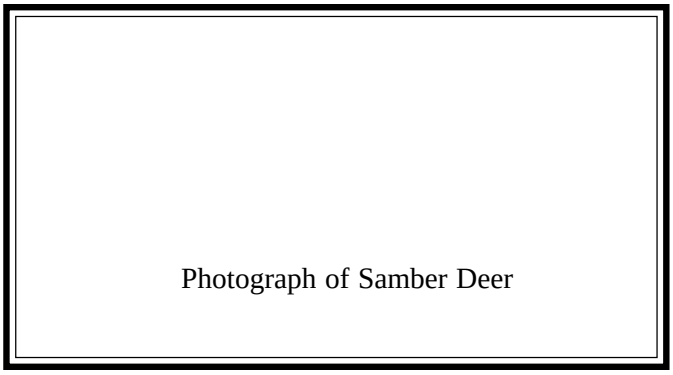
Participatory Biodiversity Conservation in the South Asia Region

Proceedings of Regional Networking Seminar
and
Second General Assembly

10 - 11 February 2001, Kathmandu, Nepal



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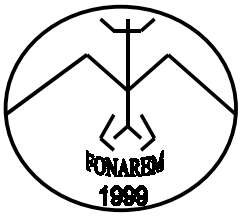

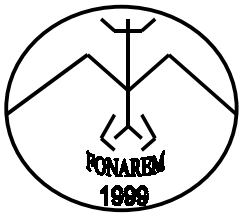

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May 2001

Mohan K. BALLA, Santosh RAYAMAJHI and Narendra M. B. PRADHAN (eds.). 2001. Participatory Biodiversity Conservation (Proceedings of Regional Networking Seminar and Second General Assembly). Kathmandu, Nepal, 10 - 11 February 2001. FONAREM, Kathmandu, Nepal.

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Design and page-layout:
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Cover photograph: A Sambar deer (*Cervus unicolor*) in the Royal Chitwan National Park.
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Rhinoceros Conservation in Nepal

Narendra M. B. Pradhan[1]

Abstract: The rhinoceros population estimated at about 1000 individuals until 1950 in Chitwan dropped down to less than 100 during the late 1960s due to several reasons. The rhino conservation was started in 1961 with the establishment of the Rhino Patrol Guard in Nepal. The establishment of the Royal Chitwan National Park (RCNP) in 1973 and subsequent measures to protect the rhinos from poachers resulted in a gradual increase of its population. As its population increased in RCNP, a founder population of 13 rhinos was translocated to Royal Bardia National Park in 1986 followed by 25 in 1991 and 14 in 1999 to boost this sub-population. The rhino census in 2000 showed 536 and 67 individuals in Chitwan and Bardia respectively. For the long term viability and conservation of rhinos, management, rehabilitation and protection of their habitats, translocation to potential sites, strengthening anti-poaching capability, ex-situ conservation, eco-development through buffer zone management, extension and conservation education, etc. have been suggested.

1. Introduction

The greater one-horned rhinoceros, *Rhinoceros unicornis* (family Rhinocerotidae) is one of five living species of rhinoceros in the world. They were once commonly ranging throughout the northern floodplain and nearby foothills of the Indian subcontinent between Indo-Burmese border in the east and in Sindhu river basin, Pakistan in the west. Destruction of apropos habitats and uncontrolled poaching has restricted these animals to a few isolated pockets of protected forests in Nepal and India. Two rhinoceros recorded until early 1990s in Indo-Pakistan border are reported to have been extinct. Despite joint efforts of Bhutan and India, survival of a small population of rhinoceros living along Indo-Bhutan border in Manas still remains questionable. Today, only about 2200 rhinoceros survive in the wild, of which 1500 are restricted in Kaziranga, Assam, India.

The massive reduction of the rhinos has been primarily due to disappearance of most of the alluvial plain grasslands that are the most suitable for rice cultivation and due to massive poaching for their horns. In Nepal by 1970s, rhinos were confined to the Royal Chitwan National Park (RCNP) only. His Majesty's Government of Nepal's (HMG/N) efforts of conserving this animal through the establishment of RCNP, implementation of buffer zone management and translocation of rhinos have contributed to the remarkable increase in number and protection from any natural and other disasters by developing a second viable home, Royal Bardia National Park (RBNP). At present, these two protected areas in the country contain the total population of rhinos. Furthermore, the small patches of alluvial plains in these protected areas face the danger that could change the course of vegetational succession to a climax condition unsuitable for species like rhino. Therefore, the long term future of the rhinos in Nepal lies within protected areas but these areas are increasingly interrupted by human activities and development programmes.

2. Historical background and status of rhino population in Nepal

In Nepal, rhinoceros population was estimated at about 1000 animals until 1950 in Chitwan Valley. The valley was well protected by the then ruling Rana regime for their hunting purposes. The area was also protected from outsiders due to the fear of malaria prevalent in the valley. Only few communities of indigenous Tharus known to be immune to malaria were residing in the valley. Their impact on valley's natural resources was minimal.

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In Nepal, malaria was eradicated during mid 1950s, which opened up the valley for outsiders. Above 100,000 people, attracted by highly fertile land, moved from mid hills and cleared large tracts of forest lands for settlement and agricultural expansion. This not only destroyed natural forest areas but also greatly affected wildlife population, as illegal killing of wild animals was also conspicuous as early as mid 1950s. Poaching of animals mainly affected large mammals including rhinoceros. As a result, rhinoceros population dropped down to less than 100 individuals during the late1960s (Adhikari *et al.*, 1999)

Realizing the rapid decline in its population, HMG/N declared remaining prime rhino habitats of about 544 km^2 along Rapti, Narayani and Rew rivers as RCNP. The park was later extended to encompass a total area of 932 km^2. After a successful effort of the Department of National Parks and Wildlife Conservation (DNPWC), disappearing population of rhinoceros started to increase gradually. Investigations revealed that the population had increased to 270 - 310 individuals by 1975 with 73 (32.3%) adult females, 45 (19.9%) adult males, 48 (21.2%) sub-adults and 60 (26.6%) calves (Laurie, 1987). By 1988, the park was supporting a viable population of 358 rhinos (Dinerstein and Price, 1991).

The increase in the number of rhinos since the late 1960s demonstrate that population can rebound vigorously when sufficient habitat and protection are provided. Chitwan rhinos provide an example of a population that almost was extinct but still carrying a high genetic diversity. The high heterozygosity was a consequence of the large population size prior to 1950 and a long generation time on an average. The present rhinos have retained 90% heterozygosity of the original population going back to 1400 A.D. despite the accelerating rate of extinction.

2.1. Population census

In 1994, the DNPWC in collaboration with the Resources Nepal and King Mahendra Trust for Nature Conservation (KMTNC) launched a Count Rhino Program in Chitwan and estimated a maximum population size of 466 individuals with 250 adults, 100 sub-adults, 2 unknowns and 114 youngs in and around RCNP (Yonzon, 1994).

It is customary to know the status of this mega-herbivore population for the management purpose as well as scientific point of view in an interval of five years. Looking at the present situation, its population in Chitwan seems to have been increased as noticeable numbers of animals are being observed straying outside the park boundary.

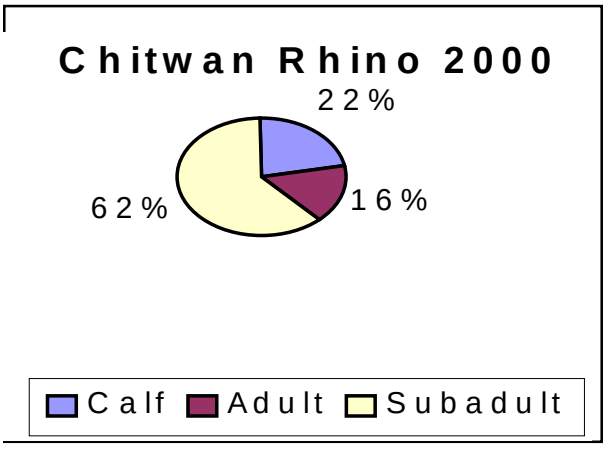
In 2000, the DNPWC in collaboration with KMTNC and the World Wildlife Fund (WWF) Nepal counted a total of 544 rhinos in and around RCNP and RBNP (DNPWC, 2000). Among the direct counted 536 individuals in Chitwan, 332 were adults, 87 sub-adults and 117 calves were identified (Figure 1). Likewise in Bardia, a total of 67 rhinos were counted with 38 adults, 20 sub-adults and 9 calves. The number of adults, sub-adults and calves of rhinoceros by sex in RCNP and RBNP is presented in Table 1.

It was found that the number of rhinos in RCNP has increased by 104 since 1994 (taking the minimum number of 446 according to 1994 census) with an annual increment of 3.88 %. Fourteen rhinos recently translocated as well as eight dead rhinos in 2000 have not been included in this census. The census number is encouraging in the sense that since 1995 nearly 99 rhinos were recorded dead in Chitwan area due to various causes.

Increased numbers of rhinos are apparent within blocks of the suitable rhino habitat in Chitwan. Rhinos occurred in highest densities along the flood plain grasslands and reverine forests bordering the Rapti, Narayani, Reu and Dhungre rivers, suggesting reverine grasslands as the single most critical habitat dominated by 4 - 6 m tall *Saccharum spontaneum*.

2.2. Reintroduction of rhinoceros

As rhinoceros population increased in RCNP, a few animals residing along the park border entered into nearby agricultural fields to raid crops during nights and a few incidents of local harassment



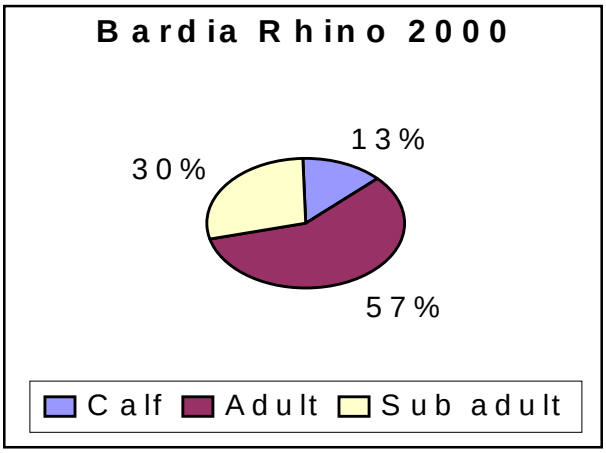


Figure 1. Rhino distribution in RCNP and RBNP

were reported from the area. These created conflicts between the local communities and RCNP staffs involved in conservation of newly revived rhinoceros population in Chitwan.

A founder population of 13 rhinos was translocated from RCNP and reintroduced in RBNP in 1986. Most of the translocated females conceived shortly after they were released indicating their acceptance of the new habitat. In 1991, 25 more rhinos were translocated to the Babai valley, northeastern part of RBNP in an effort to boost this sub population and further safeguard the species against natural calamities such as disease, flooding, etc. Its population in RBNP has since increased to 45 individuals by 1995, but population density in RBNP is still low (0.3 animals/km^2) compared to that of RCNP (8 - 10 animals/km^2), and the translocation of rhinos to RBNP should bolster a more viable rhino population (Jnawali, 1995). Furthermore, to strengthen its population in RBNP and as per the recommendation made by the Asian Rhino Specialists Group meeting in 1999, HMG/N has translocated 14 more rhinos to RBNP (4 in 1999 and 10 in 2000). In addition, Nepal also provided four Chitwan rhinos to Dudhwa National Park in 1984.

2.3. Rhino mortality in Chitwan

With the establishment of the national park and the introduction of the Army personnel in the park protection system, poaching decreased for a couple of years. From 1976 to 1983, poaching was stopped in the park. Since 1984, poachers

Table 1. Number of rhinoceros by sex and age group in RCNP and RBNP

Age Group	Sex*			Total
	Male	Female	Unidentified	
Royal Chitwan National Park				
Adults	41% (135)	56% (187)	3% (10)	332
Sub-adults	39% (34)	52% (45)	9% (8)	87
Calves	49% (57)	29% (34)	22% (26)	117
Royal Bardia National Park				
Adults	34% (13)	58% (22)	8% (3)	38
Sub-adults	30% (6)	40% (8)	30% (6)	20
Calves	10% (1)	45% (4)	45% (4)	9

Note: * Number in parentheses indicates the number of individuals.

re-started poaching, as they became familiar with the patrolling system of the Army and the park staffs. Twenty rhinos were killed between 1984 to 1991 and 18 in 1992 in the Chitwan valley. A quick decision was made to form an Anti-poaching Unit (APU) to control the situation. The anti-poaching measure did work and minimized the poaching and was virtually stopped by 1995.

However from 1996, poaching was started again in the Valley because of the political instability, slackness of APU, replacement or transfer of experienced APU staffs and the merging of Gaida Gasti with the Forest Guard. In 1990, the political situation of the country was changed that affected the government mechanism and most of the experienced staffs were transferred. As a result, APU activities became slack. In the year 1996 and 1997, altogether 12 rhinos died in Chitwan valley, out of this only one was poached. Since 1998, the situation of APUs became worst. From January 1998 to 15 August 2000 altogether 86 rhinos died, out of which, 24 rhinos were killed by poachers using different methods. It shows that from 1996 onwards, 25.5 percent of rhino deaths was due to poaching in the Chitwan valley (Table 2).

3. Crisis and measure for conservation

The strategy of rhino conservation in Nepal is to ensure long term viability of the rhinos throughout their range, while minimizing conflicts with the people. It will not be possible to save Nepal's each and every rhino by providing physical protection, but losses can be kept to a minimum if economic development plans take into account the needs of threatened wildlife species, and planning for conservation takes into consideration the needs of local people.

3.1. Habitat improvement

Considering the rate of increase in rhino population in RCNP, it is apparent that its population is likely to increase with the availability of suitable habitats and protection. At the present population growth rate of 3.8 %, the carrying capacity of the Park for rhino is likely to be exceeded in the near future. This may lead to various environmental catastrophes resulting into decline in population and genetic viability. To avoid such an instance, it is necessary to improve the quality of existing habitats so that it can sustain a viable population to its full capacity. Habitat improvement through weed elimination and plantation with indigenous grass species such as *Saccharum spontaneum* preferred by rhinos should be done. Flood plain grasslands and riverine forests bordering the Rapti, Narayani, Reu, Dhungre, and Icharni rivers contain the highest densities of rhinos in Chitwan. Several prime rhino habitats in the park are taken over by unpalatable grass species and weeds (e.g. *Pogostemon* sps, *Eupatorium* sps. etc.), and tree species such as Simal (*Bombax ceiba),* Sissoo (*Dalbergia Sissoo),* Khair (*Acacia catechu),* etc. subsequently making them less suitable for rhinos.

Wetland is very important for rhino to avoid heat stress and meeting nutritional requirements. Maintenance of open water is equally important in maintaining the rhino habitat as the flood plain grasslands.

3.2. Rehabilitation of rhino habitat

Rehabilitation of Padampur village elsewhere and development of a habitat suitable to rhinos in that area is likely to sustain its increasing population in RCNP. Development of rhino habitat in Padampur area, once it is rehabilitated, however, needs a

Table 2. Year- wise rhino mortality in Chitwan valley

Year	Killed by poachers	Natural deaths	Total
May 1996 to the end	-	6	6
1997	1	5	6
1998	4	24	28
1999	9	21	30
Till July 2000	11	17	28
Total	25	73	98

study to be conducted to explore the possibility of creating a suitable habitat. All grasslands may not necessarily be suitable for rhinos and therefore, certain manipulations may be required in order to make a habitat suitable for rhinos. A rhino habitat can be developed in the areas by encouraging the growth of preferred grass species such as *Saccharum spontaneum* and others. Plantation of this species can also be done if it fails to grow in the area.

Rhinos also inhabit forest areas outside RCNP particularly, in the Tikauli forest. This forest area also needs to be managed and protected for the rhino conservation. It is preferable that this forest area is included in the park rather than just making it as a buffer zone.

3.3. Translocation/Reintroduction

Fifty- eight rhinos were translocated from RCNP to RBNP in the years 1986, 1991, 1999 and 2000. Considering the historical range of rhinos (all throughout the Gangetic plain), possibility of translocating some individuals to other protected areas needs to be explored. However, there are only two protected areas namely, RBNP and Royal Suklaphanta Wildlife Reserve that can sustain the reintroduced rhino population. Some more rhinos should be added in Bardia to create a viable sub-population of at least 100 individuals. Moreover, Royal Suklaphanta Wildlife Reserve will be the potential site for reintroduction of the third sub-population in Nepal.

3.4. Strengthening anti-poaching capability

At the beginning of the establishment of RCNP, in addition to the Rhino Patrol Guard, which was primarily responsible to control poaching outside the Park, an APU was established in cooperation with Flora and Fauna Preservation Society to curb escalating rhino poaching. The escalation in poaching is attributed to the recent surge in the smuggling of rhino horns out of the country into the Southeast Asian markets.

Considering such a spurting poaching activity, APU has been constituted once again with the support from WWF and the International Trust for Nature Conservation. The strategy of APU is to work in close collaboration with the local people who work as secret informants to the park management in order to apprehend the poachers. Efficiency of the unit is however, restricted due to the inadequacy of equipment such as vehicles, portable communication equipment, and necessary fire- arms. The rhino poaching is likely to be controlled by strengthening APU by allocation of adequate staffs, funds, and equipment.

The park awards the village informants up to the amount of Rs. 50,000 and the penalties for poaching rhinos can be a 5 to 15 years of imprisonment with a fine of Rs. 50,000 to 1,00,000. Despite such severe penalties and efforts, occasional poachings are still reported. This indicates that stringent law alone is not sufficient in curbing the poaching of endangered wildlife species. Cooperation of local people living adjacent to the protected areas is the key to achieving success in such issues. However, cooperation from the local people can be expected only when they get some direct benefits from the protection of wildlife species. The recent amendment of Buffer Zone Act to channel 30 to 50% of the Park revenue for the local development may develop some positive attitudes in the local community.

3.5. Regional and international collaboration

The increasing number of rhinos in Nepal is the indication of HMG/N's commitment and the effective program implemented by DNPWC. However, lack of financial resources is a great hindrance to implement effective conservation programmes for the future. Besides, the demand for rhino horns in the international markets posses great threats to the survival of these animals in the wild. Therefore, regional and international collaborations are essential for their effective conservation.

3.6. Ex-situ conservation

Rhinos have always been in high demand in zoological gardens of several countries. A number of rhinos were provided to various agencies in the past. The results from Count Rhino 2000 reveal that its population is increasing in RCNP. In such

circumstances, providing a few individuals to different zoological parks, strictly for ex-situ conservation purposes is unlikely to have negative impact on the source population.

3.7. Research

To transpire a scientific basis for conservation and management of rhinoceros, a strong collaboration should be made with different national and international universities, research stations and foundations. It has been proved that the species survival plan (SSP) population of rhinoceros is doing very well with an increase of about 4% annually, which is almost close to the population growth rate in RCNP. However, there is a question on genetic foundation of captive population. Thus, collaboration with such institutions which have already worked on this animal will help maintain genetic diversity in the captive population.

Long term research and monitoring programmes should be initiated to assess their numbers, population trend, ecological requirements, carrying capacity, and people/rhino conflicts (DNPWC, 1993). Rhino census similar to Count Rhino 2000 is suggested every five years to assess the population trend and status. Besides, yearly monitoring of the rhinoceros is essential to evaluate the effectiveness of conservation efforts implemented by DNPWC.

3.8. Conservation education

Conservation awareness programs need to be actively launched in the area in cooperation with the local NGOs and institutions and various other relevant organizations. Conservation education through radio, TV, audio-visual arrangements at the local level, posters, papers, billboards, visitor centre, etc. needs to be activated. Convention on International Trade of Endangered Species (CITES) status of rhino, fines and punishments, rewards to the informers, and other relevant information should be furnished simultaneously to the local people.

3.9. Eco development through buffer zone management

Cooperation from the local people can be realized only when they see the direct benefit from the existence of the park and protection of wildlife. Most of the local people in the surrounding areas are subsistence farmers. They can not think of conservation of wildlife if their life sustaining system is disrupted. At present, local people are realizing very little benefit directly from the tourism in parks. They should be trained in hotel/lodge management, tour operations, and nature guides so that they get the benefit from tourism. If this can happen, they will put all their efforts in sustaining the source of income i.e., the protection of wildlife.

Increase in living standard of the local people will lead to reduction in pressure in the parks from several means. For example, firewood consumption will be reduced, number of livestock will be reduced, and moreover, they will be conscious about nature conservation.

HMG/N has already implemented the buffer zone management programme in and around the protected areas. The programme should link eco-development with biodiversity conservation To increase the efficiency of the park personnel in the conservation of rhinos, specific training on habitat improvement, population monitoring, anti-poaching, conservation education and extension, orphan rearing, etc. are necessary.

4. Conclusion

The rhino conservation in Nepal was started in 1961 with the establishment of the Rhino Patrol Guard. RCNP was established in 1973 primarily, to protect the rhino population in Nepal. Until recently, this park was the last stronghold of rhinos in Nepal. With the adequate protection and conservation measures, the rhino population has rebounded to about 544 individuals in the park. Besides this park, some rhinos have been translocated to RBNP, which now supports a total of 67 rhinos. These parks are likely to loose their fame in the world if the rhino population dwindles. Habitat improvement and rehabilitation, conservation education campaign, strengthening APU, population monitoring, etc. are urgently needed to support the increasing rhino population. Strong conservation commitment (both political and technical) is required for the long-term survival of the rhinos in RCNP and RBNP.

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