

ROYAL CHITWAN NATIONAL PARK: PAST AND PRESENT

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Introduction

Conservation of biological diversity has long been seen as a matter of creating parks and reserves which are free from human interference. There are 425 million hectares of land in about 3,500 areas worldwide under various degrees of protection. In Nepal, a comprehensive program for environmental conservation was proposed in 1970 with the establishment of national parks and wildlife reserves in different parts of Nepal. The Royal Chitwan National Park (RCNP) was officially established in 1973 as the first national park of the Kingdom. Since then, seven national parks, five wildlife reserves, one hunting reserve and one conservation area have been established in Nepal covering approximately 14,702 km², i.e. about 10% of the total land area of the country. The Royal Chitwan National Park was included in the list of World Heritage Sites in 1984.

Royal Chitwan National Park

Royal Chitwan National Park is located in the Chitwan district of Narayani Zone at 27° 30' N latitude and between 84° and 34' E longitude. It lies approximately 90 km southwest of Kathmandu (about 160 km by road). The park is roughly 50 km long and 6 to 20 km broad. At the time of declaration of RCNP the park covered an area of 540 km² but its size was increased to 932 km² in 1976. It is situated in the subtropical inner terai (lowlands) of the central part of Nepal. It is also known as the Rapti Valley, Churia or Someswor range with 180 to 800 meter elevation. This park consists of the Churia hills, 17 small lakes, and the floodplains of the Rapti, Reu and Narayani rivers.

The environmental setting of the Chitwan Valley prior to the establishment of RCNP was

regarded as the richest sanctuary of wildlife. During the Rana rule in Nepal from 1846 to 1950, Chitwan was promoted as the ruling hunting preserve. In the winter of 1861, Prime Minister Jung Bahadur Rana assembled 975 domestic elephants and shot 31 tigers, captured 21 wild elephants, and killed 11 wild buffaloes, 10 wild boars, 4 bears, 3 leopards, 1 rhino and many other game animals. Similarly, Chandra Shamsheer had assembled 600 trained elephants in Chitwan Valley for King George's visit in December 1911. They bagged 58 tigers, 28 rhinos, 60 sloth bears in a period of 5 days.

There were only a few scattered villages in the Chitwan before 1950. But this fertile valley with a rich forest-grassland attracted the attention of the government in the 1950s. The government of Nepal started the Rapti Valley Multipurpose Development Project in 1955 acting jointly with the US cooperation mission. By the year 1959, Chitwan district had about 2,000 families, and by 1965 about 100,000 people inhabited this valley. This migration resulted in the indiscriminate cutting of trees, large-scale destruction of habitats and wildlife, burning of grasslands and development of agricultural activities.

In 1959, the Government of Nepal established the Mahendra Mrigkunj (Mahendra National Park) north of the Rapti river and a rhino sanctuary south of the Rapti. The Chitwan Wildlife Management Division headquarters at Tikauli was established for the protection of wildlife habitats. The population of Chitwan was asked to vacate the park area and about 4,000 families moved to the Reu valley and near Thori, and 600 families to north of Rapti. Thereafter, the Royal Chitwan National Park was formally established in 1973.

The vegetation of Chitwan valley was not well recorded except for the categorization of forest

by Champion and Seth (1968), Stainton (1974) and Laurie (1978). Tamang, during 1963-67, estimated the vegetation of Chitwan park area on the basis of stock aerial maps. According to him, Sal forest covered 70%, riverine forest 7%, grassland 18%, and there was mixed vegetation at Churia side. Sal (*Shorea robusta*) accounted for 80% of the canopy coverage. Riverine forests were found along the Rapti, Reu and Narayani rivers, swamps and streams, with khair (*Acacia catechu*) and Sissoo (*Dalbergia sissoo*) trees as early colonizers with moderate size. Grasslands were interspersed between riverine forests. Grasses used to attain about 6 to 7 m height. Intensive grazing by livestock and irregular fires were disturbing factors to the vegetation.

The present day Royal Chitwan National Park is covered with: Sal forest: 70%; grassland: 20%; riverine forest: 7%; and pine forest: 3%. About 500 vascular plant species have already been listed from this park by Mishra and Jeffries (1991) based on several surveys. Sal is the dominant species in RCNP with the highest Importance Value Index (106). Relative coverage of Sal is about 80% (Singh, 1993). There is a pine (*Pinus roxburghii*) forest at the top of Churia Hill. This forest also has Sal trees. Riverine forests vary in their composition. Three distinct types of riverine forests exist in the park: (i) *Acacia catechu* and *Dalbergia sissoo* forest at the banks of the Rapti and Narayani rivers; (ii) *Bombax cieba*, *Trewia nudiflora*, *Litsea monopetala* forest; and (iii) tropical deciduous riverine forest with *Syzygium cumini*, *Ficus* sp. Laurie (1978) classified a fourth category of riverine forest in the park as tropical evergreen forest containing species such as *Litsea monopetala*, *Albizia procera*, etc. Density and frequency of these species differ in different blocks of riverine forest.

The grassland area is expanding in the RCNP, indicating successional changes. Tamang reported that 18% of the land of RCNP during 1963-67 was grassland. One can easily see the encroaching trend of *Saccharum spontaneum* into forest, forming ecotones. About 70 herbaceous species occur in the grasslands of RCNP. Out of these, *Saccharum spontaneum*, *S. porphyrocoma* and *Themeda* attain heights of up to 8 m. Short

grasses including *Cynodon dactylon*, *Eragrostis japonica*, *Chrysopogon* sp., *Cyperus* sp. and *Imperata cylindrica* are other important grasses found in abandoned and fire affected areas.

Wildlife

About 40 species of mammals, 450 species of birds, 200 species of butterflies, and 60 species of fishes have already been enumerated from the park, which comprise some endangered and rare species. Besides the two important animals, the rhino and tiger, there are many other animals such as leopard, wild buffalo, wild dog, monkey, langur, jungle cat, leopard cat, fishing cat, jackal, squirrel, etc. present in the park. Elephants are also found here.

There are no accurate census' records of wild animals in Nepal, but Mishra, basing his observations on a data-base, reports that there are 5,476 chital, 704 sambar, 706 hog deer, 320 barking deer, 897 rhino and 32 wild boar in RCNP. There are 113 elephants within RCNP with the Department of National Parks and Wildlife Reserves (DNPWR) (58), King Mahendra Trust for Nature Conservation (6) and different hotels (49). Out of these, 67 elephants are available for elephant safaris.

Rhino: Royal Chitwan National Park is the native habitat for the one-horned rhinoceros (*Rhinoceros unicornis*). One estimate indicates that RCNP has over 300 (400 in Nepal) out of the world's total 2,000 one-horned rhinos (Caouette, 1993). The census figures of the rhino population in Nepal over the last 40 years indicate their depletion story as well as conservation success as shown in Table 1.

From 1980 to 1993, His Majesty's Government gave 25 rhinos to India, Pakistan, Singapore, USA, Germany and Bangladesh. Since the establishment of the RCNP, 113 rhinos have died, of which 67% of deaths were of natural causes and the rest resulted from poaching. Considering its value and poachers' activity, this number of rhinos poached appears misleading. Thought to be more

potent, the retail price of Asian horn was approximately US\$54,000 in the city of Taipei (Taiwan) in 1990 (Caouete, 1993). Foresters and wildlife experts have voiced various opinions about the tradition of giving rhinos to friendly countries. Yonjon (1993) opposes this practice because the rhinos in Nepal reportedly have 9.9% heterozygosity, which is a trait needed for survival. Rhinos outside Nepal have only 5%, and therefore Nepal should not be sending the animals outside the

country. Train (Chairman, WWF) is of the opinion that the number of rhinos in Nepal is near to its maximum carrying capacity (and still increasing) and therefore some animals should be sent to other conservation areas to preserve these rare animals. The spokesman of the Ministry of Forest and Soil Conservation, HMG, supports the government's policy of giving rhinos to friendly countries to enhance relations with them and foster the growth in the population of rhinos.

Table 1: Rhino Population in Nepal

Year	No. of Rhinos	Authority
1950	800	Willian
1957	400	Stracy
1959	300	Gee & Stracy
1966	100	Spillest
1968	80-100	Unknown
1973	120	Upreti & Pelvick
1974	250	Laurie
1980	300	DNPWR
1992	400	DNPWR

Tiger: The tiger is another very important wildlife species that is becoming extinct. The exact number of tigers in Nepal is not known, but it is presumed to be between 50 to 60. In the last twenty years, RCNP has lost 10 tigers. Previously it was very common to see a tiger while on an elephant safari, but now it is rarely seen. Mishra (1982) reported that the resident tiger population was 5 adult males and 16 females, an average density of one tiger hold per 43 km². The tiger's prey species in the park include: chital, sambar, hog deer, wild boar and baby rhinos.

Gharial: Crocodiles are another endangered species worldwide. Out of about 500 wild adult crocodiles in the world, the Narayani river has the greatest concentration. It was once estimated that there were 100 to 150 gharial and about 50 to 70 mugger crocodiles (short snout) there. To conserve gharials and muggers, a crocodile breeding center has been established by the DNPWR in Royal Chitwan National Park. The first batch of 50 crocodiles were released in 1981 in the Narayani river. Since then,

435 crocodiles have been introduced into the Narayani, Gandaki, Rapti, Karnali and Koshi rivers.

Rivers

Three rivers, the Narayani, Rapti and Reu, form the northern and southern boundaries of the park. These rivers sometimes change their courses and create problems for nearby populations by submerging their lands and eroding fertile soil. Outside the park people complain that the Narayani and Rapti rivers have engulfed their agricultural lands. A flood in July, 1993, badly disrupted tourism to RCNP. The only road to Sauraha sustained severe damage and vehicle movement was impossible until it was repaired. Seventy percent of the hotels and lodges in Sauraha experienced serious loss and/or damage to their structures as a result of the flood. The National Park area was inundated and the wildlife had to move to safer areas. One rhino was swept away by the flood 1.5 km down the Rapti river and another was trapped in the marshy land

formed by the flash floods, and were saved by the Royal Army and RCNP authorities. The river diversion project was launched in this valley, but it had unacceptable environmental impacts on the RCNP. Even the economic benefits expected to be derived from the project were questionable (Ishwaran, 1992). The river diversion project was subsequently abandoned and the conservation of biodiversity in one of the world's most important sites was ensured through international cooperation.

Socio-Economic Conditions

The Royal Chitwan National Park is one of the most popular parks for visitors. There has been a continuous increase in the number of tourists visiting RCNP. In 1974, 236 tourists visited RCNP, whereas this number reached 55,335 in 1992.

From the economic point of view, RCNP is in a good position. Park revenues from August 1992 to July 1993 came up to Rs. 27,152,144 (US\$1=NRs.50). Sixty percent of the revenue came from entry fees, 11% from royalties from the hotels, 15-18% from elephant rides, 2% from grass cutting permits, and 3% from penalty charges for offenses committed in the park.

Besides the impacts of tourists on the park, about 20,000 local people live in the park, another 58,000 live outside the park, and about 200,000 people live in areas surrounding the park. These populations exert pressure directly or indirectly on the park resources. The park has one army battalion with 800-1,000 people for protection purposes.

RCNP allows the neighbouring population to cut thatch grass and charges a fee of only Rs.10 per person. In the last year, over 60,000 people utilized this facility. Some of the grass cutters misuse this provision and steal fuelwood and small animals. Their free movement in the park creates problems for the authorities. Local people also complain about misbehaviour by the army and park authorities.

There are six hotels in the park, each occupying 5 bighas (1 bigha = 0.7 ha. approx.) of

land. In addition, there are three tented camps, each occupying an additional 2 bighas of land in the park. These hotels own about 30 vehicles moving in and out of the park. The park has 200 km of rough road, out of which 100 km are available for vehicular movement.

There are three important religious sites in the park. These are: Vikram Baba at Kasara, Godhak Nath at Maadi, and Valmiki Asharam at Triveni. Every year thousands of pilgrims visit these places. The neighbouring population also uses these places for picnics.

Park Periphery

Over one hundred hotels and guest houses are centered in Sauraha near the RCNP boundary. Most of the hotel owners immigrated from the midhill areas in the last ten years. These hotels and the neighbouring population indirectly depend on park resources. These hotels give employment to over 1,000 people, but most of the hotel workers earn a poor salary, sometimes as low as 200 to 400 rupees (US\$4 to 8) per month. Tharus, the local ethnic people, are in the process of shifting elsewhere. Land prices in Sauraha have increased sharply but the economy of the local people has not significantly improved. All the benefits have been gone to the businessmen. Tourism has influenced the lifestyle of young Tharus. Some of them are involved in "Tharu dance shows" in different hotels.

The habitat around the park is under heavy population pressure and the landscape has been largely altered. National forests have almost disappeared around the park except for Tikauli. This forest too is under serious threat. A Community Forestry Program has been launched by the Department of Forests and supported by RCNP. In the beginning the villagers did not appreciate this program, but in time they learned to do so. Bagmara community forestry is one of the successful programs in this area.

Bis Hezari tal near Tikauli was supposed to be a very good sanctuary for migratory birds and had some crocodiles. In 1979, the then government

allowed the lake to dry up and the fishes extracted. This had a devastating effect on the lake ecosystem and its surroundings.

Park wildlife threaten the crops and cattle of the surrounding population. There is no way to control damage by these wild animals. In this matter the local population is unhappy with the park, as there is no provision of compensation or any benefits from the park. HMG has recognized this problem and made a fourth amendment to the Wildlife Protection Act (1992). According to this amendment, 50% of the park income will go for development of the neighbouring population. This provision is aimed with the hope of local people's participation in the park conservation process.

References

- Bhattarai, K. 1988. A comparative study on habitat ecology of cavity nesting birds in Isle (disturbed) and Icharni (protected) along riverside forest of Royal Chitwan National Park. M.Sc. dissertation, Dept. of Zoology, T.U. Kathmandu.
- Bolton, M. 1975. Royal Chitwan National Park Management Plan (1975-1979). Project working document No.2. National Park and Wildlife Conservation Project Kathmandu.
- Caouette, L. 1993. UNEP fights rhino horn trade. *Our Planet*, 5(1):4-8.
- Evans, M. 1985. An ecological survey of the Narayani river within Royal Chitwan National Park. A study of the fish distribution and their predators, in particular the smooth Indian otter (*Lutra perspicillata*).
- Ishwaran, N. 1992. Biodiversity, protected areas and sustainable development. *Nature and Resources*, 28:18-25.
- Laurie, A. 1978. Ecology and behaviour of greater one-horned rhinoceros (*Rhinoceros unicornis*). Ph.D. thesis, University of Cambridge, U.K.
- Lehmkuhl, J.F., Upreti, R. and U.R. Sharma. 1988. National parks and local development in Royal Chitwan National Park. *Nepal Environmental Conservation*, Vol.15.
- Maskey, Y.M. and H.R. Mishra. 1982. Conservation of Gharial in Nepal. *Wild is beautiful*, ed. T.C. Majupuria. pp. 185-196.
- Mcgladdery, S. 1980. A survey of fish in rivers and lakes of Chitwan National Park. Report of Aberdeen University, Expedition to Nepal.
- Milton, J.P. and G.A. Binney. 1980. Ecological planning in the Nepalese Terai: A report on resolving resources conflicts between wildlife conservation and agricultural land use in Padampur Panchayat threshold. International Centre for Environmental Renewal, Washington, D.C., USA.
- Mishra, H.R. and M. Jafferries. 1991. Royal Chitwan National Park Wildlife Heritage of Nepal. David Bateman, New Zealand.
- Seidensticker, J.C. 1976. Ungulate population in Chitwan Valley, Nepal. *Biological Conservation*, 10:183-210.
- Sharma, U.R. 1987. A study of park people interaction in RCNP. Report submitted to World Wildlife Fund, USA.
- Singh, R. 1993. Vegetation Ecology at RCNP. (M.Sc. thesis work in progress).
- Smith, J.L.D. 1984. Dispersal, communications and conservation strategies for the tiger (*Panthera tigris*) in Royal Chitwan National Park. Ph.D. thesis, University of Minnesota, St. Paul, USA.
- Sunquist, M.E. 1979. The movement and activities of tiger (*Panthera tigris*) in Royal Chitwan National Park. Ph.D.

thesis, University of Minnesota, St. Paul, USA.

Wildlife Conservation Office, Kathmandu.

Tamang, K.M. 1979. **The population characteristics of the tiger and its prey.** Ph.D. thesis, Michigan State University. East Lansing, USA.

Willian, R.G.M. 1985. **The Chitwan Wildlife Sanctuary in Nepal.** IUCN Bulletin No.8. Switzerland.

Torth, R.C. and D.H. Nicholson. 1977. **Artificial key to the common shrubs of the riverside forests.** Royal Chitwan National Park.

Xenthalis, L.D. 1992. **Chitwan, Sauraha and Tourism.** University of Wisconsin, USA.

Upreti, B.N. 1973. **Report on the Royal Chitwan National Park.** National Parks and

Yonjon, P. 199. Letter to the Minister for Forest.

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PROTECTED AREA COVERAGE OF MANGROVE IN THAILAND

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Introduction

Mangrove forest involves two different concepts. Firstly, the term refers to an ecological group of evergreen plants species belonging to several families, but possessing marked similarity in their physiological and structural adaptations to similar habitats. Secondly, it implies a complex of plant communities fringing sheltered tropical shores. They are usually salt-tolerant ecosystems, straddling marine and terrestrial environments.

The area of mangrove habitat in Thailand in 1961 was 3,679 km² (2,299,375 rai) (Klamkamsorn et al, 1981). By 1989 it had decreased to 1,805.6 km² (1,128,494 rai), 49.08% of the former total. The dramatic decrease in mangrove habitat in the

country has been attributed mainly to conversion to shrimp farm aquaculture, partly in response to the government's promotion of the black tiger prawn *Penaeus monodon*.

Species Diversity in Mangrove

Flora: Santisuk (1983) reported that Thailand's mangrove trees and shrubs belong to 35 families, 53 genera and 74 species, of which 37 species are entirely dependent upon salt or brackish water (true mangrove species); the remaining trees and shrubs species belong to the littoral vegetation which are regularly found in the back mangroves (mangrove association). Aksornkoae (1989) lists 18 epiphytes, including 14 species of Orchidaceae, found in