



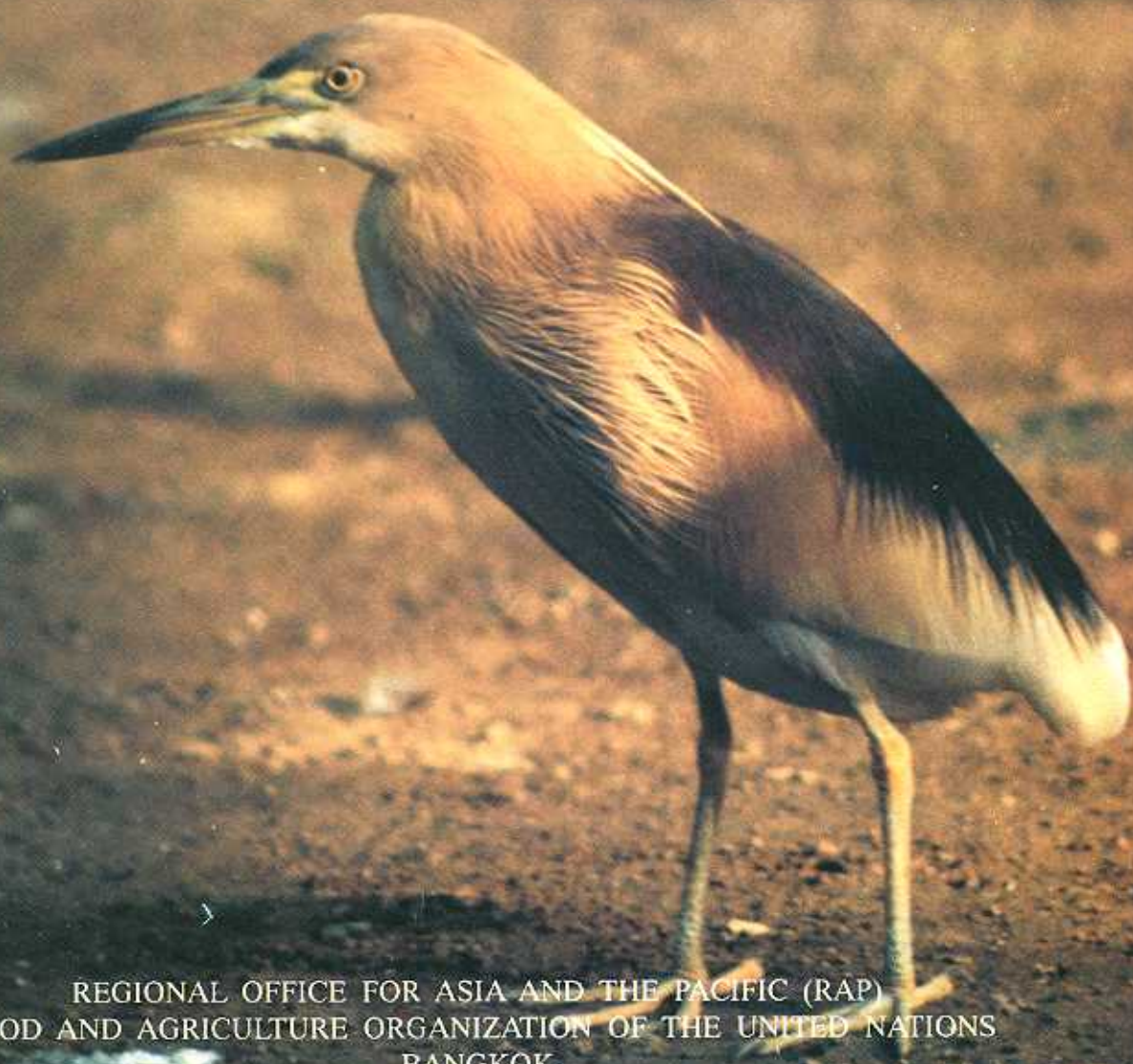
FEATURING
FOREST NEWS

TIGER PAPER

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DISCUSSION PAPER FOR PROTECTED AREA MANAGERS: ZONING PROTECTED AREAS AND APPLYING COMPLEMENTARY REGULATIONS

by John Parr

Protected areas often cover vast areas, encompassing mosaics of habitats. Their intrinsic values vary strongly. The distinguishing features of these 'zones' relate to their conservation and biodiversity values, their degree of disturbance and accessibility; and to their compatibility with certain development actions. Recognition of these spatially differing values by protected area managers is reflected in zoning schemes, which are in turn highlighted in reserve management plans.

A generalized zoning scheme which might be found in a management plan for a protected area is outlined below. The precise number and types of zones may be a subject for debate.

A Generalized Zoning Scheme and their Characteristics

Totally Protected Zones

Areas which have:

1. high to medium conservation value
2. low accessibility and existing use by local communities
which are found inside the protected area.

Village Lands Zones

Areas which have:

3. a concentration of human settlements and agricultural activity
4. an absence of natural habitats
which are found within the protected area.

Controlled Use Zones

Areas which have:

5. high accessibility by local communities for natural resources
6. high potential for joint management with local communities
which are found inside the protected area.

Tourism Development Zones

Areas which have:

7. low - moderate conservation values
8. high scenic values
9. high recreational values
10. high accessibility
11. low - moderate existing use by local communities
which are found inside the protected area.

Multipurpose Zones

Areas which have:

1. low - high conservation values
2. high scenic values
3. high recreational values
1. high accessibility
2. low - high use by local communities
which are found inside the protected area.

Special Protection Zones

Areas which have:

3. nationally important conservation values
which are found inside the protected area (and which may overlap existing controlled use zones).

Community Development Zones

Areas which have:

4. no - low conservation values
5. high concentrations of human settlements and economic activity
which are located outside the protected area.

In summary, two zones are defined primarily for protecting the most important habitats and conservation values of the park; whilst another provides for park management and tourism infrastructure. Three further zones are defined relating to the local communities. One of these deals with enclave villages. A second zone provides for joint management of the natural resources inside the reserve by local communities and

the reserve authorities. The fifth zone is located on the periphery of the protected area, being designed to meet the intensive development needs of the local communities situated in closest proximity to the reserve. Finally, a (special) multipurpose zone has been put forward, to provide for a reservoir waterbody found within a reserve.

The Application of the Generalized Zoning Scheme to a Protected Area

The generalized zoning scheme was applied to Phou Khao Khouay National Park in Northern Lao P.D.R. Figure 1 shows the zoning scheme within this park.

The Need for Regulations

However, while zoning is a universally recognized management tool by protected area practitioners, these zones need to be more than theoretical lines on a map. This raises the question as to how the different reserve values may be recognized and respected, by protected area personnel, by resource users (local communities) and by other concerned government officials. The author suggests that zones will only gain some sort of recognition if they are supported by the production of site specific, zoning regulations.

Development of Regulations relating to Zoning

Regulations may be drawn up which relate to the zoning scheme for a protected area. To be most effective, it is important that they are drawn up in consultation with the local communities, and approved by the appropriate, local government agencies. These 'local' regulations will make specific references to the activities permitted and prohibited in each of the defined zones.

The local regulations should be subject to regular review. The reviews should take account of new information gathered on conservation values. They should also take account of the changing needs of the local

communities regarding accessing the natural resources within the protected area; balancing the needs of increasing populations versus increasing economic development within the communities. Finally they should consider progress in tourism development.

An example of Zoning Regulations for Phou Khao Khouay National Park is outlined below. It should be noted that the regulations outlined are still in draft form at the reserve itself, and have not been formally approved. The author has modified the regulations somewhat. Furthermore, for the Penalties section, the author has only included examples from the Tourism Development Zone and a Special Conservation Zone (for Green Peafowl). However, protected area managers should be able to draw up their own penalty system for the respective zones. The reader is recommended to consider the gist, and potential benefits to management of drawing up zoning regulations, rather than consider the line-by-line contents of the regulations.

Regulations for Recognized Zones within Phou Khao Khouay National Park

Based on Government directives and policies regarding the conservation of forest resources, aquatic, wildlife and environmental issues.

Based on the Prime Minister Decree No. 164/PM dated 29th October 1993 regarding the establishment of a national system of protected areas.

Referring to Forest Law No. 01/96 dated 11 October 1996, Article 42 pertaining to protected area management.

Part I

GENERAL PROVISIONS

Article 1. General Provisions.

1.1 Stipulation of these regulations has been based on Prime Minister's Decree No. 164/PM dated 29 October 1993 regarding the establishment of protected areas and

the Forest Law No. 01/96 dated 11 October 1996.

- 1.2 Amendment of these regulations may be undertaken if the resulting articles remain consistent with government directives, policies and legislation.
- 1.3 Provisions stated within these regulations may deviate from national law only if the deviation serves to increase the effect of the law.
- 1.4 The regulations shall become effective for the national park following approval by the districts and the provincial governors of the four provinces.
- 1.5 Each district must appoint a National Park Sub-committee comprising representatives from forestry, agriculture and finance and chaired by the district officer or the deputy district officer. The national park director and his deputy directors are ex officio members of each District National Park Sub-committee. These committees will resolve management disputes.
- 1.6 The National Park Management Committee, comprising the District National Park Sub-committees and nominated agencies from Government and independent stakeholders, shall determine future management policy and resolve major management disputes.

Article 2. Zoning Provisions

- 2.1 Zoning of the national park has been established following consultation with people living in and around Phou Khao Khouay National Park.
- 2.2 The national park has been divided into two general zones, namely Controlled Use Zones and Totally Protected Zones. These two zones have been clearly specified in the Forest Law of November 1996.
- 2.3 A special kind of Controlled Use Zone – termed Village Lands Zone – provides for homesteads and permanent agricultural lands of enclave villages found within the national park.
- 2.3 Forest areas subject to community utilization have been identified and nominated as Controlled Use Zones

following consultation with respective communities. Broadly speaking, these zones extend about 3 to 4 km from the boundaries of the reserve into the interior. The Controlled Use Zones for each of the four enclave villages and the seven villages located on the shores of the Nam Ngum reservoir will be clarified following land allocation exercises.

- 2.4 The core areas of the reserve have been identified and nominated as Totally Protected Zones, being mutually exclusive of the Controlled Use Zones already identified.
- 2.5 In addition, three types of site-specific special zones have been declared, following nomination and approval by the national park authorities, and subsequent approval by the district authorities and the respective local communities.
- 2.6 Areas of high tourism interest (including potential) have been identified and nominated as Tourism Development Zones as follows:
 - Tad Leuk waterfalls; Tad Xay waterfalls; Tad Phou Khao Khouay waterfalls; Tad Xang waterfalls; Pha Xett; and the Nam Leuk dam, reservoir and environs
- 2.7 Areas for wildlife conservation of rare and endangered species have been identified and nominated as Special Conservation Zones. To date, two sites have been declared, these being:
 - a Special Conservation Zone for Green Peafowl in habitat adjacent to Nakhay and Nakhon Thung villages.
 - a Special Conservation Zone for White-Cheeked Gibbons on the ridges near Phou Khata village.
- 2.8 In addition, Phou Khao Khouay National Park has been divided into 35 management sectors. These sectors have been selected using clear physical features (where possible).

Article 3. Rights of Access within the National Park.

- 3.1 All vehicles have right of access to the road from Thabok village to Hom District. Time restrictions on access will be imposed in

- due course (from 06.00 hrs. – 20.00 hrs).
- 3.2 All vehicles have right of access to the road Route No. 151 from Ban Nawa village to the plateau from 06.00 hrs. – 18.00 hrs.
 - 3.3 The national park authorities reserve the right to open or close main roads or feeder roads into the national park interior at any time when necessary to protect/conserves resources. Whenever the roads need to be used they can be opened.
 - 3.4 No overnight parking on the roadside, in lay-bys or in car parks is permitted within the national park.

Article 4. General Zoning Regulations.

- 4.1 No new settlement is permitted anywhere within the national park.
- 4.2 Temporary infrastructure (field houses or temporary shelters) is permitted only within the Controlled Use Zones.
- 4.3 No construction or renovation of roads, bridges will be allowed within the national park, unless the Department of Forestry has granted permission.
- 4.4 Road enlargement or new road construction may only be undertaken following approval from the Department of Forestry.
- 4.5 The possession of any type of equipment for felling trees is prohibited.
- 4.6 The possession of all types of weapons (locally manufactured rifles, automatic weapons) is prohibited within the national park.
- 4.7 Fishing methods utilizing poisons, explosives, chemicals, electricity and weapons are prohibited within the national park.

- 4.8 Fishing methods utilizing small mesh (4 cm or less) are prohibited.
- 4.9 The pumping of water out of its natural source i.e. water basin, lakes, canals, etc. and introducing exotic fish species into the national park is prohibited.
- 4.10 No earthen, stone or barrier made of sticks/branches may be built across waterways for the purposes of fishing.

PART II

REGULATIONS FOR THE ZONES

Article 5. Regulations for Totally Protected Zones

- 5.1 Within the Totally Protected Zones access is prohibited, unless the national park authorities have granted permission.
- 5.2 The following activities are forbidden within the Totally Protected Zones: hunting and trapping, trapping of live wildlife for trading purposes, fishing, and collection of non-timber forest products.
- 5.3 The national park authorities, in consultation and collaboration with the respective District Sub-Committees for Park Management, have the responsibility to manage Totally Protected Zones.

REGULATIONS FOR VILLAGE LAND ZONES AND CONTROLLED USE ZONES

Article 6: Villages with Mandates for Co-management

- 6.1 Villages with mandates for co-management within the national park are stated below:

No.	Recognized Villages	Management Sector
	Thulakhom District	
1	Phou Khao Keo, Phou Khao Khouay	2,4,5
2	Vang Hua	4,5,6
3	Phonkhamh, Vatt Had, Nafay, Phonghong and Nam Khae	2
4	Nakang, Pakhang, Phakho	2
5	Nawa, Napheng and Nam Ngam	5
6	Nanok Khoum, Nagnangkao, Nagnang Mai and Na-Ngeun	6
	Xaithany District	

1	Houakhoua	6
2	Houana	
3	Nakhan Thoung, Nakhay, Na Ngom Mai, Na Ngom Kao, Nattan	7
4	Nonh, Thakok Hai	8
	Pak Ngum District	
1	Thaxienglae, Naxienglae and Veunkabou	13
	Thaphabath District	
1	Naxai, Xaisavang	14
2	Houay Saiphai, Laokha, Phabath, Na, Somsa-ard	15
3	Thwainoi	15,16
4	Oudomxai, Palai	16
5	Thabok, Pakleuk	18,19
6	Gnangkhua	16,17,18
7	Phongngam	16,18
8	Hatkhai	19,20
9	Phongsavanh, Nakham	21
10	Namching, Phonbok, Namlo	22
11	Gnoyhai, Nongkeun	23, 24
12	Pak Thouay Nua, Pak Thouay Dai	24
	Long Xan District	
1	Nampa	27,28
2	Pha-ant	30
3	Naxai, Phonxai, Phonlao, Xamkhon, Nam Khouay	31
4	Khongvath, Hinsor, Phongmuang	31,34
5	Keng San	34
6	Nam Leuk, Thamdin, Tha Hua, Don Home	34,35
7	Paktou, Khet Sam, Phou Phadang	35
	Keo Oudom District	
1	Huaypong, Mai Nagnaeng	1

6.2 Of these 74 villages, the following communities have been identified as enclave villages found in the interior of the reserve: Phou Khao Kel, Phou Khao Khouay, Vang Hua and Phou Phadang. In addition, five enclave villages are located on the shores of the Nam Ngum Reservoir: Don Home, Paktou, Khet Sam, Huaypong, and Mai Nagnaeng. All these villages have the right to establish Village Land Zones and Controlled Use Zones within the national park.

6.3 The remaining 65 villages have also been recognized as being dependent upon the natural resources within the national park. These villages have the right to establish Controlled Use Zones within the national park,

6.4 Access rights to utilize land and forest resources by the 74 villages within the Totally Protected Zones are prohibited.

Article 7. Regulations for Village Land Zones.

7.1 Recognized enclave villages must register all their households and their permanent agricultural lands with the national park authorities during regular socio-economic surveys.

7.2 The recognized enclave villages must identify and demarcate their permanent agricultural lands in collaboration with the national park authorities, following which these communities will be prohibited from expanding their lands

further.

- 7.3 Enclave villages must nominate villagers to represent them regarding land use allocation issues.
- 7.4 No land ownership documents (land titles) will be issued for land (homesteads and agricultural land) found within the national park.
- 7.5 Temporary land certificates will be issued to villagers for homesteads and agricultural land which may be handed to direct relatives, but cannot be sold to other individuals.

Article 8. Regulations for Controlled Use Zones.

- 8.1 All villages with mandates for co-management inside the national park must identify their Controlled Use Zones in collaboration with the national park authorities and the respective district authorities. Neighbouring villages should be consulted to avoid conflicts of interest.
- 8.2 The village boundary must be walked out by the villagers in the company of the national park authorities and the respective district. The boundaries of the Controlled Use Zones must be demarcated with sign-posts (to be maintained by the villages themselves).
- 8.3 Villages should nominate representatives from their respective villages to deal with land use planning issues and liaise with the protected area authorities.
- 8.4 Villages may zone their Controlled Use Zones according to land use, and demarcate accordingly.
- 8.5 Mapping of the Controlled Use Zones, and any zoning found therein, should be undertaken in order to gain permanent recognition.
- 8.6 Villages may draw up their own regulations for natural resource utilization within their respective Controlled Use Zones.
- 8.7 Formal agreements should be drafted by village communities with the national park authorities and the respective district authorities.
- 8.8 Patrolling must be undertaken regularly by the protection authorities within the

Controlled Use Zones to inspect the activities undertaken by villagers in accordance with the protected area regulations.

- 8.9 Non-timber forest products may be collected within the Controlled Use Zone so long as it is sustainable (with reference to the non-timber forest product list prepared by the national park authorities).
- 8.10 Enrichment planting of non-timber forest product species may be undertaken by any of the 74 communities within their respective Controlled Use Zones.
- 8.11 Permits are required for the commercial collection of non-timber forest products. The District Park Sub-committees will issue these permits. The precise list of forest products and their quotas will be subject to regular review by the National Park Management Committee.
- 8.12 Destructive methods for collecting forest products, like felling of trees or resin tapping, are not permitted.
- 8.13 Collection of fuelwood in the Controlled Use Zones is permitted.
- 8.14 Villagers from any of the 74 communities requiring timber for construction of new housing must make a formal request to the national park authorities. Each request will be evaluated on a case by case basis. Each request may be independently scrutinized by the Department of Forestry.
- 8.15 Hunting, trapping, and capturing live animals for trading purposes within the Controlled Use Zones is prohibited.
- 8.16 The use of traditional fishing methods in the Controlled Use Zones for family consumption only will be permitted. No trading of fish will be permitted.
- 8.17 Outsiders who wish to use resources within the Controlled Use Zones belonging to the 74 villages located within and around the national park should have to inform the respective villages of their purpose of entry into the national park. Official permission has to be granted by the respective village headman.

Article 9. Regulations for Tourism Development Zones.

- 9.1 All visitors (local and international tourists) must abide by the following regulations at tourism sites within the national park. These regulations have been drawn up by the national park authorities.
- 9.2 They are prohibited from collecting or destroying all species of fauna and flora or taking stones or rocks from tourism sites within the national park.
- 9.3 They are prohibited from doing graffiti on trees, stones, caves or buildings and amenities (benches, picnic tables etc.) in tourism sites.
- 9.4 They are prohibited from littering the tourism sites.
- 9.5 They are prohibited from setting fires in tourism sites, apart from in specified camping sites that have already been determined.
- 9.6 They are prohibited from bringing any species of pet into tourism sites, or any other part of the reserve.
- 9.7 They must abide by all signs erected within the tourism sites and along the access roads.
- 9.8 They may stay overnight in the national park in designated tourism sites where camping is permitted. These areas include Tad Phou Khao Khouay Waterfalls, Tad Leuk Waterfalls, Tad Xay Waterfalls, the Nam Leuk Dam and Pha Xett. Anyone wishing to stay overnight in other parts of the national park requires permission from the national park authorities.

Article 10. Regulations for Multiple Use Zones (the Nam Leuk Reservoir and Environs).

- 10.1 Visitors (both local and international tourists) may visit the Nam Leuk reservoir for the purposes of sight-seeing.
- 10.2 Visitors may undertake recreational fishing in the Nam Leuk reservoir, but require a fishing permit from the national park authorities.
- 10.3 Fishing by local communities on the Nam Leuk reservoir has to be authorized by the

national park authorities, Electricite du Laos, and Long Xan District.

- 10.4 Fishing by villagers may only be undertaken in the zone allocated and demarcated by signs.
- 10.5 Fishing is only permitted during the period July to January. Fishing is prohibited from February to June.
- 10.6 Fishing using net mesh size smaller than 6 cm is prohibited.
- 10.7 Introduction of exotic fish species into the Nam Leuk reservoir is prohibited.
- 10.8 No temporary settlements are permitted along the shores of the Nam Leuk reservoir.
- 10.9 No growing of agricultural crops is permitted along the shores of the Nam Leuk reservoir.
- 10.10 No livestock are permitted to graze along the shores of the Nam Leuk reservoir.

Article 11. Special Conservation Zone (for Green Peafowl).

The Special Conservation Zone (for Green Peafowl) covers an area overlapping the Controlled Use Zones of Ban Nakhay and Ban Nakhan Thoung. Within these Controlled Use Zones, the normal regulations for Controlled Use Zones apply. However, given the conservation significance of the area for Green Peafowl, additional regulations specifically for the conservation of this endangered bird species have been drawn up. These regulations have been drawn up in consultation with the local communities, with approval from the district authorities.

- 11.1 The Special Conservation Zone for Green Peafowl has been identified and drawn up on a map, which has been signed and approved by the village committees and the district authorities.
- 11.2 Within this Zone, the trapping or hunting of adult birds, as well as the collection of eggs or chicks for raising or sale is prohibited.
- 11.3 Within this Zone, disturbance of Green Peafowl is prohibited during the breeding season, from February to June.
- 11.4 Ownership of Green Peafowl within

households is prohibited.

- 11.5 Villagers should be particularly careful with respect to accidentally starting fires and take all measures to prevent burning of the peafowl habitat.

Article 12. Special Conservation Zone (for White-Cheeked Gibbons).

The Special Conservation Zone (for White-Cheeked Gibbons) covers an area overlapping the Controlled Use Zone of Ban Phou Khata, as well as some Totally Protected Zones. Within the Controlled Use Zone of Ban Phou Khata, the normal regulations for Controlled Use Zones apply. However, given the conservation significance of the area for White-Cheeked Gibbons, additional regulations specifically for the conservation of this rare primate have been drawn up. These regulations have been drawn up in consultation with the local communities, with approval from the district authorities.

- 12.1 The Species Conservation Zone for White-Cheeked Gibbons has been identified and drawn up on a map, which has been signed and approved by the village committees and the district authorities.
- 12.2 Within this Zone, the hunting of gibbons is prohibited.
- 12.3 Ownership of gibbons within households is prohibited.
- 12.4 Villagers are encouraged to report the presence of hunters or traders from other villages or towns to the national park authorities.

Article 13. Regulations for Community Development Zones.

- 13.1 The Community Development Zones have been identified by the national park authorities as encompassing village communities situated within 5 kilometres of national park boundary, whose villagers are deemed likely to be dependent upon the natural resources of the protected area to some degree.
- 13.2 The Community Development Zones – apart from the recognized enclave

villages – lie outside the national park. As such, they lie outside the jurisdiction of the national park authorities. Consequently, no regulations may be enforced.

- 13.3 The national park authorities wishes to recognize these villages, in order to promote rural development within them.
- 13.4 The national park authorities will give particular attention to promoting rural development in villages located in immediate proximity to Special Protection Zones.

PART III

PENALTIES

Examples of penalties proposed for two zones within Phou Khao Khouay National Park are shown below.

Penalties with respect to the Tourism Development Zones

1. Picking flowers in tourism sites will result in a fine of up to 100,000 kip.
2. Carving or scratching trees, stones, and park infrastructure in these areas will result in a fine of 1,000 - 20,000 kip.
3. Dropping litter or rubbish may result in a fine of 1,000 - 20,000 kip.
4. The setting of fires outside designated areas will result in a fine of 1,000 – 20,000 kip
5. The possession of a pet in the national park will result in a fine of 10,000 kip / animal.
6. Failure to abide by tourism signs may result in a warning or a fine of up to 10,000 kip.
7. Overnight staying within the national park is permitted in designated areas at selected tourism sites, namely Tad Phou Khao Khouay Waterfalls, Tad Leuk Waterfalls, Tad Xay Waterfalls, Pha Xett and Nam Leuk reservoir. Any individual wishing to stay overnight outside the aforementioned sites requires permission from the national park authorities. Violations of these guidelines may result in a fine of 20,000 to 50,000 kip.

In the case of a serious violation, the individual will be sent to court for sentencing.

Penalties with respect to the Special Conservation Zone (for Green Peafowl)

1. Any individual found killing, trapping, collecting eggs or having Green Peafowl in their possession for sale or other purposes will be fined 50,000-500,000 kip.
2. Disturbance of Green Peafowl during the breeding season (from February to June) will be fined 10,000 kip - 200,000 kip.
3. Any individual found in possession of Green Peafowl's eggs or chicks in their

own homes will be fined 50,000 - 100,000 kip.

Protected area managers and conservationists may wish to consider how many zones should be put forward and recognized for an individual protected area. Does zoning really work, and if so which zones are worthwhile? Is there a need to have a Special Conservation Zone or is this sheer elaboration? Should there be a Rehabilitation Zone, for degraded areas? Is having regulations related to each zone an optimal solution, or simply a red herring? Should regulations be drawn up for the protected area staff to follow, or should they be drawn up with the emphasis towards the village communities? It would be nice to have a forum whereby questions like these could be discussed.

SURVIVAL OF GIANT PANDA IN THE WILD

by Li Zhaohua and Manfred Denich

Introduction

Giant panda (*Ailuropoda melanoleuca*) is an international favorite among the most rare animal species of the world (Etling, 1999). Ever since Pére Armand David, a missionary and avid collector of museum specimens, first saw a skin of "the famous black and white bear" back in 1869, no other species has attracted as much attention in the world as the giant panda (Carter, 1999; Reid, 1991; Taylor, 1991). In 1958, WWF (World Wide Fund for Nature, formerly World Wildlife Fund) adopted the giant panda as its international logo (Hu, 1985). In 1984, due to its dwindling numbers, the U.S. Fish and Wildlife Service listed it as an endangered species under the Endangered Species Act (Fish & Wildlife Service, 1998).

Fossil evidence shows that in the late Pleistocene (0.7 million years ago) the giant panda was widely distributed in Myanmar, northern Vietnam, and much of eastern and

southern China, reaching as far north as Beijing (Taylor, 1991). Its range has since contracted due to climatic changes and, in recent centuries, increasing human settlements. The species is now restricted to six isolated mountain ranges in Gansu, Shaanxi and Sichuan along the eastern edge of the Tibetan plateau. The remaining area of suitable panda habitat totals about 29,500 km² (Hu, 1985).

Although the Chinese government lists the giant panda as a first priority endangered species and has invested heavily in its protection, the population of wild pandas has still declined rapidly during the past three decades as a result of numerous detrimental forces such as habitat shrinkage, poaching, and the mass flowering and subsequent die-off of bamboo (Guo, 1999; He, 1998; O'Brien, 1987; Schaller, 1987). The survival of wild pandas is still considered to be an unsolved problem. This article briefly reviews the population changes over the past three decades and the main threats to the survival of wild pandas.

Population Dynamics

Population in the 1970s

From 1974 to 1977, about 3,000 Chinese scientists conducted a census of the remaining wild pandas in their known range, based on the classic transect method which entailed searching for sightings, spoor and droppings (O'Brien, 1987; Hu, 1985). The field investigation estimated that about 2,200 wild pandas were living in Gansu (ca. 310), Shaanxi (ca. 200) and Sichuan (ca. 1,500) provinces (Fong, 2001; Xiongmao Jiayuan, 1999). Since the transect method was originally applied in the panda census, some measuring errors and other mistakes were checked by other auxiliary methods such as tracking by hunting dogs and feces analysis. In order to give urgency to panda protection, the Chinese government estimated that there were 1,050-1,150 animals in 1978 (Fong, 2001). However, the field data might be closer to fact than the official figure.

Population in the 1980s

From the late 1970s to the mid-1980s, due to the mass flowering of bamboo which deprived the panda of their main food staple, and also the capture of wild pandas for conservation purposes, the wild population of giant panda significantly declined. An intensive survey was carried out between 1985 and 1988 by a joint group organized by WWF and the Chinese Ministry of Forestry. The scientists covered thousands of miles of panda country high up in the mountains of Sichuan and neighboring provinces. It was estimated that about 872-1,352 giant pandas were alive in the wild (Fong, 2001). Meanwhile, O'Brien (1987) estimated that the wild population ranged from 600-700, based on deducting the losses during the disastrous period of bamboo flowering from the official 1978 figures. Considering that the official figure was half that of the field data results, the higher end of WWF's estimation was probably closer to the truth (Lindburg, 1999; Pan, 1998). MacKinnon and De Wulf (1994) used satellite imagery to estimate the total area inhabited by giant pandas, and predicted a total population of 1,200 pandas split into 29 fragmented areas.

Table 1: Population Dynamics of Giant Panda in Some Reserves

Reserve	No. of Pandas(Year)	No. of Pandas/Year	Resources
Wuyipeng	27 (1994)	24 (1998)	Zhang, 2000
Wolong	100 (1985)	86 (1998)	Zhang, 2000
Tanjahe	44 (1992)	42 (1999)	Ou, 1999
Daxiangling	8 (1991)	5 (1999)	Fang, 1999
Taibaishan	20 (1988)	11 (1996)	Ma, 1999
Wanglang	11 (1983)	19 (1994)	Fong, 2001
Yele	8 (1988)	7 (1998)	Fong, 2001
Mabian	32 (1988)	7 (1999)	Fong, 2001
Meigu	23 (1988)	5 (1999)	Fong, 2001
Huangnong	11 (1988)	23 (1996)	Fong, 2001
Washan	20 (1988)	6 (1998)	Fong, 2001
Yele	8 (1988)	7 (1998)	Fong, 2001
Fuping	27 (1988)	65 (1998)	Fong, 2001
Changqing	31 (1988)	36 (1997)	Fong, 2001
Taibaishan	20 (1988)	11 (1996)	Fong, 2001

Population in the 1990s

Since the population estimate needs a better

census, Chinese scientists have applied the DNA fingerprinting method to identify the population size in the wild (Wei, 1999; He,

1998). For example, Ou (1999) and his colleagues used DNA techniques to investigate the wild population in Tangjiahe Panda Reserve. Their results showed that there are 42 giant pandas belong to 6 families living in the reserve.

Although the new survey is still in progress and there is as yet no absolutely accepted data on giant panda in the wild at the moment, from recent reports it is estimated that at least one-fourth of the giant pandas have disappeared from the reserves since 1988. Therefore, we can probably assume that the wild population of giant panda has decreased to less than 1,000 animals and might even be as low as 800-900 animals.

Threats to the Giant Panda

Habitat destruction

The available giant panda habitat has been severely reduced by logging and forest clearance for agricultural settlements. In the early 1950s, giant pandas occupied about 51,103 km² as their habitat. With agricultural development and forest cutting, their habitat was reduced to 13,823 km² in 1974, only about 17% of that in the 1950s. In 1990, this figure continued to shrink to less than 11,000 km² (Xongmao Jiayuan, 1999). Even worse, because most of the valleys are inhabited by people, the panda populations are isolated in narrow belts of bamboo no more than 1,000-1,200 m in width. Panda habitat continues to disappear as settlers push ever higher up the mountain slopes (Taylor, 1991).

Another kind of habitat destruction is habitat fragmentation. Recent research in Wolong Giant Panda Reserve shows that in this famous reserve the habitat can be rated as follows: 90.36 km² (4.47%) of the total area is most suitable for giant panda; 226.42 km² (11.19%) is suitable area; 286.09 km² (14.13%) is moderately suitable; and 177.91 km² (8.8%) is marginally suitable (Chleng, 1999). This means that more than 60% (about 1,236.51 km²) is completely unsuitable for giant panda. Even the habitats in the most suitable and suitable sites are in extremely fragmented

situations from spatial distribution, which has reduced the carrying capacity of giant panda in the reserve.

Capture, poaching, and collaring

From 1953 to 2000, at least 256 giant panda have been caught from the field and never returned to the wild (Fong, 2001; Etling, 1999). Since 1949, in Fengtongshi of Baoxing County, 131 pandas have been officially taken from the wild, out of which 16 were sent to foreign countries as "State Gifts" and another 115 were transferred to zoos and research centers in China (Sichuan Daily, 1999).

Poaching is another threat that is contributing to the decline in the panda population. In the 1980s, 146 smuggled panda skins were confiscated by Chinese customs officers. In the late 1980s, capital punishment was introduced for panda poachers; however, illegal hunting has not ceased. In May 1996, Chinese police uncovered the country's biggest wildlife smuggling ring in Gansu Province, arresting 12 people and confiscating 3 panda skins. In June 1996, a Shaanxi farmer was caught selling a panda pelt for RMB 60,000 (US\$7,200). In April 1997, one panda was killed in Qingchuan County and five farmers were sentenced to jail (Muzi Dailynews, 4 August 1999). It is estimated that from 1982 to 1992, illegal hunting was responsible for 23.1% of the casualties of giant panda in the wild in Sichuan Province (Fong, 2001).

Besides the captures and poaching, the local accounts also suggest that collaring the animals for scientific researches has also had a negative effect on the survival of wild giant pandas.

From November 1980 to 1987, WWF conducted ecological observations of the wild pandas in Sichuan Province. During the field survey, 14 giant pandas were collared and one was ear-tagged. By the end of 1987, only 3 of the collared pandas (20%) were still alive, 6 were missing, 2 had died of diseases, another died of unknown causes, one was killed by a hunting rope and another by starvation. The

mean life span of pandas used for experimental purposes is only half the normal expected life span of pandas in the wild (Hu, 1985). Of course there are many explanations given to explain this phenomenon, but the fact is that the population used in the experimental fields has been significantly reduced, especially in Wuyipeng and Baixiongping in Sichuan Province (Fong, 2001).

Bamboo flowering

Although they belong to the order Carnivora, giant pandas have become almost exclusively vegetarian. Bamboo stalks and roots make up about 99% of its diet (Schaller, 1985). According to the field records (Xiongma Jiayuan, 1999), Hu (1985) concluded that there are 47 species of bamboos in the diet of giant panda. Among them, 13 species are favored food, 10 species are frequently ingested, and 24 species are eaten on occasion. The giant panda also feeds on gentians, irises, crocuses, fish, vines, mushrooms, rice grass and occasionally small rodents. One adult panda must eat 10 to 20 kg of fresh bamboo each day to survive and spends 10 to 16 hours a day feeding.

The different varieties of bamboo go through periodic die-offs as part of their renewal cycle (Taylor, 1991; Reid, 1989). At the end of its life cycle, bamboo will bloom and then drop its seeds and die. Often vast areas of the bamboo forest disappears at the same time. In the past, the giant pandas responded to this phenomenon by moving to another area. But increased human settlements makes it difficult for the giant panda to reach new food supplies. Without the ability to move to new areas that have not been affected, starvation and death will certainly follow for the giant panda. Such die-offs of the bamboo also put the giant pandas in more direct contact with farmers and poachers as they try to find new areas in which to feed.

For example, in the Wanglang reserve, an estimated population of 196 individuals in 1969 was reduced to only 10-20 by the 1980s due to lack of food (Menghu, 1993). In 1983, large areas of arrow bamboo blossomed and

then died across the Qionglai Mountains in Sichuan Province. In Pingwu County alone, 100 pandas starved to death during that period (MOF, 1998). Bamboo die-offs may, however, have once been an important feature in the population dynamics of the giant panda, with forced emigration promoting out-breeding and maintenance of a healthy population. Generally after a die-back it takes about 10-20 years before the plants can support a panda population again (Taylor, 1993; Schaller, 1985).

Conservation Prospects

Panda conservation began as early as the 1940s, when Chinese scientists carried out field research on this species. In 1963, the Chinese government established four panda reserves, namely Wanglang, Xianzhizigou, Baihe and Labahe, in Sichuan Province. Meanwhile, Wolong was established as a forest reserve that later became better known as a panda reserve. Since the bamboo die-off in the Min Mountains in the late 1970s, the state and local provincial governments have designated another 8 panda reserves. In 1992, the Chinese government announced the establishment of another 15 panda reserves. Thus, the total area of panda reserves is now 11,159.2 km², which covers 38% of the panda habitat and houses about 75% of the wild panda population.

In 1992, the Chinese Ministry of Forestry began to carry out a project on the panda and its habitat protection. The objectives include:

- C improving the existing 14 reserves and setting up an additional 14 reserves;
- C building 14 panda protection corridors that will link the different groups and facilitate the mingling of genes through cross-breeding;
- C establishing panda protection administration stations in each of the 22 counties where pandas are distributed;
- C strengthening scientific research in artificial breeding and ecological preservation; and
- C more rural development activities to reduce the local peoples' dependence on

forest products and wild animals in panda habitats.

When fully implemented, these measures will provide protection for 95% of the wild panda population.

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THE BREEDING BIOLOGY OF THE POND HERON (*Ardeola grayii* Sykes) IN CAPTIVITY

by Rudayba Yesmin, Khalilur Rahman and Nazrul Haque

Introduction

The pond Heron (*Ardeola grayii* Sykes) is a common picivorous bird of Bangladesh. It is widely distributed in open country, agricultural fields, water ditches, banks of rivers, ponds, etc., and occupies an important position in the ecosystem. Information about different aspects of the Pond Heron is scanty. The objectives of the present study were to collect data on the breeding biology of the Pond Heron in captivity.

Study Area

The Dhaka Zoological Garden, established in 1964, comprises about 184 acres of land, situated about 16 km north-west of the city center. The study site within the garden was a wire-netted enclosure of about 40 feet in length and 25 feet in width, with a height of 14 feet. It had a small water tank and a pucca shade, and had *Terminalia belerica*, *Mesua ferrea* and *Psidium guyava* plants growing inside the enclosure.

Observations and Results

The breeding season ranges from February to November. Selecting a nesting site was a joint effort, although the female was the first to place nesting material at the site. The shape of the nest was determined by the configuration of the site where the nest was lodged. Although both sexes took part in collecting nest materials such as small petioles of leaves, small branches of trees, etc., the male brought in more nest materials than the female. The materials were arranged in a criss-cross fashion, resulting in a circular platform with a 'cup' in the center. The frequency of collection of nest material was higher in the morning and gradually declined

towards noon, and increased again in the afternoon. The time required for nest building ranged from six to twelve days.

The height of the nest from the ground ranged from 0.12 - 3.35 m., with an average of 1.95 m. The clutch size varied from 1-4 eggs, with an average of 2.62, and the laying intervals ranged from 1-2 days.

Of the fourteen pairs of Pond Heron that raised first clutches, nine pairs (64.28%) raised 2nd clutches, five pairs (35.71%) raised 3rd clutches, and one pair (7.14%) raised a 4th clutch.

The eggs are broad, oval and medium in size and the color is a pale sea-green without any markings or spots. The length varied from 30-44 mm and the width from 25-37 mm. The average weight of the 76 eggs was 19.27 g.

Both sexes alternately took part in the incubation during the daytime. While one sat on the eggs, the other remained within the territory and watched over the nest. At night, only the female incubated the eggs. The incubation period varied from 21-24 days. Out of 76 eggs laid, 20 (26.31%) were not available for incubation. These included nine lost due to human interference, nine lost to natural calamities, and two lost during handling.

Out of 76 eggs laid, 35 hatched. Hatching was found to be the highest (13.15%) in May, with the first hatchings beginning at the end of April. Brood size varied from 1-3, with an average of 2 nestlings. Of 35 nestlings, 14% comprised broods of one, 17.14% comprised broods of two, and 68.57% comprised broods of three.

The newly hatched nestlings were very small

and nearly naked. The eyes were closed and the abdomen was almost transparent. The body was a light flesh color. The bill and claws were soft, fleshy and of the same color. The mouth cavity was a reddish color. The legs were very small and weak. The natal plumages grew on the head region of the embryo before hatching and became visible right after drying the body of the hatchling. The average weight of the hatchlings was 15.62 g. It should be mentioned here that the hatchlings were not weighed just after hatching.

The nestlings did not take food for the first 24 to 36 hours. The parents brought small fishes such as *Amblypharyngodon mola*, *Rohtee cotio*, *Gudusia chapra*, prawns, *Palaemon*, etc. Both the male and the female took part in feeding the nestlings by the process of regurgitation. On the 5th day after hatching, the average feeding frequency by the male and female per hour were 6.14 and 3.38 times respectively. Frequency was highest at noon and lowest before evening.

The nestlings eyes opened on the 3rd to 5th day after hatching and the average weight was 33.02 g.

Seven nestlings were lost, one due to human interference, two to disease, one to starvation, and three to natural calamities.

The mean daily weight of the nestlings increased continuously for up to two weeks and then began to slightly decrease just before they left the nest.

Out of 35 nestlings, 28 successfully fledged from the nest. The fledging period ranged from 24 to 30 days, with an average of 27.10 days. The birds' weight upon leaving the nest ranged from 158.75 to 235 g, with an average of 188.61 g. Of the 28 fledglings, one fledged in May, 11 in June, four in July, six in August, two in September, and four in October.

Out of 76 eggs laid in 14 nests, 35 hatched. Of the 35 nestlings, 28 successfully left the nest. Thus, the breeding success was 36.84%.

Discussion

Baker (1929), mentioned the breeding season of the Pond Heron as being from December to March in southern India and June to August in northern India and Burma. According to Ali and Ripley (1968), the breeding season of the Pond Heron in most parts of the sub-continent ranges from May to September; in south India and Ceylon from November to February, and in Ceylon until August. During the present study, the breeding season was found to range from February to November.

According to Butler (1890) the nests of Pond Herons were small and built of dead sticks loosely put together, looking like old crow's nests. Allen (1961) mentioned that the nest was flat and without any lining. Baker (1929) found that the nests were rough collections of twigs and sticks with no lining. According to Ali and Ripley (1968), the Pond Heron nest was 'an untidy structure of twigs, slightly more substantial than a dove's nest.' Henry (1971) said that the nest was an untidy platform of twigs. During the present study it was found that the Pond Herons used dry small branches and petioles of leaves of different trees like *Delonix regia*, *Mesua ferrea*, *Terminalia belerica*, *Psidium guajava*, etc. as nest materials. In addition, they also used thin slips of bamboo as nest material.

Hancock & Elliott (1978) mentioned that '...the male collects material while the female does most of the construction.' According to Ali & Ripley (1968), both sexes take part in nest building, apparently with the male chiefly responsible for collecting the material which the female puts together.

During the present study, it was found that the rate of gathering nest material was higher in the morning than during the noon hours. It was further noted that the male Pond Heron gathered more nest material than the female and was statistically significant.

Baker (1929) mentioned that the nest was located 'at some height from the ground.' Ali & Ripley (1968) reported that the nests were 'between two and four meters above the

surface.' Hancock & Elliott (1978) stated that the nests could be 'at heights of anything from two to ten meters.' In the present study it was found that the height of the nests from the ground ranged from 0.12-3.35 m (average - 1.95 m).

Smythies (1953) observed four to six eggs in one clutch and that 'the clutch varied from three to five, though four to six is more usual in Burma.' Jerdon (1963) recorded four to five eggs per clutch in his study. Ali & Ridley (1968) mentioned three to five eggs. During the present study, the clutch size of the Pond Heron was found to vary from one to four eggs, with an average of 2.62.

Roy (1992) mentioned a 24-hour interval between the laying of successive eggs of the Little Green Heron. During the present study, 86.84% of the eggs the Pond Heron laid had a 24-hour interval, and 13.15% of the eggs had a longer interval.

Baker (1929) stated that the average size of the Pond Heron egg was 30.0 x 28.5 mm, after studying 100 eggs. Ali & Ripley (1968) reported similar results. Henry (1971) said that 'the three or four greenish-blue eggs measure about 39.5 x 29.5 mm.' During the present study the average size of the 76 eggs was found to be 36.38 x 29.87 mm, and the average weight was 19.27 g.

Ali & Ripley (1968) mentioned that both the male and female took part in incubation. During the present study it was observed that the female incubated the eggs on most days, though the male relieved her occasionally. At night only the female incubated the eggs.

During the present study the incubation period of 38 Pond Heron eggs was found to range from 21 to 24 days, or an average of 23.02.

Nothing was mentioned by earlier workers about the loss of eggs of the Pond Heron. During the present study the following causes were found to be responsible for egg loss: human interference (9), natural calamities (9), loss during handling (2), and infertility (21).

No information is available in the other

literature about the hatching success of the Pond Heron. In the present study the hatching success was found to be 46.05% of the total laying.

Nothing was mentioned about the weight of the nestlings of Pond Herons in the earlier literature. In the present study the weight of the nestlings was found to increase continuously up to two weeks after hatching. After that, the weight was found to drop until the birds finally left the nest.

No earlier records are available about the brood size. In the present study, the percentage of nestlings of brood sizes one, two and three were 14.28%, 17.14% and 68.57% respectively.

Ali and Ripley (1968) mentioned that both the male and female took part in feeding the nestlings. In the present study, the average feeding visits by the male and female were 6.14 and 3.38 per hour respectively.

No data was available in the literature about the loss of nestlings of the Pond Heron. During the present study, 8.5% of the nestlings were lost due to natural calamities, 5.71% succumbed to attacks of an ectoparasitic disease, 2.85% died due to human interference, and 2.85% died of starvation.

Earlier literature did not give statistics about the breeding success of the Pond Heron. During the present study 76 eggs were laid, out of which 35 (46.05%) hatched, and 28 (80%) of the nestlings successfully left the nest. The breeding success was 36.84% in relation to egg-laying.

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MANGROVE FOREST OF PAKISTAN AND ITS IMPORTANCE

by Mian Muhammad Shafiq and Mamoona Wali Muhammad

Introduction

Mangroves are woody plant species that grow along tropical and sub-tropical coasts in a saline environment with typically anaerobic soils. They are mostly sheltered from direct sea waves and receive fresh water from inland sources for at least some parts of the year. Apart from their scenic beauty as coastal forest, they help to reduce the speed of fierce gales in tropical cyclones by acting as windbreaks and also provide food for various fish species in the estuaries.

Distribution

Mangroves cover an area of about 28,300 ha in Pakistan, mainly distributed in Sindh (28,100 ha) and Balochistan (200 ha) (Amjad and Khan, 1983). According to Mirza *et al.* (1983), the mangroves are estimated to cover about 26,000 ha, comprising 44% of the total tidal range area of the Indus delta.

Mangrove forests in Pakistan lie between 24°10' and 25°37' N latitude and 61° and 68°10' E longitude. They occur mainly in the Indus swamps in the province of Sindh in the south along the Arabian Sea coastline. Small patches also exist in the deltaic swamps on the shores of the rivers Hub, Prali/Hungol and Dashst, which meet the sea at Kalmat Hor, Miani Hor and Gawadar Bay (Champion *et al.*, 1965).

Climate

The weather conditions are fine due to the pleasant sea breeze that blows all year round, except when local atmospheric disturbances take place during the summer and winter months. During winter from November to February, western weather disturbances bring short periods of cold weather. Similarly, during the summer from March to June, hot weather sets in when the hot desert winds blow in from the great Indian desert. Temperatures can shoot up to

110°F and above. Such heat waves, however, do not last long.

The strength of the monsoon current increases from July to August, when it usually starts retreating, but can occasionally last through September.

The rainfall is more important for its effect on the soil salinity than for the moisture that it brings. At 75%, the humidity is higher on the coast than inland.

Soil

The soils of the deltaic swamp are river-borne clays, silt and sometimes loams. They are stiff where rich in salt and elsewhere permanently saturated with salt water. There is also some brown or river-deposited sand.

Salinity

The salinity varies widely, mainly due to the interaction of riverain and tidal flows. Variations are generally more sudden and more extreme than observed in the nearby estuary. A sudden shower of rain during the low tide phase may reduce the salinity to near zero. The return of the high tide may inundate the area with almost full strength sea water. Furthermore, the salinity of the interstitial water remains higher than in the overlaying water by an order of magnitude because of the high evaporation during the low tide phase and the retention of salts, due to the compaction of the substrata.

Flora

Avicennia mariva is the principal species found in the mangroves. In fact, it is found growing all along the Pakistan coastline (Kogo *et al.*, 1980). *Rhizophora strylosan* occupies a large area in Miani Hor.

According to Stewart (1972), 8 mangrove species occur in Pakistan, i.e. *Bruquiera gymnorhiza*, *Ceriops tagal*, *Rhizophora decandra*, *Rhizophora apiculata*, *Rhizophora mucronata*, *Aeqieeras cormniculatum*, *Avicennia marina* and *Sonneratia caseolaris*.

Fauna

A large number of animals find their oilseed or feeding grounds in the mangrove environment. Fishing cat (*Felis viverrina*), jackal (*Canis aureus*), small Indian civet (*Viverricula indica*), smooth Indian otter (*Lutra* spp.), crocodile (*Crocodylus palustris*), tortoise, sea snakes, fishes, prawns, shrimps, crabs, oysters and mussels are found there. In addition, a large number of birds are present, both migratory and resident, including pelicans, flamingoes, egrets, herons, kingfishers and raptors such as kites, falcons, hawks, etc.

Importance of the Mangrove Forest

Being composed of various kinds of plants and fauna, the most important aspect of the mangrove ecosystem is the energy and food protein resources that it provides for people. The role of mangroves as a potential sustainable source of fuelwood is also an important one in meeting the needs of developing countries for wood energy. Prawns are caught in mangrove waters and the trees provide leaves that are good fodder for camels and cattle.

According to FAO's estimate, the northwest part of the Indian Ocean/Arabian Sea where Pakistan is situated is believed to contain one of the largest potential resources of marine fish. About 400 species of fishes belonging to 21 orders have been recorded in this region. Mangroves are used by the fishes for their nests and food resources. The fishing industry plays a vital role in the country's economy and in the people's socio-economic life, providing jobs for local people, solving food problems, and earning a handsome amount of foreign exchange at the same time. Local supplies of firewood, fodder and wood for charcoal are also provided by the mangrove forests.

Salt extraction is another small industry located in this environment, providing common salt on the one hand and employment on the other.

A number of scattered fishing villages are situated along the shoreline. Nearly 10,000 fishermen are engaged in catching prawns, shrimps, lobsters, crabs, oysters, etc. The fishes

are collected not only for consumption within the country, but also for export.

Crocodiles and fishing cats are prized wildlife species in this ecosystem. Crocodile skins fetch a high price but they are relatively rare in the area.

The mangrove system is a good nesting ground for migratory birds and also provides hunting and recreational activities. Taking an overall view of the activities, mangroves have an enormous implication in society (Mirza *et al.*, 1983)

Many forest products can be obtained from this great resource, including firewood, charcoal, timber, poles, piling, pulp, and the materials to make furniture, pencils, matches, tannin and beverages (Tirmazi, 1983).

Problems in the Mangroves

The following factors are responsible for the deterioration of the mangroves:

- C the decrease of fresh water inflow into the Indus delta;
- C the cutting and felling of trees;
- C the industrial development in and round Karachi that has increased marine pollution;
- C the mismanagement, over-exploitation, lack of knowledge, etc. on the part of authorities and others.

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SAMBAR DEER BREEDING IN CAPTIVITY IN DULAHAZRA SAFARY PARK (MANAGED NATIONAL RESERVE), BANGLADESH

by M.A. Basbar, F. Begum and K.K. Mondal

Introduction

In earlier times in the Cox's Bazar forest area, sambar (*Cervus unicolor*), the largest, heaviest and most robust deer species, was very common (Ahmad, 1981; Rahman, 1996). Prior to 1970 it was found in plentiful numbers (Mountfort, 1969) but today it is extremely rare due to heavy hunting pressure and loss of forest cover (Islam and Islam, 1997). Twenty years ago, the entire forest area was well covered with vegetation (Baten, 1969; Choudhury, 1970; Islam and Islam, 1997). Today the deforestation rate is alarming and the process is continuing with the involvement of local undergrowth-cutters and unauthorized wood cutters (Bashar *et al.*, 2000). The main threat to the survival of wildlife is the loss of their habitats and the activity of poachers.

Today, the conservation, preservation and protection of sambar deer is a subject of discussion at the national level due to its economic importance and values in wildlife biodiversity. Now virtually extinct in most of its former ranges, it is still found in some of the most remote and inaccessible areas, but the population has declined drastically and it is now in need of special protection and care for its survival. The Forest Department of Bangladesh has taken an initiative to ensure the survival of sambar deer and maintain it in the Dulahazra protected area. This is a specially selected natural area of Cox's Bazar forest zone.

Under the Bangladesh Wildlife Preservation Act (1974), Dulahazra Wildlife Sanctuary was declared as a Game Reserve to protect the wildlife in this zone. The Game Reserve comprised 3,950 acres of forest land (Husain, 1986) situated between longitudes 92°5'7"-92°5'30"E and latitudes 21°40'8"-21°40'24"N.

Dulahazra was declared as a "Deer Breeding

Centre" in October 1995. The breeding centre constitutes an area of 105 acres (= 42.5 ha) of forest land and provides a conducive habitat for the sambar deer. The breeding centre is under the jurisdiction of the Chokoria Police Station of Cox's Bazar district. According to the United Nations "List of National Parks and Protected Areas (IUCN, 1990), Dulahazra Safary Park belongs to Category IV as a "Managed Natural Reserve". This is to protect the natural conditions necessary to national significant species, groups of species, biotic communities or physical features of the environment which require specific manipulation for their perpetuation (IUCN, 1992).

The biological indicators (the existing vegetation, fauna and forest environment) of this area distinctly indicate that it is a natural forest, but due to human interference it is now highly disturbed. To protect the area from further degradation, conservation procedures can be adopted as per the guidelines of IUCN.

Bangladesh's Forest Department has attempted to breed sambar deer in captivity in the natural habitat of Cox's Bazar forest zone. This paper deals with some aspects of the success of the deer breeding program in Dulahazra Safary Park.

Climate and Vegetation

The forest area of Cox's Bazar district is a natural forest zone. The climate is typically sub-tropical. Annual rainfall is 3,558 mm and the temperature varies from 13.3°C to 24.4° in winter and 26.1°C to 38.1°C in summer. The average relative humidity is 78.1%.

The forest is the tropical type with large old trees and dense undergrowth serving as a natural forest environment for wildlife. The top canopy ranges from 20 to 40 m in height and the

dominant trees are *Dipterocarpus* sp., *Shorea robusta*, *Syzygium grandis* and *Quercus velutina*. The dipterocarps are very old (about 70-80 years). Of the bush species *Dendrocalamus strictus*, *Melocanna bambusoides*, *Bambusa tulda* and *B. teras* are dense. *Calamus viminalis*, *C. guruba*, *C. tenuis*, and *Daemonorops jenkinsianus* are also common in the area, as are *Lantana camara* and *Eupatorium odoratum* and a large number of creepers, lianas and epiphytes. There is also a lake with an area of about 2,000 m by 300 m.

Common Fauna in the Safary Area

Due to continuous deforestation and heavy poaching, the wildlife species are rapidly declining. Already at least 505 species have disappeared from the forests of Cox's Bazar (Khan, 1982). To prevent further loss and to improve the situation, a thorough knowledge of the present conditions is needed.

In Dulahazra Park, the wildlife is protected by wire fencing that allows easy access between the protected area and the outside jungle. The common inhabitants of this fenced area are: spotted deer (*Axis axis*), sambar (*Cervus unicolor*), monkeys (*Macaca mulata*, *M. assamensis*, *M. nemestrina*, etc.), wild boar (*S. scrofa*), mongoose (*Herpestes* sp.), golden jackal (*Canis aureus*), Bengal fox (*Vulpes bengalensis*), Indian grey mongoose (*Herpestes urva*), Indian crested porcupine (*Hystrix indica indica*), squirrel (*Ratufa* sp., *Petaurista* sp.), etc. Some gayal (*Bos banteng*) have also been seen in the area, as have some lizard species (*Gecko* sp., etc.) and snakes (both poisonous and nonpoisonous). Insects and birds are the most prolific inhabitants. Among the birds, *Streptopelia* spp. and *Psittacula krumeri* are very common. Forest spiders are very common in this area.

The Forest Department released some wild animals into the park including 2 sambar, 50 spotted deer, 35 maya deer (*Muntiacus muntjac*), 5 gayal, 80 monkeys (*M. mulatta*), 1 python (*Python molurus*), and 2 black bears (*Selenarctos thibetanus*). Among the released animals, sambars and black bears are kept under captive conditions.

Sambar Breeding Centre

The Dulahazra Safary Park has a well-protected area of 42.5 ha in which to raise sambar. The Sambar Breeding Centre started operations with one pair of sambar in 1995. This original pair was captured from the Rangamati forests zone of Banderban District. They were stout, strong and healthy. The male weighed 42 kg and the female 56 kg. They adjusted easily to their captive conditions because it is also a natural forest area. In captivity they gave birth to their first fawn after 19 months. The birth weight of the fawn was 4 kg. It was nursed by the mother for six months, after which it started to take grasses and other natural foods from the vicinity. The pair produced a second fawn in August 1999, 52 months after being brought to the centre and 20 months after the birth of the first fawn. The development was observed regularly and carefully. It was found that by about 10 months of age the weight of the fawn tripled; after 24 months its body weight was eight times that of the birth weight.

Two more sambars (1 male, 1 female) were released in the Breeding Centre in October 1995. The released pair produced one male and one female fawn in June 1997 and August 1999 respectively. They are physically sound, strong and stout. The natural foods consumed by the deer from the surrounding habitat include leaves of horinlata (*Vitis lanceolaria* Laws), bamboo (*Bambusa longispiculata*), grasses, kadam (*Anthocephalus chinensis*), and fruits of banjarn (*Ardisia solanacea*), dumur (*Ficus* sp.), etc. In addition to the natural grasses and leaves available in the protected centre, the sambars are also given supplementary food twice a day, usually various seeds and fruits such as jab (*Avena sativa*), brinjal (*Solanum melongena*), borbati (*Vigna sinensis*), Umloki (*Phyllanthus embelica*), Horitoki (*Terminalia chebula*), bohera (*T. belerica*) and cucumber (*Cucurbita* spp.). Bamboo leaves are also given often.

Under captive conditions the availability of fresh water sources is very important, especially during the summer season (Kalaiarasan *et al.*, 1999). There is a natural water body in the Dulahazra Deer Breeding Centre which is the main natural source of water for the deer. The

water body arrangement and maintenance is good and water is available throughout the year. In the summer the animals are often seen bathing in the water body.

Effective management of plant-animal associations and how to sustain them depends upon maintaining the habitat and may also require control of their utilization. Proper utilization and management of the resources can help the conservation process. Suitable ecological conditions with a sufficient water supply is needed for deers in captive conditions (Kalaiarasan *et al.*, 1999). The Dulahazra Deer Breeding Centre has good natural conditions and vegetation for deer culture. As this management system provides a good model for rearing sambars, it could be pointed to as an example of conservation and breeding of some necessary and essential faunal diversity, particularly in Third World countries like ours. Observations of the development and daily behavior are intended to maintain good conditions the breeding success.

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THE LONG AND THE SHORT OF ICDPs

by Craig Leisher

Introduction

Integrated conservation and development projects (ICDPs) attempt to link biodiversity conservation in protected areas with local socio-economic development. Over the past 20 years, ICDPs have become the most widely used approach for conservation of biodiversity in developing countries. The theory of integrating conservation and development activities in a poor country is very attractive. In many ICDPs, for example, local income losses due to conservation activities, such as ending local hunting, are supposed to be offset by alternative income generating development activities, such as livestock raising. The idea is to make conservation more sustainable without jeopardizing local livelihoods. In practice, however, there have been very few successful ICDPs.

A New Approach

One of the fundamental problems of current ICDPs is that the time scale is all wrong. Most ICDPs last three to seven years, and within this time, are expected to remove the key threats to a protected area. Yet many of the threats to local conservation have been negatively impacting the ecosystem for decades, and these systems need more than a few years to recover in the best of circumstances. Moreover, it takes much more than three to seven years to change negative human resource usage patterns that have developed over hundreds of years.

The current three to seven-year projects, with the need to disburse relatively large amounts of money each year, create projects that spend money but have marginal impacts on conserving a protected area. Why not have more time and less money per year for protected area projects?

If ICDPs were funded for 20 to 25 years, this would allow sufficient time for a strong inception phase. Sufficient time for building local human capital, for training people in the

skills needed to manage a protected area sustainability. Sufficient time for a more detailed and comprehensive analysis of what are the threats to biodiversity in the project area. Sufficient time for stakeholder agreements to be developed and signed by all the affected parties.

Less money does not mean a cut in funding but spreading the same money over a longer period, thus there is less money each year but more years of funding. This makes sense from a biodiversity perspective and because the absorption capacity of many rural areas is limited. Having to spend large amounts of project funds in poor, often remote areas leads to project components that have little relevance to biodiversity conservation. The best way to spend a lot of money in a short time in most rural areas is to build something—a school, a bridge, a road. In fact, many of these infrastructure components potentially make things worse for the remaining biodiversity by providing better access to natural resources and markets. Most conservation activities do not require large capital outlays. Conservation is more about changing local knowledge, attitudes and practices, and this is much cheaper than building things.

A 20 to 25-year time frame would also allow for more meaningful monitoring and evaluation of a project's conservation impacts. The problems of year-to-year fluctuations in local biodiversity giving the perception of significant changes is nullified. Real versus perceived trends in biodiversity are more apparent in the longer term.

True long-term ICDPs would have some special needs. There is a need for periodic reviews of the project's strategy and objectives. Otherwise, there is a risk of ineffective objectives and activities continuing for many years because of no reassessments. There is a need for an extra degree of flexibility to be built into the long-term design. As the situation on the ground changes, so should the project adapt. There is

also the need for a special financing mechanism. Multilateral and bilateral donors as well as international NGOs often need to disburse money in the short term, but conservation needs money for the longer term. One solution is to set up trust funds for a protected area where money can be paid in the near term but disbursed over the long term.

Recommendation

The traditional short-term approach to ICDP has

not been successful after more than two decades of trying. ICDPs need a different approach if they are to succeed. Making ICDPs operate over a longer term is a critical first step that will move the projects closer to the time frame of nature rather than the time frame of donors and give ICDPs a better chance of helping to conserve biodiversity in developing countries.

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STATUS OF *Rhinoceros unicornis* IN ORANG NATIONAL PARK, ASSAM

by B. Hussain

Introduction

Assam is the home land of the Indian One-Horned Rhinoceros (*Rhinoceros unicornis*), which at present it is found only in certain grassland swampy pockets of Assam and West Bengal in India and in Nepal. This endangered species is presently limited to three protected areas in Assam, namely Kaziranga National Park, Orang National Park and Pabitora Wildlife Sanctuary. The present study focuses on the status of *Rhinoceros unicornis* in Orang National Park.

Study Area

Orang National Park lies between 26°30'N-26°40'N and 92°15'E-92°30'E. Archaeological remains give evidence of a Shiva Temple, proving existence of a human settlement. The area was abandoned, perhaps due to some epidemic (Talukder and Sharma, 1995). It was first declared a Game Reserve with an area of 80.54 km². It was later upgraded to a Wildlife Sanctuary in September 1985, with an area of 75.6 km². Another 3.21 km² was added to the Sanctuary in 1991. In consideration of its importance, Orang was declared a National Park

in April 1999, with an area of 78.81 km².

The southern part of the park has the natural barrier of the Brahmaputra River. The park is situated at the alluvial flood plains of the Brahmaputra River and most of its area is seasonally flooded by the Brahmaputra and its tributaries the Dhansiri and Pachnoi. The average annual rainfall is 3,000 mm. The annual average minimum and maximum temperatures are 7°C and 32°C respectively, and the humidity ranges from 66% to 95%. The altitude ranges between 30 m to 80 m above sea level.

About 50% of the area (36.45 km²) of the national park is grassland and 12.6% (9.53 km²) is swamp. The other parts of the park have mixed deciduous forest, i.e. natural forest patches of 1.98 km² (2.60%) and planted forest patches of 9.83 km² (13.60%). It also has a river island area of 9.04 km² (11.95%).

The park has pure grassland with associations of *Themeda villosa*, *Arundo donax*, *Phragmites karka*, *Erianthus ravannae*, *Apluda mutica*, etc. The natural forest is mainly composed of *Sterculia villosa*, *Melia azadirachta*, *Toona ciliata*, *Dysoxylum binectariferum*, *Albizia*

procera, *Callicarppa arborea*, etc. The planted forest patches are mainly composed of *Dalbergia sisso*, *Bombax cieba*, *Acacia catechu*, *Gmelina arborea*, *Anthrocephallus kadamba*, *Tectona grandis*, etc. (Nath and Chowdhury, 1994).

Population Status

Orang National Park provides an ideal habitat for the rhino and a census carried out in 1991

showed an increasing trend over the 1985 census. It is a matter of great regret that the authority could not maintain the increasing trend after 1995, and that during the period 1995 to 1999, the mortality rate increased significantly. The 1999 census showed a more than 50% reduction in the population of rhinos over the previous census. The census records show the population pattern of rhinos in the national park as follows:

Year	Adult			Sub Adult		Calf	Total
	M	F	Unsexed	M	F		
27.8.85	23	23	—	7	2	10	65
30.3.91	28	41	5	—	1	22	97
30.3.99	17	17	1	3	2	6	46

The main threat to the rhinos of Orang National Park is heavy poaching activity. The mortality among rhinos due to poaching from 1983 to 1994 was 41. But mortality due to poaching between 1995 to 1999 was about 35. Poachers take full advantage of the poor protection system in the national park, and rhinos also stray out of the park during the night to forage in the surrounding villages. The national park is surrounded on three sides by villages and this makes the park more vulnerable to poaching. The poachers used to take shelter not only in the villages, but also in the riverine island of the Brahmaputa. The poachers are mostly outsiders who hire local people as guides and take full advantage of the weak surveillance in the park. Nowadays, poachers use sophisticated guns to kill the rhinos. In addition to guns, they also use the pitfall method and poison. To cope with the problem, the Forest Department set up 22 camps inside the national park, but this is still not adequate.

Rhino Conservation Approach

The State of Assam has been taking initiatives since the beginning of the 20th century to

protect this rare species. The Assam Rhinoceros Prevention Act was adopted by the Government of Assam in 1915, which prohibits hunting of rhinos in Unclassed State Forest. In 1954, The Assam Rhinoceros Prevention Act provided protection to this rare species in all areas of the State. In 1976, the Indian Wildlife Protection Act 1972 came into force, which provides stringent protection to the wildlife of Assam, including the rhinoceros.

The Indian Action Plan for Rhino Conservation includes 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 to 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

The main reason for poaching of rhino is the high value of rhino horn in the international market. Rhino horn is used in traditional medicines in China, Taiwan, Japan and South Korea. It is used in medicines as an anti-pyretic, for treating paralysis, high blood pressure and body pain. Also for the treatment of renal disorders, haematemesis, hepatic malfunctions, pulmonary disorders and proper circulation. Rhino horn is made into traditional dagger handles in Yemen and Oman. It is used in rings as a lucky stone and as an alleged aphrodisiac. It is also used in six principal Tibetan medicines marketed in India and in cutlery to detect poison (Hanfee, 1998).

Though there are many Acts and Action Plans to conserve the rhinos in Assam, the poaching of rhino is going on unrestricted in the State. The primary reason for this trend is the slackness in the implementation of the Acts by the Government of Assam. Sometimes political interference also helps the poachers escape penalties and punishment.

According to the last census (1999) records, there are 1,672 rhinos in Assam (Kariranga NP - 1,552; Pabitora WLS - 74; Orang NP - 46). It is encouraging news that the rhinos have increased favorably in Kaziranga National Park (in 1993 - 1,164 rhinos) and in Pabitora Wildlife Sanctuary (in 1993 - 56 rhinos). But no rhinos have been observed in Manas National Park or Laokhowa Wildlife Sanctuary at present. In 1983 there were about 80 rhinos in Manas NP and 50 in Laokhowa WLS. Now that Manas NP is occupied by an armed force, there is no hope for the survival of any rhinos. Laokhowa WLS was the habitat of 50 rhinos until 1983, but the entire population was wiped out by the poachers during the ethnic violence in Assam in 1983, when all arms were withdrawn by the Administration from the forest camps. Therefore, the government should make strong efforts to prevent Orang NP from becoming like Manas and Laokhowa.

Rhino poaching in Orang NP was nil in 1990. Two rhinos were taken in 1989, 1 in 1991, 2 in 1992, and 1 in 1993. Fewer incidences of poaching were the result of the efficient protection and conservation measures employed during that time by the authorities. However, between 1995 to 1999, about 35 rhinos have been killed by poachers, which reveals that the park is not receiving adequate protection measures to conserve and protect the rhinos from poachers.

It is now time for the Government of Assam to take strong initiatives to stop the poaching in the State of Assam by implementing and modifying the present existing laws, and the forest personnel should implement the acts and laws properly. NGOs should also take bold steps with their awareness program in the fringe areas of rhino habitats to give strong protest against political interference. This grave situation should be realized by all concerned and effective measures must be taken immediately to save this rare species from total extermination from its natural habitat.

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A HEALING TOUCH TO AN ENDANGERED BIRD – THE GREAT INDIAN BUSTARD: A CASE STUDY OF ROLLAPADU SANCTUARY

by D. Sudhakar Reddy

Introduction

The Great Indian Bustard (*Ardeotis nigriceps*) is one of the most endangered birds in the world. Endemic to the Indian sub-continent, it was once widely distributed but is now confined to six Indian states. The total population is now about 2,000 (Rajasthan: 1,000; Madhya Pradesh: 100; Gujarat: 500; Andhra Pradesh: 100; and Karnataka: ?).

The Great Indian Bustard was rediscovered in Andhra Pradesh at Rollapadu Village, near Kurnool District. The Rollapadu Sanctuary was established in 1988 upon acquisition of 614 ha of private lands in Rollapadu Village. About 323 ha of adjoining compensatory afforestation areas are being added to the sanctuary. Other fauna present in the sanctuary include: Indian wolf, jackal, horned owl, Indian fox, blackbuck, hare, sand grouse, Indian courser, cobra, rock python, Russell's viper, saw-scaled viper and monitor lizard. In addition, flamingoes, bar-headed geese and demoiselle cranes migrate to the Rollapadu Sanctuary.

Study Objective

The main objective was the conservation of the Great Indian Bustard and to suggest measures for the restoration of this rare bird species that was led to extinction by deforestation and the destructive activities of man.

Great Indian Bustard

The Great Indian Bustard belongs to the order Gluformes and family Otididae. The bird's long body is peculiar compared to other birds. They are inhabitants of open grasslands and scrub

country of plains. They avoid areas with dense tree cover and build their nests on open grasslands, as their body shape would prevent them from doing so in trees.

The coloring of the Great Indian Bustard is a deep buff above, white at the underparts with a black gorget on the lower breast and a conspicuous black-crested crown falling backwards. Bustard vocalizations are loud and can be heard for up to 2 km.

Adult male birds are about 122 cm in height and weigh between 12-15 kg. Females reach about 92 cm and weigh about 6 kg. Chicks weigh about 90 g.

Female birds form the major part of the bustard society. The bustard's body stature is very large and according to the mating system one dominant male will mate with all the females present. In Rollapadu, the breeding season is between August and January.

The incubation period is 28 days and the bustard egg is very fragile. It is olive green in color and the size is about 6 x 9 cm.

Beneficial Aspects of Bustards

Bustards eat locusts and other pests infesting crops, thereby rendering benefits to the farmers. As a result, the use of pesticides can be reduced.

The villagers of Rollapadu have extended their cooperation to protect these birds. Thus, a symbiotic relationship exists between the bustards and the farmers.



Reasons for Extinction

Some of the factors that have contributed to the decline of the Great Indian Bustard are:

- C Hunters like the bustard because its long body yields a lot of meat.
- C Deforestation and cultivation of open grasslands have destroyed the bustard's habitat
- C Fire is one of the chief causes of bustard migration since they reside on open grasslands.
- C Cattle grazing and poaching also cause bustard migrations.

Constraints at Rollapadu

The main constraints at Rollapadu Sanctuary are: 1) proper water-hole management has not been provided for the bustards; and 2) the fencing arrangement is not up to standard for preventing cattle from entering and grazing.

Recommendations

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The following recommendations have been made to help conserve the remaining bustard population:

- C Awareness should be created among villagers regarding the importance of the bustards. This can be achieved by visual presentations depicting the bustard to the villagers.
- C A separate course curricula called "Endangered Species" should be included in the primary education system.
- C Proper water supply and fencing should be provided to the bustards present in the sanctuary.
- C The communication system in the sanctuary should be strengthened, e.g. walkie-talkies (mobile phones) and other modern equipment should be provided.
- C Patrol staff in the sanctuary should be receive sufficient training to combat smugglers.
- C Research studies should be carried out to find out ways and means to increase the bustard population. In this regard, NGOs

and the government should provide ample funds to the sanctuary.

- C Severe punishment should be meted out to the hunters by amending the existing Wild Life Protection Act - 1972. A legal cell should be established in the sanctuary.
- C The Forest Department should encourage people by announcing a reward for those who provide information about the existence of eggs in their fields.
- C The government has to come up with initiatives to encourage people to take up the conservation of this rare bird.
- C The government should take measures to

develop tourism in the sanctuary by providing facilities to tourists.

- C People have to be taught to respond positively for the restoration of this endangered bird.

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MEASURES TO ENHANCE THE EFFECTIVENESS OF THE CHEER RE-INTRODUCTION PROJECT

by Zulfiqar Ahmed

Pakistan has been blessed with some of the rarest and most magnificent species of pheasants in the world. The Northern Himalayan Range is the natural habitat of many a regal inhabitant, such as the White Crested Kalij, Koklas, Himalayan Monal, Western Tragopan, and last but not least, the Cheer pheasant.

Cheer Pheasant

In beauty, the Cheer Pheasant looks out of its league when compared to other pheasant species; however, it certainly makes up for what it lacks in looks by a graceful and almost majestic posture, which keeps it at par with its cousins.

The Cheer pheasant is the only species belonging to the genus "Catreus". Unfortunately, though it is also one of the rarest species in the world, (listed in IUCN's **Red Data Book**). The numbers of this bird gradually dwindled until it had all but vanished in 1976, when the last male bird was shot from the Margalla Hills, Islamabad.

The Cheer population was quite comfortable until the beginning of the 20th century. Thereafter it fell prey to the shooting and hunting instincts of man. Also, in the mid 1960's a large-scale construction and development work was commenced at the base of the Margalla Hills to establish the new Capital. The human interference and ruthless shooting and hunting of the bird affected the fragile biodiversity of the region, resulting in the complete extinction of the Cheer from the wild.

Cheer Re-Introduction Project

The extinction of bird in the wild triggered the World Pheasant Association (WPA) to act. In collaboration with the Wildlife Department, NWFP, a massive Cheer Re-introduction Project

was launched. In 1978, WPA collected 25 breeding pairs of the rare species and distributed them amongst aviculturists in the UK for breeding. The resulting eggs were transported to Pakistan courtesy of British Airways.

Dhodial Pheasantry was made the hub of the activities, where the eggs were incubated and hatched and chicks were reared. Initially, hatched chicks were kept at Dhodial to build up stocks of future breeding birds. Subsequently the poults were shifted to a pre-release pen at Jabri.

Pre-Release Pen at Jabri

It is vital that the birds, prior to their release in wild, become accustomed to the environment and climate of the particular region where they are to be released. For this purpose a site near Islamabad known as "Jabri" situated in Margalla Hills was selected by WPA and GOP. (This was the area where the last bird was shot). For the construction of Pre-Release Pens and to devise a strategy for the release of the Cheer poults, technical advice was sought from a UK national who was by profession a sportsman and a game bird breeder, apparently having no past experience in reintroduction.

Effectiveness of the Project

By scrutinizing past records and the history of the project, which has been spread over a period of nearly a quarter of a century, it has been revealed that the Cheer reintroduction programme has not been successful. Although very sincere and whole-hearted efforts were put in, and people from different walks of life participated in it, plus an enormous amount of money was spent, still the output (in terms of released birds in the wild) has been very low.

Personal Experience

Last year at my request, Dr Malik Mumtaz, Conservator, of the Wild-life Dep NWFP granted me a pair of Cheer for study and research purposes. I was also provided with eggs from the Dhodial Pheasantry, which subsequently successfully hatched; presently I am rearing the chicks. The adult Cheer and the chicks have been thoroughly studied under close observation, and a lot of data has been compiled, with special emphasis on the following fields:

- C A detailed study of bird psychology (habits) and physiology, with a view to determining its probable behaviour in the wild.
- C Study of some of the common diseases (which constitute the main cause of high mortality among Cheer chicks and adults) along with suitable cures.
- C Development of some very useful incubating techniques that are well suited to the climate of Pakistan (i.e. very high temperature, coupled with low humidity).
- C Some very useful tips for the rearing of chicks, in terms of providing them a disease-free environment, and achieving an optimum rate of growth.

Causes of Low Success Rates

The two major causes of the retarded pace of the Cheer Re-introduction Project are:

- C Factors that contribute to poor breeding success or high incidence of diseases are carried forward to the next year. In other words, lessons from the past are not being learned.
- C We are relying upon the technical advice and expertise of western aviculturists, but although they have remarkable experience and knowledge in the field, our country has an altogether different environment and climate. Resultantly, our birds suffer from diseases that are not known to the West.

Recommendations

After considering different aspects of the project, and through personal experience, it is felt that the project has still a lot of potential, and that its effectiveness can be increased manifold. A very remarkable aspect about the project is that there are about 50–60 pairs of breeding birds that are very well kept at Dhodial. A natural environment is provided to them, and they are enjoying the personal attention of the Conservator of Wildlife, Dr Malik Mumtaz, and the DFO Abbotabad. In order to make this project more effective, the following recommendations need to be hastily implemented:

- C A Cheer Research Centre be established at Dhodial. The centre should also serve as a computerised data bank.
- C A revolutionary pre-release pen strategy is needed.
- C Efforts must be made to achieve maximum breeding results.
- C A thorough study of the predators in the area of release be carried out, with a view to determining their role in the ecology, and the extent of damage they can cause to the released birds. After that, the predators should be controlled accordingly.
- C A comprehensive plan should be prepared to educate the local population on the importance of this bird. Incentives should also be offered to locals in order to seek their co-operation in the rehabilitation of bird.

Expected Results

With the implementation of above-mentioned recommendations, a target of release of 800-1000 Cheer poults per annum can be achieved, which will dramatically enhance the prospects of re-establishing the wild population of this species.

The author is Squadron Leader, Peshawar, Pakistan.

FOREST NEWS

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CAUTIOUS OPTIMISM ON REDUCED IMPACT LOGGING

Several timber-producing countries in the Asia-Pacific region have recognized the potential of reduced impact logging (RIL) in advancing sustainable forest management. They have been supported for many years by FAO and other organizations, including the International Tropical Timber Organization (ITTO), the Center for International Forestry Research (CIFOR), and the USDA Forest Service, among others. Over the past five years, these organizations have embarked on a major information and awareness-raising campaign designed to provide interested stakeholders with better information on forest harvesting options.

International conference

More than 260 people from 36 countries attended the International Conference on the Application of Reduced Impact Logging to Advance Sustainable Forest Management, which was convened 26 February to 1 March, in Kuching, Sarawak, Malaysia. Participants included representatives from government, forest industry, universities, NGOs and international organizations. The Conference was organized by the Asia-Pacific Forestry Commission (APFC), ITTO, Sarawak Timber Association (STA), Sarawak Forest Department, USDA Forest Service, USAID, FAO, CIFOR, CIRAD-Forêt, Tropical Forest Foundation (TFF) and the Indonesian Ministry of Forestry.

The conference was intended to further increase awareness and build political and institutional support for effective implementation of the *Code of Practice for Forest Harvesting in Asia-Pacific*,

reduced impact logging and improved forest management in general. The specific objectives of the conference were to:

- Review current knowledge and experiences in implementing RIL
- Identify knowledge gaps and constraints to implementing RIL
- Formulate recommendations that advance the effective application of RIL

The conference assessed past and ongoing efforts to implement RIL and considered options for future adoption and application. Specific sessions focused on: key technologies; training; economics; safety and occupational health; practical experiences; policy instruments; research-related issues.

Participants generally recognized the importance of forests for supporting national and regional development, maintaining forest-based livelihoods, and providing a wide range of products and services. They further recognized the important impacts that timber harvesting can have on the environment and the potential to minimize negative impacts through the application of RIL practices.

Participants accepted that many issues surrounding RIL are location-specific, particularly with respect to economic aspects. Among the presentations related to the economics of RIL, a wide range of (sometimes contradictory) results and views were presented. The presentations highlighted the need for more studies related to the financial and economic aspects of RIL.

There was broad agreement that more training is needed at all levels. It was encouraging that the concept of training for improved timber harvesting has progressed considerably from a very narrow focus on such things as directional felling and improved skidding to now include training for staff at supervisory and management levels. The conference stressed that capacity building will lead to only minor changes unless

attitudes and mind-sets are also changed as a part of overall training initiatives.

The conference emphasized that RIL is an essential component of sustainable forest management. Participants called on governments, industry, research institutions, and international organizations to cooperate in furthering the adoption and application of RIL.

Recommendations of the Conference

FOR GOVERNMENTS:

- Provide an enabling environment for RIL and sustainable forest management, including provision of secure resource tenure and investment climate, appropriate resource pricing, fiscal incentives, and the elimination of policies that discourage improved forest management.
- Strengthen monitoring of forest harvesting practices and enforcement of regulations pertaining to RIL and sustainable forest management.
- Develop and implement industry operating standards and competency criteria, and support through appropriate training programs, operator accreditation schemes and promotion of occupational health and safety.

FOR FOREST INDUSTRY:

- Show commitment to good forest management by adopting RIL and working towards sustainable forest management.
- Enhance skills and capabilities of employees through training and raising awareness of the environmental, social, and economic implications of forest harvesting.
- Develop payment and incentive systems for forest workers that promote and reward quality performance and efficiency in forest harvesting.

FOR INTERNATIONAL ORGANIZATIONS:

- Support human resource development to enhance capacities at all levels, from forest workers to policy makers, for effective implementation of RIL.
- Support the transfer of appropriate technology and facilitate the sharing of information and experiences related to RIL and other aspects of sustainable forest management.
- Foster development and raise awareness of innovative mechanisms for encouraging the adoption and application of RIL (e.g., certification, forest-based carbon offsets, and other payments for the environmental benefits of sustainable forest management).

FOR RESEARCH:

- Develop and apply standardized methods for assessing the costs and benefits of specific components of RIL so as to allow comparison of operational studies and to promote acceptance of results by all stakeholders.
- Assess RIL in the context of sustainable forest management, with due consideration to damage reduction, timber productivity, conservation of biological diversity, and social welfare.
- Give priority to practical applied research that supports the adoption of RIL practices by timber harvesting organizations.

FAO RELEASES COMPREHENSIVE DATA ON THE WORLD'S FORESTS

FAO recently released the most comprehensive data ever compiled on the world's forests as the Forest Resources Assessment 2000 (FRA 2000) culminates. The main findings indicate a global forest area of 3,856 million hectares, and a net global deforestation rate of 9.0 million hectares per year (equal to 0.23 percent).

The corresponding figures for Asia are 542 million hectares of forest cover, and a net annual deforestation rate of 371,000 hectares (0.07 percent).

Oceania's figures for 2000 are estimated at 202 million hectares of forest cover, with a net annual deforestation of 83,000 hectares (0.04 percent).

FAO's 1995 estimates indicated a net global deforestation of 11.0 million hectares per year, which was slightly higher than the current estimates.

These net figures mask the fact that loss of natural forests continues at roughly the same pace as before. The net deforestation rate has declined largely as a result of accelerated establishment of forest plantations, particularly in Asia and the Pacific, and a general increase in forest cover in Europe and North America.

Data aggregated at the global or continental levels cover a wide range of forest types (both natural forests and plantations), closed forests and open forests, and forest health and characteristics.

FRA 2000 data aggregated at the regional or global levels conceal important developments in individual countries. More detailed data for the individual countries can be retrieved from

the FAO forestry website, where the data are often available for individual sub-national units: <http://www.fao.org/forestry/fo/fra/index.jsp>.

About FRA 2000

FRA 2000 is the most comprehensive review of the world's forest resources ever undertaken. FRA 2000 is made up of three major components:

1. Assessment based on existing information on forest inventories provided by individual countries.
2. Remote Sensing Survey of vegetation changes occurring over the period 1980-2000, based on analysis of a pan tropical sampling of 117 Landsat TM images.
3. Special studies of a number of important aspects of forest resources not encompassed by traditional statistics (e.g., trees outside forests, non-wood forest products, forest fires, etc.).

Accessing the data

FRA 2000 provides the status as of the year 2000, based on the best available existing information. Since the publication of FRA 1990, Internet use and access has become widespread, offering an ideal media for presenting data as it allows for dynamic updating and a free-of-charge, world-wide dissemination of the findings.

The FRA 2000 website <http://www.fao.org/forestry/fo/fra/index.jsp> offers a gateway for accessing the large amount of information collected for the FRA 2000.

The FRA website links to the data at the country level in the country profiles found at

the FAO Forestry website http://www.fao.org/forestry/fo/country/nav_world.jsp?lang_id=1. Apart from FRA 2000 information, these country profiles include information on a range of topics, e.g. products and trade statistics, and links to information provided by partners (e.g. legal texts). Currently, more than 10,000 pages are available online that contain texts, maps and statistics for all countries.

Tables for the area figures aggregated at the regional level can be extracted from the FRA website. The FRA website also provides access to the above-mentioned special studies, as well as to global maps of forest cover and ecological zones.

The FRA 2000 findings will also be made available as a printed report during 2001.

Data presentation and transparency

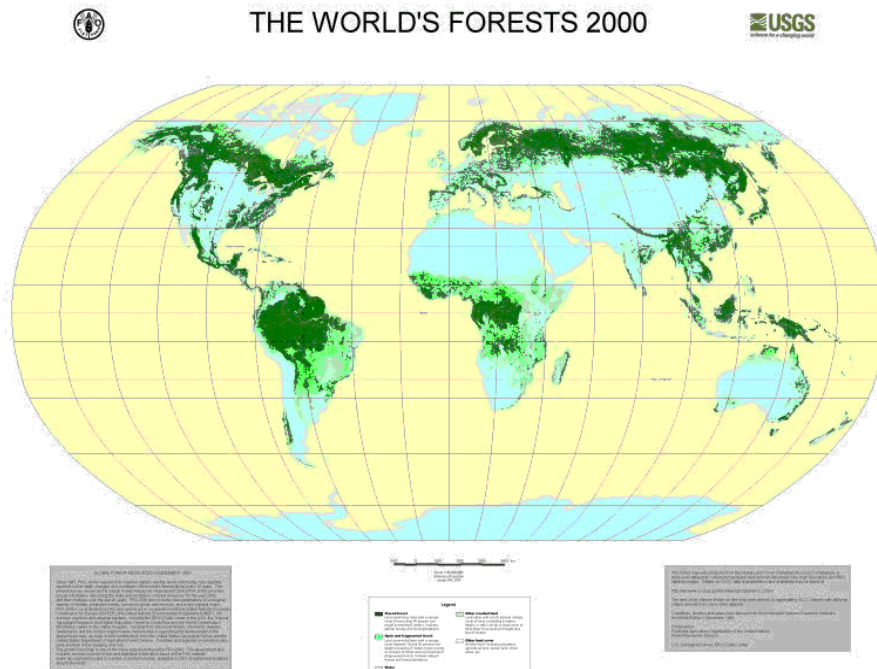
Figures and findings concerning forest cover and deforestation naturally depend on how forest is defined. Definitions of forest vary

from country to country. For reasons of comparability, a common set of FRA terms and definitions are employed.

Transparency is a cornerstone in the data presentation of the FRA 2000. All figures quoted are traceable to a named source document (typically a national forest inventory or national forest statistics). The translation from national forest classification to the classifications employed by FRA is stated for each country. Furthermore, each country has been asked to validate the data prior to publishing.

FRA 2000 provides the status by the year 2000 based on the best existing information currently available. As it will eventually become outdated as new and more recent surveys and inventories become available, continual updating and refinement of the information will therefore be necessary.

At the country level the webpages are equipped with a feedback mechanism allowing any user to provide feedback to the FRA team.



REGIONAL FORESTRY WORKSHOP ON DATA COLLECTION FOR THE PACIFIC REGION

With the assistance of the Forestry Division, Samoa Ministry of Agriculture, Forestry, Fisheries and Meteorology, FAO organized a regional workshop on data collection in Apia, Samoa, 4-8 September 2000. The workshop was funded by the FAO Global Forest Resources Assessment 2000 (FRA 2000). Participants came from both the large and small island countries in the region, namely Papua New Guinea, Fiji, Vanuatu, Samoa, American Samoa, Cook Islands, Tonga, Niue, Federated States of Micronesia, and Kiribati. Participants from New Caledonia and Solomon Islands were invited but were unable to attend. The South Pacific Regional Environment Programme (SPREP) and the Secretariat for the Pacific Community (SPC) were also represented at the workshop.

The workshop programme consisted of:

- C an overview of FRA 2000 – status, activities, and outputs;
- C the status of forest and forestry development in the region;
- C country reports (focusing on status of forestry data and information);
- C presentation of special papers on several forestry topics;
- C group discussions on issues relating to data collection and reporting; and
- C individual country consultations between FAO and the country representatives.

The objectives of the Pacific Regional Workshop were to:

- C collect data for the FAO Forest Resources Assessment Programme and other FAO forestry programmes;
- C assist participating countries in meeting FAO data needs; and
- C explore areas where FAO and member countries could work together in strengthening future forest resources assessments and other forestry programmes.

Some key issues and findings of the workshop

Key issues and findings emerging from the workshop included the following:

- C Most countries have some data and information on forests and the forestry sector related to national forest resources and forest production; some forest vegetation maps are also available.
- C Nearly all the forestry data (especially from forest inventories) are old and are not being regularly updated. The consequence is that there are not enough data to estimate changes in forest cover over time, or changes in forest production or use over periods.
- C Data and information on fuelwood are limited or non-existent in most countries, despite the fact that fuelwood is the major source of energy in many households in the rural areas.
- C There is an urgent need for forestry agencies to collaborate with other agencies, such as Customs and Energy Departments, to systematically collect, verify and record forestry-related data.
- C There is a lack of detailed and easily accessible information on non-wood forest products (NWFP) in most countries, e.g. information on their status and production trends and use is hard to track over time.
- C There is a need for targeted training to improve the capacities of the countries in data collection, analysis and presentation.
- C Institutional support is needed at national and regional levels to strengthen collaboration, information sharing, and networking amongst the countries.

Conclusion and recommendations

The workshop gave countries the opportunity to: i) understand how FAO gathers and checks forestry data; ii) discover where and how the countries can assist; and iii) view first-hand how the FAO FRA web page could be accessed and

used.

The major recommendations made by the workshop are as follows:

- C Another regional workshop should be conducted, preferably within the next 12 to 18 months. The workshop will follow-up on recommendations made at the Apia workshop, and check on new information and progress in individual countries.
- C An Institutional Needs Analysis (INA) should be carried out in several countries (yet to be identified) to identify the types of technical assistance needed, and to check on what additional resources are needed for funding.
- C A group e-mail list for sharing of information on forest inventory and forestry data collection should be established.

- C A Forest Inventory Working Group should be established.
- C Targeted assistance for selected countries with problems in collecting forestry data and information should be identified and funded by supporting donors.

Individual consultations between FAO and the country representatives focused on country reports and review of the forestry data and information supplied by the countries for the FAO-compiled country profiles (relating to the work of FRA). Data gaps were identified for the individual countries, issues and problems faced by the countries were reported, and proposed actions to update and supply data and information to FAO were agreed upon.

FAO LAUNCHES NEW CLIMATE CHANGE NETWORK

At the 18th Session of the Asia-Pacific Forestry Commission (APFC), held in Noosaville, Australia last year, member countries considered key issues related to forestry, climate change, and the Kyoto Protocol. Given the importance of these issues and the likely implications for forestry, APFC members requested FAO to facilitate the exchange of information on forestry and climate change issues.

In response, FAO has recently established an electronic list server, (entitled CLIM-FO-L) to disseminate and share current information and experiences on climate change and forestry. CLIM-FO-L, which is being managed by the FAO Forest Products Division, will periodically send syntheses of reports and other information to subscribers by e-mail.

The managers of CLIM-FO-L welcome all interested individuals to subscribe to the network and make contributions. The following types of information relevant to climate change and forestry are appreciated:

- publications, documents, and speeches
- information on related websites
- announcements of events and job opportunities
- developments of climate change negotiations
- opinions, comments, and enquiries

To subscribe to CLIM-FO-L, please send an e-mail message to mailserv@mailserv.fao.org containing the following message ***SUBSCRIBE CLIM-FO-L***. Please leave the subject line blank.

Once you have subscribed, you will receive instructions on how to contribute information, retrieve past messages, unsubscribe, etc.

All interested individuals are invited to join CLIM-FO-L and contribute information, ideas, and opinions. Please inform others who are interested in forestry and climate change issues about the new network.

WORLD FORESTRY LEADERS MEET TO DISCUSS CURRENT ISSUES

Delegates from 101 countries met at FAO Headquarters in Rome, 12-16 March 2001 for the fifteenth session of the Committee on Forestry (COFO). Observers from 6 UN agencies and 19 intergovernmental organizations and international NGOs also participated. Of particular relevance for the Asia-Pacific region were the following COFO decisions and recommendations.

Forest information and knowledge management

The Committee:

- C recommended that FAO should continue to give high priority to improved information and knowledge in support of sustainable forest management;
- C reconfirmed the usefulness of forestry sector outlook studies for policy and planning formulation;
- C recommended that FAO continue to develop partnerships with other organizations and institutions to facilitate the collection, analysis and dissemination of information, and to increase the efficiency and effectiveness of knowledge management;
- C welcomed the use of new technology to collect and disseminate information, but noted that many member countries did not have access to such facilities, and therefore recommended that FAO continue to publish information using a broad range of media;
- C requested FAO to support training and technology transfer related to information management;
- C recognized the need for improved information sharing among stakeholders *within* countries; and
- C welcomed a proposal to address information sharing and capacity building within the framework of the proposed national forest programme implementation facility.

State of the World's Forests 2001 (SOFO)

Delegates were provided with advance copies of *State of the World's Forests 2001*, which will be released to the public in mid 2001.

Criteria and indicators of sustainable management of all types of forests and implications for certification and trade

With regard to criteria and indicators, the Committee recommended that FAO, in collaboration with national, regional and international partners and processes:

- help streamline concepts, terms and definitions to foster common understanding and facilitate reporting;
- increase country capacity building in data collection and analysis;
- promote the exchange of information and experiences;
- support the establishment of model and demonstration forests;
- facilitate and support involvement of countries not currently participating in on-going criteria and indicator processes;
- promote discussion in high-level regional and international fora to heighten policy-level awareness and political commitment to sustainable forest management; and
- promote information exchange between forestry and related sectors.

The Committee:

- C supported a recommendation to organize a broadly-based international conference on the subject of criteria and indicators for sustainable forest management; and
- C noted the need to further explore the relationship between criteria and indicators at national and forest management unit levels, and between these and forest certification.

With regard to certification, the Committee:

- C stressed that certification schemes should be voluntary, nondiscriminatory, transparent and market-oriented;
- C recognized the need for further clarification of the effects of certification on sustainable forest management and trade, as well as its relation to criteria and indicators processes;
- recommended that FAO continue to provide a neutral forum and facilitate dialogue on issues of compatibility, equivalency or mutual recognition between certification processes; and
- requested FAO to continue providing information and analysis on trends and opportunities related to certification, in order to further assist the various stakeholders to make appropriate decisions.

Implementation of the Intergovernmental Panel on Forests/Intergovernmental Forum on Forests (IPF/IFF) proposals for action

The Committee:

- C requested FAO to provide support to the work of the United Nations Forum on Forests (UNFF), and to take an active leadership role in the Collaborative Partnership on Forests (CPF), which will replace the Interagency Task Force on Forests (ITFF);
- C requested FAO to continue collaboration with the secretariats of the forest-related conventions;
- C requested FAO to assist the UNFF in monitoring, assessing and reporting on progress in implementing the IPF/IFF proposals for action; and
- C requested FAO to support countries in their implementation of the IPF/IFF proposals for action through capacity building and technical and financial assistance.

Review of FAO forestry programs and activities

The Committee:

- C recommended that FAO continue to support national forest programmes, and to fully

consider the interactions among forestry, agriculture and other sectors;

- C recommended that FAO keep member countries informed about international processes, including the various conventions that relate to forests, and to assist countries in their participation in the international forest policy dialogue;
- C supported the strengthening of the FAO field programme in forestry, and the strengthening of its collaboration with regional organizations active in the forest sector;
- C recommended that FAO should facilitate the exchange of information within and among countries about successful approaches to forest management; and
- C commended FAO and its member countries in Asia for the development of the *Code of Practice for Forest Harvesting in Asia-Pacific* and the development of national codes, with the active support of the Asia-Pacific Forestry Commission.

Results of the Forest Resources Assessment 2000 (FRA 2000)

While recognizing that the rate of global deforestation may have slowed in the 1990-2000 period, the Committee nonetheless noted with concern the continued high level of deforestation.

The Committee:

- C recommended that FAO continue to carry out broad assessments that include various aspects of forest resources, such as biological diversity, forest health, resource use, and social and economic aspects of forest use;
- C recommended that FAO continue to analyze the findings of FRA 2000, including the causes underlying the positive and negative long-term trends in forest resources;
- C recommended that FAO continue to work with regional partners and processes in global forest resources assessment, and emphasized the benefits of carrying out assessments and analyzing results at the regional level;

- C requested FAO to provide continued technical and financial assistance for country capacity building in carrying out national-level assessments and monitoring; and
- C supported, in principle, the idea of a Global Forest Survey (GFS), to improve the availability and quality of national-level data; it recommended that FAO present a more detailed proposal to the next sessions of the Regional Forestry Commissions and to the next session of COFO.

Medium-Term Plan 2002-07

The Committee supported the program priorities for forestry in the Medium-Term Plan, highlighting the importance of the information on:

- C forest and tree resources and their uses;
- C national forest programmes;
- C criteria and indicators processes;
- C outlook studies;
- C improved forest product harvesting and use;
- C facilitation of regional and international co-operation on forests;
- C implementation of the proposals for action of IPF and IFF;
- C efforts to combat desertification;
- C participatory forestry;
- C support to developing countries and countries with low forest cover;
- C management of wildlife;
- C forest fire management;
- C combating illegal activities in the forest sector;
- C forests and watershed management; and
- C development of non-wood forest products.

Climate change and the Kyoto Protocol: key forestry-related issues

The Committee:

- C fully supported FAO's neutral role in providing technical support for the international deliberations on climate change and forestry;

- C encouraged FAO to strengthen the collection and dissemination of information relevant to the dialogue on forestry and climate change;
- C urged FAO to work with other organizations and bodies, such as the IPCC, CCD Secretariat, CIFOR and ITTO, in providing technical input to the development of inventories and methodologies for measurement of carbon;
- C requested FAO to strengthen its support to country capacity related to climate change activities in the forest sector, including desertification; and
- C recommended FAO to provide assistance in the assessment of vulnerability and adaptive management strategies in response to climate change.

International Year of Mountains, 2002

The Committee:

- C recognized the importance of mountain regions and the people who live there, and acknowledged the significant opportunity presented by the observance of the International Year of Mountains (IYM) to raise awareness and action on mountain issues;
- C noted with satisfaction that, in many countries, national committees had been established for the IYM, and encouraged FAO to support these national initiatives;
- C urged FAO to collaborate with the organizers of the International Year of Ecotourism (also being observed in 2002) to ensure that both are fully synchronized; and
- C stressed the need for strong collaboration with regional and sub-regional bodies in supporting the IYM observance.

Recommendations of the Regional Forestry Commissions and other Statutory Bodies

The Committee:

- C recognized the significant potential and capacity of the Regional Forestry Commissions (RFCs) to identify emerging

regional forestry issues, bring such issues to global attention, support technology and information exchange, enhance coordination, promote regional integration and facilitate the exchange of lessons learned;

- C urged FAO to continue to strengthen the capacity and roles of the RFCs;
- C recommended that the RFCs support implementation of the IPF/IFF proposals for action by facilitating national review and prioritization of the proposals, and identifying the comparative advantages of various organizations offering support;
- C recommended that the RFCs, in collaboration with regional processes, take an active role in facilitating the input of regional perspectives to the UNFF and the CPF; it requested FAO to facilitate the exchange of information and

ideas among the RFCs and with the UNFF and CPF in a transparent manner;

- C encouraged the RFCs to enhance the involvement of the private sector and NGOs in the work of the Commissions;
- C welcomed the development of RFC websites and electronic networking as complements to traditional information exchange; and
- C welcomed the report of the Meeting of the Bureaux of the Regional Forestry Commissions, which had been convened on 11 March 2001, and requested that similar opportunities for exchanging information and ideas among the Commissions be provided in the future.

OFFICIALS OF REGIONAL FORESTRY COMMISSIONS EXCHANGE VIEWS IN ROME

A meeting of the officers from the six Regional Forestry Commissions (RFCs) and FAO forestry staff was convened 11 March 2001, prior to the fifteenth session of the Committee on Forestry (COFO).

Representatives of each commission presented summaries of ongoing, planned, and recently completed activities. The Asia-Pacific Forestry Commission report highlighted the ongoing support for the implementation of the *Code of Practice for Forest Harvesting in Asia-Pacific*, the recent International Conference on the Application of Reduced Impact Logging to Advance Sustainable Forest Management, the launching of the Regional Initiative for the Development and Implementation of National-Level Criteria and Indicators for Sustainable Management of Dry Forests in Asia, regional studies of the efficacy of logging bans and the potential for increased utilization of wood residues, the establishment of a Working Group on Forestry Statistics and

Information and the launching of the APFC website.

Participants agreed that RFCs offered excellent opportunities to facilitate review and prioritization of the IPF/IFF proposals for action, to identify the comparative advantages of various organizations offering support, and to coordinate action at the regional level.

The meeting stressed the importance of increasing the involvement of the private sector and NGOs in the activities of the RFCs and made specific suggestions for bringing this about.

The meeting also reviewed tentative dates and venues for upcoming sessions of the regional forestry commissions. The Asia-Pacific Forestry Commission is likely to convene its 19th session in July or August 2002. Offers to host the session have been made by Mongolia and Laos, and a decision on the venue is expected soon.

INTERNATIONAL NEEM NETWORK FORMULATES TWO-YEAR WORKPLAN

Representatives of nine African, Asian, and European member countries of the International Neem Network met in Jodhpur, India, 21-25 March 2001, to discuss ongoing work and formulate workplans for the next two years. Approximately two-thirds of the neem provenance trials installed in 1995-1996 have good growth and survival, confirming the potential of the network in providing unique information on the adaptation of neem.

Network participants agreed on a practical workplan for the next two years, when priority

will be given to assisting network members in further collection and analysis of data on growth and yield of neem and initiating a global assessment of trial results.

The International Neem Network is supported by FAO and the DANIDA Forest Seed Centre. For more information, please contact:

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FIRE EXPERTS PLOT STRATEGIES FOR COOPERATION

FAO and ITTO co-organized an International Expert Meeting on Forest Fire Management, 7-9 March 2001, in Rome. Sixteen fire experts from around the globe participated.

The objectives of the meeting were to:

- C examine action related to international collaboration, capacity building, and human resource development;
- C review mechanisms to support cooperation in forest fire management and control at bilateral, regional, and international levels, and the establishment of inter-country agreements among two or more countries aimed at sharing resources, personnel, and equipment; and
- C examine components of such inter-country agreements, including overall logistical, policy, and operational level considerations.

The meeting recommended that FAO, in collaboration with countries and other organizations, develop data collection standards

that address national and international fire management reporting requirements and needs. It was suggested that national focal points be identified to facilitate improved information exchange on all aspects of forest fire management and control among national, regional, and international institutes. It was also recommended that comprehensive national forest fire country profiles be developed and widely disseminated.

Participants also requested FAO to review ongoing activities in forest fire management and control to clarify linkages among agencies and organizations that might lead to future collaboration. FAO was also requested to support activities that bring local people, professionals, and policy makers together, as well as to help build awareness and capacity.

Widespread fire emergencies in recent years in most regions of the world have highlighted the need to establish international agreements to deal with such emergencies, the need to enhance

national capacities, and the need to develop effective emergency response procedures to ensure effective utilization of outside assistance.

The meeting recommended that FAO, in collaboration with ITTO and other partners, encourage, facilitate, and support the development of bilateral and multilateral agreements between countries to prepare for, and respond to, emergency fire situations. The experts recognized that such agreements need to be developed in

advance of the occurrence of fires. It was therefore suggested that preparatory exchange programs between countries be conducted in non-crisis situations to exchange information and experiences and prepare for cooperation under emergency situations.

The meeting urged FAO and ITTO to elaborate an action plan specifying responsibilities and time frames for completion.

BUILDING CONFIDENCE AMONG FOREST CERTIFICATION APPROACHES

Voluntary certification of forest management and labeling of forest products are recognized as potential tools for promoting sustainable forest management. In recent years, however, there has been a proliferation of certification and labeling schemes—sometimes competing or conflicting with one another.

FAO, the German aid agency GTZ, and the International Tropical Timber Organization (ITTO) co-organized a seminar in Rome, 19-20 February 2001, to encourage improved dialogue and linkages among organizations that have an interest in forest certification.

Eighty-five stakeholders, from 33 countries, representing producers (large and small), companies, trade associations, unions, social and environmental NGOs, buyers, certification schemes, government, scientists, international organizations, and certifiers participated in the meeting. They presented views on what they expected of certification, discussed the current status and experience of cooperation and efforts toward mutual recognition, and assessed what is required for credible forest certification schemes.

There were divergent views on many of the issues discussed, reflecting the different interests, values, and goals of the various groups. Some participants considered that the proliferation of certification schemes was a problem, while others felt that competition and choice were desirable. Mutual recognition between schemes was seen by many as one solution to the problem of proliferation; others felt such an approach was inappropriate.

Developing countries indicated that their constraints in achieving improved standards of forest management and in meeting the requirements of some of the certification schemes tend to be overlooked. Small-scale forest owners and forest communities noted particular concerns about how certification should be conducted and how they could share benefits of certification.

While there was no consensus on many of the specific issues, the seminar helped to clarify many points. It allowed different stakeholders to explain their positions and the reasons for these positions, and it provided an opportunity for developing countries to highlight the difficulties they face and articulate their needs. It was agreed that further dialogue among the various stakeholders was desirable to build mutual trust.

CHINA TO ENCOURAGE MORE PLANTATIONS

China's State Forestry Administration is set to issue new administrative regulations to encourage overseas investment in forest plantations in China. The new regulations are expected to provide secure land-use rights for 50 years, low-interest loans, rebates, and tax breaks. Plantation development in China has expanded rapidly in recent years. Guangdong Province has been particularly successful in attracting foreign investment (more than US\$154 million to date).

In a related development, the Forest Department of Anhui Province and Singapore Asia Pulp have reportedly agreed on cooperative efforts to plant more than 600,000 hectares of high-yielding pulp plantations (fully one-sixth of the entire land area of the province). If the proposal materializes, it will be the biggest international cooperative forestry project in Anhui Province, in terms of both foreign investment and area planted. The total investment is projected to be US\$1.7 billion, of which \$500 million would be spent on plantation development and \$1.2 billion on construction of pulp mills.

– *ITTO Tropical Timber Market Report* –

FURNITURE FROM MILK CARTONS?

TetraPak (Thailand) Co. recently announced that it would cooperate with Bangkok city authorities in developing a recycling plant to convert empty UHT milk cartons into "green board" suitable for making furniture and other products. The plant will be capable of processing 800,000 UHT cartons a day. It is estimated that Thai consumers empty more than 2 billion UHT cartons annually, most of which currently end up in landfills.

– *Asian Timber* –

CHINA TO CREATE FIRST NATIONAL

TIGER RESERVE

The Huangnihe River Nature Reserve in northeast China's Jilin Province will soon become a national park for the preservation of the area's endangered tigers. The reserve, which is in the Mount Changbai area, is the most important habitat for up to 20 Siberian tigers that inhabit the area.

– *Xinhua News Service* –

MALAYSIAN FIRMS PLAN EXPANSION

Merbok Hilir Bhd, the largest manufacturer of MDF in Malaysia, has announced that it intends to open a new MDF plant in Sabah or Sarawak in the next two years. The company currently has two plants located in Peninsular Malaysia, with annual production of about 350,000 cubic meters.

Latitude Tree Holding Bhd, one of the leading manufacturers of solid rubberwood furniture in Malaysia, recently announced that it intends to set up a production plant in Vietnam to meet the growing demand for rubberwood furniture.

– *ITTO Tropical Timber Market Report* –

AMERICAN CHESTNUTS MAY MAKE COMEBACK

The American chestnut (*Castanea dentata*) was once the most common tree in the U.S. eastern hardwood forests and was among the most important timber species in the country. By 1930, however, the species was all but wiped out by a fungus first brought to the United States on Japanese chestnut trees around the turn of the century. The fungus spread rapidly and proved uncontrollable, killing virtually all mature chestnut trees in the eastern United States. The fungus does not attack the tree's roots, however, and this allows shoots to sprout up from existing roots and stumps throughout the forest to this day. The sprouts are generally infected by the fungus and

die before they attain sexual maturity, however, and the process starts over again.

U.S. scientists are currently working with Asian colleagues to cross Asian trees resistant to the chestnut blight with American trees in the hopes of creating a disease-resistant hybrid with high-quality timber characteristics. "Hypovirulent" strains of the blight fungus have also been introduced from Europe, resulting in canker remission in American chestnuts (a form of biological control). The program is showing promising results, and it is hoped that sometime in the future, the American chestnut can regain its position of importance in eastern forests.

– *APSnet* –

FIJI FOREST OWNERS IN JOINT VENTURE WITH U.S. INVESTORS

A group of pine and mahogany forest owners in Fiji has entered into a joint venture with a group of U.S. investors (American Global Resources) for the harvest and processing of timber resources. The US\$200 million deal—if approved by local authorities—could see the establishment of two state-of-the-art sawmills and timber processing facilities. About 16,000 hectares of pine and mahogany forests are involved in the deal.

– *Pacnews* –

UN FORUM ON FORESTS CONVENES ORGANIZATIONAL MEETING

The recently established United Nations Forum on Forests (UNFF) convened its organizational meeting in late February 2001, in New York. The UNFF will build on the work of the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forests (IFF), two *ad hoc* bodies that grew out of the 1992 Earth Summit.

The mood during the UNFF organizational meeting was that it is time to move from dialogue to action. The UNFF is open to all governments, and participation by international organizations, NGOs, the private sector, and other interested stakeholders is encouraged.

As part of the new international arrangements on forests, the UN Economic and Social Council has invited the heads of relevant international organizations to form a Collaborative Partnership on Forests (CPF) to support the work of the UNFF.

– *United Nations Department of Public Information* –

PHILIPPINE SUPREME COURT UPHOLDS INDIGENOUS PEOPLES RIGHTS ACT

In December 2000, the Philippine Supreme Court Upheld the Indigenous Peoples Rights Act (IPRA) of 1997, which provides legal recognition of ancestral domain rights pursuant to indigenous concepts of ownership. The act has major implications for local management by indigenous peoples in forest areas of the Philippines. The IPRA is believed to mark the first time that a national government in Asia has legally recognized indigenous peoples' territorial rights.

– *Center for International Environmental Law* –

CAMBODIAN INDIGENOUS GROUP GRANTED HISTORIC COMMUNITY FORESTRY RIGHTS

The Ya Poey Community Forestry Association, comprised of representatives of six indigenous Kreung villages in northeastern Cambodia's Ratanakiri Province, signed a historic community forestry agreement with the government in late December 2000. The agreement gives the Ya Poey Community Forestry Association authority to protect and manage 5,000 hectares of the O Tabearr semi-evergreen forest, which have traditionally been used by villagers for generations. The Ya Poey Community Forestry Association was formed in early 1997 to help protect the forest from a variety of outside threats, including timber harvesting operations by the Hero Taiwan company, which was granted a 60,000-hectare concession, overlapping areas claimed by the indigenous Kreung villagers. The Association established community patrols and formulated regulations prohibiting the cutting and burning of trees and the use of guns for hunting. Non-timber forest products can be collected from the forest, but only for individual subsistence use,

not for sale to outside companies.

– *Phnom Penh Post* –

CHINA’S WOOD IMPORTS SURGE

China imported 13.612 million cubic meters of logs in 2000, valued at US\$1.66 billion, up 25 percent from 1999 levels. Hardwood log imports comprised 53 percent of the volume and 77 percent of the value. The biggest single supplier of roundwood was Russia, which supplied 44 percent (5.931 million cubic meters) of China’s log imports. Malaysia and Gabon each supplied more than 1 million cubic meters. Other major suppliers included Papua New Guinea, Indonesia, and Myanmar.

China’s sawnwood imports in 2000 rose to 3.614 million cubic meters—up by over 65 percent compared to 1999. The value of lumber imports was US\$982 million, nearly double 1999 values. Major suppliers of sawnwood included Indonesia, Malaysia, United States, Canada, Russia, and New Zealand. Imports of plywood totaled about 1 million cubic meters.

– *ITTO Tropical Timber Report* –

INDONESIA ACKNOWLEDGES FORESTRY COMMITMENTS WON’T BE MET

Indonesia’s newly installed forestry minister, Marzuki Usman, has acknowledged that the country will fall short of commitments made to the donor countries last October. Donor’s pledged US\$4.8 billion to Indonesia in return for promised reforms, including a crack-down on illegal logging activities. The World Bank estimates that Indonesia is losing US\$650 million per year in uncollected royalties because of illegal logging and trade.

– *Agence France Presse* --

ICRAF AND CIFOR NAME NEW DIRECTORS

The International Center for Agroforestry Research (ICRAF) has named Dr. Dennis Garrity as its new Director General, succeeding Dr. Pedro

Sanchez 1 October 2001. Dr. Garrity has been with ICRAF since 1992. He founded ICRAF’s Southeast Asia program, which currently has over 40 staff working in six countries.

The Center for International Forestry Research (CIFOR) has named Dr. David Kaimowitz as its new Director General, succeeding Jeffrey Sayer, who has headed CIFOR since its establishment in 1993. Dr. Kaimowitz was appointed principal economist at CIFOR last year. Prior to that, he was the team leader for CIFOR’s program on Underlying Causes of Deforestation, Forest Degradation and Changes in Human Welfare.

NEW COMMERCIAL AGENCY FOR WESTERN AUSTRALIA FOREST RESOURCES

State Government forest resources in Western Australia have been separated into conservation and commercial properties. The existing Department of Conservation and Land Management (CALM) will maintain administration of natural resources and a new Forest Products Commission (FPC) will take over the commercial activities. Under the new structure, harvesting or sale of forest products, the management and harvesting of plantations, and construction of logging roads will pass to the new FPC.

CALM manages more than 22 million hectares, encompassing more than 8.5 percent of Western Australia’s land area, including parks and reserves. The new separation of duties differs significantly from previous management strategies, which encouraged multiple use of forests.

– *Southern Hemisphere Forest Industry Journal* –

SECOND “LIVING FOSSIL” DISCOVERED IN AUSTRALIA

A new species of tree, another remarkable living fossil, has been discovered in the vine-tangled rainforests of the Nightcap Range, in the far north

of New South Wales, Australia. The newly discovered tree has tentatively been named the "Nightcap oak", and has been placed under protection. Only 23 adult trees (with girth over 10 centimeters) have been located. They are all living in a single catchment—the location of

which is being kept a closely guarded secret.

The Nightcap oak is the second such newly discovered tree in New South Wales, following the discovery of the Wollemi pine some years ago.

FAO ASIA-PACIFIC FORESTRY CALENDAR

5-8 June 2001. ***Rehabilitation of Degraded Mangrove Forests: Practical Approaches***. Chennai, India. Co-organized by FORSPA/FAO and M.S. Swaminathan Research Foundation. Contact: Simmarthiri Appanah, Senior Programme Adviser, FORSPA, c/o FAO/RAP, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 281-7844; Fax: (66-2) 280-0445; E-mail: Simmarthiri.Appanah@fao.org

10-15 June 2001. ***Field/Model Level C&I Workshop***. Lin'an, China. Co-sponsored by RMFP, USDA Forest Service and IMFNS, with the support of the Chinese Academy of Forestry and Lin'an Forestry Bureau. Contact: Tang Hon Tat, Chief Technical Officer, GCP/RAS/177/JPN, c/o FAO/RAP, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 281-7844; Fax: (66-2) 280-0445; E-mail: Hontat.Tang@fao.org

25-28 July 2001. ***Communities in Flames***. Balikpapan, Indonesia. Organized by Project FireFight South East Asia, FAO and RECOFTC. Contact: Organizing Committee for the International Conference "Community in Flames", P.O. Box 6596 JKPWB, Jakarta, Indonesia; Fax: (+62) 251-622 100; E-mail: cbfim@cgjar.org. Additional information including hotel rates and application forms for financial support is also available at <http://www.recoftc.org/headlines.html#apr501>

25-28 September 2001. ***International Conference on Advancing Community Forestry: Innovations and Scaling up Experiences***. Chiang Mai, Thailand. Organized by RECOFTC, FAO/RAP, ICRAF, IUCN, and SMRP/GTZ. Contact: Dr. Somsak Sukwong, Executive Director, Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC), Kasetsart University, P.O. Box 1111, Bangkok 10903, Thailand; Tel: (66-2) 940-5700; Fax: (66-2) 561-4880; E-mail: ftcsss@ku.ac.th

25-30 November 2001 (provisional). Pyay and Yangon, Myanmar. ***3rd Project Steering Committee Meeting and Regional Model Forest Workshop of RMFP***. Contact: Tang Hon Tat, Chief Technical Officer, GCP/RAS/177/JPN, c/o FAO/RAP, 39 Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 281-7844; Fax: (66-2) 280-0445; E-mail: Hontat.Tang@fao.org

2-11 September 2002. Johannesburg, South Africa. ***World Summit on Sustainable Development ("Rio+10")***. Contact: J.B. Ball, Coordinator, Forest Programmes Coordination and Information Unit, FAO Forestry Department, Via delle Terme di Caracalla, 00100 Rome, Italy; Tel: (3906) 57054047; Fax: (3906) 57052151; E-mail: James.Ball@fao.org

21-28 September 2003. ***XII World Forestry Congress***. Québec City, Canada. Contact: Secretariat General, XII World Forestry Congress 2003, P.O. Box 7275, Québec City, Canada G1G 5E5; E-mail: sec-gen@wfc2003.org

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2. *Asia-Pacific Tropical Forestry: Ecological Disaster or Sustainable Growth?* (RAPA Publication 1994/18)
3. *Workshop Report: Reform of the Forestry Sector: Towards a Market Orientation in China, Laos, Mongolia, Myanmar, and Vietnam* (RAPA Publication 1995/4)
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5. *A Guide to the Identification of Diseases and Pests of Neem (*Azadirachta indica*)* (RAP Publication 1995/41)
6. *Non-Wood Forest Products in Bhutan* (RAP Publication 1996/6)
7. *Asia-Pacific Agroforestry Profiles: Second Edition* (APAN Field Doc. No.4/RAP Publication 1996/20)
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23. *Decentralization and Devolution of Forest Management in Asia and the Pacific* (RAP Publication 2000/1 - RECOFTC Report No.18)
24. *Asia-Pacific Forestry Commission Fifty Years* (RAP Publication 2000/2)
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32. *Information and Analysis for Trees Outside Forests in India* (Working Paper No.1. EC-FAO Partnership Programme)

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