

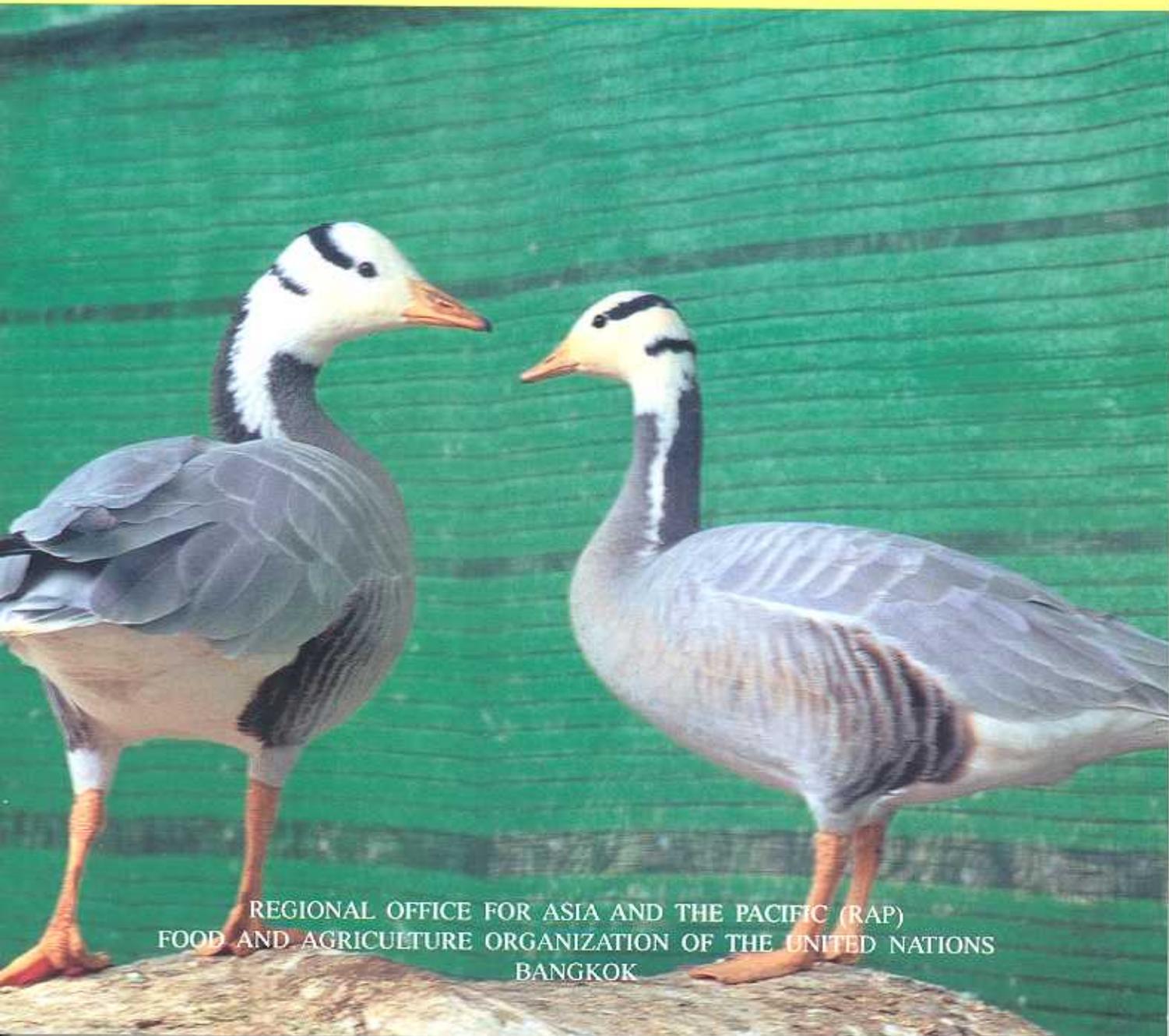


TIGER PAPER

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Contents

TIGERPAPER

Establishment of the Y.S. Rao Memorial Forest.....	1
Star Tortoise – A Victim of the Exotic Pet Trade.....	4
Mammal Species Profile of Melghat Tiger Reserve.....	7
Population Status and Conservation Approach for <i>Rhinoceros unicornis</i> in Pabitora Wildlife Sanctuary.....	11
Getting Along with the Neighbors: Human-Elephant Relationships in Lao PDR and the Potential for Conflict Resolution.....	15
Bharal – The Most Sighted Ungulate of Nanda Devi NP.....	21
Wild Birds Should Not Be Killed to Fight Bird Flu.....	25
Is There a Need to Monitor Conservation Agencies?.....	26
Zangi Nawar – A Wetland in the Desert of Baluchistan.....	28
Mollusks in the Scat of Leopard.....	29
Return of White Scavenger or Egyptian Vulture in Punjab.....	30
Reappearance of Bamboo or Green Pit Viper in Kalakkad-Mundanthurai Tiger Reserve.....	32

FOREST NEWS

Searching for New Ways of Financing Sustainable Forest Management.....	1
Taking Stock of Forestry in Asia and the Pacific.....	5
Managing Insect Pest Outbreaks in Asian Forests.....	7
What Does it Take to Accelerate Tree Planting by the Private Sector? Workshop on the Impact of Incentives on Plantation Development in East and Southeast Asia.....	9
Asia Pacific Association of Forestry Research Institutions (APAFRI) Meets.....	10
Accelerating Implementation of National Forest Programmes in South Asia: Strategies and New Directions.....	11
Building Bridges to Model Forests.....	13
Asia-Pacific Forestry Chips and Clips.....	14
FAO Asia-Pacific Forestry Calendar.....	16

ESTABLISHMENT OF THE Y.S. RAO MEMORIAL FOREST



by M. Kashio

Eleven years have passed since the sudden demise of Dr. Y.S. Rao (FAO Regional Forestry Officer) on 12 March 1993 in Mumbai (Bombay), India, during a terrorist bombing. In his memory, a group of colleagues in the FAO Regional Office for Asia and the Pacific (FAO/RAP) established the Y.S. Rao Fund, created through the precious donations given by many people and organizations. Administered with the assistance of FAO/RAP, each year on World Food Day, the Y.S. Rao Award was presented to outstanding farmers chosen from the region for their good farming practices. Up to 2002, an award was also given to the best botanical garden located in a school in Thailand.

However, due to the dwindling of the Fund after the devaluation of the Thai baht in July 1997, and also the retirement of two of the original Fund management staff (Mr. Chakkrit Sittimongkol and Ms. Nongnuch Tuntawiroon), it was decided to utilize the remaining balance of the Fund to establish a Y.S. Rao Memorial Forest. The location was identified in June 2003, inside the Phu Hin Rong Kla National Park¹, in Phitsanulok Province, in close cooperation with

the Thai Ministry of Natural Resources and Environment. Part of the Fund was also donated to support the construction of two new caged enclosures to house endangered wild ducks, geese and leopard cats at the Khao Kho Wildlife Propagation Center in Phetchabun Province.

The two sites were recently visited during 6-7 March 2004, and it was confirmed that the 100 rai (about 16 ha) memorial forest, that was formerly a degraded bush land, has now been covered by tree seedlings, and the two enclosures are now occupied.

It is planned to construct a nature trail in the memorial forest within the next few years, utilizing the remaining funds and any additional donations, to help the younger generation learn about the ecological and social functions of trees and forests.

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¹Information about this national park is available at the following website:

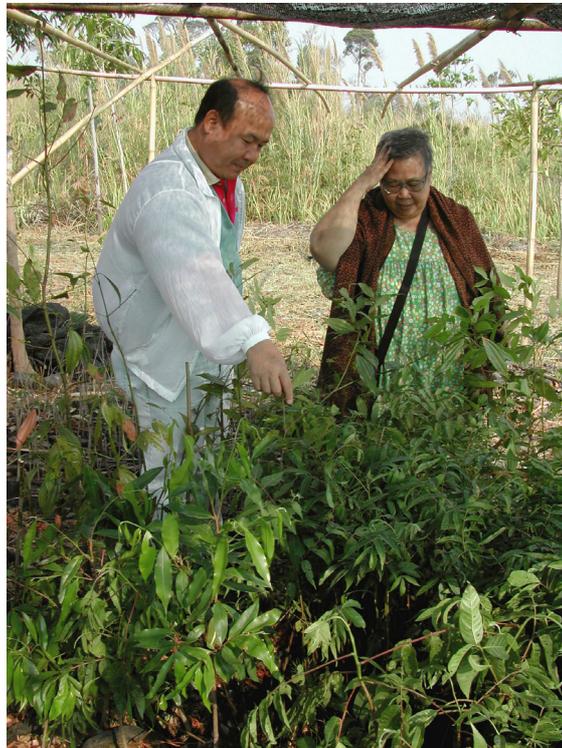
<http://www.trekthailand.net/north41/>



Site selected for the Y.S. Rao Memorial Forest



A tree seedling starting to grow at the site (March 2004)



Temporary seedling nursery



Top Left/Right: old cages for ducks and geese
Below: new enclosures for ducks and geese



Right: leopard cat in old enclosure
Below: leopard cats in new enclosure



STAR TORTOISE – A VICTIM OF THE EXOTIC PET TRADE

by Anand C. Sekhar, N. Gurunathan and G. Anandhan

Introduction

The star tortoise *Geochelone elegans*, belongs to a group of tortoises that bear a distinguishing radiating pattern on their carapaces, from which they get their name. The striking star pattern mimics the light and shadow through tussocks of grass, their natural habitat. The species is found in a number of habitat types from the semi-deserts in the outskirts of the Thar region in Rajasthan and Gujarat, to the savannahs and deciduous forests of southern and western Sri Lanka. The most distinguishing feature of its habitat is its dryness, with 3-10 dry months a year. Dry grasslands with mixed grasses, prickly pear, succulents and thistles form their prime habitat.

The shell of the star tortoise is often bumpy with raised scutes giving it a pyramid-like appearance. The reason for this pyramiding is uncertain, but it is believed that the raised scutes make it easier for the tortoise to right itself if turned upside down. A typical male star tortoise is about 20 cm (8 inches) in straight carapace length (SCL), while a female may grow as large as 30 cm (12 inches). Large scales cover the anterior part of the front legs, while the hind legs lack this protection. The soft parts are cream-yellow to yellow, with varying amounts of dark brown or black irregular spots. It possesses 5 claws on each foot and the posterior claws of females are longer than those of males, to facilitate nest excavation on hard and dry ground. The head is speckled with black.

Diet

The star tortoise's diet is predominantly vegetarian and mainly comprises different grasses. It can also feed on insects and carrion when given the opportunity.

Reproduction

Mating coincides with the monsoon (June to September). Within 60-90 days after mating, the female is ready to lay the first of several clutches of eggs. Once the female has found a suitable spot, she digs a flask-shaped nest, approximately 15 cm deep, with her hind legs. She then proceeds to lay a clutch of 1-6 eggs and covers up the nest with soil. She usually lays up to 3 clutches of 4-6 eggs. The eggs hatch in around 100 days time. Sex determination of hatchlings is dependent upon the incubation temperature. The threshold temperature is 30.5°C. Temperatures below this (28-30°C) will produce mostly males, while higher temperatures (31-33°C) will produce mostly females. Maturity in nature is attained at 6-8 years of age in males and 8-12 years in females. They do not hibernate.

Trade

Star tortoises are stunning in their beauty, with the radiating star pattern on their carapace making them an eye-catching display in zoos or private collections the world over. They are much sought after as pets or souvenirs and are a common sight in many pet stores and markets throughout Asia. In India as well as in Southeast Asia (Hong Kong, Singapore) and in the Gulf States (Dubai, Oman and UAE), wild-caught specimens, mainly juveniles, can be found in almost every animal market. A conservative estimate is that the yearly toll on the Indian population is 10-20,000 specimens. The Indian star tortoise is an endangered species and has been placed on CITES Appendix II. Without a valid CITES export permit, the import of the Indian star tortoise violates the Wild Animal and Plant Protection and Regulation of International and Inter-provincial Trade Act (WAPPRITA). The species is also protected under the Indian Wildlife Act (1972), where it has been placed under Schedule IV, making it illegal both to possess and trade in star tortoises inside India without a permit.

The hub of the trade is in Sri Lanka and Chennai (India). The tortoises are mainly exported to Singapore and the United States. Smugglers enlist the aid of tribal communities to procure the tortoises, offering them a paltry sum without running the risk of being caught by forest authorities themselves. For a few dollars, the underpaid customs personnel from the export countries are encouraged to look the other way while consignments of tortoises pass through. This nexus between the smugglers and import/export officials is the primary factor that permits the trade to flourish. The ability of the species to survive without food for days, and its lack of vocal expression, enables them to be easily smuggled undetected. They are inhumanely packed in large crates and more than half of them perish during transit, due to overcrowding and rough handling. Even if the consignment is detected, the customs personnel lack the necessary resources and expertise to identify tortoise species in trade. This fact is taken advantage of by the smugglers, who pass them off under the guise of tortoise species which are not under threat from trade. On the bright side, the star tortoise trade is still a small, localized enterprise and very erratic in nature. It must be contained before it assumes alarming proportions and becomes established.

Going beyond the actual trade in the species, another major threat faced by the tortoises is that, though popular as pets, very few owners know how to care for them. It is estimated that 95% die within 6 months because their owners fail to provide an adequate diet or try to keep them in entirely wrong conditions. In captivity, it is a common error to feed them too much wet food such as lettuce, tomato and fruit, leading to gut problems like colic, while in reality it requires a coarse, high fiber diet. Their demand for calcium and vitamins is high, especially in juveniles and egg-laying females, and supplements have to be given. The species is extremely sensitive to respiratory problems if kept too cold or damp. They are very susceptible to catching diseases from other tortoise species and hence must be reared in isolation. A dark side of the pet trade is that once the novelty of having an exotic pet wears off, owners stop caring for them. They are abandoned near water bodies and left to fend for themselves in a

hostile alien environment often with fatal consequences. These tortoises may also act as carriers of harmful microorganisms, thus endangering the flora and fauna of the countries to which they are exported.

Solutions

The following suggestions would vastly improve the current state of the tortoise trade, making it more humane and less of a detriment to wild populations:

1. The pet industry must be discouraged from selling tortoises collected from the wild.
2. All taxa of tortoises must be placed in CITES Appendix II at a minimum.
3. Export of tortoises should be carefully monitored and the monitoring mechanisms improved.
4. Retail tortoise dealers should be registered and provide accurate care sheets with each tortoise sold.
5. National and local anti-cruelty laws should be broadened to cover the treatment of tortoises by collectors and dealers.
6. Tortoise dealers should develop industry standards and a method to ensure compliance.
7. Air carriers should abide by the live animal regulations of the International Air Transport Association, which sets standards for tortoise shipments.
8. Indigenous people must be weaned from using the species as a source of protein by impressing upon them the ecological value of the species.
9. The tortoise's plight must be highlighted and widely publicized.
10. Customs officials must be trained to identify threatened species and must be familiar with CITES regulations.
11. The penalty for illegal trade in tortoises must be made more severe.
12. Tortoise Reserves could be established to offer protection and create awareness among the public.

Conclusion

In our quest to conserve glamorous flagship species such as the tiger and elephant, the plight of smaller creatures such as tortoises is often overlooked. It is an irony that the very shell

designed by nature to protect the tortoise may lead to its downfall. It will be a great tragedy if there are tortoises in homes as pets, but none left in the wild. The tortoise trade will deal a severe blow to slow-growing and slow-reproducing species like the star tortoise. It has become increasingly evident that the tortoise trade as it now exists cannot continue without devastating effects on individual tortoises, entire species, their habitats and possibly even on human health. On simple humane and environmental grounds the trade must stop. If it does not, it faces its own extinction, either as a result of public outrage or simply because eventually, dealers will run out of tortoises to sell.

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MAMMAL SPECIES PROFILE OF MELGHAT TIGER RESERVE, AMRAVATI DISTRICT, MAHARASHTRA STATE

M.S. Pradhan and Ramakrishna

Introduction

Melghat Tiger Reserve, located in Amravati District, Maharashtra State, was one of the first 9 Tiger Reserves declared under Tiger Project by the Government of India in 1973-74. At present there are 26 Tiger Reserves in India and Melghat has the unique distinction of being the only Project Tiger Reserve in Maharashtra State and boasts a tiger population of over 70 animals.

The name "Melghat" means a "meeting place of ghats," and the reserve is situated in a picturesque setting among a succession of hills and valleys. It lies on a southern offshoot of the Satpuda hill range. The most prominent geological feature of Melghat is the Gawilgarh hill range. The ranges run in a generally north-east to south-west direction in the eastern part of Maharashtra State. Chikhaldara plateau is the highest tableland in Melghat.

Melghat Tiger Reserve has an area of about 1,618.24 km² and spreads between the course of the Tapi river and Madhya Pradesh border on northernmost side, and the Gawilgarh hill range on the southern side. The reserve lies between latitudes: 21°15'N & 21° 45'N and longitudes 76° 57'E & 77° 30'E. The altitude ranges between 381-992 m above mean sea level. The reserve's core area is 360 km², and has now been notified as Gugamal National Park. The general topography of the region is hilly and rugged, marked with steep cliffs. The valleys are covered with beautiful forests, predominantly teak, ain, dhawda, haldu, salai, tiwas, kusum, arjun, mowal, etc. The vegetation of this region portrays a southern tropical dry deciduous forest with the canopy stretching over almost the entire area. Annual temperatures vary between 43° – 12°C, while the average annual rainfall ranges between 2,250 mm – 1,000 mm.

Melghat exhibits an extremely rich floral and faunal diversity that is impossible to describe all

at once, hence, it was decided to present a brief account of the mammals in Melghat Tiger Reserve. The present account is based on material collected and species sighted during the project period, and also on the bibliographic records (Ellerman and Morrison-Scott, 1951; Ellerman, 1961; Prater, 1980; Khajuraj and Ghosal, 1981; Tikadar, 1983; Bates *et al.*, 1997; Agrawal *et al.*, 1992; Corbet and Hill, 1992; Wilson and Reeder, 1993; Gogate *et al.*, 1993).

Systematic List of Mammalian Species Reported from Melghat Tiger Project, Amravati District, Maharashtra State

(*Asterisks indicate species actually collected and/or sighted during project period)

Phylum : CHORDATA

Class : MAMMALIA

Order: INSECTIVORA

Family : SORICIDAE

Subfamily : CROCIDURINAE

* 1. *Suncus etruscus* (Savi)

* 2. *Suncus murinus murinus* (Lins)

* 3. *Suncus stoliczkanus* (Anderson)

Order : SCANDENTIA

Family : TUPAIIDAE

Subfamily : TUPAIINAE

* 4. *Anathana ellioti ellioti* (Waterhouse)

Order : CHIROPTERA

Suborder : MEGACHIROPTERA

Family : PTEROPODIDAE

Subfamily : PTEROPODINAE

5. *Rousettus l. leschenaulti* (Desmarest)

* 6. *Pteropus giganteus giganteus* (Brunnich)

* 7. *Cynopterus sphinx sphinx* (Vahl)

Suborder : MICROCHIROPTERA

Family : RHINOPOMATIDAE

8. *Rhinopoma hardwickei* Gray

Family : EMBALLONURIDAE
* 9. *Taphozous m. melanopogon* Temminck
10. *Taphozous l. longimanus* Hardwicke
11. *Taphozous (Liponycteris) nudiventris* Cretzschmar
12. *Saccolaimus saccolaimus* (Temminck)

Family : MEGADERMATIDAE
* 13. *Megaderma spasma spasma* (Linn.)
14. *Megaderma l. lyra* Geoffroy

Family : RHINOLOPHIDAE
15. *Rhinolophus luctus* Temminck
16. *Rhinolophus rouxii rouxii* Temminck

Family : HIPPOSIDERIDAE
17. *Hipposideros ater ater* Templeton
18. *Hipposideros fulvus fulvus* Gray
19. *Hipposideros galeritus brachyotus* (Dobson)
20. *Hipposideros lankadiva indus* (Andersen)
21. *Hipposideros speoris speoris* (Schneider)

Family : VESPERTILIONIDAE
Subfamily : VESPERTILIONINAE
*22. *Scotophilus kuhlii kuhlii* Leach
*23. *Scotophilus heathi heathi* (Horsfield)
24. *Pipistrellus ceylonicus indicus* (Dobson)
25. *Pipistrellus coromandra coromandra* (Gray)
26. *Pipistrellus tenuis mimus* Wroughton
27. *Pipistrellus d. dormeri* (Dobson)

Subfamily : MINIOPTERINAE
28. *Miniopterus schreibersi fuliginosus* (Hodgson)

Family : MOLOSSIDAE
29. *Tadarida (Chaerephon) plicata plicata* (Buchanan)
30. *Tadarida aegyptiaca thomasi* Wroughton

Order : PRIMATES
Family : CERCOPITHECIDAE
Subfamily : CERCOPITHICINAE
*31. *Macaca mulatta mulatta* (Zimmermann)

Subfamily : COLOBINAE
*32. *Semnopithecus entellus entellus* (Defresne)

Order : PHOLIDOTA
Family : MANIDAE
33. *Manis crassicaudata* Gray

Order : CARNIVORA
Family : CANIDAE
34. *Canis lupus pallipes* Sykes

*35. *Canis aureus* Linn.
*36. *Cuon alpinus* (Pallas)
*37. *Vulpes bengalensis* (Shaw)

Family : URSIDAE
Subfamily : URSINAE
*38. *Melursus* sp.

Family : MUSTELIDAE
Subfamily : MELLIVORINAE
*39. *Mellivora capensis* (Schreber)

Subfamily : LUTRINAE
*40. *Lutragale perspicillata* (Geoffroy)

Family : VIVERRIDAE
Subfamily : VIVERRINAE
*41. *Viverricula indica* (Demarest)

Subfamily : PARADOXURINAE
*42. *Paradoxurus hermaphroditus* (Pallas)

Family : HERPESTIDAE
Subfamily : HERPESTINAE
*43. *Herpestes edwardsii* (Geoffroy)
44. *Herpestes smithii smithii* Gray

Family : HYAENIDAE
Subfamily : HYAENINAE
*45. *Hyaena hyaena* (Linn.)

Family : FELIDAE
Subfamily : FELINAE
46. *Felis silvestris ornata* Gray
*47. *Felis chaus affinis* Gray
48. *Felis caracal bengalensis* Fischer
49. *Prionailurus b. bengalensis* (Kerr)

Subfamily : PANTHERINAE
*50. *Panthera pardus fusca* (Meyer)
*51. *Panthera tigris tigris* (Linn.)

Order : ARTIODACTYLA
Family : SUIDAE
Subfamily : SUINAE
*52. *Sus scrofa cristatus* Wagner

Family : TRAGULIDAE
53. *Moschiola meminna* (Erleben)

Family : CERVIDAE
Subfamily : CERVINAE
*54. *Axis axis axis* (Erleben)
*55. *Cervus unicolor niger* Blainville

Subfamily : MUNTIACINAE

*56. *Muntiacus muntjak aureus* (H. Smith)

Family : BOVIDAE

Subfamily : BOVINAE

*57. *Bos gaurus* Smith

*58. *Boselaphus tragocamelus* (Pallas)

*59. *Tetracerus quadricornis* (Blainville)

Subfamily : ANTILOPINAE

*60. *Antilope cervicapra cervicapra* (Linn.)

61. *Gazella bennettii* (Sykes)

Order : RODENTIA

Suborder : SCIUROGNATHI

Family : SCIURIDAE

Subfamily : RATUFINAE

62. *Ratufa indica centralis* Ryley

Subfamily : FUNAMBULINAE

63. *Funambulus palmarum robertsoni*
Wroughton

*64. *Funambulus pennanti* Wroughton

Family : PTEROMYIDAE

*65. *Petaurista philippensis philippensis* (Elliot)

Family : MURIDAE

Subfamily : MURINAE

*66. *Mus musculus castaneus* Waterhouse

*67. *Mus musculus homourus* Hodson

*68. *Mus booduga booduga* (Gray)

*69. *Mus dunni* (Wroughton)

*70. *Mus phillipsi* Wroughton

*71. *Rattus rattus rufescens* (Gray)

72. *Rattus rattus narbadae* Hinton

73. *Millardia meltada* (Gray)

*74. *Cremnomys blanfordi* (Thomas)

75. *Golunda ellioti ellioti* Gray

*76. *Bandicota bengalensis* (Gray)

77. *Bandicota indica indica* (Bechstein)

Subfamily : GERBILLINAE

78. *Tatera indica indica* (Hardwicke)

Suborder : HYSTRICOGNATHI

Family : HYSTRICIDAE

*79. *Hystrix indica* Kerr

Order : LAGOMORPHA

Family : LEPORIDAE

*80. *Lepus nigricollis* Cuvier

Results and Discussion

The systematic list of mammalian species given above, reports the occurrence of 80 mammalian species in Melghat Tiger Project. Out of these, 44 species (55%) were actually collected and/or sighted during the project period between 1991 – 1996, while 36 species (45%) were included in the list on the basis of literature consulted. The list clearly indicates that the Melghat Tiger Project area possesses fairly good mammalian species diversity. Class: Mammalia is represented by nine orders, with the predominance of Chiroptera, Carnivora and Rodentia, followed by Artiodactyla. More than 75% of the mammalian species in the reserve belong to the orders Chiroptera, Carnivora and Rodentia. Incidentally, Chiropteran representation is very good in the region (total =26 spp.).

Some of the most interesting species thriving in the region are: *Anathana ellioti ellioti*, *Rhinopoma hardwickei*, *Scotophilus* spp., *Tadarida* spp., *Rhinolophus* spp., *Manis crassicaudata*, *Cuon alpinus*, *Panthera pardus fusca*, *Panthera tigris tigris*, *Mellivora capensis*, *Lutragale perspicillata*, *Viverricula indica*, *Felis silvestris ornata*, *Bos gaurus*, *Tetracerus quadricornis*, *Boselaphus tragocamelus*, *Ratufa indica centralis*, *Petaurista philippensis philippensis*, *Cremnomys blanfordi*, *Hystrix indica*, etc.

When the endemic status of the mammalian species/subspecies reported from Melghat was studied, it was surprisingly noted that there were only 4 endemic species (5% of the total 80 mammalian species) belonging to orders Scandentia (1) and Rodentia (3):

Order : SCANDENTIA

1. *Anathana ellioti ellioti* (Waterhouse)

Order : RODENTIA

1. *Ratufa indica centralis* Ryley

2. *Mus phillipsi* Wroughton

3. *Rattus rattus narbadae* Hinton

Therefore, although the mammalian species diversity is rich, the endemicism in this region is poor.

The conservation status of the mammalian species under the Indian Wildlife (Protection) Act, 1972 (1991) was also studied. It was found that 52 out of the 80 mammalian species have been included in all five schedules of the Act. Of these, 25 species (32%) are under high

conservation status (Schedule I and II). However, there are about 28 mammalian species, mostly microchiropteran bat species, which have not been listed under any of the Wildlife Act schedules.

The following conclusions can be drawn on the basis of our observations:

1. Melghat Tiger Project can boast of a rich mammalian species diversity, quantitatively as well as qualitatively. However, endemic representation of the mammalian species in Melghat region is remarkably poor.

2. Some of the most interesting mammalian species other than *Panthera tigris tigris* and *Panthera pardus fusca*, which can attract attention are: *Anathana ellioti ellioti*, *Mellivora capensis*, *Lutragale perspicillata*, *Ratufa indica centralis*, *Petaurista philippensis philippensis*, *Felis silvestris ornate*, *Rattus rattus nerbadae*, etc.

3. A fairly large number of mammalian species (28 = 32%) with higher conservation status belonging to Schedule I and Schedule II of the Wildlife (Protection) Act, 1972 (1991), was recorded, while about 33% of the total number of mammal species dominated by microchiropteran bats with no status under the Wildlife (Protection) Act, have also been reported from this region.

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A STUDY ON THE POPULATION STATUS AND CONSERVATION APPROACH FOR *Rhinoceros unicornis* IN PABITORA WILDLIFE SANCTUARY, ASSAM, INDIA

by Arati Bairagee

Introduction

North-East India is noted for its rich biodiversity, and Assam itself is famous for its population of one-horned rhinoceros (*Rhinoceros unicornis*), one of the most threatened mammalian species on earth. Unfortunately, the population of this precious animal, which is found in some protected areas of Assam and West Bengal, is decreasing at an alarming rate. In Assam, one-horned rhino is found in Kaziranga National Park, Manas National Park, Orang National Park and Pabitora Wildlife Sanctuary, with a total population of around 1,676 individuals (Kaziranga NP: 1,552; Orang NP - 46; and Pabitora WLS - 78). Out of these, the rhino population in Pabitora Wildlife Sanctuary has the highest density in Asia, at four rhino per km² (Talukder & Mahanta, 1994). Though Pabitora Wildlife Sanctuary is small in area, its grassland area provides a conducive rhino habitat for a significant population, but it receives little attention in terms of infrastructural inputs and research.

Study area

Pabitora is a small wildlife sanctuary covering an area of 38.81 km² situated on the southern bank of the River Brahmaputra in Morigaon and Kamrup Districts of Assam. Until 1971, the area was a grazing reserve with encroachments by immigrant settlers. It was upgraded to reserved forest status in November 1971, at which time it covered an area of 15.84 km². In 1987, the State Government of Assam declared the area a wildlife sanctuary. In 1998, after 11 years, the Pabitora Wildlife Sanctuary was formally notified with an area of 38.81 km².

The sanctuary is mainly an alluvial flood plain of the River Brahmaputra and most of the area is seasonally flooded by the Brahmaputra and by Kallong, a small tributary of it. It lies at 26°12'-

26°15' N latitude and 90°2'-90°5' E longitude. The altitude ranges between 15- 25 m above sea level. The average annual rainfall is 2,500-3,000 mm. Climatic conditions are those of the temperate zone with dry winters and hot summers, followed by heavy rains. The annual average minimum and maximum temperatures range from 9 °-38°C and the humidity ranges from 75% to 95%.

Grassland covers 72.25% of the total area of the sanctuary, mainly *Imperata cylindrica*, *Saccharum spontaneum*, *Erianthus ravanae*, *Phragmites karka*, *Arundo donax*, etc. Trees cover 13.09% of the total area, of which *Albizia procera*, *Barringtonia accutangula*, *Trewia nudiflora* etc. are established and regenerating species. Swampy areas cover almost 14.66% of the area, of which 10.6% is perennial and 4.05% swamp.

Materials and methods

The methods of assessment were very simple. The entire Pabitora area was surveyed over a period of three years (2000-2002) to study the rhino poaching trends. Visits to the fringe villages were made to collect data on straying rhinos, grazing, etc. A questionnaire was used to collect the data from the villagers. Census figures, data on poaching and rhino mortality were collected from the forest department. The problems of Pabitora were discussed with the authority/manager.

Results and discussion

In 1971, there were only 8 rhinos in the Pabitora Wildlife Sanctuary. From that year onward, an increasing trend prevailed in the sanctuary and the 1995 census recorded a rhino population of 68. The rhinos now number 78 (1999 census). Between the 1995 census and the 1999 census 12 rhinos died of natural and other causes. But

increase.

in spite of such losses the rhino population of Pabitora Wildlife Sanctuary is noticeably on the

Table 1: Population status of Rhino in Pabitora WLS

Census year	Adult			Sub-Adult			Calf	Total
	Male	Female	Unsexed	Male	Female	Unsexed		
1993	18	21	1	1	2	2	11	56
1995	11	28	3	3	1	13	9	68
1999	–	–	–	–	–	–	–	78

Mortality of rhinos

The forest department carried out an extensive census from 1989 to 1997 which revealed the mortality trend of rhinos in Pabitora Wildlife Sanctuary. From 1989 to 1992, mortality as a

result of poaching was less, but from 1993 onwards the mortality has been gradually increasing, which reveals an upward trend of poaching.

Table 2: Mortality of Rhinos in Pabitora Wildlife Sanctuary

Year	Poaching			Natural causes				Grand Total
	Bullet	Electric trap	Total	Illness	Infighting	Drowning	Total	
1989	1	2	3	1	-		1	4
1990	2	-	2	2	-		2	4
1991	1	-	1	-	1		1	2
1992	1	2	3	-	1	1	2	5
1993	4	-	4	-	-	1	1	5
1994	-	4	4	-	2		2	6
1995	2	-	2	1	-		1	3
1996	-	4	4	1	1		2	6
1997	2	-	2	1	-		1	3

It is therefore clear that rhino mortality has been more greatly affected by poaching than by natural calamities. In recent times the Government has developed extensive protection measures to stop/reduce poaching, but they have not succeeded in reducing the mortality of rhinos. The general behavior of the rhino also makes it easier for the poachers. Rhinos usually follow a particular trail or route for their daily activities and the poachers track these routes and take the animals with the help of electric traps, pitfalls, poison and guns. In addition, the

rhino's tendency to stray out of the sanctuary to forage, especially at night, also helps the poachers. About 30% of the rhinos in the sanctuary used to stray outside the core area to forage in the fringe area. The poachers take the opportunity to kill the rhinos. Pabitora is surrounded by villages on all sides, which facilitates easy access for the poachers to enter the sanctuary. The Forest Department has set up many camps outside the sanctuary to try to control the situation, but despite all these efforts around 75% of the total rhino poaching occurs

outside the sanctuary area.

But in spite of all this, the population of rhinos in Pabitora has still continually increased because of the habitat suitability and good breeding potential.

Since up until 1971 the sanctuary was a “grazing reserve” for the surrounding villages, grazing by domesticated animals is a major problem in Pabitora Wildlife Sanctuary. More than 2,500-3,000 cattle presently graze inside the sanctuary. Due to grazing pressure, one third of the rhinos stray outside the sanctuary every day, and weeds have also invaded one-third of the area. Illegal collection of thatch and wood from the sanctuary is also a common practice, which has remained unchecked over the years and places additional pressure on the sanctuary resources.

Moreover, the annual floods in Pabitora Wildlife Sanctuary are the most severe of all the natural calamities that affect the area. The flood waters submerge up to 90% of the area during the rainy season, which compels the animals to take shelter in nearby villages and on small hillocks like Buraburi Pahar. Young calves can be swept away by the strong current and killed. This situation also makes the rhino population more vulnerable to poaching.

Rhino conservation approach

In 1954, the Assam Rhinoceros Prevention Act gave protection to *Rhinoceros unicornis* in all important areas of the state and the Act was strengthened with the enactment of the Indian Wildlife Protection Act, 1972.

The Indian Action Plan for Rhino Conservation has the following components (Talukder, 1999):

1. Habitat protection and restoration
2. Creation of corridors for migration
3. Proper communication network
4. Anti-poaching squads and strike force
5. Training of wildlife personnel
6. Arms training for protection staff
7. Research and monitoring
8. Eco-development works
9. Education and public awareness program
10. Relocation of enclaved villages through persuasion
11. Veterinary care
12. Translocation of animals for rehabilitation

13. Development of intelligence networks
14. Rewards for good work and case detection.

However, most of the components of the action plan are not functional and cannot be executed due to financial and other administrative constraints in the state of Assam. This is particularly true for Pabitora Wildlife Sanctuary, which has always been given low priority in comparison to the other rhino-occupied areas of the state. The present state of habitat management in Pabitora consists only of yearly uncontrolled and unplanned burning of grassland. From the infrastructure point of view, the sanctuary stands at a very low level, especially regarding the communication network, patrol vehicles, anti-poaching squads, etc. Proper law enforcement always depends upon the manpower and infrastructure. Unlike the other rhino areas in the state, one of the main deficiencies in Pabitora is the lack of research and monitoring. Insufficient accurate information about the status of the rhino population weakens the conservation strategies for Pabitora Wildlife Sanctuary.

Rhinos are poached for their horn, which has great value in the international market. It is used in traditional medicines in China, Taiwan, Japan and South Korea (Nowell *et al.*, 1992; Loh & Loh, 1994).

The primary goal in most of the protected areas of Assam, including Pabitora, is to protect rhinos from hunting and killing, which can be properly done by enforcing the laws, deploying personnel and building up the infrastructure.

But the ecological factors in wildlife management has not been properly reviewed in Pabitora Wildlife Sanctuary. Habitat conditions in Pabitora have deteriorated significantly in the last decade (Talukder, 1994). Although anti-poaching activities are important, so is the improvement and maintenance of the habitat, as they are also vital for protection. It has been observed that the ideal rhino habitat should comprise 50% plain grassland for feeding and grazing, 25% should be suitable for wallowing during the hotter part of the day and to protect the animal from the bites of flies and insects, and 25% should contain forest highlands where the animals can seek shelter and shade during the hot summers and times of flooding (Sharma & Bhattacharyya, 2000).

The grazing by domestic cattle inside the sanctuary is a major problem which must be stopped immediately in order to preserve the sanctuary. Prohibition of grazing is important for protecting the animals from contagious diseases like anthrax, rinderpest, etc., which can wipe out entire rhino populations. Moreover, grazing also encourages the invasion of dangerous weeds which can spoil the rhinos food base. Therefore, drastic measures should be taken immediately to stop the entry of cattle into the sanctuary.

Floods are natural calamities which are very difficult or impossible to check. To save the rhinos and other animals in the sanctuary from the floods, the construction of artificial highlands in the low-lying areas is a good strategy to provide shelter for the wildlife, as practiced in Kaziranga National Park.

The Government of Assam has already taken various measures to save this precious animal by enacting laws and developing appropriate infrastructure in the rhino-occupied areas of the state. But the approach is not uniform, as seen in the case of Pabitora Wildlife Sanctuary, even though it harbors a population of rhinos with the highest density in Asia. The lack of proper initiative to implement legislation of acts and other programs has led the rhino population in Pabitora to a vulnerable state. NGOs, both national and international, can play an important role in managing the sanctuary by helping to develop the infrastructure, create awareness among the local communities, and promoting research. It is now time for the State Forest Department to come forward and cooperate with all concerned to save the rhino population of Pabitora by tapping every possible resource to

give maximum inputs to the sanctuary.

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GETTING ALONG WITH THE NEIGHBORS: HUMAN-ELEPHANT RELATIONSHIPS IN LAO PDR AND THE POTENTIAL FOR CONFLICT RESOLUTION

by Khamkhoun Khounboline, Chay Noy Sisomphane, Bounleuam Norachak, Thibault Ledecq, Arlyne Johnson and Richard E. Salter

Lao PDR is a landlocked country with a total area of 236,800 km², approximately two-thirds of which is steep, hilly terrain. The human population is currently estimated at 5 million, approximately 80% of whom live in rural areas. Most are subsistence farmers who rely at least in part on wild biodiversity resources. Although estimates of mature forest cover remain above 40% of the land area, virtually all areas have been influenced to some extent by the subsistence agriculture and hunting and gathering activities of the widely dispersed human population (Robichaud *et al.*, 2001).

Known historically as Lane Xang, or “Land of a Million Elephants”, Lao PDR had large and widely distributed populations of both wild and domesticated elephants in the past. The elephant has played an important cultural and religious role for centuries, and its symbolic importance continues to be recognized across the country. Elephants remain widely distributed within their historic range, and continue to be viewed in a generally positive light, even in rural areas where land use conflicts occur.

Habitat suitable for occupation by elephants has not been mapped or otherwise assessed, but estimates of vegetation cover are indicative of the extent of the remaining habitat. Approximately 85% of the country is covered by unmanaged, “natural” vegetation cover, much of this secondary or degraded forest formations (Robichaud *et al.*, 2001) that potentially provide elephant habitat. Recent surveys have documented the presence of elephant populations in and around at least 18 of the 20 legally established National Biodiversity Conservation Areas (NBCAs), which cover 14% of the land area (Duckworth and Hedges, 1998). The proportion of the total national population

that occurs within these areas is unknown, but is likely to be relatively high, as the NBCA system incorporates much of the best remaining forest cover in Lao PDR. Additional populations are included in corridors and in provincial (and possibly district and village) conservation areas, which comprise an additional 8.6% of the area of Lao PDR, and in landscapes outside of the protected areas system.

Although Lao PDR currently supports what is probably the most important elephant population for conservation in the Indochina Region (Duckworth and Hedges, 1998), reliable data on numbers remains to be developed. Available estimates are indicative only, ranging from 200-500 (Rabinowitz, cited in Lair, 1997) to 2,100-3,300 (Venevongphet, 1988). Recent comprehensive compilations of available data have concluded that no accurate estimate can be made of the national population, although based on distribution and local population sizes the estimate of 200-500 published in 1997 is considered to be much too low (Duckworth and Hedges, 1998; Duckworth *et al.*, 1999). Khounboline (2002a) provides useful interview-based estimates of local population sizes in and around NBCAs. Additional details on locally derived population estimates are provided in Duckworth and Hedges (1998). The national population is rated as “At Risk” (roughly equivalent to the Globally Threatened category of IUCN) in the medium term (Duckworth, *et al.*, 1999). Threats include fragmentation of seasonal ranges, particularly by large hydropower projects and infrastructure developments, and poaching, particularly in border areas (Duckworth *et al.*, 1999).

All wildlife in Lao PDR, including wild (but not domesticated) elephants, are the property of the

State. Elephants are effectively treated as a protected species, the hunting, killing, trade or export of which is prohibited. The protected status of elephants seems to be well known by villagers, who have in some cases petitioned the government for permission or kill or remove them rather than taking precipitate action on their own and facing the legal consequences.

Why and where do human-elephant conflicts occur in Lao PDR?

Elephants require large amounts of food and space, and the need to obtain these resources in increasingly human-dominated landscapes is a primary determinant of conflict occurrence. Human-elephant conflicts in Lao PDR center on crop depredations by elephants who leave forested habitat to feed in adjacent cropland areas. Impacts include direct damage to subsistence and cash crops, constraints on expanding cash crop areas for fear of elephant depredation, and occasional human and elephant deaths.

Analysis of available information shows that human-elephant conflicts are widespread in Lao PDR and are probably increasing. Case studies developed through field visits to current conflict sites, and compilation and analysis of records of human-elephant conflicts elsewhere in Lao PDR, indicate that a common feature of virtually all conflict sites is incremental conversion of elephant habitats to crops that are palatable to elephants, and/or an incrementally increasing area of such crops directly adjacent to forest areas occupied by elephants. Conflict development is considered to be at an early stage, at least as compared to neighboring countries, but the social and economic costs cannot be accurately determined from currently available data (FAO, 2002).

Mitigation of human-elephant conflicts

Although documentation of human-elephant

conflicts is incomplete, it provides a basis both for drawing some initial conclusions and for identifying suitable mitigation measures and management responses. Review of the types of human-elephant conflicts that have been documented to occur in Lao PDR, or that can be expected to occur on the basis of generalizations from elsewhere within the Asian elephant's range, leads to some simple and straightforward basic principles for anticipating and managing conflict situations:

- C Whenever possible, growing of highly palatable crops in or adjacent to elephant habitats needs to be avoided. The feasibility of replacement of such crops needs to be examined as a first option in chronic problem areas. This is particularly important in the context of protected areas, where palatable crops may draw elephants out of adjacent forested habitats.
- C Development activities need to be carefully planned in order to avoid unforeseen impacts on elephant habitats, and inadvertent creation of conflict situations in adjacent croplands. Avoiding problems through good planning is greatly preferable to resolving conflicts that have been needlessly or carelessly created.
- C Some elephant incursions into crop areas will inevitably occur, and land owners and the relevant authorities need to be ready with a suite of potential mitigation measures adaptable to specific conflict situations (i.e. type and location of crop; frequency of crop-raiding; sex, age and number of elephants involved).

The following assessment of applicable mitigation and control methodologies (Table 1) is based on a review of available literature, drawing from experience with both Asian and African elephants; the personal experiences of expatriate advisers; interviews with DFRC Provincial (PAFO) and District (DAFO) staff; village interviews; and workshop discussions.

Table 1. Human-elephant conflict mitigation methodologies identified as most applicable in Lao PDR

Methods for Ensuring Elephant Access to Critical Resources
1. Maintenance of habitat security, suitability and safety in main remaining habitats <u>Strengths</u> : relatively inexpensive (except for opportunity costs) and easily sustainable; implementation already initiated through establishment of Biodiversity Conservation Areas <u>Weaknesses</u> : requires planning expertise and high political commitment; not realistically applicable to all areas
2. Incorporation of appropriate measures to minimize elephant depredation in agricultural and forestry development projects <u>Strengths</u> : minimizes problems through forward planning <u>Weaknesses</u> : requires planning expertise and monitoring; broad-scale application could be time-consuming and costly
Methods for Preventing Elephants from Entering Production Areas
3. Firecrackers, gunshots and other noise-makers <u>Strengths</u> : may be effective where crop-raiding pattern is not well-established; low cost; little expertise required; already in use in Lao PDR <u>Weaknesses</u> : elephants may become desensitized and ignore; requires continuous monitoring of crops and capacity for rapid action; can result in human mortalities if elephants react aggressively
4. Fire (stationary fires, torches) <u>Strengths</u> : may be effective where crop-raiding pattern is not well-established; low cost; little expertise required; already in use in Lao PDR <u>Weaknesses</u> : elephants may become desensitized and ignore; requires continuous monitoring of crops and capacity for rapid action; applicable only at night; can result in forest fires if not carefully controlled; can result in human mortalities if elephants react aggressively
5. Lights <u>Strengths</u> : may be effective where crop-raiding pattern is not well-established; low cost; little expertise required; already in use in Lao PDR <u>Weaknesses</u> : elephants may become desensitized and ignore; requires continuous monitoring of crops and capacity for rapid action; applicable only at night; can result in human mortalities if elephants react aggressively
6. Repellents and irritants <u>Strengths</u> : may be effective where crop-raiding pattern is not well-established; potentially low cost; little expertise required; already in use in Lao PDR (e.g. burning of chilli peppers) <u>Weaknesses</u> : requires continuous monitoring of crops and capacity for rapid action; can result in human mortalities if elephants react aggressively
Methods for Removing Elephants (no highly applicable methodologies identified)
Methods for Managing Impacts of Human-elephant Conflicts
7. Training of villagers in concert with NBCA (where applicable), PAFO and DAFO staff <u>Strengths</u> : highly acceptable to local people; promotes coordinated and effective response <u>Weaknesses</u> : requires initial high level of inputs for organization; requires political and budgetary commitment
8. Development of a reporting and record-keeping system <u>Strengths</u> : useful for identification of chronic problem areas; useful for documentation of successful techniques <u>Weaknesses</u> : requires initial high level of inputs for organization; requires political and budgetary commitment

Note: Only methodologies ranked as highly applicable are listed. Additional methodologies ranked as having **moderate** applicability are: planting of unpalatable crops (*e.g.*, tea, coffee, chilli); habitat enhancement (*e.g.*, controlled burning, selective felling, enrichment planting); remote-controlled or tripped noise-makers; natural fencing with spiny or prickly and unpalatable species; electric fencing; village relocation; crop damage compensation; crop damage insurance; micro-credit or revolving funds for financial assistance to affected farmers; and rapid response teams for documentation and mitigation of elephant damages. Methodologies ranked as having **low** applicability are: planting of unpalatable crops as buffer zones between main cropland and forest habitat areas; planting of lure crops to keep and/or lure elephants away from main crop areas; herding/dispersal using domesticated elephants; mechanical fences; trenches; canals; translocation; capture and captivity; and culling (by shooting or other means).

Conclusions

Elephant habitats in Lao PDR are being increasingly fragmented by large scale infrastructure developments, particularly hydropower projects and road building, and probably to some extent by large scale forestry operations. At the same time, incremental increases in the rural population are resulting in the conversion of elephant habitats to paddy fields and shifting cultivation plots, and increased use of the remaining elephant habitats for non-timber forest product (NTFP) collection. The effects of infrastructure development are largely unknown and undocumented (except for direct habitat loss) and require further assessment. The effects of habitat conversion to agricultural land are also largely undocumented, but conversion, along with increased human use of the remaining elephant habitats, are probably major factors in what appear to be increasing incidents of human-elephant conflicts.

Human elephant conflicts are currently widespread in Lao PDR, but are still at a very low level, at least compared to other countries such as India and Indonesia. However, consequences can be severe for individual families. Conflicts appear to be largely confined to raiding of ripened rice crops (both paddy and shifting cultivation) and other highly palatable crops such as sugar cane, pineapples and bananas. The destruction of structures and occasional loss of human lives can also occur as a result of the crop-raiding behavior. Because conflict development is at an early stage, it is still possible to introduce measures (e.g. land use planning) to prevent uncontrolled increases in problems and to mitigate existing conflicts using accepted methodologies (preferably low tech/low cost) that could also be modified to fit the particular case. The clear lesson learned from all other areas where human-elephant conflicts have been studied is the need to identify and resolve problems before they reach unmanageable proportions.

The Government does not have the capacity to assist villagers when human-elephant conflicts occur. District and provincial officials lack the expertise to deal effectively with conflict situations and there are no trained or specially

qualified elephant management specialists at the center. Expertise, guidelines for action, communications equipment, transport, training and funding are needed at all levels. Standardized response procedures, and the ability to quickly implement them, must be developed in order to prevent villagers from taking unilateral action to resolve conflict situations, which could ultimately injure or kill the elephants. A clear policy regarding compensation for crop damage and payments to families of persons killed by elephants is needed. Other initiatives, including a centralized database for maintaining information on human-elephant conflicts as an aid to management planning and decision-making, and establishment of trial sites for conflict resolution, also need to be pursued.

Virtually all rural land use planning initiatives, and many broad-scale conservation programmes, have implications for elephant conservation and management in Lao PDR. In addition to ongoing efforts to improve the management of national and provincial biodiversity conservation areas, the Government of Lao PDR (GoL) is currently undertaking a number of programmes dealing with village land use and forest management. Initiatives related to managing shifting cultivation, development of land classification systems, land suitability assessments and land allocation are all particularly relevant to elephant habitat management, but interventions need to be designed to promote the compatibility of objectives. Land use planning is seen as an essential tool, both for maintaining elephant habitats and for minimizing the future occurrences of human/elephant conflicts, and it also provides an entry point for proactively improving rural livelihoods in areas shared by elephants and people.

The main actions required for the conservation and management of elephants in Lao PDR have already been defined (Santiapillai and Jackson, 1990; Salter, 1993; Duckworth and Hedges, 1998; Duckworth *et al.*, 1999; FAO, 2002), but these need to be elaborated and updated with the full participation of all stakeholders. They also need to be put into a long-term strategic framework, to ensure cohesiveness and clarity of

objectives.

There is a need both for rapid action to mitigate the human-elephant conflicts that are now occurring, and for longer-term planning and policy development to minimize the future occurrence of conflict situations.

Current and planned activities in support of human-elephant conflict management in Lao PDR

This paper is subtitled “Getting Along With the Neighbors” because the authors believe that there is excellent potential for (relatively) peaceful coexistence between the remaining elephant populations and human land use in Lao PDR. However, this will require timely implementation of the recommendations outlined above, including policy, programming and personnel commitments from all levels of government, and significant advisory and material support utilizing external resources.

At present, the main externally supported initiative focussing on human-elephant conflicts is the GoL/WCS Elephant Project on the Nakai Plateau. Initial studies conducted during 2001-2002 (Khounboline, 2002b) found that human-elephant conflicts were increasing, and were threatening crops, human lives and elephant survival. These studies also found that it is likely there are more elephants on the plateau than previously thought. Much of the study area and adjacent parts of the plateau are scheduled to be flooded in 2006 by the reservoir of the Nam Theun 2 (NT2) hydroelectric dam, resulting in the submergence of most of the high quality (for elephants) riverine habitat on the plateau, and the potential of increased human-elephant conflict levels. Hence, studies will be continued in order to: 1) train government staff and farmers in methods to reduce crop damage and threats to humans by elephants; and 2) conduct a plateau-wide survey to determine the number and location of elephants in order to guide land use planning in support of the NT2.

An additional initiative supported by the United Nations Development Programme (UNDP) and FAO incorporates both national-level and site-specific issues. The initial component of this

support comprised a month-long mission completed in 2002, aimed at developing a structured assessment of human-elephant conflict in Lao PDR, and at initiating the formulation of a draft strategy/action plan for the long-term management of Lao PDR’s elephant population (FAO, 2002). The results of this mission have largely formed the basis of the current paper.

A second mission conducted under a partnership between GoL, UNDP, FAO, the Wildlife Conservation Society (WCS), Worldwide Fund for Nature (WWF) and the World Conservation Union (IUCN) was completed in April 2003 (FAO, 2003). This mission resulted in the formulation of a National Programme for Integrating Elephant Management and Sustainable Rural Development and Livelihoods (NPEM) in Lao PDR that would: 1) improve the living conditions and socio-economic development of local people who coexist with elephant populations; 2) enhance the conservation and sustainable management of forests and all other biodiversity resources in landscapes used by elephants; and 3) ensure the proactive management of viable populations of Asian elephants throughout their current range in the country. Components of the proposed five-year programme focus on identification and conservation of elephant habitat and populations, land use planning, environmental impact assessments, management of human-elephant conflicts, monitoring and management of poaching and trade, management of domesticated elephant populations, awareness building, strategic planning and programme management and national capacity development. Funding support for the programme is currently being sought.

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BHARAL – THE MOST SIGHTED UNGULATE OF NANDA DEVI NATIONAL PARK

by V.P. Uniyal

Introduction

The blue sheep or bharal (*Pseudois nayaur*), in both structure and habit, occupies an intermediate place between sheep and goats. It has affinities with both genera, i.e. Ovis and Capra, but according to habitat requirements and behavior, it is closer the goat (Schaller, 1973). The blue sheep lives in one of the remotest spots on earth. They prefer habitats in the higher ridges of the Himalayas between the timber and snow lines. Like sheep, they graze on open grassy slopes, but like goats, they climb well, even on precipitous cliffs (Prater, 1980). They alternately forage and rest throughout the day.

Bharal live in groups of 10 to 50, but sometimes as many as 200 may congregate. The available estimates of population densities range from 0.9 to 2.7 animals/km² (Schaller, 1977; Wegge, 1979; Wilson, 1984; Fox *et al.*, 1986; Chundawat *et al.*, 1991). Due to their excellent camouflage and the absence of cover in their environment, bharal remain motionless when approached. Once they are noticed, they scamper up the precipitous cliffs. The habitat requirements of bharal are very similar to those of snow leopard (*Panthera uncia*). Both prefer rocky cliffs and steep slopes. It is also the main ungulate prey of the snow leopard (Jackson and Ahlborn, 1984; Chundawat, 1992).

Bharal has a wide range of distribution across the major mountain ranges of the Himalayas, stretching from Baltistan in Kashmir, eastward across Tibet and into Yunnan, Szechwan, Kansu and Shensi provinces of China (Schaller, 1973). Its distribution has also been documented from the extreme northeast corner of Pakistan in the Karakoram ranges and all along the Himalayas in India (Gee, 1964; Dang, 1967; Roberts, 1977; Schaller, 1977; Ali, 1981; Fox *et al.*, 1986; Chundawat, 1992).

Information on bharal is very limited. A recent study on its behavior and other ecological aspects was conducted in Nepal. Schaller (1973) surveyed the Kang Chu valley of eastern Nepal and studied the activity pattern, food habits, group size, courtship rituals and aggressive behavior of blue sheep. Wilson (1981) studied the ecology and habitat utilization of bharal in the Dhorpatan Shikar Reserve in Nepal. However, very little information on bharal in India is available. A few survey reports have documented the presence of blue sheep in the Trans and western Himalayan regions, but detailed studies are still needed. Chundawat (1992) studied the population structure, distribution and habitat use of bharal and the food habits of snow leopard in the Hemis National Park in Ladakh. Mishra (2001) studied the livestock grazing impacts on the native wildlife habitat in Spiti valley of Himachal Pradesh.

Study Area

The Nanda Devi National Park (NDNP) is located within the high mountain ranges of Garhwal Himalaya and is one of the most important wilderness sites and a treasure trove of western Himalayan biodiversity. Nanda Devi is the second highest peak (7,817 m) in India and is considered to be the world's second toughest peak to climb. Due to its floral and faunal richness, the entire basin was declared a sanctuary in 1939. The whole area was later upgraded to the Nanda Devi National Park in 1982 and, therefore, completely protected with no human interference allowed inside the national park area of 624.62 km². Subsequently, in 1988 the area was notified as India's second Biosphere Reserve and designated as the Nanda Devi Biosphere Reserve (NDBR). Realizing the importance of its biological diversity and the occurrence of several rare and endangered floral

and faunal species, NDBR was listed as a World Heritage Site in December 1988.

The national park has a wide range of altitudes – from 1,800 m to 7,817 m above sea level – with a unique topography and climate that supports diverse habitats, species richness, communities and ecosystems. The high percentage of endemic species also adds to the conservation values of the park. The park supports about 620 plant species, 18 mammal species, 200 species of birds and a large insect fauna, including about 35 species of butterflies, many of which are in the endangered category. The important mammals of the park are goral (*Naemorhaedus goral*), Himalayan tahr (*Hemitragus jemhalicus*), leopard (*Panthera pardus*), Himalayan musk deer (*Moschus chrysogaster*), snow leopard (*Panthera uncia*), serow (*Capricornis sumatrensis*) and bharal (*Pseudois nayaur*). Earlier surveys on mammals in NDNP were conducted by Dang (1961), Khachar (1978), Tak (1986), Lamba (1987), Sathyakumar (1993), Arora *et al.* (1995) and Uniyal (2002).

The present survey was carried out in the NDNP during the expedition conducted by the Garhwal Rifles Regiment Centre, Lansdown, known as the “Clean Nanda Devi Expedition 2001.” The author had the opportunity to join this expedition from 26 August to 14 September 2001, and thus was able to study the floral and faunal diversity in the park.

The trekking commenced from Lata Village (2,100 m) and further camps were established at Lata Kharak ((3,800 m), Dharansi (4,200 m), Dibruggheta (3,500 m), Deodi (3,600 m), Ramni (3,600 m), Bhujgarh (4,000 m), and Sarsopatal (4,300 m). A trek distance of about 75 km was

covered from Lata village to Sarsopatal base camp.

Methodology

The field observations on mammals were made in the upper ridges, hill slopes and alpine pastures adjacent to each camping site. These observations coincided with the animal's foraging time in the early morning and late afternoon hours. The area was thoroughly scanned with the help of binoculars. Different parameters viz aspect, slope, habitat, altitude, time, number of individuals and distance, etc. were recorded. GPS was used to record the locations of bharal sightings.

Results

During the expedition, goral, tahr, musk deer, bharal, red fox, weasel and pika were sighted on several occasions in different locations. A total of 245 bharal were sighted at eight different locations in ten groups between 4,300 to 4,500 m altitude. Group sizes varied from 10 to 55 individuals. The largest group size of 55 bharal was sighted on the way to the Devastan base camp area (4,500 m), which was also the highest elevation point reached during the present expedition. The smallest group size of 10 bharal was observed at the Patalkhan (4,300 m) area. The majority of groups sighted were mixed groups of adults and sub-adult males and females. Grasses preferred by bharal included *Danthonia* sp., *Stipa* sp., *Festula* sp., *Kobresia* sp. and the legume *Thermopsis* sp. in alpine pastures. Bharal was also observed browsing on *Juniperus* sp. below the Sarsopatal camp.

Table 1: Sighting details of Bharal in NDNP

Locations	Altitude (m)	Slope*	Aspect	Sighting Time	Distance (ocular)	Activity	Habitat type**	No. of sightings	
								Direct	Individuals
Dharansi	4,300	A	NW	0630 h	1 km	Feeding & moving	Alpine pasture	1	35
Malla Dharansi	4,400	B	NE	0730 h	1.5 km	Feeding & moving	Rocky & glacier	1	45
Patakhani	4,300	C	NE	0930 h	100 m	Moving	Cliffs	1	10
North Sanctuary	4,300	A	NW	1615 h	500 m	Feeding & moving	Alpine pasture	2	24
Sarsopatal	4,300	A	NE	1700 h	20 m	Resting (lying on ground)	Alpine pasture	1	36
Malla Sarsopatal	4,300	B	NE	1400 h	50 m	Resting (lying on ground)	Alpine pasture	1	20
Devastan area	4,500	C	NE	1130 h	100 m	Resting (lying on ground)	Rocky & glacier	1	55
ND base camp area	4,300	C	NW	0930 h	30 m	Grazing & moving	Rocky & glacier	2	20

*Slope categories: A=Smooth (<30° with less rock cover); B=Steep (>40° with medium steepness and rocky boulders); C=Scree (>60° with high steepness with rocky boulders)

**Habitat type categories: Alpine pastures=full with grass cover, little base ground and rocks; Rocky=25 to 50 % rock coverage; Cliffs=steeper undulating slopes with more than 50% rocky boulders; Glacier=ice covered slopes

Predation

Snow leopard has been reported as the main predator of bharal, while red fox is a second possible predator (Wilson, 1981). No bharal kills were encountered during the expedition. One fresh scat of snow leopard was recorded in Sarsopatal and two pugmarks in Dharansi and the Pataalkhan area, but there were no direct sightings of snow leopard. A red fox was sighted in the bharal habitat near malla Dharansi.

The present short survey revealed that the NDNP provides adequate food, habitat and a human-free environment. The larger group sizes also indicated that bharal is the most conspicuous ungulate in this national park.

Recommendations

Many aspects of the behavior, distribution, habitat, and predation of bharal remain unexplored in this high potential habitat. So far, such a high density of bharal has never been reported from the western Himalayan region. A detailed long term study on the population structure, distribution and habitat utilization of bharal in this area is thus a high priority. It is important to generate baseline data on various aspects of the behavior and conservation of this species. This will be of immense use to wildlife managers for effective management of this priority conservation area.

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WILD BIRDS SHOULD NOT BE KILLED TO FIGHT BIRD FLU

Eliminating wild birds is not an appropriate measure to control the spread of the avian influenza virus, FAO recently announced. Killing birds will not help to prevent future bird flu outbreaks. Prevention needs to be based on a control and surveillance system to ensure that any contact between wild birds and poultry is avoided or at least monitored. For example, commercial poultry owners need to ensure that poultry pens and poultry drinking water supplies cannot be contaminated by migrating birds. If this cannot be done, then making the drinking water safe by appropriately treating it is necessary. Experience has shown that this has been a good strategy and that the destruction of wild birds is unnecessary, FAO said.

FAO called upon bird owners to be vigilant. Owners of backyard poultry or free-range poultry should be extra cautious. Bird owners should:

- C erect pens to keep domesticated poultry away from wild birds;
- C keep domestic waterfowl separate from poultry where the waterfowl have access to the same water as wild waterbirds;

C be alert to the symptoms of avian influenza in birds and quickly report any suspicions to the veterinary authorities.

Commercial poultry producers should apply good biosecurity measures, including:

- C maintaining a high level of security regarding all traffic coming onto poultry farms and a very high standard of hygiene to minimize spread of the disease;
- C bird proofing of poultry sheds to prevent contact between wild birds, especially wild waterbirds, and poultry;
- C keeping records and reporting sudden decreases in production;
- C ensuring that all sick or dead birds are checked by an experienced veterinarian and that samples are submitted to the regional laboratory.

Poultry in the vicinity of wetlands or anywhere else where wild waterbirds congregate could be at higher risk, so surveillance in these areas needs to be reinforced.

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IS THERE A NEED TO MONITOR CONSERVATION AGENCIES?

by John Parr

The 2003 United Nations list of Protected Areas, launched at the Vth IUCN World Parks Congress, records more than 100,000 sites covering 18.8 million km². Of the total area protected, it is estimated that 17.1 million km² constitute terrestrial areas, or 11.5 percent of the global issues. Marine areas are significantly under-represented, with only 1.64 million km² being protected - an estimated 0.5 percent of the world's oceans and less than one-tenth of the overall total.

Taking the planet's surface as a whole, forest and woodland covers 26.1 percent of the world's surface and permanent pasture covers 23.4 percent. Protected areas - with 11.5 percent exceed the total area of arable land (9.2 percent) and permanent crops (0.9 percent). Thus, nature conservation has become one of the most important human activities on the planet.

An article in the *Parks* journal (1999) involving five protected area experts, Grazia Borrini-Feyerabend, Tariq Banuri, Taghi Fravar, Kenton Miller and Adrian Philips, stated that "it was only during the last century that national governments all over the world began to identify, regulate and protect territories with natural resources of particular value - although they did so with great determination and might. The first fundamental distinction between community-conserved and government conserved areas is thus the historical dimension." These statements touch on a much broader issue, namely that when governments started developing the global protected area estate, we were essentially naive at the global level as to what the key protected area management issues really were. Indeed, this poor grasp of the core issues, most especially the role of site level management board and management planning, is clearly illuminated within the existing protected area legislation.

In 2001, a sample 23 pieces of protected area legislation relating to this substantial international protected area estate, including

several countries in Asia (Brunei, Cambodia, India, Indonesia, Lao P.D.R, Malaysia, Myanmar, Nepal, Pakistan, Singapore, Sri Lanka, Thailand and Vietnam) as well as Australia and New Zealand, were reviewed. Based upon the analysis of this legislation, many countries place their protected area system under the management of a single line agency. In essence, it is fair to guesstimate that "by law" - some seven per cent of the planet's surface - is directly in the hands of approximately 130 Directors of Conservation Departments and Forest Departments, and their colleagues, in nations of high biodiversity.

Professor Daniel H. Janzen is probably one of the world's foremost ecologists, with over 50 years experience in management issues in the world heritage site, Area de Conservacion Guanacaste, Costa Rica. In the same *Parks* journal (1999), he stated that "*A conservation area must survive in a national as well as local arena. A biodeveloped conserved wildland may benefit neighbouring communities sufficiently to be well received locally, yet still be viewed as economically unattractive to centralized governments and societies. Moving the decision-making and spending process from a centralized government to a decentralized Area de Conservacion Guanacaste automatically reduces political and economic resources of the very centralized government whose consciousness spawned the conservation area in the first place. The single largest national-level threat to the construction, growth and biodevelopment of the ACG is the mass of traditions, legislation and income streams in central government and centralized society, all of which are organized around keeping the income stream flowing to the central system. No society has much interest in moving control of the source of production to that source of production.*"

It appears that the issue has not been overlooked by the conservation fraternity at the global level either. The Durban Accord - "A Global

Commitment for People and Earth's Protected Areas" which was signed by all participants to the World Parks Congress in South Africa in September 2003, also drew attention to the issue. The Accord relates to five elements, comprising: Linking to international development and biodiversity agendas; Expanding, safeguarding and strengthening the system; Mainstreaming into programmes, policies and resource allocation; Incorporating rights, interests and aspirations of women, younger generations, indigenous people.....; and Increasing positive and reducing negative financial flows. An important question is "To what extent does Element 5 thwart the development of the other four elements?"

Assuming that there are real issues to be addressed, echoing the statements of Professor Janzen and the Durban Accord, we need to ask ourselves "How can we evaluate what the conservation agencies are really achieving?" Interestingly, while evaluating protected area effectiveness has gathered momentum as a conservation tool, there has been little attention on monitoring the performance of the government agencies themselves administering protected areas.

The author suggests that certain key documents should elucidate a conservation agency's performance and its real level of commitment. Within each protected area, there should be specialization within the management body, including law enforcement units, community outreach units, wildlife research units, tourism outreach units and administration units. These units in turn should link into specialized divisions within the conservation agency itself. These specialized divisions should be producing annual reports. These reports might refer to (i) law enforcement results including statistics on hunters arrested and hunters camps; (ii) forest encroachment and selective logging; (iii) forest fire outbreaks; (iv) important wildlife observations (v) community relations and (vi) tourism statistics, providing information on a site-by-site basis. To facilitate these annual reports, the monthly reports – and both its structure and contents - submitted by individual protected areas, become incredibly important. So too does the content of the annual report produced by each protected area manager.

The aforementioned evaluation should provide

the clearest picture as to whether a conservation agency is an effective administrative body, with well-organized management systems, or a body more lending itself towards "smoke and mirrors". An evaluation of this nature should be welcomed by dedicated protected area officials who genuinely care about the services in which they work.

But ultimately, if we really want to improve protected area management within the vast global conservation estate, it is vitally important that we all understand the core pillars of protected area management. These core pillars comprise the national level committee, the site level management board and the management plan, - "*the equilateral triangle for sound protected area management*".

The national level committee - a small technical body of experts from government agencies, academia and concerned NGOs - provides the policy guidelines on wise development in protected areas. The site level management board has on-the-ground knowledge on the management issues (both biological and social), the threats, and the optimal solutions to solve management issues. The management plan provides direction to wise management. Its content is prepared by the site level management board; while the national level committee ensures technical quality, as well as transparency. The three core pillars are totally interdependent - for effective protected area management.

The recognition of these three components being critical to effective protected area management is important. Without them, issues such as "benefits beyond boundaries", protected areas and poverty, linkages in the landscape, and good governance, are just catch-phrases in the corridors of conservation organizations and academic institutions. One only has to look over the protected area legislation of Canada, New Zealand or Scotland to see where they place the emphasis.

In the long-term, the best thermometer of judging whether a country - and its conservation agency - is truly concerned about quality protected area management is to gauge whether they support the appointment of a technically competent national level committee that provides the country with quality technical

advice on wise development within its protected area system, and whether they empower site level management boards with on-the-ground powers of authority. Thus, we should monitor the incorporation of the three pillars of sound management into upgraded pieces of protected area legislation. When “the equilateral triangle for sound protected area management” is ingrained within protected area legislation, we may rest assured that 11.5 per cent of the earth’s surface is being well cared for.

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ZANGI NAWAR – A WETLAND IN THE DESERT OF BALUCHISTAN

by Mohammad Nawaz and Mohammad Ibrahim

Pakistan has a diverse range of wetlands, made up of natural and artificial lakes, barrages, dams, canals, rivers, streams and waterlogged areas. These form a chain of habitats for aquatic birds, both local and migratory, from central Asia and Russia.

Zangi Nawar is an important wetland that lies at 65°47' E longitude and 29°27' N latitude, situated at an elevation of about 975.36 m above sea level in the province of Baluchistan. The chain of lagoons extends over a distance of about 12.8 km in an east-west axis, bounded on both sides by high sand dunes. The catchment area of Zangi Nawar is very large, stretching from Pishin, Quetta, Mastung, Chaman, Panjpai to Sarl beside the Khwaja Imran mountains.

Seven years of drought dried out Zangi Nawar and the waterfowl, flora and fauna were badly affected, but in 2003 the area was filled to capacity and birds started landing in the lake again. This state should last for at least two years, even with no rain or flood waters.

At present, due to the lack of funds, staff and also illegal hunting, the fauna of Zangi Nawar is suffering a lot. The impact of Afghan refugees on the habitat of the lake and the surrounding areas is also very serious and many game species have disappeared completely. The shortage of wildlife staff and lack of equipment and facilities make protection and conservation efforts ineffective.

At the local level, the Chaghahi Nature Conservation Society (CNCS) was established in 2000, headed by Mohammad Ibrahim, a retired game watcher. The other members of the society comprise a few local sardars, nature lovers and ex-wildlife staff. CNCS endeavors to protect and conserve the grazing pastures and wildlife in Zangi Nawar, Mobatt, Houkan, Baghak, Mall and Dak plains of Chaghahi District. Although the activities are not limited to these areas, the society already has four full-time conservation guards besides 243 volunteers drawn from zamindars and cattle/livestock owners.

Another society organized by the local people is the Rodain-e-Kacho Conservation Society, and its area of operation is in Awaran District, Tehsil Jao.

After a long period of drought, a bird survey was conducted in February 2003 (Table-1). Common cranes were seen in the Dak Badro area in a single flock of 100-150 birds. Two white cranes were also flying with them. When darkness fell the birds settled on the ground, and on the next day the flock flew north. Two flocks of demoiselle cranes with 20-24 members were also seen.

A few gazelles were also spotted near the border with Afghanistan during this survey.

Zangi Nawar lake and the surrounding area is

still an undisturbed natural habitat for many wild animals and birds migrating from central Asian states and Russia, including Houbara bustard. But illegal hunters are exterminating the wildlife in the area using vehicles and sophisticated weapons. International conservation agencies are requested to give encouragement, along

with financial and technical assistance to the local conservation societies in their efforts to protect the natural resources of Baluchistan.

The author is Professor of Zoology, Baluchistan University, Quetta, Pakistan.

Table-1: Avifauna of Zangi Nawar Lake (February 2003)

No.	Common Name	Scientific Name	No. of birds spotted
1.	Ruddy shelduck	<i>Tadorna ferruginea</i>	30
2.	Common shelduck	<i>Tadorna tadorna</i>	40
3.	Whiteheaded duck	<i>Oxyura leucocephala</i>	a single group of 6-7
4.	Marbled teal	<i>Marmaronetta angustirostris</i>	40-50
5.	Wigeon	<i>Anas penelop</i>	40-45
6.	Mallard	<i>Anas platyrhynchos</i>	several flocks of 15-20
7.	Gadwall	<i>Anas strepera</i>	several flocks of 20-50
8.	Common teal	<i>Anas creca</i>	numerous
9.	Garganey	<i>Anas querquedula</i>	a single flock of 30-40
10.	Pintail	<i>Anas acuta</i>	4-5 flocks of 30-40 birds
11.	Shovellor	<i>Anas clypeata</i>	several flocks of 6-20 birds
12.	Tufted duck	<i>Anas fuligula</i>	50 birds in groups of 3-5
13.	Pochard	<i>Netta rufina</i>	40 birds in groups of 3-6
14.	Baern pochard	<i>Aythya nycora</i>	5-10
15.	Common pochard	<i>Aythya ferina</i>	300-400 birds in flocks of 5-100
16.	Coots	<i>Fulica atra</i>	numerous
17.	Red-breasted marganser	<i>Mergus serrator</i>	two flocks of 5-1- birds

MOLLUSKS IN THE SCAT OF LEOPARD

by Latchoumanan Muthu Andavan

Leopards will kill and eat almost anything. They prey on cattle, deer, monkey, smaller beasts of prey and on large rodents like porcupine. It is also known to feed on birds, crabs and reptiles (Prater, 1965). The leopard can digest flesh, including some cartilaginous parts, but is unable to digest hair, hooves and bones, which are found in the droppings.

A general study of scats was carried out in Kalakkad-Mundanthurai Tiger Reserve in southern Western Ghats of Tamil Nadu, India. One of the most interesting findings in the scats of leopards in the reserve was mollusks. These

soft-bodied animals are found mainly in streams and rivers. It is not known why the leopard cannot digest mollusks.

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RETURN OF WHITE SCAVENGER OR EGYPTIAN VULTURE (*Neophron percnopterus*) IN PUNJAB

by Tejdeep Kaur Kler

Introduction

A natural scavenger, the vulture has been a friend of the human race for centuries due to its usefulness. In India, there are eight species of Old World vultures found in different geographical regions (Ali and Ripley, 1987). Four species have been reported from Punjab (Toor *et al*, 1982) .

The author conducted field surveys over a period of 5 years, which revealed the absence of vultures in and around the animal disposal centers in different districts of Punjab. During recent surveys in Kapurthala District, a group of white scavenger or Egyptian vultures (*Neophron percnopterus*) was sighted at one animal disposal center, which was a startling observation as earlier efforts to locate these birds had not previously yielded any success.

Materials and methods

Field surveys have been carried out at animal flaying and disposal centers at different locations in Punjab since 1998. Observations were recorded on the total number of bird species, their abundance and other animals feeding in association. Habitat features like tree species, vegetation, proximity of the sites to main highways, village roads, crops grown in the surrounding area, etc. were also recorded. Number, type and condition of the carcasses, along with the effectiveness of the resident/visiting bird populations in keeping their immediate surroundings clean by feeding upon dead animals was also noted. The present paper discusses the sightings of white scavenger or Egyptian vultures (*Neophron percnopterus*) and related observations during the period January to April 2003, at an animal disposal center in Kapurthala district.

Results and discussion

Field observations were made from January to April 2003 on the bird community feeding at this particular disposal site. The following bird species were observed: House Crow (*Corvus splendens*), Cattle Egret (*Bubulcus ibis*), Common Myna (*Acridotheres tristis*), Pariah Kite (*Milvus migrans*) and white scavenger or Egyptian Vultures (*Neophron percnopterus*), etc.

A number of birds of different species were observed community feeding along side vultures on carcasses. House Crow was the most abundant species seen, accounting for 42.66%, followed by Cattle Egret (30.72%). Other species present were Pariah Kite (11.95%), Common Myna (8.53%) and white scavenger or Egyptian vultures (6.14%). A large number of carcasses were dumped at the site, out of which 80-85% were buffaloes, 5-10% calves and cows and 5% other animals.

In the cold months of January and February, vultures were observed roosting on uncultivated land, barns, electric towers or barren trees. Flocks consisting of 18 vultures basked for long periods in various poses up to midday before leaving to feed. While basking they were seen trying to expose the maximum amount of their body parts, mostly the wings, and preening. During winter their preferred feeding time seemed to be during noontime and in the afternoon. While feeding, the vultures seemed to ignore observers and did not fly away.

The vulture's mating season extends from February to April. Efforts were made to locate their nests, but without much success.

Vultures were not observed at this study site or others in previous surveys between 1998 and 2002. There had been reports in the media of the presence of vultures in some areas near the foothills of the Shivalik range, and the sighting

of these vultures after a gap of many years raises the possibility of their migration from some hilly pockets. White scavenger or Egyptian vultures used to be seen in mixed groups of different vulture species in the 1970s and early 1980s in Punjab.

Many years ago, the Bombay Natural History Society sounded a warning on the alarming status of vulture populations in several parts of India (Anonymous, 1998). Many reasons were put forth for their disappearance. Pesticide poisoning was cited as the main cause, among other things (Anonymous, 1999, Chhangani, 2002). The big griffon vultures that used to be ubiquitous in India, started disappearing in the 1990s. In 2000, it was reported that 95% of Indian vultures of the genus *Gyps* had disappeared (Anonymous, 2003).

It remains to be seen whether this particular population of white scavenger or Egyptian vultures will be successful in permanently establishing themselves in this area or in other parts of Punjab, or whether their stay is a transitory one. They may have migrated from their original habitat to avoid unfavorable conditions (e.g. food shortages, overcrowding, bad weather). Only time will tell.

Acknowledgments

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White scavenger or Egyptian Vulture (Neophron percnopterus)

REAPPEARANCE OF BAMBOO OR GREEN PIT VIPER (*Trimeresurus gramineus* Shaw) IN THE KALAKKAD- MUNDANTHURAI TIGER RESERVE, SOUTHERN WESTERN GHATS OF INDIA

by L. Muthu Andavan

According to Daniel (1992), the Bamboo or Green Pit Viper (*Trimeresurus gramineus* Shaw) is confined to peninsular India in the hill forests of the Western Ghats in bamboo localities at an altitude of about 450 m above mean sea level.

A study was carried out on the predation of mammals in the Kalakkad-Mundanthurai Tiger Reserve (KMTR), covering an area of about 895 km², geographically located between 08°25' to 08°53' N latitude and 77°10' to 77°35'E longitude. KMTR is the 17th Tiger Reserve under Project Tiger in India. Situated at the southernmost tip of Western Ghats, it is one of the 18 hot spots of the world (Myers, 1999), containing some of the least disturbed forests in the state of Tamil Nadu. KMTR is exceptionally rich in biodiversity with many endemic species, making it a priority area for conservation.

During the field work, *Trimeresurus gramineus* Shaw was recorded from a riparian forest in the southern tropical wet evergreen forest in the

northern part of KMTR, Kadayam beat of

Kadayam range, adjoining Courtallam Reserve Forest in September 2001. The specimen was sighted near a stream in a rocky cave at an altitude above 1,210 m. According to available literature, this species has not been recorded at such a high elevation.

There have also been some reports of Russell's Viper (*Viper russelli*) and Saw-Scaled Viper (*Echis carinatus*) around this reserve.

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FOREST NEWS

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SEARCHING FOR NEW WAYS OF FINANCING SUSTAINABLE FOREST MANAGEMENT

One of the main topics for discussion at the upcoming twentieth session of the Asia-Pacific Forestry Commission (APFC), to be held 19-23 April, in Fiji, is “financing sustainable forest management.” Sound forest management costs money – money that is often in scarce supply, especially as traditional sources of funding are in decline.

The most important source of funds for sustainable forest management is timber itself. Sound forest management can generate steady and significant timber revenues that can and should be plowed back into management of the resource. But according to the International Tropical Timber Organization’s (ITTO) “Annual Review and Assessment of the World Timber Situation,” the value of primary timber products derived from natural forests each year has declined some 40 percent since 1990 – from US\$13 billion to only US\$8 billion. The fact that the value of secondary products has tripled during the same period is not much consolation to primary timber producers (i.e. the legal producers) who have seen their fortunes decline substantially in recent times.

Logging companies and forest concessionaires, which have been accused for decades of making windfall profits, are not the only ones to have seen their revenues dwindle. Numerous countries that rely on the proceeds from logging and timber sales for financing broader economic development are also struggling. And government forest departments in many countries have witnessed a

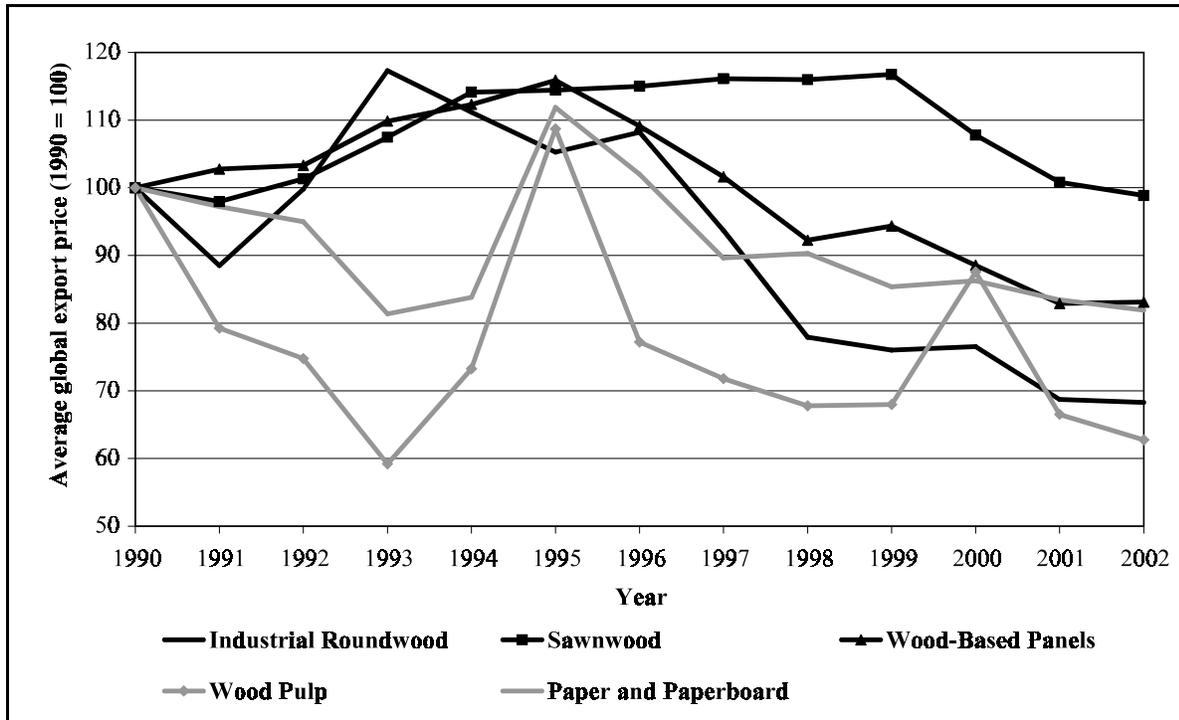
drastic decline in their main source of income – increasingly threatening their ability to practice sustainable forest management.

Faced with these challenges, the effective mobilization of domestic and international financial resources has become a critical matter if further progress is to be made toward sustainable management of forests. Thus, the search for new and innovative financing is on.

A boost in timber and wood product prices would certainly help. However, since the mid-1990s, most prices have been declining (Figure 1) and new investments in the forestry sector have come to a near standstill. Adding complexity to the challenge is the growing recognition of the non-timber values of forests – especially since the Conference on Environment and Development (UNCED) in 1992 – and subsequent measures to reduce timber harvesting in order to preserve and enhance other forest values. Unfortunately, although many people have come to realize the importance of forests for conserving biodiversity, protecting watersheds and storing carbon, few people are thus far willing to pay for these services.

While the public increasingly supports the expansion of protected areas, increased forest conservation and greater restrictions on forest harvesting, the private sector appears to have concluded that sustainable forest management is rarely a viable investment option. Tangible and

Figure 1: Recent trends in global forest products export prices



Source: FAOSTAT data (2004).

direct flows of funding into the forest sector appear to be declining as quickly as money coming out of the woods. If this bleak assessment is correct, then what alternatives are available to forest departments to ensure that future generations can enjoy the same benefits from forests as people do today?

One possibility – in selected situations – would be to increase timber royalties to enable forest departments to carry out their functions more effectively. However, with timber production from natural forests in decline, and moving to less and less accessible areas, it is doubtful that this approach can have any marked long-term impacts on financing.

In many cases, the fundamental role of forest departments will need to be reconsidered and forests perhaps handed over to those directly affected by their management (i.e. local communities and individuals). These entities are often in a better position to manage forests more efficiently and cost-effectively than forest

bureaucracies that lack the flexibility to react quickly and appropriately to fast-changing conditions.

Beyond depending on royalties from the sale of forest products or reducing the costs of government forestry agencies, there are three main potential avenues for countries and forestry organizations to take in trying to secure adequate funding for forest management.

A first opportunity is for governments to recognize the full and total value of forests (not just timber and a select group of non-timber forest products) and subsequently increase budget allocations to enable forest departments to do their jobs properly. Interest in the non-market benefits of forests and their valuation was significantly heightened by the seminal article by Peters *et al.* (1989) in *Nature*, which focused on the value of the tropical forest in Peruvian Amazonia. Since then, a variety of publications have provided insights into the “true” economic value of forest services and the intricacies of forest valuation

(Richards, 1994; Gregersen *et al.*, 1995; Lampietti and Dixon, 1995; Kengen, 1997; Bann, 1998; Bishop, 1998; Roper and Park, 1999; Lette and de Boo, 2002; EEP, 2003). This flurry of publications has helped raise awareness of the failure of markets to account for the full value of the forest benefits and services, and in the subject more generally. Unfortunately – so far at least – it has not stimulated governments in most countries to increase budget allocations to forest departments. It would seem appropriate, therefore, to launch new efforts to convince government decision makers of the need to increase funding for forest management or risk jeopardizing the ability of remaining forests to provide the full scope of benefits desired.

Unless and until governments provide adequate funding to forestry organizations, such agencies will be forced to seek funding support from elsewhere (e.g. external donors and alternative funding schemes). This leads to the second of the avenues available to countries seeking funding for forest management – donor funds. There is a vast assortment of sources and opportunities for externally funding sustainable forest management. Unfortunately, the array of funding mechanisms is confusing and complicated to assess, and useful information is often extremely hard to come by (Chipeta and Joshi, 2001). Sifting through hundreds of potential funding sources and ensuring that a proposed project matches donor requirements can be time-consuming and highly frustrating.

To help overcome the difficulties of matching good ideas with appropriate sources of donor funds, the Collaborative Partnership on Forests (CPF) recently developed an online *CPF Sourcebook on Funding for Sustainable Forest Management*. A major component of the *Sourcebook* is the database of funding sources, containing information on over 350 funding sources. The *Sourcebook* also provides suggestions on how to package project proposals when seeking funding and on ways of using funds more efficiently once obtained (Kilawe, 2003). (The *CPF Sourcebook* can be accessed at: www.fao.org/forestry/cpf-sourcebook .)

Even when donor funds can be secured, however, they involve major drawbacks. One of the main problems is that donor funding is usually provided for specific activities over a relatively short duration. Thus, while donor funding can provide relief for the short term and can sometimes serve to catalyze major activities, such funding, in and of itself, does not ensure sustainability. Far from it – forestry agencies can easily become overly-dependent on donor funding, leading to major problems when such funding declines.

In addition, donors usually require the recipient to fulfill specified conditions that – while of interest to the donor – often may not be the highest priorities of the recipient country. Reporting formats and accounting requirements are rarely consistent from one donor to the next, and donors frequently lure the best civil servants into working on their programs at the expense of overall development. In general, the amount of staff time required to service myriad donor-funded projects in some countries is staggering. Perhaps for these reasons, it appears that donor funding of forestry projects is falling out of favor. It is certainly not in vogue with market-oriented economists who currently trumpet the virtues of market-based approaches.

This third avenue of opportunity for financing forest management (i.e. market-based mechanisms) has generated immense interest in the past few years. Within the forestry sector, however, little is known about market-based approaches aside from traditional marketing of forest products. Those in the business of selling timber and wood products are gradually becoming aware of market benefits (and costs) under the various eco-labeling initiatives. Beyond this, however, there are several market-based approaches being used or tested for financing the provision of forest ecosystem services, including watershed protection, biodiversity conservation and carbon sequestration.

A number of analysts have recently examined the extent to which payments for environmental

services could contribute to sustainable natural resource (including forest) management (Johnson *et al.*, 2001; Landell-Mills and Porras, 2002; Scherr *et al.*, 2002; Khare and White, 2003; Pagiola *et al.*, 2003). Khare and White (2003) concluded that “*ecosystem service markets could potentially offer a powerful new set of incentives for tropical forest conservation and restoration, and new income opportunities for forest producers.*” However, it remains unclear to what extent ecosystem-service markets can effectively contribute to and finance sustainable forest management.

Landell-Mills and Porras (2002) reviewed almost 300 cases of markets developed for environmental services. Experience has been most extensive in the Americas, where a variety of mechanisms have strove to transfer funds from the consumers of forest goods and services (i.e. benefits) to the providers. A key lesson drawn from the review conducted by Landell-Mills and Porras was the importance of a positive “enabling environment” (i.e. secure land tenure, good governance and strong legal and regulatory frameworks) as a crucial precondition for successful implementation of such schemes.

High transaction costs are often an obstacle to bringing sellers and buyers of forest benefits together and true markets have only developed in a small number of cases. Hence, it remains, in Landell-Mills and Porras’ words, uncertain whether markets for forest environmental services are potentially a “*silver bullet or fool’s gold.*” Whiteman (2003) is also skeptical and questions whether “*innovative financing*” can make a significant contribution to the profitability of forestry on a broader scale. While many people remain keenly interested in such approaches, a considerable level of caution seems appropriate to avoid unwarranted expectations.

Recognizing the intense interest and concern of member countries with regard to financing forest management, the upcoming discussion at the APFC session in Fiji promises to be stimulating.

It is anticipated that delegates will elaborate on their countries’ experiences in searching for funds to support sustainable forest management, and that collectively all countries in the region will identify more effective ways of securing and managing scarce financial resources.

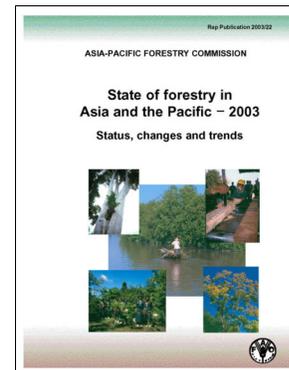
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TAKING STOCK OF FORESTRY IN ASIA AND THE PACIFIC

Although a few countries in Asia and the Pacific have made remarkable improvements in forest management in the past decade, conditions in many parts of the region continue in a downward spiral. Region-wide, more than 10 million hectares of forest were cleared over the past ten years. Millions more were degraded as a result of mismanagement, poor logging practices, shifting cultivation, uncontrolled wildfires, and pests and diseases. This ongoing destruction of forests – allied with policy inconsistencies and examples of patent cronyism – lend weight to conclusions that some countries in the region have lost their way in working toward forest sustainability goals. Rhetorical commitment to sustainable forest management is simply not being adequately translated into widespread action on the ground, so concludes a



first-of-its-kind report on the state of forestry in Asia and the Pacific, recently published by FAO and the Asia-Pacific Forestry Commission (APFC).

The *State of forestry in Asia and the Pacific – 2003* report provides a concise review of the status, changes, and trends in forestry in recent years – covering aspects of forest resources (planted and natural forests), management, policies, institutions, utilization and international cooperation. The report is based on documents submitted to FAO and APFC by member countries, from surveys of forestry experts based in the region, and from comprehensive analyses of forest resources and production trends carried out by FAO officials and consultants.

Despite the bleakness of the situation overall, the report does highlight several positive trends. For example, almost a quarter of the countries in the region have increased forest cover over the past decade. While the experiences of developed countries such as Japan and New Zealand mirror those of many countries in Europe and North America and are therefore not surprising, the examples set by developing countries such as China and Vietnam in rehabilitating and expanding forest areas give rise to optimism that other countries in the region can and will eventually address their daunting forestry challenges with similar commitment.

There is also cause for optimism in the broad area of participatory forestry, or devolution of forest management as it has more recently been called. By 2003, close to 85,000 joint forest management groups were managing over 17 million hectares of forestland in India (more than a quarter of the country's forests). In

Nepal, nearly 13,000 forest user groups have been formed to manage 1 million hectares of forestland that have been handed over to communities. In the Philippines, community-based forest management covers nearly 6 million hectares of forestland. The trend is gaining momentum in other countries as well, with more and more forest areas being handed over to individuals, households, and communities.

The new report cautions, however, that participatory forestry has yet to prove itself broadly, even in leading countries. Progress in devolving forest management is constrained by lack of trained staff and money to support programs, weak capacity within communities, and skepticism among government forestry officials. It can also be argued that community forestry efforts have not benefited the most impoverished. Participatory forestry apparently offers an avenue of hope – but not a guarantee – for a brighter future for forestry.

Trends in forest area and participatory forestry are just two of the many issues examined in the *State of forestry in Asia and the Pacific – 2003*. The publication describes all the latest developments in the forestry sector in the region and provides a comprehensive overview of what has, and what has not happened, in forestry in the region. For a copy, please contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. Tel: 66-2-697-4139; Fax: 66-2-697-4445; Email: patrick.durst@fao.org.



“Trees are the earth's endless effort to speak to the listening heavens.”

Rabindranath Tagore, 1928

MANAGING INSECT PEST OUTBREAKS IN ASIAN FORESTS

Contributed by Gillian Allard, Forestry Officer, FAO Forestry Department, Rome, Italy

Pests and their negative impacts on forests are more important than many people realize. Insect pest outbreaks can contribute either directly or indirectly to economic and environmental losses. They may compromise national economies and can threaten local economic stability, livelihoods and food security. Globally, ecosystems are under increasing threat, and the periods between outbreaks are rapidly decreasing because of climate change and lack of proper forest and plantation managements.

FAO offers assistance to countries in response to pest outbreaks and emergencies and also to establish long-term prevention and forest protection strategies. Through the FAO Technical Cooperation Programme (TCP), assistance related to forest health is being provided to three countries in Asia that are facing critical and urgent situations. In China, FAO is assisting with on-the-ground control methods such as restructuring of shelterbelts and introduction of new tree species. In Mongolia and DPR Korea, where traditional on-the-ground methods have proved ineffective and a more drastic response is necessary, FAO is providing equipment and training for aerial application of biopesticides to complement other control methods.

Integrated pest management in China

In China, massive outbreaks of the Asian longhorned beetle, *Anoploa glabripennis*, an endemic borer infesting hardwoods, are affecting the large reforestation program in the Three North Region. The damage has become critical because of severe climatic stress and increasing reliance on monoculture and clonal tree plantations. The insect pest has now spread to 240 counties of 13 provinces in the Three

North Region. The tree genera most affected are poplars, willows and elms. In the most severely affected areas, up to 80 to 90 percent of the trees are infected. One of the control methods has been the removal and destruction of millions of infested trees.

Local initiatives to control the beetle have included physical control by hitting the eggs and small larvae with a hammer; inserting insecticide-impregnated sticks into the holes created by newly emerged larvae; and injecting insecticides in excrement holes and in tree trunks. Local governments have also paid farmers and children to capture live adults and bury them. Other local methods are biological control measures such as introduction of parasitic wasps baited with a pathogenic fungus into exit holes to attempt to infect larvae, and attracting woodpeckers to feed on larvae by providing nesting boxes and half-dead trees as breeding sites for the birds. Some of these innovative methods have been successful, but no quantifiable data are available to confirm their efficacy.

In 1986, in the region of Ningxia Hui, a new shelterbelt network was established with alternative tree species including *Ailanthus altissima*, *Fraxinus chinensis* and *Robinia pseudoacacia*, which are more tolerant of the beetle. However, these trees are not so well adapted to cold, arid areas and diseases, and they give less economic return. Local farmers thus prefer to plant poplars following traditional practices. From 2001 to 2010, the Three North Shelterbelt Programme plans to establish over 9.5 million hectares of forests, and the risks associated with the Asian longhorned beetle will have to be taken into consideration in the choice of species and management practices.

FAO, together with Agriculture and Agri-Food Canada, Shelterbelt Centre, is working with the local authorities to examine alternative shelterbelt designs that emphasize species diversity and reduce the dependency on poplar. Species with proven resistance to the Asian longhorned beetle will be promoted and local clones tested. FAO is working with Chinese tree breeders to develop strategies for shelterbelts that focus on improving adaptation to regional environmental conditions, with greater emphasis on native species. These measures will be coupled with monitoring, restriction of movement of planting material and application of biological control measures. FAO, in collaboration with Chinese entomologists, is also developing a pest risk map based on the beetle's life cycle and climatic information to track the likelihood of its becoming established in regions in and beyond China.

Developing technology to control *Dendrolimus sibiricus* in Mongolia and DPR Korea

Since 2001, outbreaks of the Siberian caterpillar, *Dendrolimus sibiricus*, have affected more than 1 million hectares of larch (*Larix* spp.), and to a lesser extent pines (*Pinus* spp.) in more than ten provinces in Mongolia, including the culturally important Khan Khentii Protected Area (the birthplace of Genghis Khan) and peri-urban forests around Ulaanbaatar. It is forecasted that in the next decade, Mongolia will lose around 30 percent (3.6 million hectares) of its forest if action is not taken to control this pest.

Dendrolimus sibiricus is also affecting almost 30,000 hectares of larch forests in Ryanggang Province in DPR Korea. Infestations have resulted in a reduction of timber production and significant loss of seed (used for food and oil) and resin.

Dendrolimus sibiricus causes repeated defoliation, and outbreaks can apparently continue for up to five years. Severe defoliation results in a decline in vigor, increased susceptibility to secondary infestations by bark beetles, and ultimately the death of the trees.

In Mongolia and DPR Korea, where the forests are spread over vast, hilly terrain, on-the-ground approaches have met with limited success. In DPR Korea, these have included application of nicotine sprays (cigarettes shredded in water), wax banding of trees, injecting the trunks with insecticides and physical control measures including beating the trunks and collecting the larvae as they fall (one such exercise harvested 4.5 tons of larvae). In Mongolia, oil banding of trees and the use of car headlights to attract and trap flying adults have been used.

Given the severity of the outbreaks, the only treatment possible is large-scale aerial applications of biopesticides – *Bacillus thuringiensis* (BT) or insect growth regulators. The unusual and complex life cycle of this pest makes it very difficult to control and the time of application is critical.

Biopesticides need to be applied using equipment that will deliver the small droplets (100 µm) best suited for coniferous foliage. In both countries, FAO has provided spray equipment and trained pilots, ground crew and forestry staff in methods of aerial application. In Mongolia, this assistance was provided in collaboration with the United States Department of Agriculture Forest Service. In DPR Korea, 8,800 hectares of selected forests were treated in 2003; however, further treatment is urgently needed for spring 2004.

It was not possible to carry out spraying operations in Mongolia in 2003 because extreme weather conditions prevented the insects from developing to the stage at which they would be susceptible to the biopesticide. Aerial spraying is planned for spring 2004. In Mongolia, aerial treatment is more complex than in DPR Korea because of the nature of the terrain and the proximity of some of the infested areas to populated areas. The high winds and extreme temperatures also further complicate control strategies. For areas where aerial application was not practical, FAO provided four motorized backpack sprayers, customized for delivering the recommended doses.

***WHAT DOES IT TAKE TO ACCELERATE TREE PLANTING BY
THE PRIVATE SECTOR?
WORKSHOP ON THE IMPACT OF INCENTIVES ON
PLANTATION DEVELOPMENT IN EAST AND SOUTHEAST ASIA***

Experiences in plantation development in the Asia-Pacific region have been mixed. Although the area under plantations has increased considerably in some countries, progress in others has been disappointing. To better understand the reasons for the mixed results, the Asia-Pacific Forestry Commission (APFC) commissioned a regional study on the effectiveness and impacts of incentives on plantation development. The study included nine case studies from countries in the Asia-Pacific region. The results provide guidance in policy formulation to those countries interested in providing incentives to large- and small-scale investors in forest plantations.

As part of the follow-up to the study, a workshop “*What does it take to accelerate tree planting by the private sector? Workshop on the impact of incentives on plantation development in East and Southeast Asia*” was convened in Ha Noi, Viet Nam, 17-18 February 2004. The workshop was organized by FAO and the Forestry Science Institute of Vietnam (FSIV), within the framework of the Asia-Pacific Forestry Commission.

The workshop examined the role of incentives in plantation development and looked at what has worked and what has not worked in particular countries in the region. The primary objective of the workshop was to enhance understanding of the potential for effective use of incentives for forest plantation development and to provide a forum for open exchange and discussion of options for policy formulation in support of tree planting. A secondary objective was to elaborate basic elements of guidelines for the development and use of incentives for plantation development. Recommendations were made for further follow-up activities to be implemented by APFC.

Initial background presentations provided an overview of the plantation resources in the region, a discussion of the concepts related to incentives in general, and a summary of the APFC plantation incentives study. It was noted that although there is reason for optimism, as Asia-Pacific countries reportedly account for some 61 percent of the global plantation resources, the reliable nature of currently available data should give rise to caution.

Extensive discussions focused on what incentives are, what they can do and what they cannot do. Suggestions were provided on how to assess the impact of incentives and how to improve incentives structures. A representative of forest management companies effectively presented the private sector’s perception on incentives.

An overview of the incentives that have encouraged tree planting and plantation development in Viet Nam provided insight into real world use of incentives. Three of the nine APFC country case studies were also presented by the case study authors, including: Australia, Philippines and Thailand.

Two working groups were formed and worked to draw up a list of incentives that had been used in the participants’ home countries, and to indicate if these incentives had been effective or not (and why, or why not). Discussions revealed substantial differences among the countries in the level of understanding and use of incentives. Some countries have quite sophisticated incentives schemes, while others are still in the early stages of development. Overall, however, there is still considerable lack of understanding as to what incentives are and how they work.

The working groups were also requested to elaborate elements for guidelines on the development and use of plantation incentives. The elements were generated on the basis of the guiding principles formulated earlier during the plantation incentives study, as presented in the recent *Unasyuva* article written by Brown, Durst and Enters (*Unasyuva* 212:11-18). These principles consist of a list of “dos” and “don’ts” to consider when working with (plantation) incentives. The guiding principles will be further developed in line with a recommendation made by APFC member countries at its last session in Ulaanbaatar, Mongolia.

The working groups made the following recommendations with regards to follow up activities by APFC:

- C The final report of the plantation incentives study should be finalized and presented to the member countries, perhaps through additional

workshops like the one planned for South Asia.

- C Member countries should be encouraged to organize in-country discussions on the use of incentives, based on the results of the APFC study.
- C Additional work should be conducted to elaborate practical guidelines for the use of incentives for forest plantations development.
- C APFC and FAO should consider developing a “toolbox” (extended, user-friendly version of the guidelines) that helps identify appropriate incentives for specific situations and how they can be effectively used.
- C There should be more participation of private sector companies, associations, and NGOs in future follow-up workshops.
- C The APFC study should be extended to give greater consideration of the impact and effectiveness of incentives in relation to small holders and community forest plantations.

ASIA PACIFIC ASSOCIATION OF FORESTRY RESEARCH INSTITUTIONS (APAFRI) MEETS

The Third General Assembly of the Asia Pacific Association of Forestry Research Institutions (APAFRI) was held 21 October 2003 in Manila, Philippines.

The following observations were made during the meeting:

- C APAFRI has begun to emerge as an active network for the Asia-Pacific region, carrying out a variety of valuable activities in several countries. However, in geographical terms, the activities are still somewhat confined to the Asia region; therefore, more attention is needed in the South Pacific.
- C APAFRI needs to expand its portfolio of activities by developing regular training courses, which are currently highly in demand.
- C APAFRI should raise its profile by giving

more publicity to its activities, e.g. through its website (www.apafri.org).

- C APAFRI can further expand its activities by joining other institutions in organizing seminars, conferences and meetings. This can be done with little financial investment by providing coordination and publicity support.

Y.S. Rao Forestry Research Award

Dr. Asok Kumar, a forestry scientist from the Indian Council of Forestry Research and Education (ICFRE), Dehra Dun, India, was the recipient of the Y.S. Rao award this year. He was recognized for his valuable contributions in the selection and breeding of *Gmelina arborea*, an important commercial timber species that occurs naturally in India.

ACCELERATING IMPLEMENTATION OF NATIONAL FOREST PROGRAMMES IN SOUTH ASIA: STRATEGIES AND NEW DIRECTIONS

Good policy can lead to good forestry. If this can be an adage, then FAO has been promoting the national forest programme (nfp) for such a purpose. The nfp, promulgated by the Intergovernmental Panel on Forests/ Intergovernmental Forum on Forests (IPF/IFF), is a broad-based inter-sectoral approach to formulate policies, strategies, and courses of action. It is being seen as a process that can achieve a workable social and political framework for the conservation, management and sustainable development of all types of forests.

To support these processes, a workshop on “Accelerating Implementation of National Forest Programmes: Strategies and New Directions,” was organized 10-12 March 2004, in New Delhi, India. The workshop was organized by FAO, the Indian Ministry of Environment and Forests, and the Ashoka Trust (ATREE). The objectives of the workshop were to review the status of ongoing national forest programme development, strengthen the linkages to sustainable development strategies, and increase collaboration among the region’s countries. Over 40 participants attended the workshop – the majority was from India, with representatives from Bangladesh, Bhutan, Nepal and Sri Lanka.

Opening remarks were provided by Messrs. D. Gustafson (FAO), S. Appanah (FAO), A. Sathurusinghe (Sri Lanka) and S.N. Joshi (D.G. Forests, India). In his opening address, Mr. Joshi pointed out the importance of forests to rural poor in South Asia, and the steps taken by India to develop its National Forest Action Programme to meet emerging needs. He pointed out India’s success with decentralization through Joint Forest Management, tenure rights to forest dwellers,

development of criteria and indicators for dry forests (in collaboration with FAO), and the growth of specialty industries such as bamboo and *Jatropha curcas*. He closed his remarks with pertinent questions to the forum, viz.: i) Where is the adequate support from the international organizations? ii) What do we mean by accelerating implementation of nfps? iii) How can we increase investments in the forestry sector? iv) Can forestry alleviate rural poverty? and v) How can the South Asian countries collaborate meaningfully in forestry?

In his introduction, S. Appanah (FAO) pointed out that forestry issues are becoming increasingly complex, and involve huge areas of land, diverse livelihoods, long time frames and large amounts of money. Whilst the specific issues vary from country to country, the pattern of forest problems is common – continuing loss of natural forests, over-concentrated control, inequitable access to forests, and poorly-resourced, inflexible forestry institutions.

Poor policies are the root cause of many of these forest problems. To address these considerations, the IPF/IFF began promoting the national forest programme concept, a framework for an iterative and inclusive process of strategic development in the forestry sector. It provides guidance on how to ensure that such processes link with a wide range of stakeholders and related policy processes, and make the necessary cross-sectoral links to effectively deal with forestry issues. The nfp, it was pointed out, aims to build on, support and add value to ongoing strategic developments. The nfp brings in several additional considerations such as the participatory process, multi-stakeholder linkages, decentralization, and international

concerns related to biodiversity and climate change.

Representatives from Bangladesh, Bhutan, India, Nepal and Sri Lanka presented country papers on the status of forestry policy development in their individual countries. Bhutan and Nepal have reviewed their forestry sector quite recently, and all five countries are engaged in some form of strategic planning and action on forestry. Although nfps, as promulgated by the IPF/IFF proposals for action, have not yet become the basis for policy development in these countries, the current thinking emphasizes that development should involve an iterative process, and the national strategic framework for forestry should explicitly set economic growth and poverty reduction goals. These goals should be consistent with international agreements on sustainable development. Predictably, the forest policies in most countries appear to be rather rigid, and without a cyclic review process, they cannot be revised in time to accommodate the rapid changes that the forestry sector is facing.

The question as to how frequently policies have to be changed was posed, but without an adequate solution. However, most countries have begun to incorporate elements of the “nfp” process approach. They include decentralization and participatory processes with developments in community forests, farm forests, and joint forest management. All of these schemes are experimental, and strongly donor-funded. The forestry agencies are still seeking ways to make such programmes sustainable. Effectiveness of monitoring and evaluation also needs to be improved to ensure adequate feedback to decision making.

Thematic papers on reinventing forest policy (J. Kishwan), review of forest planning in India (S.K. Khanduri), financing sustainable forest management (R.K. Singh), forestry institutions (P. Gangopadhyay), and participatory forestry and poverty alleviation (V.K. Bahaguna) were

presented.

Several critical issues were highlighted. A key concern is that investments in the forestry sector have declined quite drastically in the last two decades. This is partly because the benefits of the sector (both the tangible and intangible benefits) have not been captured in national accounting systems. Excessively rigid policies have also constrained investment, particularly by the private sector.

Another concern is that the linkage between forestry and poverty alleviation has not been clearly emphasized. This has even cast doubts among planners as to its viability. Neither has forestry been able to interface effectively with various other important sectors, such as agriculture and rural development. This lack of convergence has prevented its poverty reduction strategies from being effective. All these problems were clearly identified as stemming from poorly formulated forest policies; they are inflexible and lack effective monitoring and evaluation mechanisms. Consequently, forestry is not receiving the importance in the national development agenda, and the forestry programs receive less and less support from the governments.

The workshop strongly endorsed the national forest programme process. The principal recommendations from the meeting urged countries to utilize the nfp process in revising forestry policy, incorporate poverty alleviation strategies into forestry programmes, work to increase investments in forestry – especially from the private sector – and establish a regional forestry forum among South Asian countries for forestry policy development. FAO was urged to strengthen the capacities of South Asian countries to introduce the nfp process into their Asian forestry management strategies.

BUILDING BRIDGES TO MODEL FORESTS

The FAO/IMFNS Regional Model Forest “Bridging” Initiative (RMF/BI), in collaboration with the International Model Forest Network Secretariat (IMFNS), FAO and the Ministry of Natural Resources and Environment, Thailand, organized a regional consultation on Developing Monitoring and Evaluation (M&E) Systems for Model Forests, 12-16 January 2004, in Lampang, Thailand. Twenty-seven participants from 7 countries (China, Indonesia, Myanmar, Philippines and Thailand, Cambodia and Sri Lanka) attended.

The objectives of the consultation were:

- C to demonstrate the importance and use of proper monitoring and evaluation (M&E) systems as an integral part of designing and implementing projects or activities;
- C to increase the understanding of participants in the roles and principles of impact monitoring and evaluation; and
- C to provide knowledge and tools to develop and implement an impact monitoring and evaluation framework for model forest or other projects.

The course consisted of 6 modules, viz: 1) Introduction to concepts; 2) Developing a logic model; 3) Identifying impact indicators; 4) Designing an impact monitoring system; 5) Preparing an evaluation strategy; and 6) Reporting and communicating results.

The participants acquired sufficient knowledge to initiate action to develop an impact monitoring and evaluation framework for their model forest/project. The understanding and knowledge of the participants regarding impact monitoring and evaluation systems and related matters can be enhanced through the regular exchange of experiences and information, both formally and informally.

After the workshop, a meeting was convened in Chiang Mai, Thailand, on 17 January to discuss the status of model forests in the region and the development of a model forest network for the Asia-Pacific region.

Some of the observations and recommendations by the participants were as follows:

- The model forest approach is a timely, practical and cost effective tool for progressing towards sustainable forest management, and should continue to be strengthened, promoted and supported.
- C All countries expressed strong support for the creation of a regional model forest network for Asia-Pacific.
- C The model forests in the region should review or prepare their strategic plans, using the M&E framework/system, and link them to their national forest programmes and broader institutional frameworks or structures.
- C The national (model forest) project counterparts (NPCs) should find out who will be representing their countries at the next Asia-Pacific Forestry Commission (APFC) meeting and lobby them to make specific recommendations to use model forests (developed through the model forest approach) as field demonstrations of their national forest programmes.
- C Greater efforts should be made by all parties concerned to prepare, publish and disseminate advocacy materials, e.g. concept notes, brochures, etc. on the model forest approach to attract and influence potential donors and/or collaborating agencies. This should include documentation of political support for the model forest approach.
- C All model forests in the region should send their lists of publications and other documentation (e.g. websites) to each other, and to the RMF Secretariat and the IMFNS, for information and broader use.

PAPER MILL TO GET A US\$ 300 MILLION EXPANSION

A US\$ 300 million expansion project is planned for the Bai Bang Paper Mill in northern Viet Nam. After the expansion, the mill will be able to produce some 300,000 tonnes of pulp and 350,000 tonnes of paper annually, processing over 1.5 million tonnes of wood annually, compared to the current 300,000 tonnes. The expansion project is expected to be completed by 2006.

– *Vietnamese English Newspaper* –

INDONESIAN ENVIRONMENT MINISTER CRITICIZES PROPOSED ACEH ROAD

The state Minister of the Environment, Nabel Makarim, criticized the planned development of the Ladia Galaska road, which is to cut through the southern portions of Aceh in Indonesia. The 500-kilometer road linking the west and east coast of the war-torn province will be cut through the Leuser National Park. The park is home to orangutans, elephants, tigers and Sumatran rhinos. Opening up of the forest is likely to have negative effects by providing easier access to the area by illegal loggers. An alternative to the proposed highway would be to upgrade existing roads, which would be less costly and cause less damage to the environment.

– *The Jakarta Post* –

VIET NAM: FOREST COVER IN THE NORTHERN MOUNTAIN REGIONS IS EXPECTED TO EXPAND BY 20 PERCENT

Forest cover in the northern mountains and midlands of Viet Nam is expected to expand from 31 percent to 52 percent by 2010, according to the Ministry of Agriculture and Rural Development (MARD). The region now covers some 10 million hectares, 31 percent of which is forestland and 40 percent is bare hills. In order to achieve its objective MARD is calling for stricter patrols, better water regulation and the expansion of lowland forests for production purposes. Farmers

will be encouraged to grow timber trees and MARD is looking to restore and develop traditional craft villages specializing in forest product processing.

– *RECOFTC Community Forestry E-News* –

MALAYSIA: TIMBER CERTIFICATION REJECTED

Over 250 indigenous communities signed a petition rejecting the Malaysian Timber Council Certification scheme (MTCC). The communities claim that they were unaware of the certification scheme and that it does not fully consider indigenous rights.

– *RECOFTC Community Forestry E-News* –

WALHI SEEKS BOYCOTT OF INDONESIAN WOOD PRODUCTS

The Indonesia Forum for the Environment (Walhi) has called for a worldwide boycott of Indonesia timber products, saying that 70 percent are sourced illegally. Walhi director Longgena Ginting claimed that a worldwide boycott would help save Indonesia's remaining forests.

– *The Jakarta Post* –

VIET NAM TO ESTABLISH NTFP EXPERIMENTAL STATION

Work has commenced on the building of a non-timber forest products experimental station by the NTFP Research Center of the Forestry Science Institute of Viet Nam. The station is to be located on a 290 hectare site in the Dong Lam commune, Hoanh Bo District, Quang Ning province. The station will conduct experiments on NTFP species introduced from other areas in Viet Nam and from overseas. The main objective of the research station is to increase the economic value of forest land utilization and also to test new technologies for the sustainable development of NTFPs. It is anticipated that construction of the station will be completed in 2004.

– *Non-timber Forest Product Research Center* –

AUSTRALIA: 2020 VISION HELPS FORESTRY FOCUS ON PARTNERSHIPS

Australia's ambitious 2020 vision programme for forestry development has been given a boost by the Australian government. The Minister for Forestry and Conservation, Senator Ian Macdonald, said that the program aimed to triple the nation's commercial tree crop area by 2020. The revitalized 2020 vision would encourage partnerships between communities, governments and industries.

– *Southern online – issue 83* –

ICIMOD CELEBRATES 20TH ANNIVERSARY

The International Center for Integrated Mountain Development (ICIMOD) celebrated its 20th anniversary in December. ICIMOD was established based upon an agreement signed in 1981 between His Majesty's Government of Nepal and UNESCO. The Centre was inaugurated in December 1983 and began operating in September 1984. ICIMOD hosts the secretariat of the Global Mountain Forum and is the regional coordinator of the Asia-Pacific Mountain Network.

NEW NATIONAL FOREST PARKS APPROVED IN CHINA

The State Forestry Administration (SFA) of China has approved 64 new national forest parks across the country in a bid to protect natural resources and boost tourism. The total number of forest parks in China is 1,540, of which 503 are national forest parks.

– *China View* –

FOREST GUARDS GO HIGH-TECH

Timber smugglers and other violators of forestry laws – beware. The lumad forest guards of the Mt. Kitanglad Range Natural Park, Philippines, are now armed with mobile phones. The phones were solicited by an NGO from Smart Communications, Inc. to boost forest protection work within the park.

– *Mindanews.com* –

FIRST DOMESTIC FOREST CERTIFICATION IN JAPAN

Japan's national forest certification scheme Sustainable Green Ecosystem Council (SGEC) was established in June 2003. Its first certificate was granted to the corporate forestland of Nippon Paper Industries and Ohi Paper Co., Ltd. The certified forests are located in Shizuoka prefecture.

– *ITTO Tropical Forest Update* –

FOREST MANAGEMENT CODE COMPLETED FOR BHUTAN

A comprehensive forest management code has been developed for Bhutan. Work on the development of the code has been conducted over the past six years. The code will be used as an everyday guide and reference by forest management planners in Bhutan.

– *KUENSELonline.com* –

PHILIPPINES PACT FOR FOREST PROTECTION

The Philippines Department of Environment and Natural Resources recently entered into a partnership with two environmental groups – Environmental Education Network of the Philippines (EENP) and the Philippine Watershed Management Coalition (PWMC) – to push for the sustainable development of Philippines forests. The focus of the joint effort will be the development of forests and watershed areas, with the main activity being the reforestation of denuded mountain areas.

– *ABS-CBNnews.com* –

CITIGROUP SIGNS NEW ENVIRONMENTAL POLICY

Citigroup, the world's largest private financial institution, has signed a comprehensive environmental policy with regards to the funding of projects that might have an impact on sensitive ecosystems, logging, indigenous areas and climate change. Under the policy, the group will no longer fund commercial logging in tropical rainforests.

– *Inter Press Service* –

FAO ASIA-PACIFIC FORESTRY CALENDAR

16-22 April 2004. Australia. **FAO Advisory Committee on Paper and Wood Products**. Contact: Wulf Killmann, Director, Forest Products Division, FAO Headquarters, Viale delle Terme di Caracalla, 00100 Rome, Italy; Tel: 06 53221; E-mail: Wulf.Killmann@fao.org

16-17 April 2004. Nadi, Fiji. **Regional Workshop on Implementation of IPF/IFF Proposals for Action and Strengthening National Forest Programmes**. Contact: Simmathiri Appanah, National Forest Programme Adviser for Asia and the Pacific, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4136; Fax: (662) 697-4445; E-mail: Simmathiri.Appanah@fao.org

17-18 April 2004. Nadi, Fiji. **Workshop on Asia-Pacific Invasive Species Network**. Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

19-23 April 2004. Nadi, Fiji. **20th Session of the Asia-Pacific Forestry Commission**. Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

24 April 2004. Nadi, Fiji. **Forest Resources Assessment 2005 Workshop**. Contact: M. Kashio, Regional Forest Resources Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4141; Fax: (662) 697-4445; E-mail: Masakazu.Kashio@fao.org

17-21 May 2004. Beijing, China. **27th FAO Asia-Pacific Regional Conference**. Contact: Biplab Nandi, Senior Food and Nutrition Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4143; Fax: (662) 697-4445; E-mail: Biplab.Nandi@fao.org

26-28 May 2004. Yokohama, Japan. **Meeting of National Coordinators [for Forest Resources Assessment 2005] from East Asian Countries**. M. Kashio, Regional Forest Resources Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4141; Fax: (662) 697-4445; E-mail: Masakazu.Kashio@fao.org

June 2004. Zheijiang, China (dates and venue to be confirmed). **Regional Seminar on Forest Certification in China: Latest Developments and Future Strategies**. Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

30 November - 2 December 2002. Kota Kinabalu, Sabah, Malaysia. **Symposium on Tropical Rainforest Rehabilitation & Restoration – Existing Knowledge and Future Directions**. Co-organized by: FAO RAP, World Wide Fund for Nature (WWF), Yayasan Sabah and the Sabah Forestry Department. Contact: Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel. (662) 697-4139; Fax: (662) 697-4445; E-mail: Patrick.Durst@fao.org

14-18 March 2005. Rome, Italy. **17th Session of the Committee on Forestry**. Contact: Doug Kneeland, Programme Coordinator, Programme Coordination Unit, FAO Headquarters, Viale delle Terme di Caracalla, 00100 Rome, Italy; Tel: 06 53925; E-mail: Douglas.Kneeland@fao.org

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 25. *Development of National-level Criteria and Indicators for the Sustainable Management of Dry Forests in Asia: Workshop Report* (RAP Publication 2000/07); *Background Papers* (RAP Publication 2000/08)
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