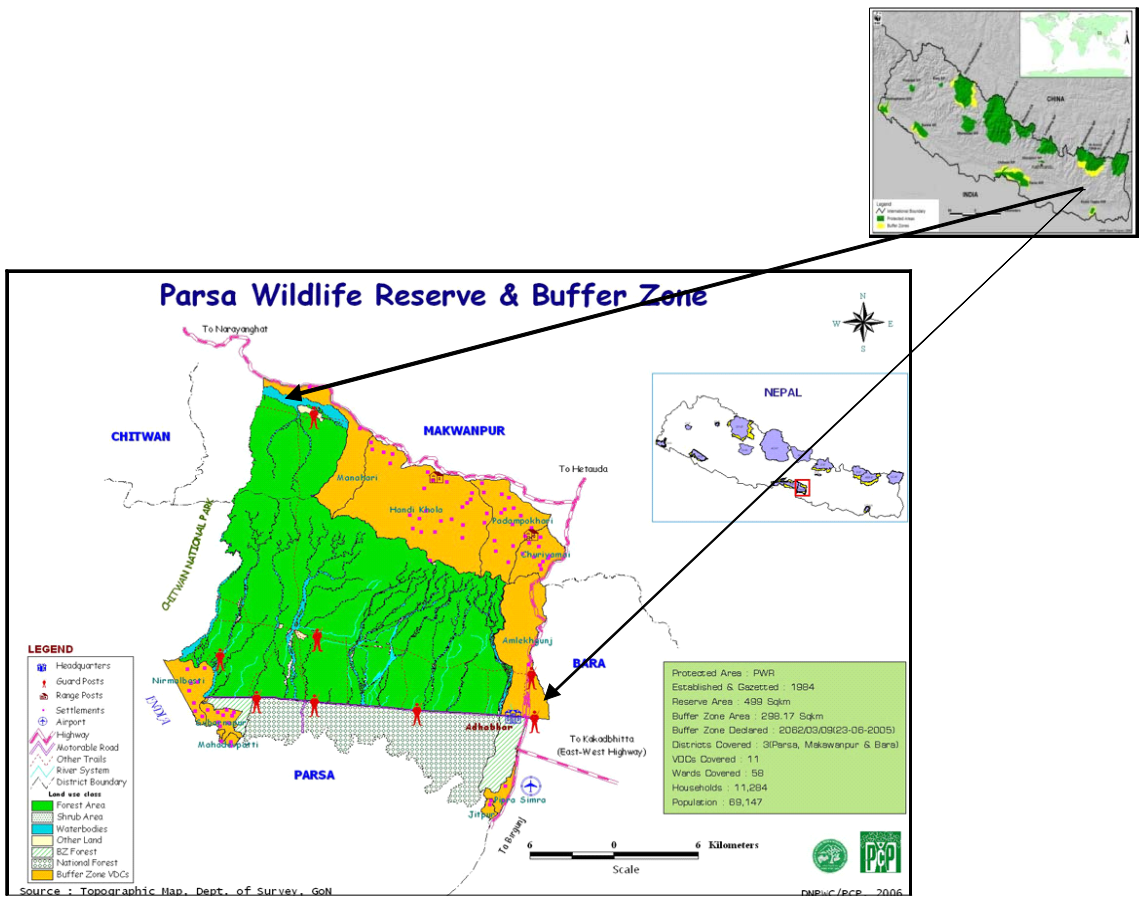
The overall aim of this project is to provide baseline information about the major prey species of the tiger and identify suitable habitats for the tiger in the reserve.

Specific objectives are:
1. To assess the principal prey species of tiger through faecal analysis; and
2. To analyze the species-habitat association and map habitat suitability in the reserve and buffer zone area.

Study area

Parsa Wildlife Reserve (27°13'52'' and 27°32'26'' latitudes and 84°40'22'' and 84°58'41'' longitudes) was established in 1984 with an area of 499 km^2. It is located in the south-central lowland terai of Nepal. The soil is primarily composed of gravel and conglomerates, making it susceptible to erosion. The hills present a very rugged face with numerous gullies and dry streambeds. As the foothills are very porous, water flows underground and surfaces at a distance of about 15 km from the base of the hills. The Churia hill range rises from 750 m to 950 m, running east to west. DNPWC has already established a buffer zone of 298.17 km^2 around the reserve.

Figure 1: Map of study area



Methodology

Scat analysis

Each well-soaked scat was carefully washed through a fine-meshed sieve to separate hairs from other organic matter. Samples were washed separately to avoid intermixing. Remains such as bones and hooves were separated from the scats and stored in ziplock bags and labelled accordingly. The separated scat hairs were washed in the same manner as for the reference hairs as far as possible. Thus, cleaned and dried hairs were stored in ziplock bags after drying. The analysis was carried out with the comparison of research hair samples with reference hair microphotographs. Next, following Mukherjee *et al*. (1994a), twenty prey hairs were randomly sampled from each scat. Cuticular slides were prepared for almost all twenty hairs, while medullary slides were prepared from the same hair slides according to necessity by examining the cuticular pattern. For this, each hair was placed on a glass slide without the use of any mounting medium and covered by a cover slip. In this way the hairs were examined under a microscope for proximal, middle and distal regions with root structure, and color. Altogether, 104 microphotographs were taken for the detail analysis.

Microphotography

Microphotography of the representative medullary and scale patterns were taken at a standard 400x magnification and examined.

Reference hair

Mainly, two reference hair microphotographs for cuticular and medullary pattern were considered for this research. The reference guides used were: 1) "Species Identification from Guard Hair of Selected Indian Mammals (A Reference Guide);" and 2) "Medullary and Cuticular hair pattern of some prey species from Melghat Tiger Reserve."

Similarly, other few references from the Wildlife Institute of India were also used.

Habitat suitability mapping

Spatial analysis

Topographic maps, Landsat Images, and GPS data acquired from the field were used for spatial analysis. Digital topographic maps (1:50,000 scale) prepared by the DNPWC Nepal with its prepared data layers were used for habitat preference mapping. The ancillary database including drainage, settlement, contours, etc. were used for the analysis. The DEM generated was not used as criteria for the analysis as the slope, aspect and elevation don't vary much in the reserve. The overall process of spatial database development is shown in figure below.

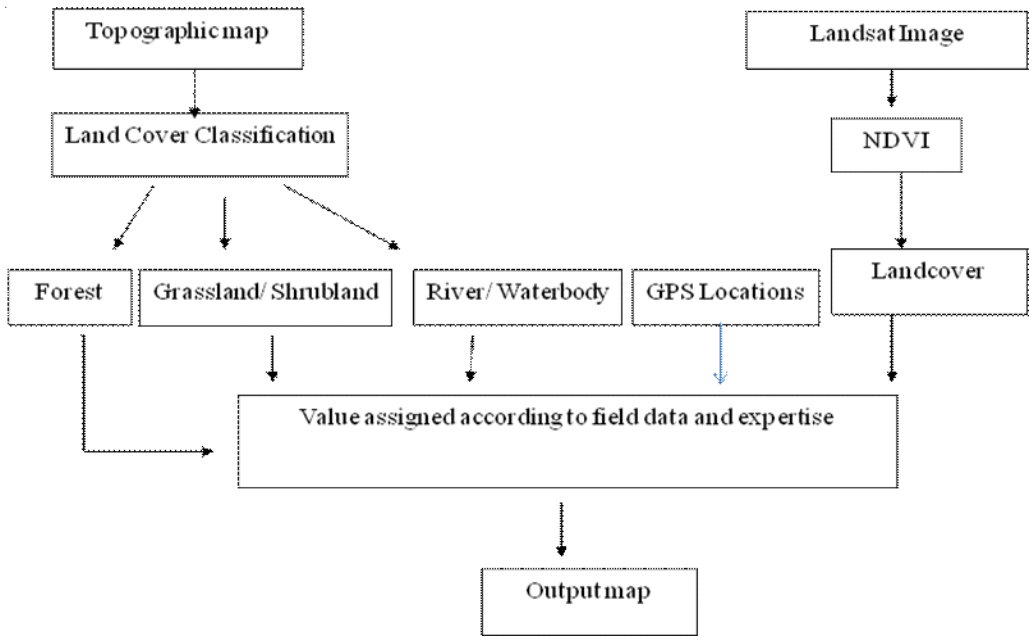


Figure 2: Spatial database development of habitat suitability mapping

Results and discussion

Species composition of tiger's diet

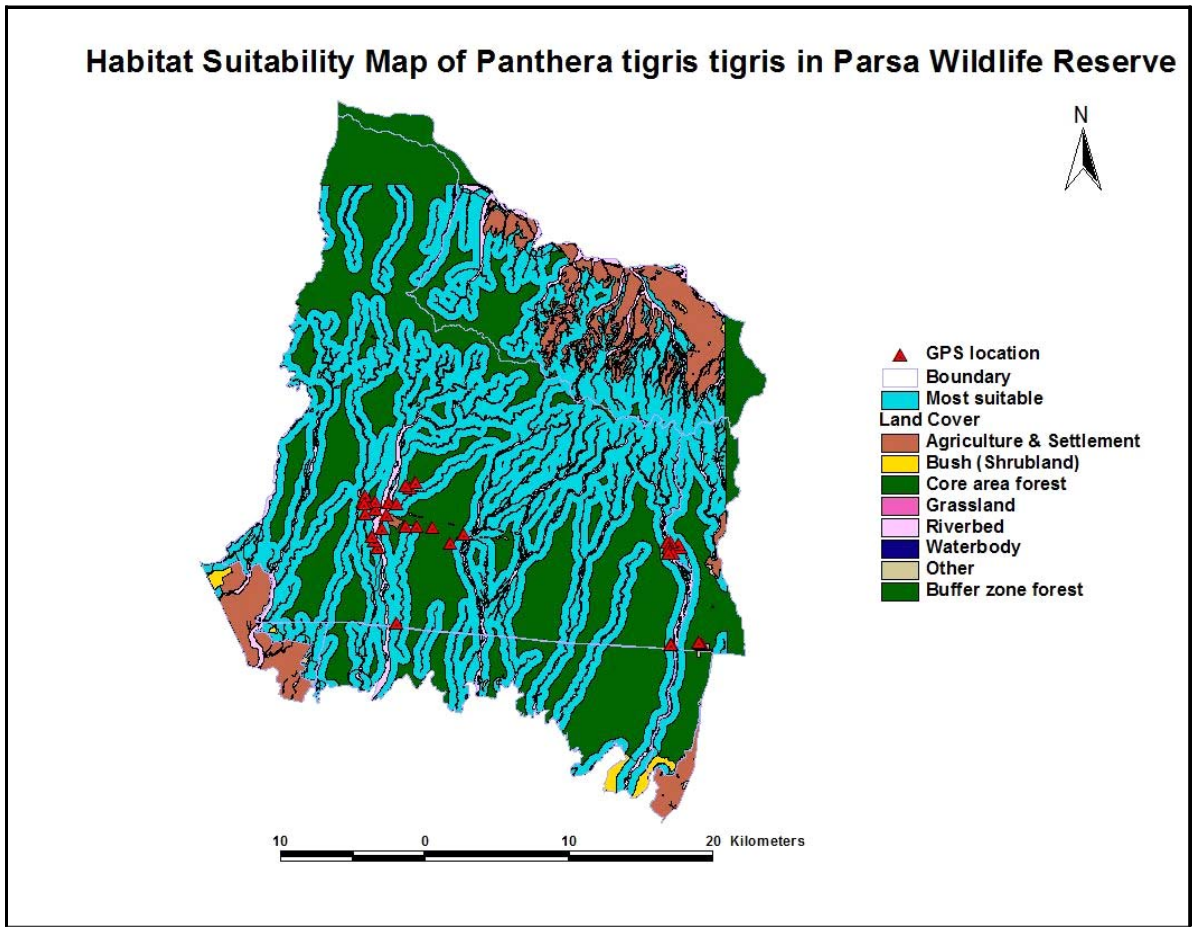
A total of 15 scats were collected from the study area. Almost all prey species found in the scats could be readily identified except for three, the results of which, including percentage occurrence and frequency of occurrence of individuals consumed by tiger, are presented in table below.

A total of seven species were identified in the 15 scats analysed. Remains of bones and hooves were found in four scats (26.67%). Although tiger scats composed entirely of grass or soil were found in previous studies (Bonnin, 2008) and are suggested to be a relatively common occurrence (Schaller, 1967; Sunquist, 1981), in the collected scats for this study, three scats contained varying amounts of soil and one scat contained grasses.

Table 1: Prey species composition in tiger scat (n=15) and their percentage occurrence

Prey Species	Total No. of prey Items	Percentage occurrence	Frequency of Occurrence
Wild boar	4(80)	23.52	26.66
Chittal	3(60)	16.74	20
Barking deer	2(38)	11.76	12.66
Samber	1(18)	5.88	6
Resus Monkey	1(20)	5.88	6.67
Langur	1(20)	5.88	6.67
Hare	2(40)	11.76	13.33
Unidentified	3(24)	16.74	8
Total	17(300)	100	Total sample=15

Figure 3: Habitat suitability map of tiger in Parsa Wildlife Reserve



Habitat suitability

Of the total 797.17 km^2 area of the reserve, almost the whole area was found to be suitable habitat for tiger. Among the suitable habitats, riverine forest represented 44 km^2 of highly suitable habitat as this area holds the highest density of prey species among all habitats. It also contained sufficient waterholes and grassland for prey species. The GPS points located at the signs of tiger were found all around the banks of streams and rivers.

Conclusion

The principal prey species found were Chital (*Axis axis*), Sambar (*Cervus unicolor*),Wild boar (*Sus scrofa*), Barking deer (*Muntiacus muntjac*), Rhesus monkey (*Macaca mulatta*), Langur (*Presbytis entellus*) and Hare (*Lepus nigricollis*). Among the seven species, the most highly preyed upon species were Wild boar and Chital.

The park has high potential to accommodate a relatively higher density of tigers than exists at present. Scarcity of water is one of the main habitat components that restricts tiger movement all over the park.

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SUCCESSFUL KETAMINE-XYLAZINE IMMOBILIZATION IN WILD GAURS (Bos gaurus) -- THEIR RESCUE AND RELOCATION AT BUXA TIGER RESERVE, WEST BENGAL

by R.P. Saini, Manas Kundu and Deepak Sharma

Introduction

This is an account of one of the most awkward situations and difficult cases dealt with in wild bison immobilization at Buxa Tiger Reserve (BTR) out of the eight successful cases (Table 1). In the early morning of 25 March 2011, two adult bisons had strayed out of the forest and were spotted at agricultural fields in Majerdabri village near Alipurduar town, 6 km from Checko Beat of BTR. There was an adult male and an adult female, both in good health. The two animals were together and were standing in the middle of open agricultural field. A huge crowd of onlookers had gathered to get a glimpse of the animals as well as the tranquilization operation. It was not an ideal location for attempting to dart the animals due to the risk of a major accident if one of the bisons panicked and ran wildly into the spectators. This was a very difficult situation for the foresters, veterinarians and police present. There was nothing to be done except to wait and monitor the movement of the two bisons. After about two hours the animals got separated and started running, creating chaos among the villagers. The male bison entered Dakshin Dhalkor village and the female ran towards Salbari village and took shelter in a bamboo plantation. In the process, forest staff, as well as some villagers, were injured. Additional police force was called in to control the crowd. Finally, after about four hours, both animals were successfully darted.

Methods used during tranquilization and relocation

Sedation was achieved with a combination of ketamine and xylazine. The doses of drugs used was as follows: ketamine-0.3mg/kg body weight; xylazine-0.8mg/kg body weight. The weights of the male and female bisons were estimated to be approximately 600 kg and 500 kg, so a dose of 1.8 ml:4.8ml and 1.5ml:4ml (inj.Ketamine -100mg/ml:inj. Xylazine-100mg/ml) was used respectively. Sometimes, due to stress resulting from prolonged capture efforts, higher doses of drugs may be required. The drug was delivered by a dist-inject rifle(Mod 60N) using a 7 ml aluminium barrel dart, 19 mm smooth needle with rear stabilizer and a white charge as the distance of the target was approximately 30-40 m. Induction of anaesthesia took about 12-15 minutes for both animals. Two teams were ready to take care of the darted animals. The animals exhibited rapid respiration with minimal salivation and the eyes remained open. To treat hyperthermia (body temperature:106°F male and 105.4°F female), cold water was poured on the animals along with placing water-soaked jute bags on their bodies and heads. The eyes were blocked from direct light with blindfolds. Without wasting time, the darted animals were loaded onto trucks with help from the locals. Each animal was accompanied by a veterinary team. The animals were kept in sternal recumbency with the neck positioned forward and slightly raised from the body (Malik *et al.*) water was sprayed on the animals at intervals and the following medicines were injected intra-muscularly in both the bisons:

1. Inj.Dexona Vet (Zydus Animal Health Ltd., each ml contains Dexamethasone Sodium Phosphate- 4.4mg)- 15ml.
2. Inj.Deriphyllin (German Remedies, each ml contains Theophylline 25.30mg, etophylline 84.70mg/ml)-12ml.
3. Inj.Melonex Plus (Intas Pharmaceuticals, each ml contains Meloxicam 5mg, Paracetomol 150mg & Lignocaine 1% w/v)- 20ml.

After travelling for 35-45 minutes, both trucks reached the Pan 6 Compartment, East Rajabhatkhawa Range, Buxa Tiger Reserve, where the bisons were to be released for relocation near a water source. The body temperatures had come down (male - 103.4°F and female - 102.9°F) after unloading and the bisons were released. Both immediately stood up, gait was uneven for some minutes but then both took off down the path towards the forest.

Discussion and conclusion

There are no reports available about the use of a xylazine - ketamine combination in bison (William *et al.*). Field immobilizations at BTR used on straying wild bisons revealed that xylazine in combination with ketamine induces a perfect analgesia and anaesthesia for around 40-45 minutes. Eight wild bison have been successfully rescued and relocated at BTR during last year and early this year. The sedative analgesic with muscle relaxant properties of xylazine works well in combination with ketamine on wild bisons without any side effects. The dosage of ketamine: 0.3-0.5mg/kg body weight and xylazine: 0.8-1mg/kg body weight has proven to be effective for wild bisons in field rescue operations in BTR. However, there are still many variables to be considered in the pre- and post-rescue management of wild animals. Field cases concerning wildlife will differ from each other to some extent so experience, knowledge and determination have roles to play.

Photographs show various actions undertaken in the field operation during the bison rescue and relocation in the forests of Buxa Tiger Reserve.

Table 1 : Details of wild bison rescue & relocation

Gender/Age & Weight(approx.)	Area of Rescue/Date.	Procedure/drugs used.	Place/Date of release.
Male/6-7 years & 700 kgs.	Marichbari village, Pundibari range, Coochbehar on 23-02-2011.	2.1 ml Ketamine (100mg/ml)& 5.6 ml Xylazine (100mg/ml)	Animal successfully released on the way to 23rd Mile tower at Sangaghai Road, BTR(West) on 23-02-2011.
Male/7-8 years & 750 kgs.	Marichbari village, Pundibari range, Coochbehar on 23-02-2011.	2.3 ml Ketamine (100mg/ml)& 6 ml Xylazine (100mg/ml)	Animal successfully released near 22nd Mile tower, BTR(West) on 23-02-2011.
Male/ 5-6 years & 600 kgs.	Dakshin Dhalkor village, Alipurduar on 25-03-2011.	1.8 ml Ketamine (100mg/ml)& 4.8 ml Xylazine (100mg/ml)	Animal successfully released at Pan 6 Comp.,ERVK range,BTR.
Female/4-5 years & 500 kgs.	Salabari village, Alipurduar on 25-03-2011.	1.5 ml Ketamine (100mg/ml)& 4 ml Xylazine (100mg/ml)	Animal successfully released at Pan 6 Comp.ERVKrange,BTR.
Female/ 6 years & 500 kgs.	Bairaguri, Alipurduar on 10-02-2012.	2 ml Ketamine (100mg/ml)& 4.5 ml Xylazine (100mg/ml)	Animal successfully released at near 22nd Mile tower, BTR(West) on 10-02-2012.
Female/ 7 years & 600 kgs.	Jeetpur, Damanpur Alipurduar on 10-02-2012.	2.4 ml Ketamine (100mg/ml)& 5.4 ml Xylazine (100mg/ml)	Animal successfully released at near 23rd Mile tower on10-02-2012.
Female/ 4-5 years & 500 kgs.	Near Topshikhata Village,Alipurduar on 23-02-2012.	1.5 ml Ketamine (100mg/ml)& 4 ml Xylazine (100mg/ml)	Animal successfully released at near 22nd Mile tower, BTR(West) on 23-02-2012.
Male/ 5 years & 600 kgs.	Near Beerpara village, Alipurduar on 30-03-2012.	1.8ml.Ketamine (100mg/ml)& 4.8ml.Xylazine (100mg/ml)	Animal successfully released at near 23rd Mile tower,BTR(West) on 30-03-2012.

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HUMAN-CARNIVORE CONFLICTS IN BANGLADESH

by Khadija Rawshan, Mohammed Mostafa Feeroz and Md. Kamrul Hasan

Introduction

The human-carnivore conflict is now a burning issue because it pits a group of people against carnivores and also against the people who want to conserve and restore carnivores (Torres *et al.*, 1996; Bangs *et al.*, 1998; Berg, 1998; Karanth and Madhusudan, 2002). It is a worldwide problem (Treves and Karanth, 2003). In Europe and North America wolves (*Canis lupus*) and bears (*Ursus* spp.) kill sheep; in Africa many carnivores prey on cattle and goats. And in Asia tigers (*Panthera tigris*) and leopards (*Panthera pardus*) sometimes kill livestock (Jackson and Nowell, 1996; Karanth and Madhusudan, 2002).

Bangladesh is a small and densely populated country in South Asia. The total area of the country is 147,570 km², which contains more than 154 million people (1,044 people/km²). Though a small country, it is home to 121 species of mammals, 690 birds (380 residents, 209 winter visitors, 11 summer visitors and 90 vagrants) and 154 reptiles (Khan, 2008; Feeroz *et al.*, 2011). There are about 226 carnivore species worldwide (Treves and Karanth, 2003) and Bangladesh has 17 species from three families (Khan, 2008). Among these carnivores 2 species are critically endangered, 7 are endangered and other species are facing different levels of threats (IUCN-BD, 2003). The establishment of new settlements, industrialization, rapid urbanization and unplanned development programs are destroying wildlife habitats at an alarming rate. Moreover, the heavy dependence on forests for fuelwood, timber, honey, grass and other forest produce is also altering, and in some places destroying, wildlife habitats. Illicit felling, hunting and poaching are causing ecological imbalances among wild animals as well as to carnivores habitats. As a consequence, carnivore habitat loss, fragmentation and shortage of prey species are increasing day by day.

Humans exploit resources from the core habitats of carnivores and eventually carnivores enter the human localities for their prey. This increases human deaths, injuries, livestock depredation, damage to human property and also carnivore deaths and injuries. The aims of this study were to evaluate the trends of human-carnivore conflict, causal factors and effects of the conflict on both of the species in the last two decades.

Methods

Bangladesh's daily newspapers report human-wildlife conflict-oriented news almost every day. Three popular daily newspapers of Bangladesh, i.e., Prothom Alo (Bangla), Ittefaq (Bangla) and the Daily Star (English) were reviewed for the study. Human-carnivore conflict-oriented data were collected from 1990-2010 with five year intervals. Any conflict-oriented news published in these three newspapers in 1990, 1995, 2000, 2005

and 2010 was documented. Reports on a single incident in different newspapers were counted as a single report. Data were recorded in five categories: i) total number of incidents each year; ii) name and number of the carnivore species involve in a particular conflict; iii) number of humans killed and injured during the conflict; iv) the number of carnivores killed and injured during conflict; and v) the number of carnivores rescued after conflict.

Results and discussion

Trends of human-wildlife conflict

A total of 84 incidents were recorded in which 8 species of carnivores were involved. During these conflicts, 68 people were killed and 24 were injured, and at the same time 26 carnivores were killed and 19 were rescued (Table 1).

The total number of incidents of human-carnivore conflicts increased at an exponential rate (46%) in 2010. The highest number of human deaths (32%) occurred in 2010 and 1990. There are positive correlations between the total incidents and the number of humans killed (r=0.647). The injury of humans was a common cause of human-carnivore conflicts. The highest (50%) number of injuries of humans was in 2000. The total incidents and the number of human injuries was also positively correlated (r=0.615). In 2010, the highest number (12 individuals, 46%) of carnivores were killed during the conflict. The correlation between the total incidents and number of carnivores killed was very high (r=0.935).

Carnivores involved in conflicts

Eight species of carnivores were found to be involved in human-carnivore conflicts viz. Bengal tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Fishing cat (*Felis viverrina*), Leopard cat (*Felis bengalensis*), Jungle cat (*Felis chaus*) and Asiatic golden cat (*Pardofelis temminckii*) from the family Felidae; and Large Indian civet (*Viverra zibetha*) and Common mongoose (*Herpestes edwardsii*) from the family Viverridae and Herpestidae respectively. Among these carnivores Bengal tiger was the most highly involved (70%) species in conflicts with humans, followed by Fishing cat (12%), Leopard (7%) and Jungle cat (6%). In 2010, 8 carnivore species were involved in conflicts whereas two decades ago only 2 species were involved. The total incidents and the number of different carnivore species involved in conflict is highly correlated (r=0.942).The number of carnivores killed varied significantly in each year with the increased involvement of carnivore species in conflict (r= 0.920).

Bengal tiger is now confined to the Sundarbans, though recently there was a single record of occurrence from the Hill Tracts (Khan, 2011). Bengal tiger is the only carnivore found to be involved with the killing of humans and all the incidents were occurred in the areas surrounding the Sundarbans. The highest number of incidents (44%) with the highest human casualties (32%) occurred in 2010. There are no permanent human settlements in the Sundarbans but there are some villages in the surrounding areas (Reza *et al.*, 2004; Reza, 2007). People have been attacked by tigers when working in the forest or when a tiger enters the village (Barlow *et al.*, 2009). Tigers rarely attack people as prey; in most events they attack people defensively or when wounded by people (McDougal, 1987; Gurung *et al.*, 2008; Goodrich *et al.*, 2010). Tigers usually enter into villages and kill livestock when their natural wild prey species are depleted (Goodrich, 2010), though livestock make up only a small proportion of the tiger's diet (Sunquist, 1981).

Factors involved in conflict

Local people are dependent on the Sundarbans in various ways for their livelihoods. They enter the Sundarbans to collect wood, honey, leaves and for fishing and other activities. About 350,000 people annually collect forest product from Sundarbans and are exposed to tigers (Barlow *et al.*, 2009; Gani, 2002). The majority of tiger victims are honey gatherers, fishermen and wood cutters (Barlow *et al.*, 2009). Hunting and poaching of spotted deer; the main prey species of Bengal tiger, is not uncommon in Sundarbans. Bengal tigers from the bordering areas of the Sundarbans sometimes visit villages looking for domestic cattle and other easy prey species and have encounters

with people. When a tiger is detected in a village, it is generally surrounded by hundreds of armed people with sticks and sharp objects (Gani, 2002). Local people might take advantage of depredations of cattle as an opportunity to poach tigers (Johnson *et al.*, 2006). Sometimes poachers might pay local people to collect information tigers about returning to feed on the carcass of depredated livestock because this provides a god opportunity to poach tigers (McDougal, 1987).

The effects of human-carnivore conflicts are increasing human deaths, injuries, livestock depredations, carnivore deaths, injuries to carnivores and destruction of the habitat of carnivores. As a result, the list of threatened carnivores is becoming longer. An average of 27 people are killed annually in forests and 3 people in villages (Barlow *et al.*, 2008, 2009; Gani, 2002; Hendrichs, 1975). According to Khan (2009) an average of 15.8 people and 2.6 tigers were killed per year during 2002-2006. The present study found 22 people killed in 1990 and 2010 each. The actual number might be higher because many incidents may not be reported in the newspaper. An average of 3 tigers are killed per year by the villagers in retribution for previous human and livestock killings or for the fear of future incidents (Barlow *et al.*, 2009; Gani, 2002).

The increasing human population with the resultant increased rate of resource use causing habitat loss is forcing wild animals to live in close proximity of humans worldwide (Inskip and Zimmermann, 2012); Bangladesh is not an exception. Increasing population pressure, limited resources, continuous habitat loss, hunting, poaching and many other anthropogenic effects are accelerating human-carnivore conflicts in Bangladesh.

Most of the people of our country are not aware about the values of carnivores in terms of their role in the ecological balance and environment. Education and awareness building programs among the local people can play an important role in changing their attitudes towards carnivores as well as other wildlife. More scientific research is necessary to minimize human-carnivore conflicts. Implementation of proper laws and the practice of conservation and management policies could also minimize the conflicts. The Government, NGOs and local people should work together to mitigate human-carnivore conflicts for the betterment of both humans and carnivores.

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Table 1: Percentage of involvement of different carnivore species in conflict

Species	Percentage involved in conflicts (%)
Bengal tiger	70
Leopard	7
Fishing cat	12
Leopard cat	1
Jungle cat	6
Asiatic golden cat	1
Large Indian civet	2
Common mongoose	1

Table 2: Scenario of human-carnivore conflict in Bangladesh in the last two decades

Year	No. of carnivore species involved	Total no. of incidents	No. of humans killed	No. of humans injured	No. of carnivores killed	No. of carnivores injured	No. of carnivores rescued
2010	8	39	22	7	12	7	7
2005	3	6	2	0	2	0	4
2000	4	20	13	12	9	0	7
1995	1	8	9	1	0	0	0
1990	2	11	22	4	3	0	1
Grand Total	**8**	**84**	**68**	**24**	**26**	**7**	**19**

ELUSIVE BEAUTIES OF MANAS NATIONAL PARK - THE SWAMP DEER

by Amit Sharma, Deba K. Dutta and Anindya Swargowary

The Swamp deer (or Barasingha) (*Cervus duvauceli ranjitsinhii*) was once widely distributed in its preferred habitats in the Brahmaputra valley. However, habitat disturbances, anthropogenic pressures and many other associated reasons have now confined the species to two protected areas of Assam. Kaziranga National Park has a healthy population numbering about 1,169 individuals (2011-12), while the population in Manas National Park (MNP) is quite small and its existence was confirmed only recently and is now presented here. A study conducted by Aaranyak (2009) could not document the direct observation of the species, but found numerous evidences that suggested that a small population of around 12 to 16 individuals in a single herd exists in the Chorpuli area of the park. This study marks the first indication of the species surviving the days of civil unrest in the area.

Manas National Park is located in the north-eastern part of India, with an area of about 500 km^2. It forms the core of the Manas Tiger Reserve which was declared among the first batch of tiger reserves in 1973 and is also a UNESCO World Heritage Site. This park is rich in biodiversity and has unique natural beauty. It shares its northern boundary with Bhutan, extending the natural habitat for its wildlife through the Royal Manas National Park further north. Prior to the civil unrest period during the mid 1990s, MNP had a healthy population of the Eastern barasingha species in the park. It has been noted that the park had a population of more than 500 individuals in 1987 that grew from less than 150 in 1973 (DebRoy, 1991).

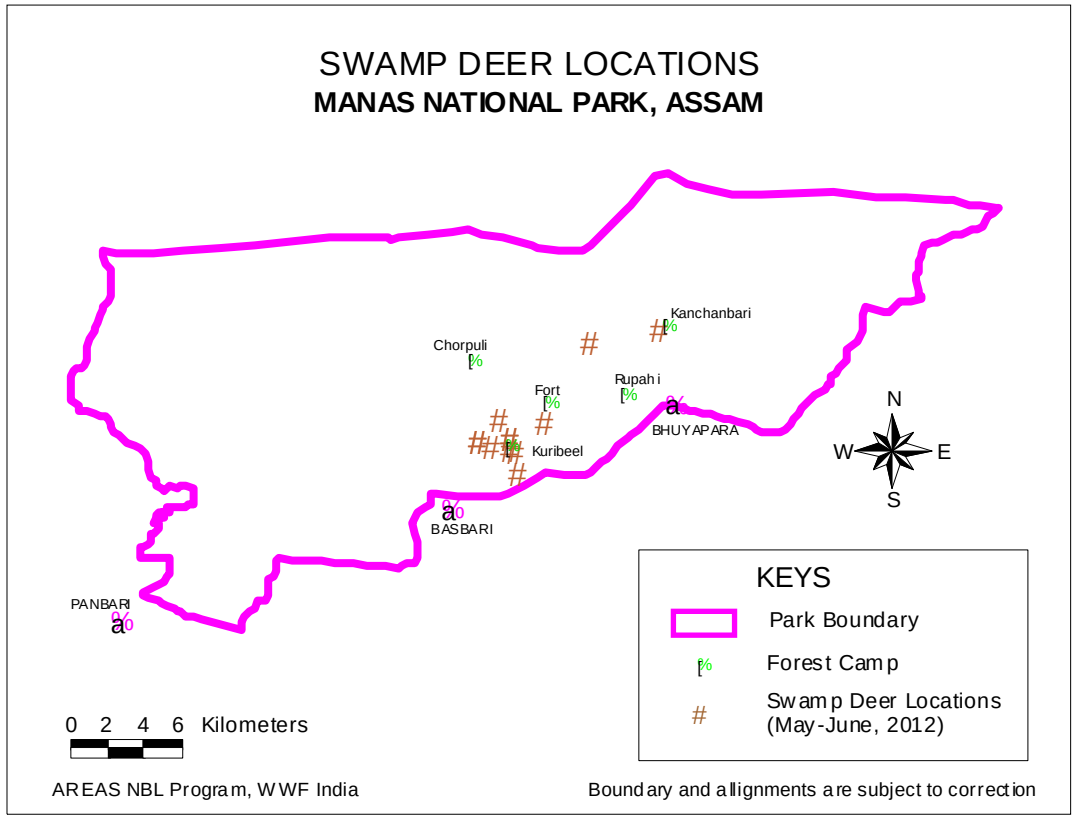
Table 1: Recent swamp deer records from Manas National Park

Sl No	Location	Range	Time	Date	Size	Vegetation
1	Kuribeel	Basbari	7-30am	1st May 12	2	Mixed grass dominated by *Saccharum* spp.
2	Fort	Basbari	6-00am	5th May 12	2	Mixed grass dominated by *Saccharum* spp.
3	Kuribeel	Basbari	5-00am	7th May 12	1	Mixed grass dominated by *Imperata*
4	Kuribeel	Basbari	7-30am	7th May 12	1	Mixed grass dominated by *Imperata*
5	Kuribeel	Basbari	7-00am	17th May 12	1	Mixed grass dominated by *Imperata*
6	Kuribeel	Basbari	5-00am	23rd May 12	2	Mixed grass dominated by *Imperata*
7	Kuribeel	Basbari	5-00am	24th May 12	1	Mixed
8	Kuribeel	Basbari	6-00am	29th May 12	2	Mixed with *Hymensia assamica* & *Lexondria*
9	Dura beel	Bhuyapara	5-00pm	2nd June 12	1	Swamp
10	Kanchanbari	Bhuyapara	3-27pm	5th June 12	3	Mixed grass dominated by *Saccharum* spp.
11	Buraburijhar	Basbari	7-00am	15th June 12	5	Mixed grass dominated by *Saccharum* spp.
14	Kuribeel	Basbari	7-00am	18th June 12	2	Mixed grass dominated by *Imperata*

Indications of the existence of swamp deer were very encouraging for the park staff and all involved in its revival. Concerted efforts were made to confirm their presence by documenting sightings, but none of these were successful, even though there were regular reports of hearing calls and of sightings during the early morning and late afternoon /evening in and around Kuribeel. The rut calls heard by the staff of the park were confirmed to be of swamp deer by Dr. Bivash Pandav of WII during his visit to the park in May 2009.

Under Indian Rhino Vision (IRV) 2020, rhinos were translocated to the park in 2008 and since then dedicated teams carry out round the clock monitoring of the rhinos in the park. This has greatly helped to improve the security in the park and also helped in the systematic documentation of wildlife in the park in addition to the rhinos.

Map 1: Recent Swamp Deer sightings in Manas NP



The first direct evidence of the existence of swamp deer in the park was recorded by the rhino monitoring team led by Mr Deba Dutta of WWF-India, when they came across a predator kill on 19th March 2010 in the Kuribeel area in the central part of the park under Basbari range. Following this, the team came across a pair (male-female) in the same area on 12th April 2010 at about 6.30am. The efforts were slowly showing results and since photography was difficult in the thick vegetation, the team even tried setting up one pair of camera traps in the areas where the species was observed for about ten nights during 2011, but this also yielded no positive results. The chance encounters continued and in 2012 things brightened up with success in obtaining photographic evidences. From the encounters and records during 2012, the presence of the species in small herds could be confirmed in at least four locations of the park viz. - Kuribeel and Fort areas under Basbari and Kanchanbari and Durabeel (north of Rupahi) areas under Bhuyapara. It is assumed that in all these locations small herds of about 6 to 10 exist, but during clear

Plate 2: At Kanchanbari

Plate 1: At Durabeel

Plate 2: At Kanchanbari

sightings counts could be made of only 1-5 animals; the largest sighted group of 5 was made in the Kuribeel area. The sightings of fawns in two locations confirmed that the present population is breeding in Manas. It is difficult to come up with a population figure for the park with the present information; however, 20 seems to be a reliable estimate.

The confirmation of the existence of swamp deer is very encouraging news for the park and management plans are needed for its revival and expansion. One immediate need is to undertake a systematic study in the entire park, as there is a possibility of the species occupying many other areas of the park as their suitable habitats are spread all around; this may help to get a more accurate estimate of the population.

The recent sightings were possible due to a bit of grassland management and it is suggested that similar efforts are continued; wetland management should also be undertaken that will help the herbivores in the park.

The existing small populations should be given an adequate chance for protected breeding and population enhancement, perhaps following the Kanha model and adapting it to the local needs.

Highlighting the importance of this species to Manas National Park, UNESCO has already advised for the development of a Species Recovery Plan for the Swamp Deer of MNP. The Forest Department at the State and the Central levels has already initiated plans to work for the recovery of the species in association with other organizations and it is necessary that an appropriate plan suited to the needs of the species in MNP is drawn up based on scientific inputs and implemented in a timely manner. Team work and multi-partner collaboration through the IRV2020 program has greatly benefitted the rhino population in Manas NP and similar efforts could result in a successful revival of the swamp deer in Manas as well.

Enhanced protection has helped in the revival of the park wildlife and recent common sightings of the elusive swamp deer is a clear indicator of this. The park soldiers (frontline staff), park management and the Government are all doing their best to bring back the glory of Assam. NGOs and other organizations are providing all possible support to this movement and community support is also in place. What is needed now is to sustain these efforts for a better future for the magnificent Manas.

Acknowledgements

The authors would like to offer their sincere thanks to the frontline staff of Manas NP for their efforts, as well as the local youths working for the protection of the park. The entire rhino monitoring team at MNP is acknowledged for their dedicated efforts and special thanks to Mr Kiran Goyary (Conservation Volunteer, IRV2020) for his innovative photography. We also thank the BTC, Assam Forest Department and all the partner organizations of IRV2020 for their support for the conservation activities in the park. Thanks to Mr Dhritiman Das and Dr. Bivash Pandav for their inputs and to the local communities for their great support in the revival process of the park, plus all the well wishers who motivated us in our efforts.

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PRESENT STATUS AND DISTRIBUTION OF LONG-TAILED MACAQUE (Macaca fascicularis umbrosa) IN GREAT NICOBAR BIOSPHERE RESERVE, INDIA

by C. Sivaperuman and K. Venkataraman

Introduction

The long-tailed macaque (*Macaca fascicularis umbrosa*) inhabits the Nicobar Islands group (Great Nicobar, Katchal and Little Nicobar). They inhabit a wide variety of habitats, including primary lowland rainforests, disturbed and secondary rainforests and riverine and coastal forests of pandanus and mangrove. Long-tailed macaques (*Macaca fascicularis*) have the third most widespread geographical distribution among primates, after humans and rhesus macaques (*Macaca mulatta*) (Fooden, 1995). It has a wide distribution in India (Nicobar Islands), Burma, Indonesia, Malaysia, Philippines, Thailand, South Vietnam and Bangladesh (Fooden, 1995). The long-tailed macaques are a well studied group in other countries; however, in India very little information is available on the status of long-tailed macaques (Rodman, 1991; Tikader and Das, 1982).

The long-tailed macaque is an endangered primate in India and it has been listed in Schedule-I of the Wildlife Protection Act, 1972. Their conservation status as documented by the IUCN Red List is listed as Near Threatened, having been amended in 2004 from the taxon's previous status as Data Deficient following some basic surveys. Although the Biosphere Reserve was declared in January 1989, only one short field survey has been conducted till date on long-tailed macaques (Umapathy *et al*., 2003). They are threatened due to habitat loss, collection of fuel wood, gathering of minor forest produce, grazing by domestic animals and commercial plantations. At present, no management measures have been taken; therefore, proper management and conservation plans should be established to conserve the exiting population of long-tailed macaques in the Nicobar Islands. To understand the present population, a preliminary survey was conducted to assess the status, distribution, and existing conditions of macaque habitat in Great Nicobar Biosphere Reserve after the 2004 tsunami.

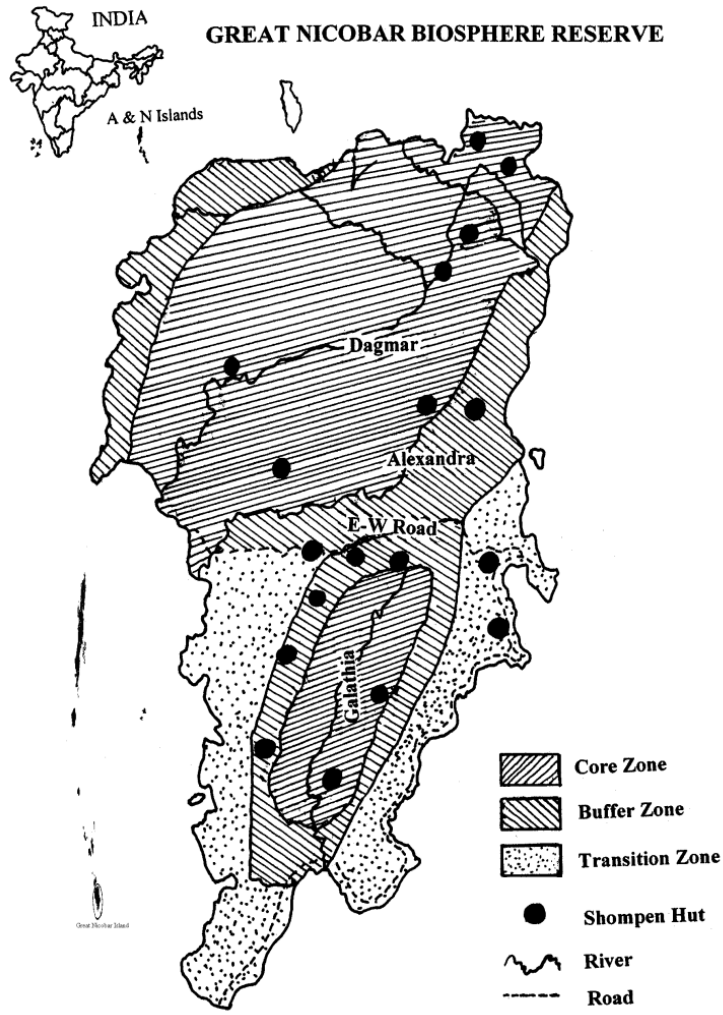
Study area

The Great Nicobar Biosphere Reserve (GNBR) is the southernmost island of the Andaman and Nicobar archipelago. It lies between 6°45' and 7°15' N latitudes and 93°38' and 93°55' E longitudes in the Bay of Bengal (Fig. 1). The GNBR includes Campbell Bay and Galathea National Parks. It spreads over an area of 885 km^2. This reserve is known for its unique biodiversity and houses rich genetic germplasm resources. The Great Nicobar Biosphere Reserve represents the tropical rain forest in the Andaman and Nicobar Islands bio-geographic region. The major forest area in this Biosphere Reserve is still in its virgin state and rich in species composition. The GNBR has rich heritage of faunal diversity and this area also harbors one of the most endangered species viz., the Nicobar megapode (*Megapodius nicobariensis*), as well as the common edible-nest swiftlet (*Collocalia fuciphaga*). Other important species include the Nicobar pigeon (*Caloenas nicobarica*), white-bellied sea-eagle (*Haliaeetus leucogaster*), Nicobar serpent-eagle (*Spilornis minimus*) and Nicobar parakeet (*Psittacula caniceps*).

Methods

The long-tailed macaque population was estimated using the total count method (National Research

Fig. 1. Great Nicobar Biosphere Reserve



Council, 1981; Whitesides *et al*., 1988; Agoramoorthy, 1989; Agoramoorthy and Hsu, 2006). The following locations were visited by foot /vehicle to assess the population namely, Johinder Nagar, Forest Check Post, East-west Road, Lakshman Beach Road, Amphibian Road, Gingem Basti, Shompen Hut, Navidera, B-quarry, Mahar Nallah, Gandhi Nagar, Galathea Bay, Indira Point, Kopenheat and Shastri Nagar. The surveys were conducted from 0700 to 1100 hrs. A questionnaire survey also conducted with local people, forest officials, defense officials and Border Road officials. Whenever a troop was sighted, the sighting distance, the sighting angle from transects and GPS coordinates were recorded. An attempt was also made to record the group size and age-sex composition.

Results and discussion

During the field surveys, 15 locations were surveyed, and a total of twenty-one troops of long-tailed macaques were recorded (Table 1). The group size varied from 25 - 48 individuals with a mean of 32.47 animals per group. The present observation is comparable with the results of Umapathy *et al*. (2003). We could not collect the demographic data for most of the troops as the animals were very shy. The Great Nicobar Island is closer to the epicenter with little or no

Table 1: Estimated number of Long-tailed macaque troops and their group size in Great Nicobar Biosphere Reserve

Location	Coordinates	Number counted	Estimated number of troops
Johinder Nagar	Lat. 06° 57.994' Long. 93°55.223'	28	1
Forest Check post	Lat. 07° 00.200' Long. 93° 52.870'	28	1
East-west Road	Lat. 07° 00.114' Long. 93° 52.781'	128	3
Lakshman Beach Road	Lat. 07° 01.134' Long. 93° 55.403'	69	2
Amphibian Road	Lat. 07° 01.297' Long. 93° 55.380'	75	2
Gingem Basti	Lat. 06° 58.515' Long. 93° 55.403'	32	1
B-quarry	Lat. 06° 59.708' Long. 93° 56.680'	32	1
Mahar Nallah	Lat. 06° 59.584' Long. 93° 55.079'	28	1
Shastri Nagar	Lat. 06° 48.151' Long. 93° 53.081'	94	2
Galathea Bay	Lat. 06° 55.231' Long. 93° 49.590'	N/A	1
Gandhi Nagar	Lat. 06° 50.196' Long. 93° 53.680'	35	1
Shompen hut	Lat. 15° 07.476' Long. 90° 05.565'	46	1
Navidara	Lat. 07° 07.564' Long. 93° 53.144'	32	1
Indira Point	Lat. 06° 45.424' Long. 93° 49.541'	55	1
Kopenheat	Lat. 06° 50.922' Long. 93° 47.983'	N/A	1

N/A = population size or troop size not available.

mangrove cover. This island faced maximum ecological damage during the December 2004 tsunami. The vegetation structure in this island, except for Pandanus, has become rare due to flooding of the coastal area and flushing of seawater in river beds. But other fruits such as coconut, banana, etc. are available in abundance in unguarded agricultural fields. The threats reported by Umapathy *et al*. (2003) still exist, such as domestic dogs that escaped the tsunami disaster. The main causes of habitat destruction of long-tailed macaques were found to be the construction of new settlements for rehabilitation of local people and the new road alignment from Campbell Bay to India Point. In addition, if the proposed marine jetty at Galatha Bay is materialized, the existing population from Galathea bay to India Point will face serious threats.

Long-tailed macaques also face pressure in the Great Nicobar Islands due to habitat loss and other anthropogenic pressures, just like other primates in the world. The local tribes as well as the settlers subsist on coconut and they have converted coastal areas near their villages into areas growing coconut, banana and tuber-bearing plants. Pandanus fruit is the staple diet of long-tailed macaques and in most of the places this habitat has been destroyed due to the tsunami. In addition, the exiting habitats are also being converted for

construction of new settlements, roads and development of other infrastructures. In view of these facts, an intensive long-term research study is needed for quantitative information on the status, distribution, demographics and habitat of this species to develop appropriate conservation and management plans.

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SIGHTING OF INDIAN GIANT FLYING SQUIRREL (Petaurista philippensis) IN PENCH TIGER RESERVE, MADHYA PRADESH

by Sunit Kr. Das

Introduction

Madhya Pradesh is a pioneer state in the national movement for conservation of flora and fauna. This area was described as extremely rich and diverse in wildlife from the earliest records available of the 16th century Deogarh Kingdom. The Pench Tiger Reserve is situated in the lower southern reaches of Satpura hills, on the border of Madhya Pradesh and adjoining Maharashtra in India, which holds a significant place in the natural history of Central India. The reserve lies between the geographical limits of 21°37' -21°50'30''N Latitudes and 79°07'45''- 79°22'30''E Longitudes and occupies an area of 757.907 km². According to Champion & Seth (1968), the vegetation of the area falls into two major categories: Tropical Dry Deciduous and the Tropical Moist Deciduous. The forest cover

in the reserve is formed by teak (*Tectona grandis*) and its associated species such as mahua (*Madhuca indica)*, tendu (*Diospyros melanoxylon)*, saja (*Terminalia tomentosa)*, bija *(Pterocarpus marsupium)*, mawai (*Lannea coromandalica)*, haldu *(Adina cardifolia*), aonla *(Emblica officinalis)*, amaltas *(Cassia fistula)* which occur on flat terrain and represent a transition from tropical dry deciduous to tropical moist deciduous forests. In some parts of the forest garari (*Cleistanthus collinus)* dominant patches are present. The undulating terrain and hill slopes have patches of mixed forest dominated by salai (*Boswellia serrata)* and dhaora (*Anogeissus latifolia)*. On rocky slopes, species like the dazzling white kulu *(Sterculia urens)* and papra (*Gardenia latifolia)* are visible. Some of the open patches of the park are covered with tall grasses interspersed with pallas (*Butea monosperma)* and ber (*Zizyphus jujube)*. Species like arjuna (*Terminalia arjuna)*, *Syzygium cumini* and lokhandi (*Ixora parviflora)* represent the evergreen trees inside the forest and they are familiar in riparian vegetation along nullahs and river banks. The ground is covered with a maze of grasses, plants, bushes and saplings. Bamboo is also found at several places.

Observations and discussion

As a part of the author's dissertation field work from January to June 2010 in Pench Tiger Reserve, Madhya Pradesh, 20 permanent transects established by the forest department were used to estimate densities of large herbivores. During the transect monitoring period mainly ungulates, primates, birds and reptiles were recorded. On 3 May 2010, surprisingly a flying squirrel was sighted on the transect line (21°53'47.4" Latitude and 79°31'21.8" Longitude). Flying squirrels are distinguished from other squirrels by the presence of an elastic membrane between the front and hind legs which acts as a parachute and permits the animal to glide from tree to tree. At first the squirrel tried to hide inside the branches of a saja tree (*Terminalia tomentosa*), but when we slowly moved in its direction it started to glide from one tree to another. Finally the author located three nests which were made inside tree holes of *Ficus* sp. and arjuna tree (*Terminalia arjuna*). During the observation period it was found that the squirrel mainly used the natural tree holes available in a circle of approximately 300 meter radius. From a central observation point the distance of different trees which were used by the individual was calculated (using a Newcon-optik rangefinder). Photographs were taken (Fig-1) with a Nikon Coolpix P-90 digital camera and the animal was identified as an Indian Giant Flying Squirrel (*Petaurista philippensis*) using the field guides of Prater (1971) and Menon (2003). *Petaurista philippensis* (Lee, 1998) was classified previously as *Petaurista petaurista* (Corbet and Hill, 1992). The surrounding vegetation was a mixed type with some patches of teak at the start of the transect. The ground was covered with dry leaves and invasive species such as *Lantana camera*. The transect line is located in the Mohgaon Beat of the Reserve Forest area which comes under the Rukhad range of the tiger reserve.

This mysterious animal is found over most of peninsular India. From the Satpuda Maikal landscape of Central India it was previously recorded from Kanha (Molur *et al.,* 2005) and Pench Tiger Reserve (Sen and Dungariyal, 2004). It is a nocturnal species and secretive in nature, which makes it one of the rare species to find. But in this instance it was observed it during the day time. Previous studies revealed that the genus *Petaurista* is extensively folivorous (Ando *et al.,* 1985). In the IUCN Red list it has been put in the "least concern" category and it is a Schedule II species in the Wildlife (Protection) Act, 1972 of India (Walston *et al.,* 2008). But from the conservation point of view it is very important to give complete protection to this arboreal species. It is an indicator species and its presence indicates the good health of the arboreal forest ecosystem. It is widespread in Southeast Asia and the major threats to this species are mainly expansion of human settlements and forest fires (Molur *et al.,* 2005). In Pench it was sighted in the reserve forest area, which indicates the good state of this region. The current threats to their survival are rapid habitat destruction and the increasing human population around the reserve. The people around the reserve heavily depend upon the forest resources, which decreases the forest cover day by day and may lead to local extinction of this sensitive species. Public awareness and the necessary steps taken by the Forest Department

are required to conserve this small mammal species and its habitats.

Acknowledgements

The author is grateful to the Forest Department of Madhya Pradesh and the Pench Tiger Reserve Authority for their support to complete this research work. I also want to acknowledge Shri Qamar Qureshi, Scientist-F, Wildlife Institute of India, Dehradun, for granting permission to conduct the six-month dissertation work under his supervision, and

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STRIPE-BREASTED PIED WOODPECKER (Dendrocopos atratus): FIRST BREEDING RECORD FROM GARHWAL HIMALAYA, INDIA

by Tribhuwan Chandra and Dinesh Bhatt

On 23 May, 2009 at 11.30h, the authors saw a woodpecker-like bird feeding two new young ones, sitting on a branch of tree at Kakragad in district Rudraprayag, Uttarakhand state (Western Himalaya), India (30˚13'N-78˚51'E). These birds were watched from a distance of about 100 m with Nikon 10x40 binoculars. The bird was later identified as a female Stripe-breasted pied woodpecker (*Dendrocopos atratus*) after consulting different field guides (Kazmierczak, 2006; Ali & Ripley, 1983; Grimmett *et al.*,1998). The bird had the following features: white-barred black back with black crown and crest; bill was greenish and horny, darker on culmen and tip; legs and feet were dusky leaden; underparts from throat to vent were boldly streaked with black, with only a faint indication of barring on the flanks; there was a black band on the hind neck and upper back, usually broader. After some time we saw another bird (probably male) which started feeding the young ones, having the same characteristics except with a crimson crown, crest and vent.

The distribution of Stripe-breasted pied woodpecker in India was thought to be around Khasi and Cachar hills, Nagaland and the hills of eastern Manipur, up to 2000 m in altitude, and probably also Mizo and the East Pakistan hill tracts as reported by Ali and Ripley (1983). However, no one has previously reported its presence in the hills of northern India, although 16 other species of woodpeckers are reported from this area. The status of the above-mentioned species is "resident but uncommon in the Indian subcontinent" (Kazmierczak, 2006). The description of the habitat used by this species mentioned in the literature includes open pine and oak forest, and stunted trees on mountainsides and ridges (Ali & Ripley, 1983).

Before the May 2009 observation, we sighted this species in April 2008 at the same place, though without any young ones, during our routine survey of the bird fauna of the Mandakini valley. We also found a typical woodpecker hole nest nearby, probably used by the same pair for nesting. Breeding season of the Stripe-breasted pied woodpecker runs from the end of March to the end of May (Ali, & Ripley 1983). Generally they lay 4 to 5 eggs. About 80 years ago a curious habit of this species was observed by Baker (1926) that in one nest both the male and female were sitting on the eggs at the same time. This is the first record of the species in northern India and even includes successful breeding. The presence of this species in the Garhwal Himalaya provides an opportunity to recalculate its range size.

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FOREST NEWS

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THE FUTURE OF FORESTRY IN THE GREATER MEKONG SUBREGION IN THE CONTEXT OF THE FOOD-WATER-ENERGY NEXUS

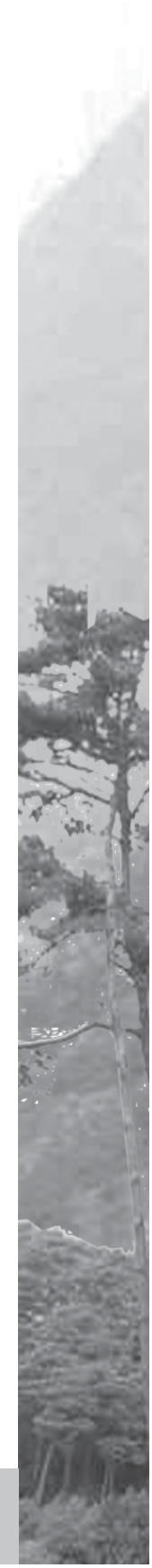
Extracts from a paper by J.S. Broadhead, B. Damen, P.B. Durst and C.L. Brown (FAO Regional Office for Asia and the Pacific) presented at the International Conference on GMS 2020: Balancing Economic Growth and Environmental Sustainability - Focusing on Food-Water-Energy Nexus, held 20-21 February 2012, Bangkok, Thailand. Proceedings of the Conference at http://www.gms-eoc.org/uploads/resources/76/attachment/International%20Conference%20on%20GMS%202020%20(full%20proceedings%20-large%20file).pdf

Introduction

Forests in the Greater Mekong Subregion (GMS) provide wood and non-wood forest products and also contribute ecosystem services such as biodiversity conservation, climate change mitigation, watershed protection, and recreational, cultural, and spiritual values. Many of the region's poor rely on wood for heating and cooking needs while non-wood forest products provide food or may be traded in exchange for cash for food. A large proportion of the subregion's poor live in forested areas; and the 2015 target for attaining the Millennium Development Goal of halving poverty from 1990 levels is just around the corner.

Myanmar has the largest area of forests among GMS countries, while the Lao People's Democratic Republic (Lao PDR) has the highest proportion of forest cover. In the subregion as a whole, forest area is falling at –0.4 percent per annum, although this figure masks some countervailing trends among the constituent countries. In Viet Nam, forest area is increasing rapidly as a result of major public and private afforestation efforts. In Thailand, forest area is also increasing, while in Cambodia, Lao PDR and Myanmar, rapid deforestation is taking place. Rates of change of forest area with respect to natural and planted forests also show considerable differences. While net forest area (including natural and planted forests) fell by 8.0 million hectares between 1990 and 2010, the area of natural forests fell by 12.7 million hectares in the GMS; planted forest establishment of 4.7 million hectares accounted for the difference between these two figures. The primary cause of deforestation is agricultural expansion for production of food and other agricultural commodities, both to supply expanding populations in the subregion and for export.

By 2020, an additional 21 million people will join the subregion's population, representing a net growth of 9.4 percent, taking the total population to 249 million people. At the same time the rural proportion of the population is expected to fall from 70 percent to 65 percent as people move to urban areas in search of employment opportunities. Economies are expected to grow rapidly and foreign direct investment in the subregion is likely to increase, including in rural sectors. Global demands for land and for agricultural commodities, including food and energy products, are set to increase further. Demands on forests, including for wood and timber, will continue to increase as populations and incomes grow, while at the same time demands for ecosystem services will continue to expand.



Forests and forestry intersect with the food-water-energy nexus at several points. For example, food is gathered in forest areas, often by poor rural dwellers; forests also help to maintain the quality of water essential for fisheries and agricultural production. Forests provide fuelwood and wood for charcoal production and potentially provide a sustainable and low carbon source of commercial energy. Trees generally differ from agricultural crops in that they often do not produce foodstuffs, but through more extensive rooting systems and their perennial nature can use more of the available water and produce greater volumes of biomass than annual, and less deep rooting, agricultural crops.

The nature of the food-energy-water nexus in the GMS differs, however, from that in more water limited areas of the world. In all except the dry zone of Myanmar, GMS total annual rainfall exceeds 1,000 millimeters and in large parts of the subregion exceeds 1,500 millimeters. In this context, the trade-offs between food, energy, and water use/production are not acute and, in comparison with most agricultural crops, the higher levels of water used by trees and forests can be viewed as a benefit under certain circumstances. Greater use of annual precipitation means higher levels of biomass production. Trees and forests can help control flooding in small and medium-sized catchments during less extreme rainfall events (FAO, 2005). They can help desaturate soil, thereby reducing landslide risk, and also stabilize soil through deep and extensive rooting. In dryer catchments, trees can, however, lower water tables and reduce stream flow. This can be the case in particular with exotic species, which generally have higher levels of productivity and use more water.

While using more water than annual crops, forest production systems are, in general, less labor and energy intensive than agriculture. For example, fertilizer and pesticide/herbicide inputs are lower and tending operations are generally confined to planting, thinning, and harvesting on a cycle of 5 years or more. With rising energy prices, forest products prices should therefore be less affected than those of agricultural products. Although lower labour requirements may constitute an advantage with rural labour markets becoming increasingly constrained in the context of expanding industrial and service sectors in the region, forests are also generally located away from urban centres/areas of high energy demand and beyond zones that are optimal for agricultural production. While reduced competition with crop production still constitutes an advantage, distance from markets also reflects the lower comparative value of forest products.

With growing interest in the role of forests in climate change mitigation, continued availability of funds from a post-Kyoto replacement for the Clean Development Mechanism, and growing interest in afforestation and reforestation in the region, forests may be set to play a greater role in moving the region towards a green development path, including in relation to energy production. The forestry sector must be cognizant of changing demands in determining potential impacts and trade-offs and position itself for the coming challenges. Other sectors and decision makers must be made aware of the benefits forestry can offer.

Synthesis

In general, the GMS experiences some undernourishment among its population, while having a good supply of water in most areas, high energy import dependence, and low carbon efficiency per unit energy production (low use of renewables). In this context, the main constraints related to the GMS food-water-energy nexus that are likely to impinge on forestry are competition for land for the production of food to address undernourishment and for energy feedstocks to reduce import dependence. Given the rising levels of economic liberalization and demand for energy, in the PRC in particular, impacts in the GMS are likely to come from increases in global as well as domestic demand, especially in view of the large remaining areas of non-agricultural land, i.e., forestland and wastelands, such as *Imperata* grasslands.

Land and water resources in the GMS have already been identified by global investors and production of cash crops has increased greatly in recent years as previously noted. In Thailand and Viet Nam, although loss of primary forest continues, overall forest cover is increasing. Cambodia, Lao PDR, and Myanmar, however, face a different

situation, being less developed and having larger forest areas and higher requirements for economic development. The result could be conversion of natural forests on a large scale but also, depending on the economics and political decisions made, expansion of planted forests.

Some aspects of forests' involvement in the food-water-energy nexus will be important in determining their role in future land management, e.g., the level of water use in comparison with crops, location of forests in relation to agriculture and area of energy consumption, watershed protection, carbon emissions of wood energy, and energy input requirements for forest production systems. On a longer time scale, the role of forests in climate change mitigation will also be of importance. Other areas will not be so important in direct relation to the nexus, e.g., traditional woodfuel use and food from forests.

Considering the trade-offs between food security and bioenergy production, a key issue will be whether this will result in a trade-off between food production and climate change mitigation and if so, whether forests can play a part in simultaneously providing climate change mitigation and helping reduce food price increases.

Given the carbon profile of modern stationary wood energy production and the separation of agricultural and forest areas, there is potential for forests to play an important role in reducing energy import dependence and carbon emissions while competing less with food production than agriculture-based bioenergy. The main deciding factors are the economics of wood energy production, the desire of governments to reduce energy import dependence and GHG emissions and government effectiveness in implementing policy.

With respect to the economics of wood energy generation, although there has been much discussion about the high conversion efficiencies and competitiveness of modern wood energy power generation systems, there remains some skepticism, centered on the following issues:

- The price of competing energy sources. The prices of oil and coal are still lower in real terms than during the peaks of the 1980s when wood energy was not found to be competitive in practice.

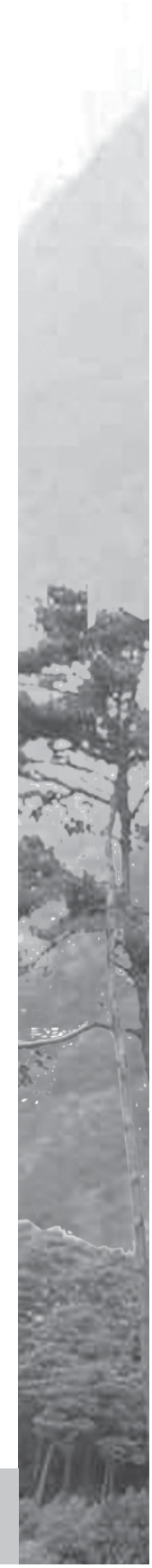
- Wood grown for energy almost always goes to a higher value use. Given the advances in wood technology, there is even more "competition" because panels and reconstituted wood products can now be made out of "junk" wood that previously had little value other than to burn.

- Where plans are for wood to be grown to burn, there is now much greater competition for land than in the past as a result of the recent trend of rising food prices.

- The cost of collection/gathering/transport of wood rises with increasing costs of diesel or petrol (unless machinery is driven by wood-powered electricity) and its costs are also higher where infrastructure and mechanization are not highly developed. The IPCC bioenergy review indicates that handling and transport of biomass from production sites to conversion plants may contribute 20–50 percent of the total costs of the biomass production. In large parts of the GMS, infrastructure is not well developed and mechanization is limited.

A key question is whether the situation has changed from the period of high fossil fuel prices 30 years ago. If not, wood use for commercial industrial energy (or electricity generation) is only likely to be economic in places where wood residues are plentiful and already amassed (e.g., sawmills). Locations not connected to the national grid could also be an attractive opportunity, but there are few examples of successful wood-fired power generation in such places.

Although substantially higher energy prices may be necessary before wood energy opportunities become viable, many developed countries have wood-fired power stations as part of their energy generation "portfolio." Such early involvement in the sector is likely to yield benefits in the longer term as energy prices rise and more detailed comparisons of the benefits offered by different renewable strategies need to be made. It should also be considered that most wood-fired power



stations have been built in northern climates where potential tree growth rates are much lower than in the warm and well watered conditions of the GMS. The availability of funding for clean development, and in relation to bioenergy and carbon emissions targets, could also help push the balance in favor of wood energy. Furthermore, strategic interests and comparisons of the benefits of wood energy production systems with other alternative and renewable energy sources may increase the attractiveness of wood energy. Reduced competition with food production and more competitive greenhouse gas profiles are key factors.

In determining a possible role for wood energy, relative prices of goods and services will be important. While price increases for timber are not presently of the magnitude of palm oil and rubber, timber prices are nonetheless high compared to the recent past. PES associated with forests and wood use are also gaining ground, albeit slowly. This may drive some rationalization of land use and expansion of timber plantations onto land that is best suited for forestry. As such, the subregion could see increased plantation establishment on marginal agricultural land or even non-marginal land if there are strong competitive advantages for forestry, such as proximity to a mill. Further clearance of natural forests for plantation establishment could also result. Such activity would almost certainly result in the loss of environmental services, especially where areas of high conservation value forest are concerned; safeguards against this possibility would be essential.

Other issues that will need to be considered are the impacts of purpose-grown energy plantations. A main concern would be local resistance against planting eucalyptus and acacia and the risk of natural forest being cleared/consumed. Plantations also contain less biodiversity and generate less leaf litter and other organic inputs than native forests, and groundwater depletion can be exacerbated by deep-rooted exotic tree species that use more water than native species. In addition, biomass power generation technologies often do not have technical standards associated with their production and distribution and developers will usually not adopt technologies without performance insurance.

Conclusions

To provide the greatest benefit to current and future generations, foresters in the GMS region need to take into account changing demands on the sector and others need to be aware of the benefits forestry can offer. Demands for agricultural land for food and energy production may mean that pressures for forest conversion increase. At the same time, climate change-related demands are likely to promote forest carbon sequestration and storage and forest-related climate change adaptation measures, particularly in relation to managing upland protection forests.

Given these demands, any conversion of forest to agricultural production should take into account trade-offs related to poverty, watershed- related services, and climate change. Within the forest sector, improved efficiency of service provision and attention to the quality of the often highly degraded forest resources in the subregion will be a key priority to 2020.

Agricultural intensification will be a priority if forest clearance is to be avoided. Rice yields, for example, differ markedly between GMS countries and great increases in productivity could be made through technological improvements. Increasing intensification may, however, mean increasing the risk of water pollution. Riverine and mangrove forests will be of increasing importance in mitigating eutrofication and hypoxia of water bodies and avoiding the creation of marine dead zones, which in turn will have negative effects on food security, given the nutritional importance of fisheries production.

To help avoid scarcities in relation to food, energy, or water a combination of strategies encompassing the following activities will be important:

- resource planning, including water audits and assessment of water balances, infrastructure development, market-led resource pricing, including externalities; and
- technological innovation, including support for research and development.

In relation to forestry in the GMS, a key concern will be preventing further forest loss, particularly in relation to high value forests, whether in terms of carbon storage, biodiversity, or watershed protection or other values.

Lifting agricultural productivity and reducing extensification must be key elements of reducing pressures on forests. Reducing postharvest losses is a particularly important factor in increasing food production. Improved efficiency in food utilization and distribution is also of great importance and will help reduce demands on agricultural expansion at the expense of forest area.

RAP NRE STAFF MOVEMENT

Mr. Simmathiri Appanah is retiring after 12 years at FAO's Regional Office for Asia and the Pacific He was appointed Senior Programme Adviser of the Forestry Research Support Programme for Asia and the Pacific (FORSPA)(GCP/RAS/163/NET) in June 2000 and served in that capacity until June 2003. He was then appointed as the National Forest Programmes Adviser for Asia and the Pacific, in which capacity he served until January 2013. Mr. Appanah was formerly with the Forest Research Institute Malaysia (FRIM) from 1981-2000, where his last position was as the Director of the Division of Natural Forests.

Joel Scriven, a joint US/UK national, has joined the RAP NRE group as Forestry Officer (REDD+) under the project UNJP/GLO/386/UNJ (UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation, UN-REDD Programme), effective 21 January 2013, for an initial assignment period of one year. In this position he supports countries to build their technical capacities on forest monitoring and measurement, reporting and verification (MRV) for REDD+ – the forestry climate change mitigation mechanism under the UN climate change convention. Mr. Scriven joins RAP after more than two years in FAO HQ, Rome; having worked first as a consultant and then as a staff member.

Mr. Scriven completed his PhD in Geography and the Environment at the University of Oxford's Environmental Change Institute, where he researched the local social, economic and institutional engagement of REDD+ in the buffer zones of Amazonian national parks in Peru. He has consulted widely on environment and development issues, including the design of a REDD+ project for a Peruvian NGO, sourcing carbon offsets from rural Bolivia for JPMorgan ClimateCare, international forestry frameworks for the Forestry Commission GB, REDD+ MRV for UNDP and sustainable development strategies for the British Council in Brazil.

Lara Mia Herrmann, a national of Germany, joined the RAP forestry group in December 2012 as an intern. Among her duties are preparing items for Forest News, drafting a chapter called "Drivers of Change and their Impacts on Communities and Forests in Southeast Asia" for a publication of the ASEAN Social Forestry Network and providing support with conceptualizing and planning a workshop to implement an Asia-Pacific Forestry Communication Network. She is also involved in the organization of the Executive Forest Policy Course to be held in Bhutan under the auspices of the Asia-Pacific Forest Policy Think Tank. In addition, she is researching and writing about canopy walkways in Asia-Pacific and has helped with research on the potentials of short rotation coppice for bioenergy in Asia-Pacific.

Ms Herrmann is studying for a Bachelor of Science in International Forest Ecosystem Management at the University of Sustainable Development Eberswalde, Germany.

FORESTRY OUTCOMES FROM UNFCCC COP 18

Prepared by Ben Vickers, Programme Officer, REDD+

On December 6, 2012, for the 18th time, climate change negotiators left their annual Conference of Parties (COP). And for the 15th time in succession, since Kyoto in 1997, they left without a comprehensive international agreement. At recent COPs of the UN Framework Convention on Climate Change (UNFCCC), discussions on forestry issues have often set the pace. This time, in the closing statements, forests were as scarce as in the dusty Doha landscape outside the conference halls.

The main outcome of COP18 was a package of work programmes and reports labeled the "Doha Gateway." Although reiterating the commitment of all countries to aim for a full agreement on tackling climate change by 2015, which would come into force in 2020, the Gateway represents no more than incremental progress towards such an agreement. The end of 2012, however, was the end of the first commitment period of the Kyoto Protocol – the only existing international framework for greenhouse gas (GHG) emission reductions. In the absence of a new agreement, the Protocol was duly extended into a second commitment period, which will last for 8 years. So far, only the EU and Australia, among the major emitters, have signed up to this second phase, representing as little as 15 percent of global GHG emissions. Although other countries may join this small club in coming months, overall, the Doha outcome has attracted strong criticism from many quarters for a lack of ambition and financial muscle.

The programme of work launched as the Bali Action Plan in 2007, carried out by the Ad Hoc Working Group on Long-term Cooperative Action (AWG LCA), came to a limp conclusion in Doha. A significant part of the AWG LCA's agenda, and perhaps the most visible area of progress to date, was the discussion track on Reducing Emissions from Deforestation and forest Degradation (REDD+). Hopes were high that Doha would see considerable progress towards a fully-agreed framework for an international REDD+ mechanism, to come into force in the future as a part of a comprehensive climate change agreement. In the first week of the COP, talks progressed better than expected, but on the sixth day they came to a shuddering halt.

The sticking point was the issue of verification. Industrialized countries, with Norway at the fore, insist that national reports of emission reductions under a future REDD+ mechanism should be verified by auditors drawn from a roster of experts accredited by the UNFCCC itself. The countries hoping to participate in REDD+ object to this, chiefly on the grounds of sovereignty, proposing instead a body to be called the Consultative Group of Experts (CGE) for the verification role. The composition of the CGE would be deliberately weighted towards citizens of the countries hoping to benefit from REDD+. Without agreement on verification, there could be no progress on the financing issues that are so crucial to maintaining the interest of potential participating countries.

The stalled talks on REDD+ negatively affected the general perception of the outcome of the COP, particularly among civil society organizations. Parties did, however, agree to resume discussions in Bonn in mid-2013, and set out a work programme on results-based finance for the coming year, including the incorporation of 'non-carbon benefits' of good forest stewardship into any future REDD+ financing mechanism. Such benefits are defined very broadly, including such elements as hydrological functions of forests, biodiversity conservation and livelihood improvement. The broadening of the REDD+ agenda was also reflected in the increased use of the term Agriculture, Forests and Other Land Use

(or AFOLU) in side events and the corridors of the conference halls. Interest in AFOLU as an umbrella term has been steadily increasing since it was introduced in guidelines developed by the Intergovernmental Panel on Climate Change (IPCC) in 2006. Both 'non-carbon benefits' and AFOLU, while attractive as concepts, add several layers of complexity to the simple, elegant link between positive financial incentives and forest carbon stocks that lies at the heart of REDD+.

The Green Climate Fund (GCF), which was established two years earlier at COP16 in Cancun, has yet to become operational. At Doha, however, it was agreed that the GCF would be based in South Korea, and it is still considered as one long-term potential source of REDD+ finance. COP18 also saw discussions on new ideas for financing, with potential relevance for the forest sector beyond REDD+. The Framework for Various Approaches (FVA) would give countries greater freedom over national rules for crediting emission reductions. Conversely, the New Market Mechanism (NMM) would require national crediting rules to be approved by the UNFCCC. As with REDD+, much of the unresolved debates hinge on the issue of sovereignty.

One more intriguing development is the fate of Forest Day – the highly successful event organized by the Collaborative Partnership on Forests and hosted by CIFOR at the halfway point of every COP since Bali in 2007. Forest Day has played a significant role in putting forests at the forefront of the climate change agenda, and has seen the genesis of many important innovations and conceptual shifts in REDD+, AFOLU, the role of forests in climate change adaptation, and other areas. At Doha, the new Director General of CIFOR, Peter Holmgren, announced that Forest Day 6 would be the last of the series. From 2013, the event would instead become 'Landscapes Day'. This is certainly in line with the broadening of the discussions regarding forests and climate change, as noted above, and may serve to build awareness, within the forestry world and without, of the importance of inter-sectoral learning and collaboration. We can only hope that, by the time Landscapes Day 1 is launched, some of the impetus lost at Doha has been regained.

UN DECLARES 21 MARCH THE INTERNATIONAL DAY OF FORESTS

The United Nations General Assembly has proclaimed 21 March the International Day of Forests. The day will be observed starting from 2013 in order to celebrate and raise awareness of the importance of all types of forests and trees outside forests. The day captures the spirit of and keeps up the momentum generated by the International Year of Forests 2011, which enabled countries to promote the sustainable management, development and conservation of all types of forests and trees.

On the International Day of Forests, countries are encouraged to get involved in local, national and international efforts in favour of forests and trees, such as tree planting campaigns.

Please visit the following link:
http://www.youtube.com/watch?feature=player_embedded&v=1_kYSjnCsqY

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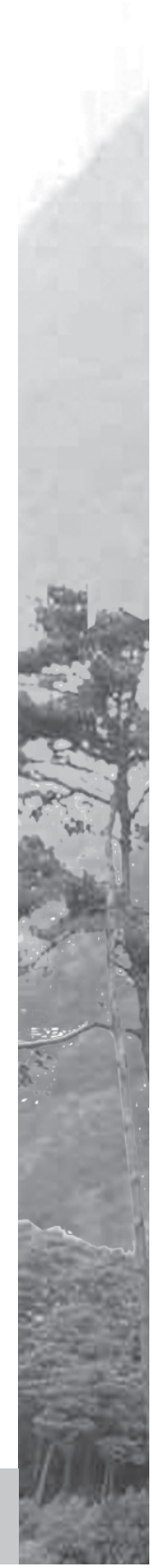


ASIA-PACIFIC FORESTRY CHIPS AND CLIPS

CHINA EXPLORES AFFORESTATION TO BOOST CARBON SINKS

China will construct a pilot demonstration area of bamboo forests in Zhejiang Province to promote the expansion of carbon sinks. China's development of sustainable bamboo management has been going on for several years. In a seminar during the UN Climate Change Conference in Doha, Qatar, the Bamboo Carbon Afforestation Methodology was officially released. It is a globally advanced scientific result. Further research will focus on carbon sinks and carbon sequestration measurements of bamboo products. Carbon transactions should increase planters' income in the long run.

– China.org.cn –

VIETNAM, NORWAY AND UN ANNOUNCE US$30 MILLION FOR REDD+ IN VIETNAM

During a UN-REDD Programme side event at the Doha Climate Change Conference (COP18) in December 2012, Norway signed a US$30 million financing agreement with the United Nations to support a second phase of the UN-REDD National Programme in Vietnam. This second phase (2012-2015) will significantly scale up the work Vietnam has been doing to reduce emissions from deforestation and forest degradation (REDD+).

– UN REDD Programme –

SHRINKING SUNDERBANS PUSH ROYAL BENGAL TIGER TO THE EDGE

Fast-disappearing mangrove forests of the Sundarbans pose a question mark over the future of the Royal Bengal Tiger, an endangered species, say scientists.

Rapid deterioration in mangrove health is causing as much as 200 meters of the vegetation-rich coast to disappear annually in the Sunderbans, according to zoologists.

Nathalie Pettorelli, from the Zoological Society of London (ZSL) and senior study author, said: "Our results indicate a rapidly retreating coastline that cannot be accounted for by the regular dynamics of the Sundarbans. Degradation is happening fast, weakening this natural shield for India and Bangladesh."

The Sundarbans is the largest block of continuous mangrove forest in the world, native to nearly 500 species of reptiles, fish, birds and mammals, including the world famous Royal Bengal Tiger, the journal *Remote Sensing* reports.

Expanding human development, rising global temperatures, degradation of natural protection from tidal waves and cyclones are all inevitably leading to species loss in this richly biodiverse part of the world, according to a ZSL statement.

Although mangroves are rare, they are an important barrier against climate change, providing protection to coastal areas from tsunamis and cyclones. They are also the most carbon-rich forests in the tropics with high carbon sequestration potential, meaning their degradation and loss substantially reduce our ability to mitigate, and adapt to, predicted changes in climatic conditions.

Mangroves comprise less than one percent of all forest areas across the world, amounting to roughly half the size of the UK. It is essential that the protection of mangroves becomes a priority, particularly for the charismatic species which will disappear with them if no action is taken to preserve their habitat.

– The Times of India – Jan 11 –

DENR SURPASSES 2012 GREENING TARGET

TUGUEGARAO CITY, Jan 7 (PIA) – The Department of Environment and Natural Resources (DENR) was able to surpass its target in the greening program in 2012 nationwide as per a report of DENR Undersecretary Demetrio L. Ignacio.

According to the DENR reports, the agency targeted 300,000 hectares of national greening program (NGP) planting sites in 2012, and some 329,000 hectares of NGP sites were planted with different species of forest trees and fruit bearing trees.

DENR is confident that the country will surpass this year's target in the NGP program. The NGP targets the planting of some 1.5 billion trees covering about 1.5 million hectares, for the 6-year period from 2011 to 2016 on public land.

Ignacio said that based on the report of the Food and Agriculture Organization (FAO), Philippines has the third-fastest-growing forest in Asia, next to China and Vietnam and the second-fastest in Southeast Asia.

– Philippine Information Agency –

ASIA-PACIFIC REGION LEADS IN FOREST PRODUCTS INDUSTRY RECOVERY

The global forest products industry is slowly recovering from the economic crisis, with the Asia-Pacific region and particularly China taking the lead, according to new data published by the United Nations Food and Agriculture Organization (FAO).

On average, global production of the main forest products grew by one to four percent in 2011 compared to 2010, FAO stated in a news release. Production of wood-based panels and paper in 2011, for example, was above the pre-crisis levels of 2007 and appears to be growing relatively strong in most regions.

Currently, FAO's forest product statistics database contains 1.2 million entries, covering production and trade of 52 products, 21 product groups and 245 countries and territories. The free online database now contains statistics for the last 50 years.

"The FAO database provides the world's most comprehensive and internationally comparable statistics for forest products, a crucial tool for making policy and investment decisions,"said FAO's Assistant Director-General for Forestry, Eduardo Rojas-Briales.

The agency pointed out that China is increasing its importance as a producer of forest products, becoming the world's second largest producer of sawnwood – which encompasses planks, beams and boards –after the United States, and having overtaken Canada.

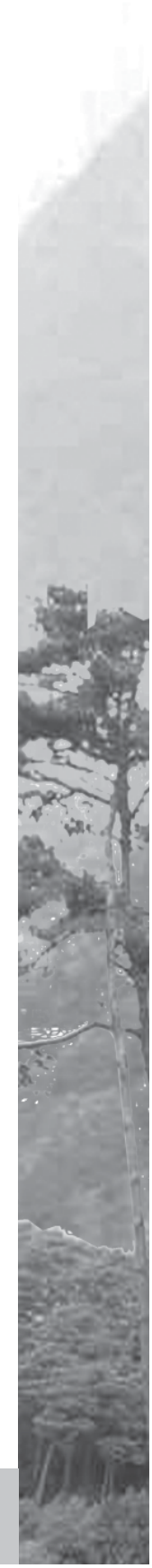
China has also increased its lead over all other countries as a producer of wood-based panels, paper and paperboard. In 2011, China produced 11 per cent of the world's sawnwood, 38 percent of its panels and 26 percent of its paper.

China is also playing a key role in international trade in forest products, being the largest importer of industrial roundwood, sawnwood, pulp and wastepaper and the largest exporter of wood-based panels.

The country is also the fifth largest importer of paper and paperboard, despite a huge increase in domestic production since 2007. In 2011, China's imports of all forest products amounted to $43 billion and account now for 16 percent of the global total.

FAO noted that a high proportion of Russian industrial roundwood exports previously went to China, but the amount fell from 2007 to 2009 due to log export restrictions in Russia. Chinese imports of industrial roundwood have recovered though and some other major producing countries, including the US, Canada and New Zealand, have expanded exports to China.

– Press Release – UN News –



UPCOMING MEETINGS AND COURSES

Second Announcement - World Teak Conference 2013 – 25-30 March 2013 – Bangkok, Thailand

In the context of world-wide depletion of forest resources, many countries took to forest conservation, sustainable forest management and timber certification, leading to reduced supply of hardwoods. Coupled with the high demand for such woods, the gap between production and consumption grew disproportionately, which almost led to a crisis. It is estimated that the global demand for tropical hardwoods will be 136 million cubic meters by 2050. The consensus is that teak has an important role to play in meeting this global hardwood crisis due to the superior quality and durability of its wood and the wide adaptability of the species to grow in varying environments.

One major finding from the last teak conference held in Costa Rica in 2011, and a subsequent FAO report, is that globally planted teak forests constitute the only planted hardwood resource that is increasing in terms of area.

It is increasingly being realized that teak forests have important ecological roles to play in guarding our environment. The World Teak Conference 2013 offers excellent opportunities for all connected with teak, and more generally with planted and natural forests, to discuss at length the problems associated with production and marketing of teak wood. Four parallel symposia are planned to cover a range of topics connected with teak and related subjects. The conference is expected to be a meeting point for not only growers and traders, but also of wood technologists, researchers and other professionals involved in the teak business.

For additional information, visit the conference website: http://ww.worldteak2013.org

Forest Policies in the Post Rio+20 World: Executive Forest Policy Course 2013 Thimphu, Bhutan, 27 May – 6 June 2013

South Asian countries continue to face major challenges in managing their forests sustainably. The complex situation in the subregion is characterized by high population densities, severe resource constraints, and persistence of poverty and food insecurity, which will be accentuated by problems stemming from climate change. Demand for forest products as well as ecological services are escalating and these need to be met in the context of the larger changes taking place in the society.

This South Asian forest policy course with the theme "Forest policies in the post Rio+20 world" is being organized as part of an ongoing initiative of the Asia-Pacific Forestry Commission and FAO to enhance the policy formulation and analysis capabilities of senior officials in forestry organizations in the region. This sixth course, jointly organized by the SAARC Forestry Centre and FAO under the auspices of the Asia-Pacific Forest Policy Think Tank, to be held 27 May to 6 June 2013 at Thimphu, Bhutan, aims to:

- Provide an understanding of the implications of larger societal changes including globalization and localization and the imperatives of current and emerging international agreements and conventions on the forest sector;
- Share experiences and best practices in adapting the forestry sector in the context of the transition to a Green Economy; and
- Explore ideas and tools for policy analysis and development and their application in South Asia.

Specifically, the course will focus on the implications of the recommendations of the Rio+20 Conference and the emerging policy and institutional issues that the forest sector will have to address in the pursuit of a "green economy

path." Leading forest policy experts will deliver nine modules specifically focusing on South Asian forest policy analysis, formulation, development and implementation, taking into account the emerging changes at the global, national and local levels.

A maximum of 25 participants, sponsored by governments, international organizations, bilateral and multilateral projects, private sector and civil society organizations, will be provided a unique opportunity to analyse, discuss and debate forest policy issues and share their experiences. The course will particularly focus on facilitating "outside the box" thinking to develop innovative solutions drawing upon the vast and diverse experience of the teachers and participants.

For more information and application please contact Patrick.Durst@fao.org (FAO) or sangaywangchuk33@yahoo.com (SAARC Forestry Centre).

International Conference on Forests for Food Security and Nutrition

Forests harbour a large number of woody plants, climbers and herbs that provide food, fibre and medicines. Along with trees on farms and agroforestry, forests can be a direct source of food, fuel, employment and cash income. Those resources and opportunities are often utilized by women, indigenous peoples and the rural poor.

Along with the direct impacts of using forests for food security and nutrition purposes, they also serve a wider range of ecosystem services facilitating the availability of food, such as: clean water delivery; biodiversity protection (estimated 80 percent in forests); maintaining and restoring soil fertility; provision of fodder for livestock; and being hosting pollinator species.

Utilizing forests for food security and nutrition seems logical, but also brings about number of problems and challenges which have not been adequately addressed such as access and rights, including tenure for local people and forest-dwellers respectively.

From a political point of view, the contribution of forests to food security is often poorly understood, underestimated and inadequately reflected in many national development and food security strategies. This might be due to the fact that policy makers rarely relate forests to food security and nutrition, although the general topic of food security and nutrition is high on the political agenda at global, regional and national levels. This may be due to with the lack of data, especially in developing countries in the Asia-Pacific Region.

The "International Conference on Forests for Food Security and Nutrition" aims to enhance the benefits for rural people from forests, trees on farms and agroforestry. It is being organized by the FAO Forestry Department and partners and will take place 13-15 May in Rome, Italy.
The objectives of the conference are:

- To highlight the different ways in which forests, trees on farms and agroforestry systems contribute to food security and nutrition;
- To identify key challenges and bottlenecks hindering the contribution of forests, trees on farms and agroforestry systems to food security; and
- To explore policy options, innovative approaches and opportunities to increase recognition of the importance of forests and trees in reducing the number of food-insecure and malnourished people, improve the availability of information and appropriate technology and increase access to forests by the rural poor.

The conference will emphasize broad-based interdisciplinary approaches that support access to resources, participatory decision-making and equity as a way of improving livelihoods, food security and nutrition, especially among the rural poor.

For more information please visit:
http://www.fao.org/forestry/events/en/

POPLARS AND WILLOWS A MAJOR FACTOR IN IMPROVING LIVES

Prepared by Walter Kollert, Secretary of the International Poplar Commission

At the end of October 2012, 197 participants from 22 countries gathered in Dehradun, India, to attend the 24th Session of the International Poplar Commission (IPC). The Indian Council of Forestry Research and Education (ICFRE) and the Forest Research Institute (FRI) jointly hosted this high-profile event that brought together international stakeholders, forest scientists, researchers, tree growers, processors and traders to address topical issues related to the theme *"Improving Lives with Poplars and Willows"***.** Altogether, 101 scientific oral presentations and 51 posters were presented during this Session.

Formal IPC Sessions are held every 4 years to demonstrate unique applications of poplar and willow culture and management in different country contexts. In 2012, the session was organized for the first time in India at the magnificent Forest Research Institute in Dehradun, which is rich in forest history and has served as a center of excellence for forestry research and education for more than 100 years.

In recent years India has undergone a remarkable economic transformation and has become a significant international player in sustainable natural resource management with the capacity and capability to share the knowledge and technology through established networks around the world. In this context the IPC Session provided an excellent opportunity for India to demonstrate its rich application of poplars with agriculture that highlight the achievements and the potential of planted forests and their end uses. This event certainly marked a significant milestone in the history of the International Poplar Commission.

The International Poplar Commission

The IPC was founded in 1947 by 9 European countries and has since increased its membership to 37 countries from temperate and arid regions. It constitutes the only legally binding agreement on forests hosted by FAO. For the past 65 years, the IPC, through its member countries and 7 Working Parties, has provided a bridge linking research of poplar and willow cultivation, conservation and utilization with development policies, planning and implementation practices. Through effective networks, long established partnerships, and comprehensive databases, the IPC has successfully transferred poplar and willow germplasm, knowledge and technology between scientists, growers, processors and users around the globe.

Significance of poplars and willows

Poplars and willows account for more than 95 million hectares of natural (82 million hectares) and planted forests and agroforestry production systems (13 million hectares) globally. They are among the fastest growing trees on the planet in temperate and arid regions, in many of which poplars and willows have become significant forest resources that support communities, smallholders, farmers and contribute to sustainable livelihoods, food security and poverty alleviation. India is, in fact, a magnificent example on how the cultivation of poplar trees can contribute to sustainable livelihoods, food security and poverty alleviation.

Poplars have long been favoured by Indian farmers for their fast growth, easy propagation, adaptation to poor soils, easy cultivation and for the broad range of possible uses. In India, poplars are the most popular tree species in agroforestry production systems, where they are intercropped with agricultural crops like wheat, sugar cane, paddy rice and shade-tolerant fodder crops due to their fast growth, outstanding properties and quick and high financial returns. These mixed intercropping production systems, where different

crops are grown on the same piece of land, developed by farmers in response to their own needs, have demonstrated that they are more effective in meeting the expectations of rural communities than specialized monocultures.

Poplars and willows provide a wide range of environmental services (such as shelter, shade and protection of soil, water, crops, livestock and dwellings) and play an important role in phyto-remediation of severely degraded sites, in the rehabilitation of fragile ecosystems (including combating desertification), in forest landscape restoration, are often integrated with other land uses, and, as fast-growing species, are effective at sequestering carbon. They create employment, boost exports and contribute to social and economic development and sustainable livelihoods in rural areas.

IPC needs reform

However impressive the achievements may be, IPC is also aware of critical aspects that deserve serious consideration. Despite the persisting interest in poplars and willows, and new uses in the fields of environmental preservation and bioenergy, membership has not increased for some years, and developing countries are a minority as members of the IPC; the National Poplar Commissions of a number of member countries, with notable exceptions, are facing internal difficulties and are not very active. The relatively narrow geographic and technical focus of the IPC makes it difficult to clearly recognize the link with the FAO mandate, and therefore, to attract multi-lateral and bilateral donor and international program interest and funding, although vast areas of Central Asia, India, North Africa would greatly benefit from an improvement of poplar and willow culture.

Following a recommendation by the Committee on Forestry of the FAO, in September 2012, the IPC Executive Committee decided in Dehradun to recognize and support a reform process to maintain IPC's relevance in a world that is very different from that of 65 years ago. It has commissioned a Task Force to develop and implement future options of reform. These options will have to consider a broader geographic area, a wider socio-economic and technical context, and an even stronger attention to the worldwide concern about climate changes, soil preservation, and the efficient use of water resources. This may also mean expanding the scope to include other species of high socio-economic or ecological significance. The IPC is aware that business-as-usual is not an option and that a new strategy for the future must be devised. With a renewed appreciation of its full potential and consequent support from the international community, the IPC can contribute to sustainable development and sustainable land-use thanks to its unique experience in addressing the livelihoods and the well being of rural communities as its primary objective.

The Forest Research Institute in Dehradun was built in 1906

Poplar plantations create jobs for women in rural areas.

EDIBLE INSECTS ARE NOT A NEW SENSATION -- 80% OF THE WORLD'S POPULATION EAT THEM!

Prepared by Lara Mia Herrmann, Intern (FAO Regional Office for Asia and the Pacific)

Insects comprise more than 60% of all organisms, over 80% of all animals – and it is estimated that 80% of the world's population include them in their diet. Still, insect consumption varies greatly by country and is often a matter of food preference. In Thailand, the demand for edible insects increases as living standards improve. This negates the common belief that eating insects is mainly an indigenous or poor people's habit.

The practice of eating insects is known as entomophagy and is recognized as having minimal environmental costs and in many cases as contributing to alleviating malnutrition. In most tropical regions edible insects are harvested from the wild; insect farming only takes place on a very limited scale or at the household level in Southeast Asia. In most temperate zones, insects are reared by companies who sell them as pet or fish feed.

The nutritional value of insects depends on species, insect stage, and the type of feed for insects. Regarding the nutritional contribution of insects to diets in traditional and informal food systems, it is known that the protein quality is generally high, similar to other animal meat sources. Fat content is variable, but in general a good source of essential polyunsaturated fatty acids. Insects are also a significant source of iron, zinc and vitamin A.

The urgency to find alternative protein sources for feed has resulted in increased market acceptance and recognition of the potential for food and feed. For fish and poultry, insects are already a natural feed. In China, silkworm pupae powder is already used as poultry feed. The use of waste streams of organic matter (including manure) to feed insects is possible due to less strict regulations when insects are used for feed rather than for food.

FAO is currently assessing the multiple dimensions of insect gathering and rearing. These aspects were the focus of a technical consultation that took place at FAO Headquarters in Rome, Italy, 23-25 January 2012, titled "Assessing the Potential of Insects as Food and Feed in Assuring Food Security." The meeting was jointly organized by FAO and Wageningen University with financial support from the Government of the Netherlands. The meeting aimed to open a dialogue and foster an exchange of information and expertise on the potential benefits of using insects for food and feed as part of a broader strategy to achieve global food security. Thirty-seven experts from international agencies, scientific institutions and private sector stakeholders, together with staff from relevant FAO disciplines (nutrition, aquaculture, livestock, veterinary science, food safety, forestry, biodiversity and nature conservation) attended the meeting. Its objectives were to map the state of the art and identify knowledge gaps along the thematic topics of insect ecology and biology, farming insects, insects as livestock and fish feed, nutrition, processing and trade, food and feed safety, communication strategies, and policies to achieve food security.

Participants developed an Action Plan aimed at moving insects higher on the agenda of national and international food- and feed-related agencies. Recommendations were formulated for developing strategies and actions addressed to the private and public sector as well as for FAO. Participants also made proposals for a communication strategy and suggested convening a global conference on insects as food and feed.

The communication strategy is expected to promote the role of insects as a viable option for improving food security and to encourage serious media coverage using less sensationalism and more credible information sources. Media coverage should aim to permeate all levels of society – from schools and government agencies to professional organizations. They are a powerful

means to help establish projects and programmes which maximize food and feed production respectively and improve health, lives and livelihoods, while at the same time minimizing energy output and environmental costs. Providing validated data and content-rich textbooks on the subject, based on respectful understanding and intercultural competency together with the use of actual models are part of the communications strategy.

Concerning edible insect species there are huge research gaps including their biology, ecology and population dynamics, as well as their dependence on the habitat during the year. Little is known about which species are eaten, and where and to what extent they contribute to food security. The effect of (over)harvesting requires further study to determine sustainable harvest limits. Further exploration also involves including the collection of insects as food and feed in an integrated pest management strategy (combining physical control with entomophagy), which is already practiced.

The expert consultation helped to compile critical baseline data for each of the thematic areas on edible insects and the Action Plan is an important tool for raising the importance and recognition of insects as food and feed sources.

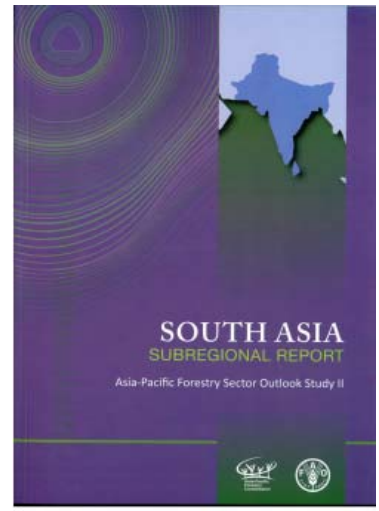
The summary report of the consultation can be found at:
http://foris.fao.org/preview/31654-08b9c12f60eda84d122b1ad454c381bb4.pdf
For more information please contact:
Patrick.Durst@fao.org

NEW FORESTRY PUBLICATIONS FROM FAO

SOUTH ASIA SUBREGIONAL REPORT: ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY II
RAP Publication 2012/10

Great changes have occurred and major advances have been made in Asia-Pacific forestry since the first Asia-Pacific Forestry Sector Outlook Study was published in 1998. Heightened awareness of the values of forests and their greater inclusion in international climate change agreements have increased the importance of linking spatial levels and broadening understanding of issues and opportunities likely to affect forestry in the coming years. Improving the responsiveness of institutional mechanisms and adapting to change constitute the most important steps in creating a robust sector in a fast evolving world.

Often developments outside the forest sector are more influential than developments within the sector. South Asia is highly dynamic and many changes are still pending until 2020, which is the scope of the scenarios and likely developments of this publication which is based on various country outlook reports and other thematic studies.



FAO welcomes this opportunity to once again contribute, at the behest of the Asia-Pacific Forestry Commission, to the regional forestry dialogue. Many organizations and individuals have put huge effort into preparing this subregional report on South Asia. In bringing it together seven country reports and over 15 thematic studies have been prepared.

GLOBAL FOREST LAND-USE CHANGE 1990-2005
FAO Forestry Paper 169

"We can't manage what we can't measure" - Accurate information on land use is critical for understanding the causes of forest-cover change and for developing effective policies and strategies to slow and reverse forest loss. Key findings on forest land use and land-use change between 1990 and 2005 are presented from FAO's 2010 Global Forest Resources Assessment Remote Sensing Survey. This survey was the result of a partnership between FAO and the European Commission Joint Research Centre. It is the first report of its kind to present systematic estimates of global forest land use and change.

The annual shift from forest land use to other land uses was lower between 1990 and 2000 than between 2000 and 2005. Forest conversion to other land uses is most prevalent in the tropical climatic domain. Other climatic domains were found to be remarkably stable in terms of net forest land-use change over the period 1990–2005. Forest land use is defined as areas with tree cover, or where management or natural processes will ultimately restore tree cover, and the predominant use is forestry. Generally land use implies a human dimension or purpose for which the land is used.

FAO ASIA-PACIFIC FORESTRY CALENDAR

5-6 March 2013. ***3rd UN-REDD Regional Lessons Learned Workshop: Social and Environmental Safeguards***. Bangkok, Thailand. Contact: Ben Vickers, Regional Programme Officer REDD+, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; E-mail: Ben.Vickers@fao.org

25-30 March 2013. ***World Teak Conference***. Bangkok, Thailand. Contact: info@worldteak2013.org

8-19 April 2013. ***10th Session of the UN Forum on Forests***. Istanbul, Turkey. Contact: www.fao.org/forestry

6-10 May 2013. ***Technical Meeting of the National Correspondents to the Global Forest Resources Assessment 2015***. Chiang Mai, Thailand. Contact: Emma Foti, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy. E-mail: emma.foti@fao.org

9-10 May 2013. ***FLEGT Asia: Regional experiences to address governance and trade challenges in the forest sector.*** Bangkok, Thailand. Contact: Robert Simpson, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy. E-mail: Robert.Simpson@fao.org

13-15 May 2013. ***International Conference on Forests for Food Security and Nutrition***. Rome, Italy. Contact: Eva Muller, FAO Forestry Department, Via della Terme di Caracalla, 00100, Rome, Italy. E-mail: Eva.Muller@fao.org

27 May - 6 June 2013. ***Forest Policies in the post-Rio+20 World: Executive Forest Policy Course 2013***. Thimphu, Bhutan. Contact: Patrick Durst, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; E-mail: Patrick.Durst@fao.org

4-8 November 2013. ***Twenty-fifth Session of the Asia-Pacific Forestry Commission***. Rotorua, New Zealand. Contact: Patrick Durst, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand; E-mail: Patrick.Durst@fao.org

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

- East Asian forests and forestry to 2020 (RAP Publication 2010/15)
- Forests beneath the grass: Proceedings of the regional workshop on advancing the application of assisted natural regeneration for effective low-cost forest restoration (RAP Publication 2010/11)
- Forest policies, legislation and institutions in Asia and the Pacific: Trends and emerging needs for 2020 (RAP Publication 2010/10)
- Report of the Asia-Pacific Forestry Commission Twenty-third session (RAP Publication 2010/09)
- Asia-Pacific forests and forestry to 2020. Asia-Pacific Forestry Sector Outlook Study II (RAP Publication 2010/06)
- Forest law enforcement and governance: Progress in Asia and the Pacific (RAP Publication 2010/05)
- Forest insects as food: humans bite back. Proceedings of a workshop on Asia-Pacific resosurces and their potential for development (RAP Publication 2010/02)
- Strategies and financial mechanisms for sustainable use and conservation of forests: experiences from Latin America and Asia (RAP Publication 2009/21)
- Asia-Pacific Forestry Week: Forestry in a changing world (RAP Publication 2009/04)
- The future of forests: Proceedings of an international conference on the outlook for Asia-Pacific forests to 2020 (RAP Publication 2009/03)
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- 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 Maldives: An illustrated field guide (RAP Publication 2007/12)
- A cut for the poor: Proceedings of the International Conference on Managing Forests for Poverty Reduction Capturing Opportunities in Forest Harvesting and Wood Processing for the Benefit of the Poor (RAP Publication 2007/09)
- Trees and shrubs of the Maldives (RAP Publication 2007/12)
- Developing an Asia-Pacific strategy for forest invasive species: The coconut beetle problem – bridging agriculture and forestry (RAP Publication 2007/02
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- Elephant care manual for mahouts and camp managers (RAP Publication 2005/10)
- Forest certification in China: latest developments and future strategies (RAP Publication 2005/08)
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- In search of excellence: exemplary forest management in Asia and the Pacific (RAP Publication 2005/02)
- What does it take? The role of incentives in forest plantation development in Asia and the Pacific (RAP Publication 2004/27)
- Advancing assisted natural regeneration (ANR) in Asia and the Pacific (RAP Publication 2003/19) - 2nd edition
- 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)
- Applying reduced impact logging to advance sustainable forest management (RAP Publication: 2002/14)
- Trash or treasure? Logging and mill residues in Asia-Pacific (RAP Publication: 2001/16)
- Regional training strategy: supporting the implementation of the Code of Practice for forest harvesting in Asia-Pacific (RAP Publication: 2001/15)
- Forest out of bounds: impacts and effectiveness of logging bans in natural forests in Asia-Pacific: executive summary (RAP Publication: 2001/10)
- Trees commonly cultivated in Southeast Asia: an illustrated field guide - 2nd edition (RAP Publication: 1999/13)

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