

KAZIRANGA

THE RHINO LAND



C.P. Oberai

B.S. Bonal



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*The Royalty out of this book will go
to the Staff Welfare Society.*



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FOREWORD

The Great Indian One-horned Rhino is the pride of Assam. The gigantic Goliath is an integral part of our culture and social fabric, like *Bihu*, *Brahmaputra* and *Kamaksha*. Many songs and legends are woven around rhino and Kaziranga. This imposing animal is revered as the 'Bahan' or carriage of Lord Bishnu. Assam takes pride in having more than 65% of the world's total population of the Indian Rhino. We affectionately call it *Gorh*.

Kaziranga National Park—KNP, in upper Assam, is the prime habitat of this mega animal, and a prehistoric relic of ancient times. This protected area is also a symbol of effective protection given to this beautiful animal, whose population has risen from a meagre of 12 individuals during 1908, to more than 1,500 today. The total population of Great Indian One-horned Rhino in India and Nepal may now be about 2,500. This is a success story, which has very few parallels in the world. But we cannot remain complacent. Such phenomenal increase in rhino population has not come about by itself. The Government of Assam had initiated timely measures to conserve forests and protect rhino. Hard work, sweat and blood of several forest workers have gone into bringing this species to somewhat respectable status. Our brave forest and police officers, duly supported by nature loving people, have made great sacrifices to protect the rhino and its other wild associates. Salutations and *Namaskars* to such unsung heroes.

I am happy to learn that a comprehensive account on the observations of rhino and its wild habitat is prepared by Shri C.P. Oberai, Former Director General of Forests and Special Secretary, Ministry of Environment and Forests, Government of India, and Shri B.S. Bonal, IFS, who has served in the wild protected areas of Assam including KNP for several years. The book has been presented in a lucid, reader-friendly style. Various facets of rhino have been placed in the form of stories/travelogues. It is gratifying that the authors have decided to *contribute the entire royalty out of the book, for the welfare of the staff and personnel of Assam*, who made great sacrifices for the protection of rhino and its habitat.

Bhupen Hazarika
29/9/2007

Dr. BHUPEN HAZARIKA





Great Indian Rhino—worried about future.

When a man wants to murder a tiger, he calls it sport;
When a tiger wants to murder man, he calls it ferocity.

—George Bernard Shaw

M.S. SWAMINATHAN

Chairman

PREFACE

The role of biodiversity in maintaining the ecological security of the country and ameliorating the climate is globally realised. Species like rhino, elephant, tiger, lion deserve special focus in the conservation efforts as their population indicates the health of the eco-system. Only very rich and diverse forests can support a good population of these species.

The Great Indian One-horned Rhino, historically was found all along the *terai* forests in India and Nepal. Partly due to killing and capturing, and partly due to destruction of the habitat, the species survives now in only a few National parks and sanctuaries in India and Nepal. At one stage, the population of Indian Rhinos declined to the level of 10 to 12 animals only, in Assam. The Central Government and State Governments have been able to reverse the trend and rejuvenate the Rhino population in Assam and West Bengal. It has been possible only through the hard work done by committed and dedicated officers, who have not only protected the species in the existing habitat, but also have created additional home for the rhinos. Dudhwa National Park in Uttar Pradesh, through a planned re-introduction programme. The current population of the species in is around 1,750.

While we are proud of persons like Late Sanjay Debroy and Shri P. Lahan, for their invaluable contribution towards Rhino conservation, we must appreciate that the rhino populations are still threatened by the pressure from poaching mafias and significant number of rhinos have been lost to poaching in Orang National Park, Laokhowa Sanctuary and Manas. However, some encouraging reports are being received from Manas to the effect that rule of law is being established here with the help of local NGOs. I am sure that we will be able to turn the tide in favour of Rhinos with the support of masses. However, this requires an extensive education and awareness programme. The book, authored by Shri C.P. Oberai, Former Director General of Forests and Special Secretary, Ministry of Environment and Forests and Shri B.S. Bonal, IFS, would contribute significantly to achieve this objective. I wish them well.



M. S. Swaminathan

Dr. M.S. SWAMINATHAN



Gorh (Indian Rhino)—all powerful king of Kaziranga...

PROLOGUE

Our association with Kaziranga is spread over two decades. The protected area, nicely sited along the National Highway 37, is fascinating due to its rich bio-diversity, fairly plain lay of the land and above all, almost assured visibility of the wildlife. Tucked among the mighty Brahmaputra River on the north and Mori Disloo River to the south, the Park has been under pressure from the poachers, and gradual reduction of the habitat due to soil erosion, floods and degradation. In retrospect, the population of the Indian Rhino in Kaziranga had gone down to just about a dozen at the turn of the nineteenth century, due to hunting of the lovely, imposing animal for game by the royalties, aristocracy, Maharajas. Many animals were killed for horn due to fanciful ideas that the horn has certain magical and medicinal effects. The poachers even tore away its flesh, nails, tail and blood, again due to strange myths of curing some diseases and to ward off evil spirits. The prehistoric Goliath hid in some remote forests and somehow survived at very critical state. Events took a turn in favour of rhino and conservation of natural resources in 1908. Assam Government, local people, nature lovers took up rhino protection seriously. Indian Rhino population today in Kaziranga forests stands at 1500 plus. How did it all happen is heart rending, yet interesting.

Forest officials and workers, totally committed and dedicated to the cause of rhino conservation, have done commendable job, despite lack of proper infrastructure, modern firearms, and dependable communication and transport system. Many protection staff stay in temporary huts amidst crafty tigers, highly agile leopards, burly wild buffaloes, elephants and meek but unpredictable rhinos. Park management has somehow created crack teams to shoo away the poachers and even take on to them, if they sneak into the park. These 'kill or get killed' teams have had many encounters with the poachers and arrested them, with sizeable cache of firearms, ammunition and even rhino horns. Many of our brave staff have also died or were seriously injured during such encounters. A Memorial Park, recently constructed at Kohora in Kaziranga Park, is a humble tribute to the brave unsung heroes who have lost life for protection of rhino and to conserve its habitat. Assamese are simple, nature loving people and concerned about the conservation of rhino-the *Gorh*. This graceful and imposing animal is revered as the *Bahan*-carriage of Lord Vishnu. Many folklore and songs are woven about *Gorh*. Local people have rendered unflinching support to the cause of rhino conservation. Very useful assistance and timely help also came from a few non-governmental organisations and voluntary agencies.

International conservation community is equally concerned about Indian Rhino, the only Asian species having some population worth the name. The other two Asian species, the Javan rhino and the Sumatran rhinos' present status is highly critical. International Union for Conservation of Nature and Natural resources-IUCN and Species Survival Commission-SSC, are facilitating programmes for building up a sizeable population of the Indian rhino so as to have the population status of about 2,500 at

Kaziranga and an overall population of 5,000 rhinos in India and Nepal. Then only can we hope for survival of the species with fairly wide genetic base, provided the animal gets good habitat and food security.

Kaziranga is a success story with very few parallels in the world. Unique sacrifice made by the forest officials and the people need to be recognised. The unsung heroes well deserve pat on the back. Technical co-operation and assistance of *international forest community* deserve kudos. The book attempts to trace the story of Great Indian One-horned Rhino—*Rhinoceros unicornis* and recall the meritorious service rendered and sacrifice made by 'do or die' forest staff. It also discusses total commitment of the local people, role played by NGOs and international forest community, which have revived the Indian Rhino from the brink of near extinction. But can we replicate Kaziranga in other forests and protected areas to save the Pygmy hog, Hangul deer, Sangai, Bengal florican, Hispid hair, Spectacled leaf monkey, Snow leopard, Musk deer, Clouded leopard, Red Panda, Great Indian bustard from extinction? We have trust that strong political will, adequate conservation infrastructure and better nature awareness can infuse Kaziranga effect in other forests.



ACKNOWLEDGEMENTS

Conservation of Great Indian One-horned Rhinoceros, the flagship species of flood plains grassland ecology, is a success story, with a few parallels in the world. It is for brave and dedicated forest and police officials supported by locals, animal lovers and NGOs that rhino has staged a come back at Kaziranga almost from the brink of extinction. Many a life were lost in the process. These acts of sacrifice and selflessness have inspired us to attempt this book.

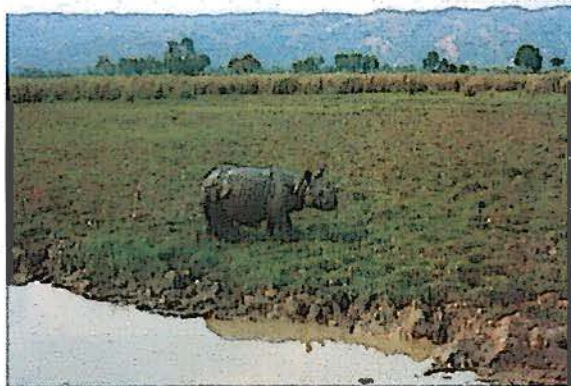
We have received willing help and inputs from the officers and staff of Assam forest department. Forest officers of West Bengal and Uttar Pradesh have promptly responded to our request for information and photographs. The officials of Central Zoo Authority, Sanjay Gandhi National Park, Patna and National Zoological Park, New Delhi have offered help on ex-situ conservation issues. Our senior colleagues in the Ministry, mainly S/Shri S.C. Sharma, P.R. Sinha, Assem Srivastava, Anmol Kumar, to name a few, have provided useful inputs and very pertinent suggestions. Sh. S.C. Dey, former Additional Inspector General of Forest, presently Secy. Genl., Global Tiger Forum, has given useful inputs as Vice-Chairman of IUCN/SSC, Asian Rhino Specialist Group. Several NGOs, Wildlife Institute of India, Dehradun, WWF-India, Traffic Network, Rhino Foundation and Aranyak have been helpful in many ways. Our sincere thanks to them all.

Dr. Bhupen Hazarika, Dadasaheb Phalke Award winner, has been very kind to agree to our request to foreword this book as the subject is so close to his heart. Dr. M.S. Swaminathan, the leading agriculture scientist, has written preface for the book. Our indebtedness to both of them.

We have borrowed a few photographs and maps from some publications listed in the bibliography. It is hoped that the earlier writers will appreciate such material being used for a book that is dedicated to the brave unsung heroes who have shed blood to save Indian Rhino from extinction.

We hope this attempt to document the revival of rhino at Kaziranga would enthuse joint action by the governments, NGOs, common public, youth and womenfolk to protect other vulnerable species of plants and animals that have reached the brink of extinction due to short sighted actions of human beings.

C.P. Oberai
B.S. Bonal



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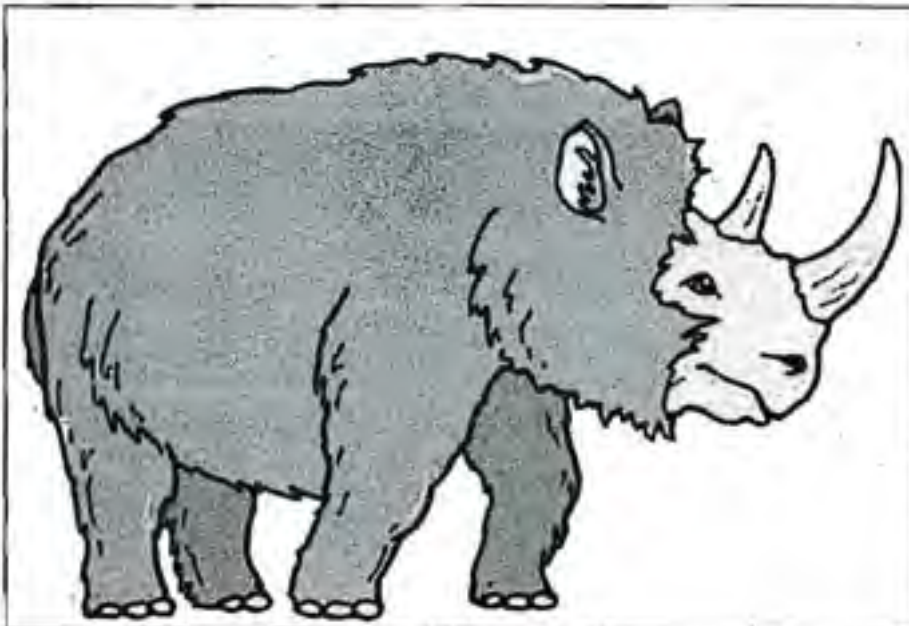
Great Indian One-horned Rhino has
its enemy on its nose—the horn



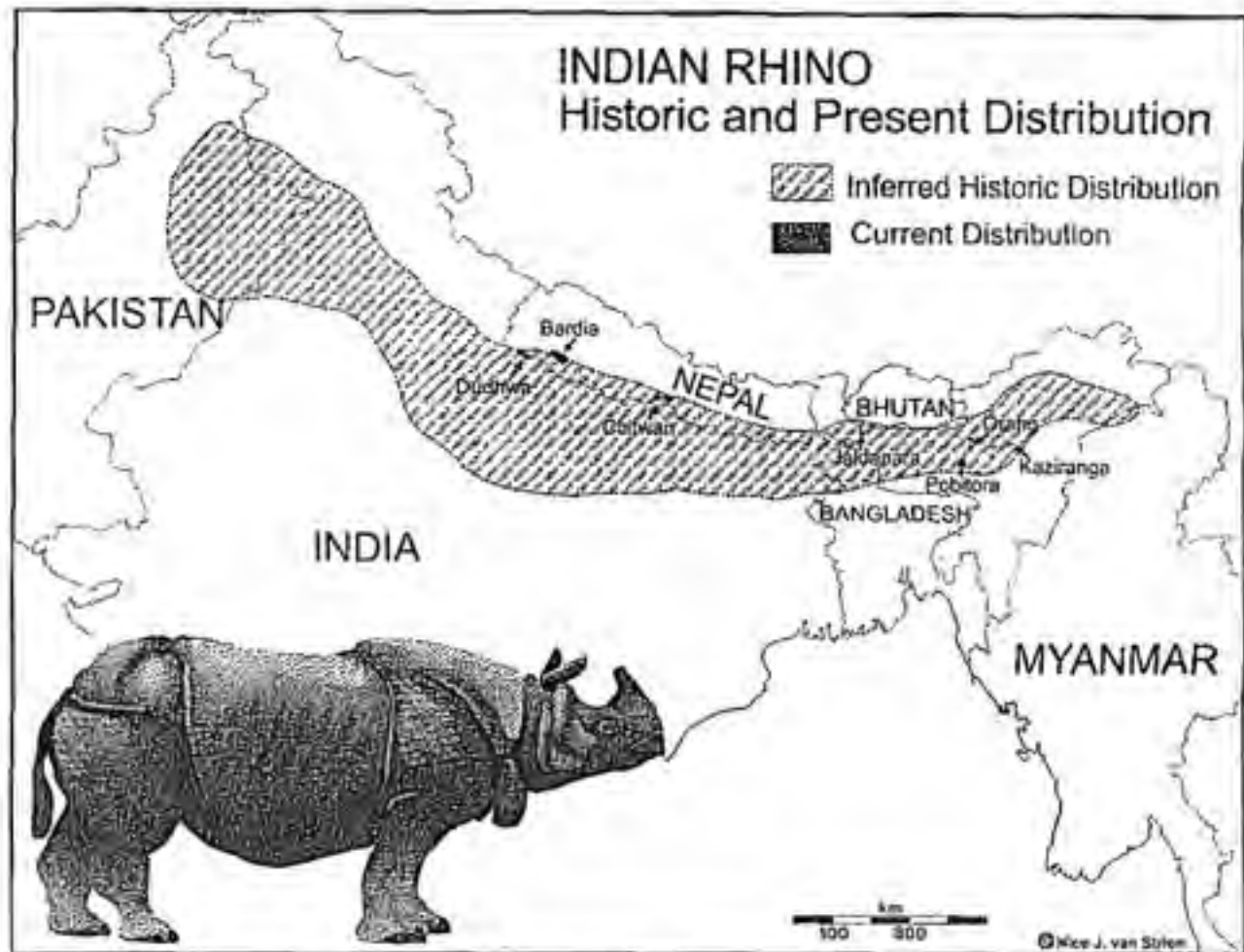
PRE-HISTORIC GOLIATH

I am going through the write up "The Vanishing Rhino of India" by Late M.D. Chaturvedi, the eminent forester and the first Indian, Inspector General of Forests. He traces the pre historic existence of the Great Indian One-horned Rhinoceros and its long association with Indian heritage and the only surviving link with its ancient past. The first look of the large animal gives impression of a veritable monster, which seems to have walked straight from the dinosaurian days. This prehistoric creature once reigned over the entire marshlands of the Indian sub continent, almost skirting the Himalayas, extending over 2,500 km., stretch. Arup Kumar Dutta, the famous writer and naturalist of Assam, in the treatise, *Unicornis*, marks the evolution of rhinoceros on the planet, earth. As per Dutta, the placental mammals first appeared on this planet sometimes during the Paleocene epoch. Consequently, many species of mammals were developed during the Eocene epoch (60-40 million years ago). Thus the family *Rhinocerotidae* existed some 50 million years ago. As per some scholars of natural history and archaeology, the distant predecessor of rhino has been the *Hydracodont*, which had long slender legs and three toes on each foot and typical mouth and jaw structure like rhino. During the Tertiary epoch, rhino was common in

North America. Another species, *Elasmotherium* existed which had a long horn between the eyes. In India, rhino was there sometime during the Eocene period, as comes out of the fossil studies. Many genera subsequently evolved and got extinct. Presently only five



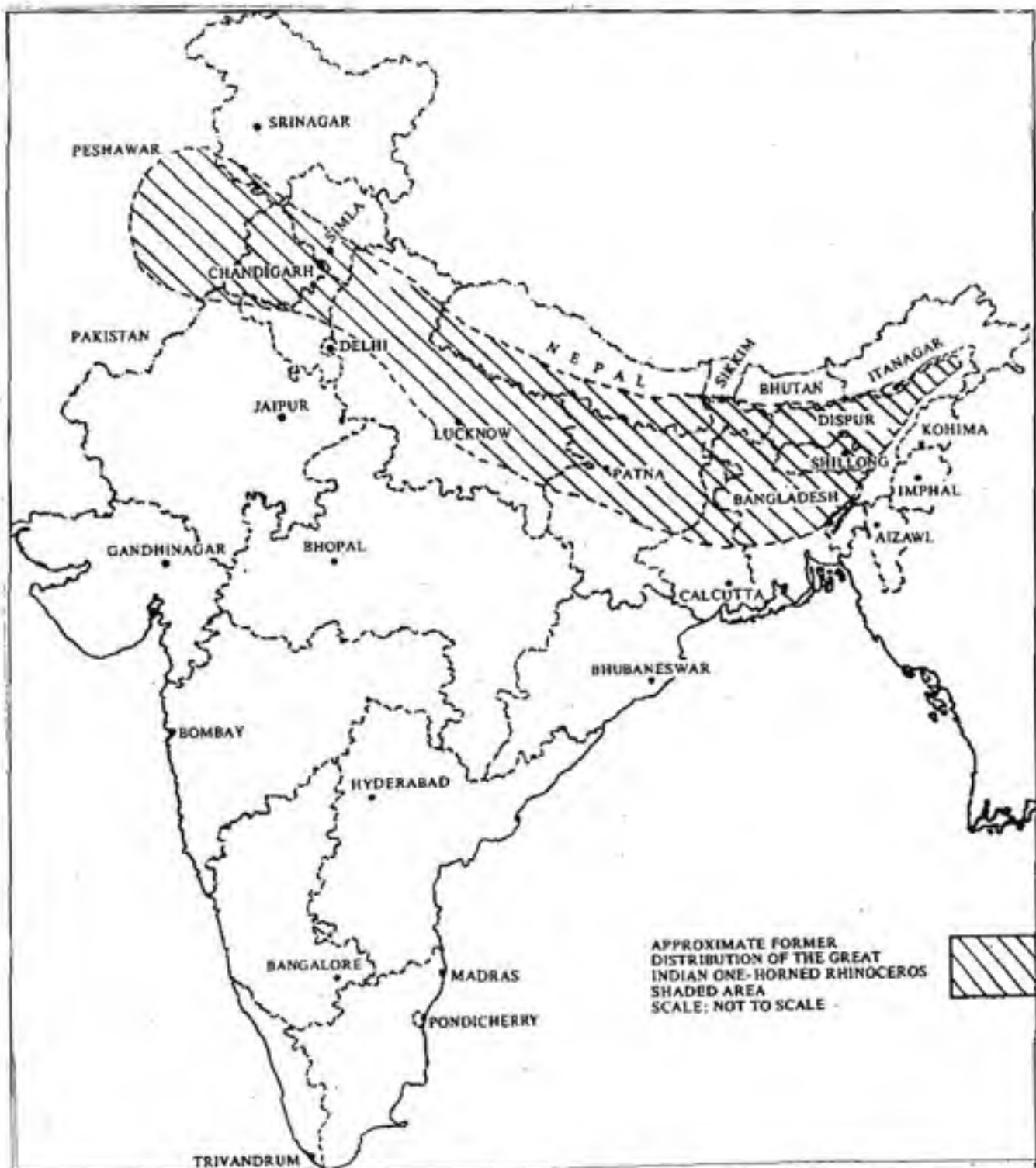
Gone Forever—The Woolly rhinoceros, literally armed to the teeth, was unable to make it through the crises of the ages.



species of the rhino, in four genera, exist on this planet. None of the species can be considered to have viable population as per the IUCN parameters. All existing species are Old World forms and call for concerted and sustained efforts for their biological future.

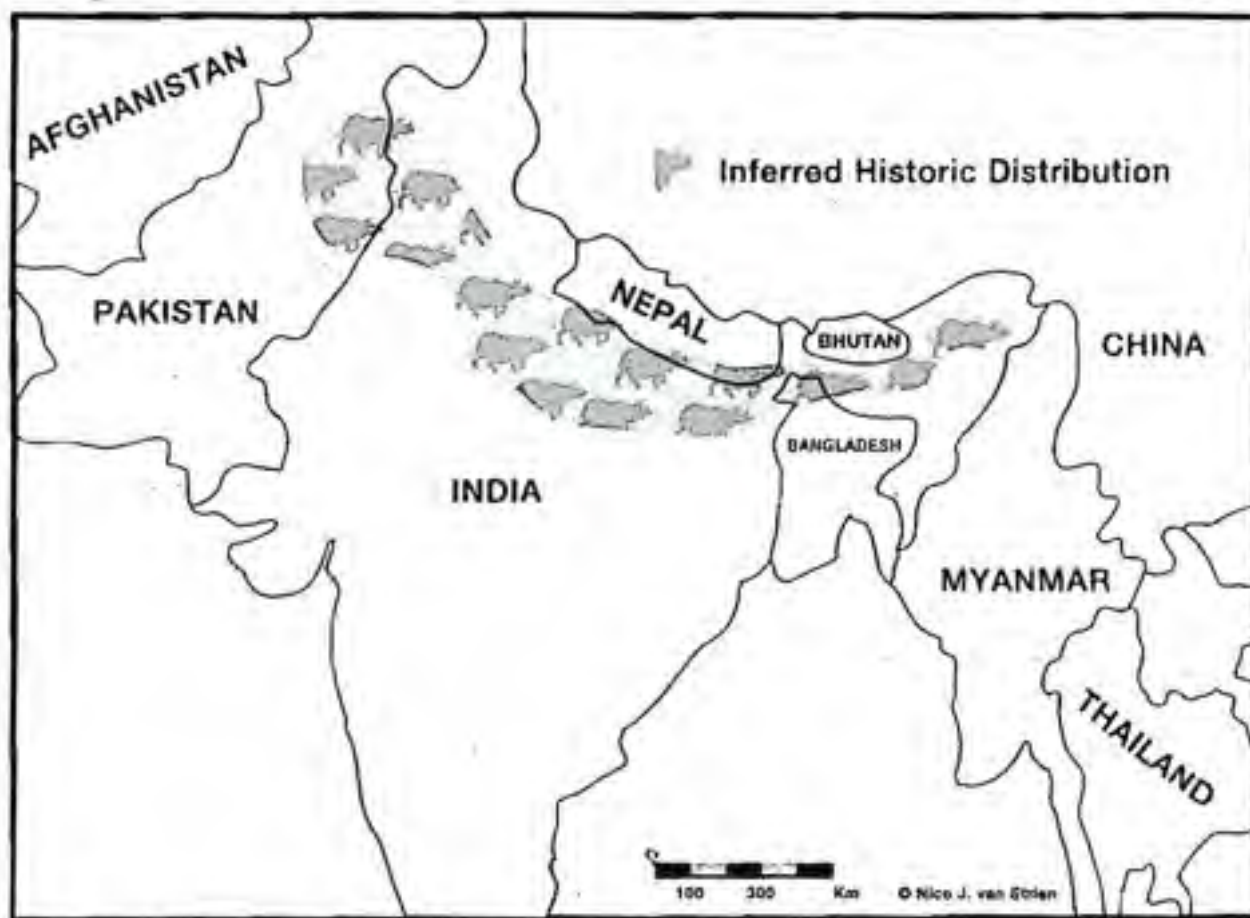
The African Black rhino, once reigned over large forest area from Cape to SW Angola and further to Somalia, Ethiopia, Sudan and even unto Volta and Ivory Coast. Even until early 20th century, there were a few thousand Black rhinos in Africa. Wanton killing for sport, horn, flesh, and bones led to its mass reduction in numbers. It is rather heart rending to note that in Assam, Col. Pollock, a Military Engineer, who was engaged in survey and laying of roads in the Brahmaputra valley, shot a rhino or a wild buffalo, almost every day for the breakfast. Another English planter fired 100 shots on rhinos in a single day, killing one animal and wounding 25 other rhinos. Even we Indians did not lag behind in persecution of the rhino. Maharaja Nripendra Narayan of Coochbehar in West Bengal, had shot 208 rhinos during his 33 years reign period (1874-1907). Persecution of the animal still continues in the wild. Its cousin, African White rhino, the smaller version, is delicately placed now in Zululand, and needs urgent conservation efforts. It is not *white* at all. Perhaps the word *white* is corrupted from *wide*, as this animal has a square wide jaw.

The Asiatic Two-horned rhino or Sumatran rhino reigned in Burma, Thailand, Cambodia, Laos, Vietnam, Sumatra and Sabah even upto 19th century. Today, the Sumatran rhino exists in small population pockets in Thailand, Malaya, Sumatra,



Hindukush to Eastern Himalayas—Earlier Rhino Territory.

and Sabah. The total number may not even reach three-digit figure. The Sumatran rhino holds special historical importance. It has hair on the body and forms a linkage between the Asiatic and the African cousins. The Lesser One-horned Rhino or the Javan rhino also roamed over large tracts of Bengal, Brahmaputra basin, Burma, Malaya and the Islands of Sumatra and Java. Today it is confined to a single population of 25-40 animals in Udjong-Kulon Reserve in the Island of Java. The Great Indian One horned rhino is now confined to some 1300 sq. km forest, mainly in North East India.



Glancing through the Oxford Anthology of Indian Wildlife, I read some of the letters on hunting and wildlife by Frank B. Simpson,⁴ which appeared in the Eastern Bengal journal. His is one of the few accounts of encounters with Javan rhino in Sunderbans. He reports of Indian rhino even near Purneah forests (Bihar). Occasionally, Javan rhino was reported and sometime shot near Chittogong and south of Tripura.

PRE-ARYAN

Rhino figures in many places in the excavations dating to pre-Aryan era. Unicornis enjoyed a place of pride as established by the *Mohanjodaro* and *Harappan* excavations of the period 2500-1500 BC. Many official seals and coins of this era depict rhino as the official insignia. Rhino was used as the symbol of power and might for a long time. The Lion appeared much later on official seals, sometime in 264 BC, during the reign of emperor Ashoka. The Fifth Pillar Edict of Ashoka also mentions of rhino. Among the fauna to be preserved are mentioned "bats, monkeys, rhinoceros, tree squirrel, barasinga stag, brahminy bulls and all four legged animals that are not utilised for eating."

Some fossil remains found at Gangasagar, Rajasthan Langhnaj and Kaneval lake, Gujarat, Mirzapur and Banda, Uttar Pradesh, and Chirand Bihar, establish the presence of gigantic Goliath. The vast number of seals of that period preserved in the National Museum, N. Delhi, depict the rhino, as logo of their might.

MEDIEVAL

Rhino continued to enjoy the place of pride for long till it attracted the attention of the Royalty and hunters who saw wild animals as *game*. Babur, the founder of Mughal



Mohenjodaro seal

Empire in India, was a keen game enthusiast. Rhino appears in *Baburnama*, (around 1525 AD), one of his hunting exploits in the Indus valley. Babur hunted rhino near Peshawar forests and later, in 1519 on the banks of river Ghaghra in Uttar Pradesh. This is how Babur describes Indian rhino:-

"The rhinoceros---- is a large animal equal in bulk to three buffaloes, ---- It is more ferocious than elephant, and more obedient and submissive. There are masses of rhinos in Peshawar and Hashanagar jungles, so too between the Sind and the jungles of Bhira colony. Masses are also there on the banks of the Saru river in Hindustan. Some were killed in Peshawar and

Hasnagar jungles in our war on Hindustan." Babur also hunted rhinoceros in Indus and records it as *Karg-Khana* or rhino-home. Al Baruni, famous historian and Persian scholar, writes "The *Gainda* exists in large numbers in India---- It is of the build of a buffalo, has a black scaly skin, and dew laps hanging down under the chin. It has three yellow toes on each foot, the biggest one forward, the others on both sides. The tail is not long, the eyes lie low further down the cheek than is the case with all other animals. On the top of the nose there is a single horn that is bent upwards---- I have myself witnessed how an elephant, coming across a young *gainda* was attacked by it. The *gainda* wounded with its horn a forefoot of the elephant and threw it down on its face." Ibn Batuta, the Arab traveller, records his 'sighting' rhino near the Indus river in 1314 AD "I saw a rhinoceros yet another time, when in the company of the king of India, we had entered a jungle of reeds. The Sultan was mounted on elephant with him. The foot soldiers and horsemen went in and beat it up and conveyed its head to the camp."

Abul Fazal, one of the courtiers of Akbar, makes many references to rhino. Jahangir, another sport loving Mughal King, makes references of hunting expeditions for rhino.



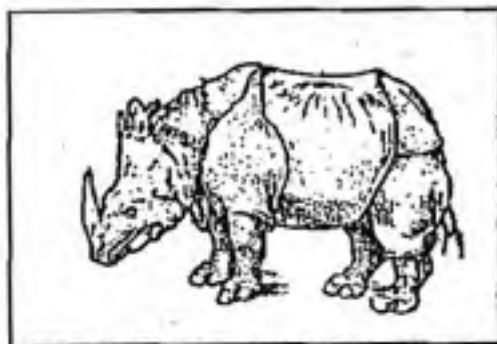
History also reveals that the King of Cambay (now in Gujarat) had presented a domesticated rhino to King Enamuel-I, of Portugal in 1513. Imagine the surprise for the members of the Royal palace at Lisbon, when they saw this household pet. The Portugal King decided to present the rhino further to Pope Leo-X. The burly beast was shipped again, but as luck would have it, the ship went into rough weathers and sank, so, the rhino met a watery funeral. Al Beruni, the famous historian, mentions of the animal that existed in large numbers in India, more particularly about the Ganges.

RECENT PAST

Even during the 19th century there were plenty of rhinos in the Indian-sub continent. The mega

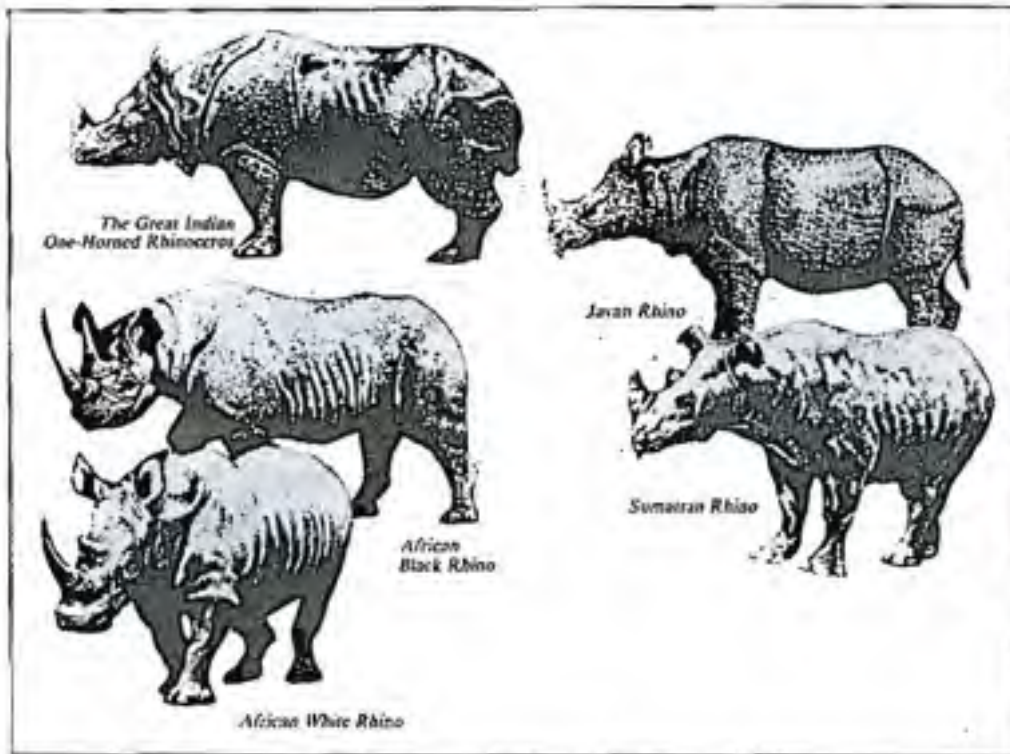
Ashtray made from the foot of a rhino.

mammal started bidding adieu at the turn of the twentieth century. As per some reports, less than a hundred rhinos were left by 1908 in India. The former range of the Indian Rhino was all along the Himalayas, mainly the *Terai* region and the valleys of Indus, Ganges and the Brahmaputra. Even till a few decades ago, rhino reigned over large forest tracts from Hindukush Ranges in the west to Myanmar in the east. With the advent of firearms and increasing, though misplaced, cult of sport and craze for rhino horn, and its parts, its territory has shrunk considerably. The pre-historic animal of mammoth proportions now remains confined to only some forest tracts of Assam, and West Bengal, in India. In the Himalayan Kingdom of Nepal, rhino is found at the Royal Chitwan National Park and Royal Bardia National Park. At Dudhwa in Uttar Pradesh, the rhino has been re-introduced in 1984. The *Terai* tract, which once formed the preferred habitat for the rhino, has become fragmented and degraded at most of the places. Corridors for seasonal migration of the large mammal are not available any more. As of now, the Great Indian One-horned Rhino has a tiny territory. Unless both India and Nepal launch sincere efforts for the protection and conservation of rhino habitat, it would be difficult to save this mega animal from extinction. Only strong political will, committed forest, police, customs staffs and well meaning non-governmental organisations and people can halt the relegation of this pre-historic monster to the pages of natural history.



A historical rhino sent by King of Cambay to King of Portugal in 1513 A.D., as sketched by the noted German artist Dürer

RHINO COUSINS



Rhino is a unique pre-historic animal, which binds us with our heritage. This gigantic *Goliath* has undergone the least morphological changes in the evolutionary history of the species over the Geolithic time scale. The history of rhino on the evolution ladder is very interesting. Many species of mammals were evolved during the

Eocene epoch, some 40 million years ago, which also included the family *Rhinocerotidae*. Some scholars of natural history, believe that the present rhino is the distant successor of *Hydrocodant*., which had long slender legs, three toes on each foot and typical mouth and jaw structure like rhino. During Tertiary period, another species *Elasmotherium* existed which carried a long horn between the two eyes. In India, rhino existed sometime in Eocene epoch, as brought out from the fossil study and other indirect evidences.

FIVE COUSINS

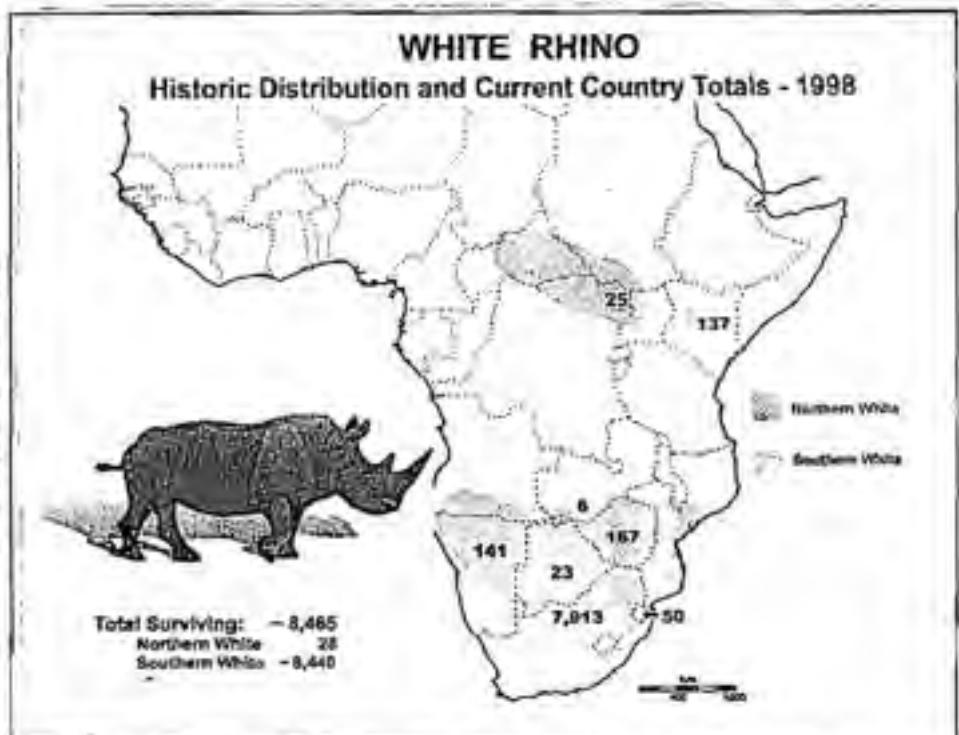
Presently, only five species of four genera, exist in some parts of Asia and Africa. While the Great Indian One-Horned rhino has somewhat respectable population status, the other Asian and some African extant species have reached critical limits, much

below the threshold level. As per IUCN parameters, the "minimum population deemed necessary to maintain 95% heterozygosity for 100 years, is 2500 individuals, for each of the rhinoceros species," if it is provided adequate food and habitat security. Based on recent studies, only African White rhino meets these requirements. The Indian rhino and the Black rhino are somewhat close to this minimum threshold level. The Javan and the Sumatran rhino are in very critical state, putting a question mark

on their survival. Several national and international institutions have been helping for conservation of rhino habitat and protection of rhino. US Fish and Wildlife Service-Rhino Conservation Fund, Environmental Investigation Agency, International Rhino Foundation, Global Environmental Facility, WWF International Tiger Conservation Program, UNESCO, UNDP, Wildlife Trust of India and SOS Rhino have rendered considerable help, in providing technical, financial and moral support for the conservation of rhino and other flagship species. Many non-governmental organisations and nature loving people have also rendered help in conservation of natural resources and wild animals.

WOOLLY RHINO

Dr. J.C. Daniel of Bombay Natural History Society, in his booklet, *Extinction-Gone for Ever*, calls for soul searching and self introspection. Woolly rhino is now relegated to the pages of natural history. Even its animated model is not found anywhere. As per some line drawings, on the





African White Rhino in Assam State Zoo.
Lonely—needs company.

basis of fossils or other indirect evidence, the woolly rhino was very large and had coarse curly woolly hair over most of the body. It carried two horns on the snout, the anterior horn being longer and stronger. Similarly *Baluchitherium* rhino, which stood around six metres tall and roamed in the plains of Baluchistan for long, is extinct and gone forever.

WHITE RHINO

This is the largest rhino of all the extant species. It measures upto 1.80 m at the shoulders, has the body weight of 1600-2500 kg and carries two horns. The anterior horn has the average size of 60 cm and weight upto 4.0 kg. This mega mammal once reigned over vast forests of African continent. The White rhino *Cerathotherium simum*, were about half a million till late nineteenth century. It is now reduced to just about 8000 animals, in the wild, in S. Africa, Zimbabwe, Kenya and some forests of Namibia, Swaziland Botswana and Zambia. Another subspecies, *C. cottoni*, is reported in Zaire as a small isolated group of 30 animals.

This rhino weighs upto 1300 kg, in some cases,

and carries two horns. Some experts on natural history feel that the animal is not white. It is ash coloured or pinkish grey. The name *white* is perhaps a misnomer of *wide* as the rhino has square or *wide* jaw. I have met Mohan, the White rhino, at Assam State Zoo, Guwahati. It seems to be in good health, but was very restless, being alone, and smelling Baghakati and her mate Vishnu, in heat, next door. It was banging its head against the brick wall, out of anger. It has almost rubbed off its horns because of constant rubbing with the walls of the feeding chamber and the open moated enclosure. Dr. Durga Charan Deka, Zoo Vet, informed that the feed to such animal, in heat, is reduced for a few days to let it cool off.

BLACK RHINO

I have seen this lovely animal earlier in the Frankfurt Zoological Garden. My subsequent meeting with the Black rhino *Diceros bicornis*, was in Bangkok zoo, where it sends cheer among the visitors due to its awe inspiring dinosaurian built and a pair of horns adorning its snout. Upto 1970, there were about 70,000 black rhinos in the wilderness areas of Africa. Its numbers fell to hardly 2000 in 1990. The international community, alarmed by such critical situation launched sincere conservation efforts, which gave some results. The total population of this rhino, at present is just about 2600, mainly in the forests of Namibia, S. Africa, Kenya, and Zimbabwe and in small groups in Tanzania, and Swaziland. This animal measures about 1.50 m at the shoulder and weighs upto 1400 kg in some cases. The horn, on an average is 50 cm long but in rare cases it can even grow upto 120 cms. The main horn weighs about 2.5 kg.

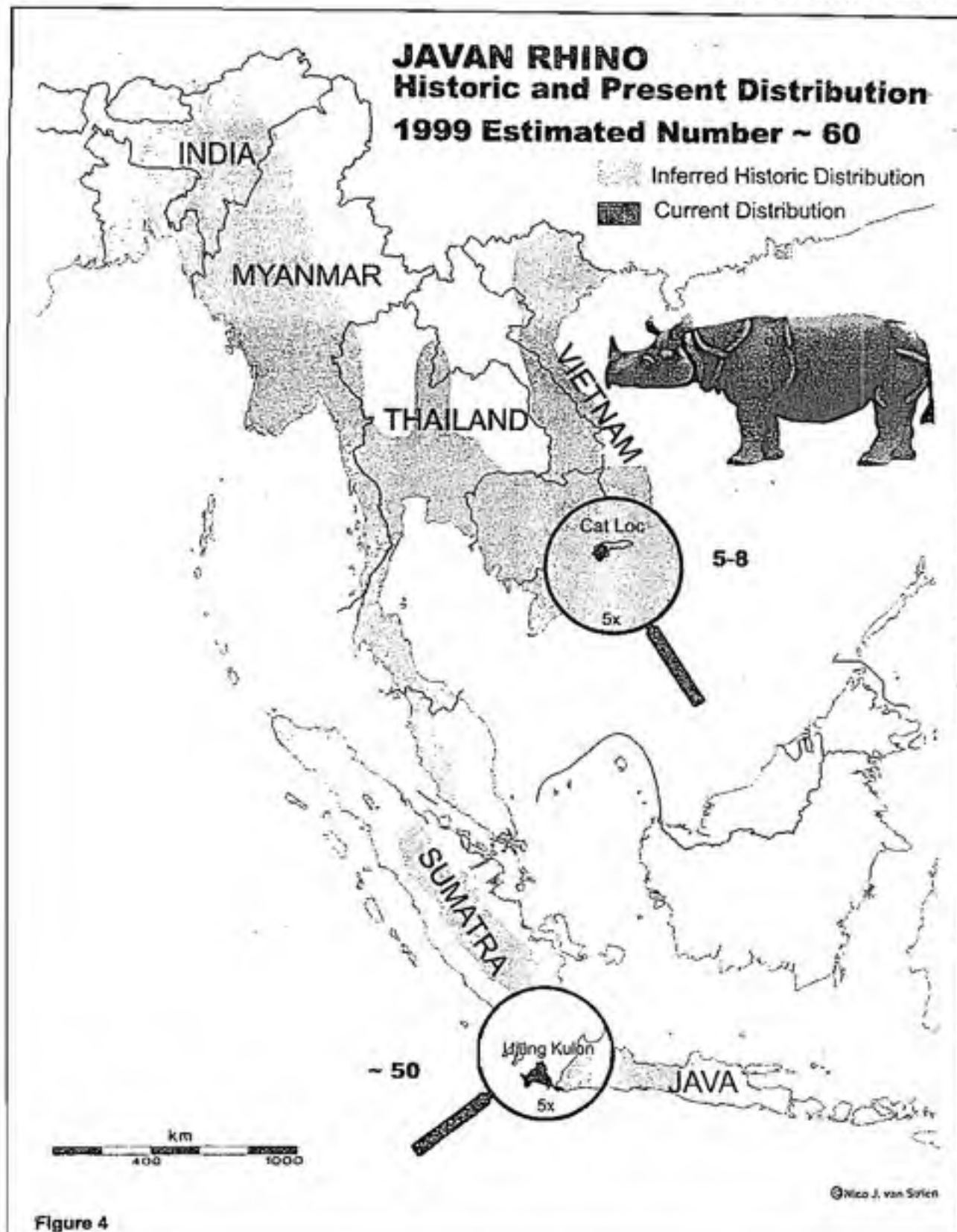


Figure 4

JAVAN RHINO

Historically this rhino, once roamed in parts of Eastern India, Myanmar, Thailand and forests of Vietnam. It had very comfortable population status even at the turn of the twentieth century. Letters on wildlife by Frank B Simpson, appeared serially in the Eastern Bengal journal. Some of these, reproduced in the Oxford Anthology on Indian Wildlife, edited by Mahesh Rangarajan, record the presence of Javan rhino in



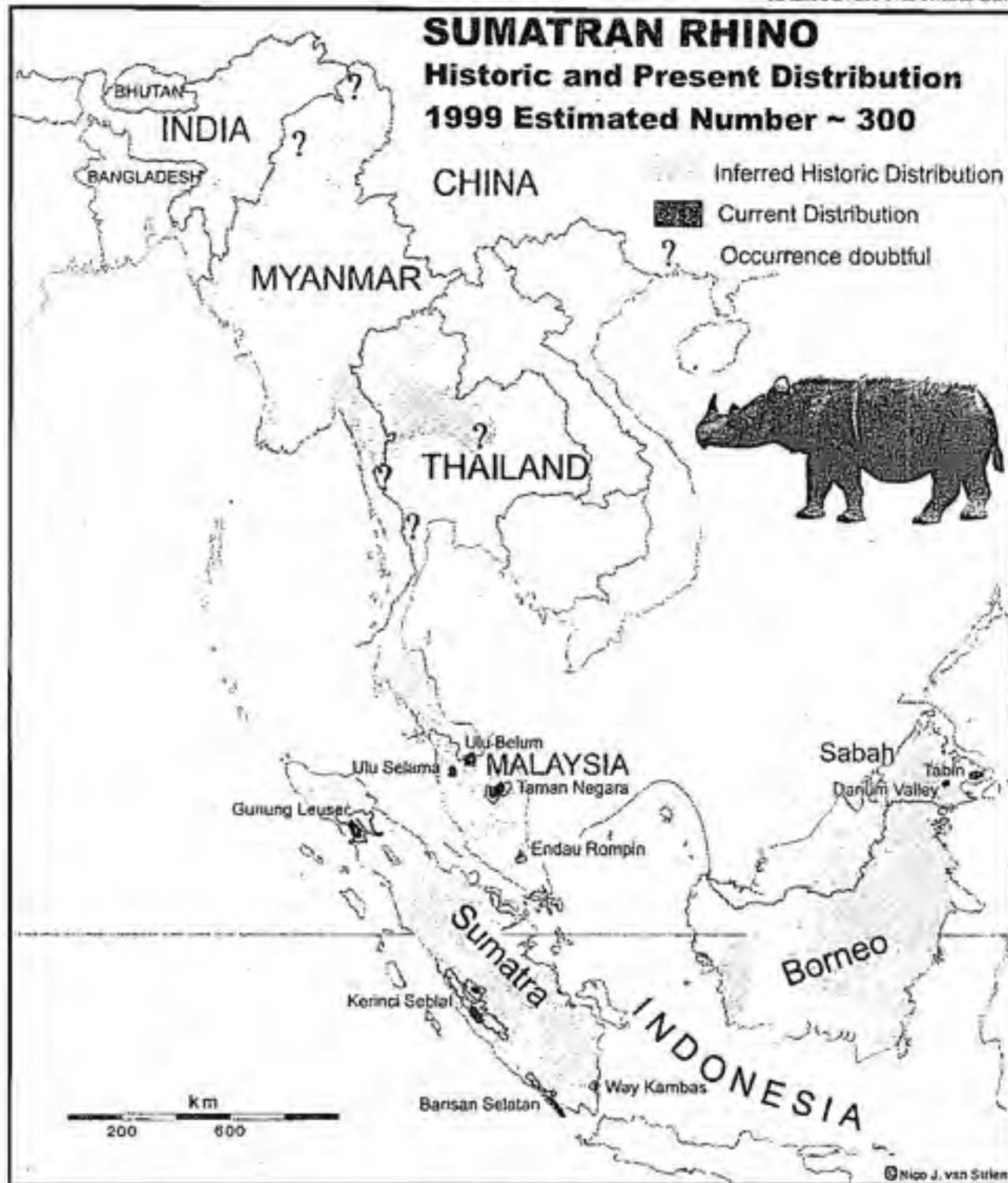
Sunderbans and grassland, south of Tripura, in fairly large population, just a few decades ago. Its present status is pitiable, only 60-70 individuals in Indonesia, and parts of Vietnam. This is much below the threshold level and cannot be considered viable. Javan rhino *Rhinoceros sondaicus*, is a large animal and measures about 1.60 m at the shoulder. Like Indian rhino, it carries one horn, which grows to 15 cm size and can weigh upto 0.60 kg. In this species, only males have a horn. Javan rhinoceros is a close relative of Indian rhino, as both species have evolved from the Tertiary genus *Caenopus*, but Javan rhino is senior and has remained almost unchanged since late *Pliocene* age. Its present minuscule population is confined to Udang Kulon Reserve in Java. And it calls for urgent conservation measures, so vital for the survival of the species. The male rhino sprays red urine at bushes in the creeks or in manure fields.

SUMATRAN RHINO

It is the smallest of all the extant species and measures upto 1.2 m at the shoulders. Interestingly, this mini model *Dicerorhinus sumatrensis* carries two horns. This rhino which even during the turn of the last century, had comfortable population groups in parts of India, Myanmar, Thailand, Malaysia, Sumatra, Borneo and Sabah, is now just struggling to survive in small pockets in Malaysia, Sumatra, and Sabah. This meek animal has been shot for its horn, flesh, though the rhino has smaller horn that weighs hardly 250 gm. Its present population status is precarious, less than 400, mainly in the woodlands of Indonesia, Malaysia peninsula, Sabah and one or two tiny unviable population groups. This rhino holds special importance of being the only Asian rhino having hair on the body and thus has some linkages with the African cousins.

INDIAN RHINO

Rhinoceros unicornis has somehow just recovered from near extinction. Its present population is about 2500 in India and Nepal. It is the largest rhino in Asia and measures



1.8 m at the shoulders. This mega mammal weighs about 2000 kg and carries only one horn on the snout. The average horn has a size of 20 cm and can weigh upto 720 gm, though size upto 60 cm. and weight upto 2 kg are on the record. Its horn is its biggest enemy since the rhino is persecuted for its horn, which supposedly has few magical or medicinal properties. This lovely meek animal is now confined in few protected areas of Assam and W. Bengal in India. The rhino has been reintroduced in Dudhwa National Park of UP, where the animals population now stands at 15 individuals. While African rhinos often use the horn for attacking other animals and sometimes even human beings, Indian rhino keeps the horn mainly as a showpiece and does not use it during the assault, combat or for defence. It rather uses the teeth



African White Rhino in Indian Zoo

for biting and then gives the upward jerk. This gives the impression that the rhino has made use of the horn for offensive action. In the case of Indian rhino, the horn is not the integral part of the skull or the upper jawbone. It is merely a mass of agglutinated hair, which take shape of a horn after some time, due to the effect of its sweat and exudation from the nose. If cut off by strong blow

or accident, there is some bleeding, but the horn reappears after a few years. B.S. Bonal has served in several protected areas of Assam, and observed Gorh, the Indian rhino for many years. He sees perfect mother in Indian rhino. It keeps the calf under affectionate care for about two years and would even take on the tiger to save the calf. Unlike African rhinos, Indian rhino mother generally keeps the calf in front, for security reasons while foraging in the forest or moving along the *dandi*.

CONCERN FOR RHINO

Seeing the fast degradation of rhino habitat and declining animal numbers, many nations have launched serious conservation initiatives. For India, the rhino population has just recovered from the tiny, less than 100 animals in 1908, to the present nearly 2000 mark. Even several international organisations have offered technical and financial support to save and stabilise the population status of the rhino. Traffic International supported a study on the status of rhino as response to CITES Resolution on protection of rhino and effectively implement ban on the trade of rhino horn and other animal parts. The study deals with the crucial and sensitive issues like use of rhino horn in Traditional Chinese Medicine-TCM and rhino as symbol of wealth and status. Rhinoceros trade is another contentious issue, which has trans continental ramifications. Careful strategy needs to be evolved by bringing in all players and stakeholders. Many countries where bush meat still forms part of sustenance food, have to be persuaded and helped to come out of the bush meat sustenance as early as possible. Other nations where hunting is still considered as game, are to be convinced of the need to conserve the natural resources and protect the wildlife for overall ecological security of the nation. Talking about gigantism and relics of abundance, J.C. Daniel appreciates the sincere efforts by forest officials and the local people of rhino areas. He adds that the Indian rhino could survive in Kaziranga and other flood plains, as such low-lying areas were earlier considered unsuitable for colonisation due to deadly diseases like malaria. Lee Talbot (1959) of the International Union for Conservation Nature and Natural resources, had mentioned that the Hangul-Kashmir stag, rhino and the lion are on the road to extinction. Can we make sincere efforts to save rhino and other animals from extinction. For rhino, mere protection of habitat and demystifying and dispelling the myths about magical/medicinal properties of rhino horn should make lot of difference.

CHAPTER- THREE

GREAT INDIAN RHINO

India Rhino is one of the world's most imposing animals which has been a source of wonder and awe for a long time. It is a pleasure to see Indian rhino in its natural habitat. It is a friendly creature that has been brought to the brink of near extinction because of greedy and thoughtless human beings.

GREATER AND SMALLER

We are mainly discussing about the Great Indian One-horned Rhino (*Rhinoceros unicornis*). Its main habitat is in Assam at Kaziranga National Park, and in Royal Chitwan National Park in Nepal. Great Indian Rhino is also found in small pockets in Jaladapara Sanctuary and Gurumaru National Park in West Bengal. In Assam, apart from Kaziranga, this, meek, magnificent animal is also found in Orang Wildlife Sanctuary and in Pabitora Sanctuary. This large mammal also existed in good numbers in Manas National Park in Assam. The present population of rhino in Manas National Park may not even reach two digits Mark.

Smaller Indian Rhino (Sumatran Rhino), *Dicerorhinus sumatrensis* was also found in India in some parts of Tripura and West Bengal, a few decades ago. This

Enjoys
Wallowing.



species is no more found in India. Only small numbers of Sumatran Rhino are now found in particular habitats in the forests of Indonesia, Malaysian peninsula, and Sabah. Smaller Indian Rhino has two horns, while the Greater Indian Rhino has only one horn.

PHYSICAL ATTRIBUTES

The Great Indian One-horned Rhino measures upto 1.80 metres in height and has a girth of about 3.30 metres. Its horn, on the average, measures upto 20 cm, but a record horn has also been reported which measures 60 cm.

I was discussing with P. Lahan, Principal Chief Conservation of Forests as to why this huge animal has comparatively thin legs and why on each foot it has got three toes. Lahan explains nicely that the combination of thin legs with three toes helps the animal to run faster and wade through muddy, slushy swamps. I was shown a video film, where a rhino has been shown running very fast. It was galloping at a speed of 30 to 40 Km/hour. Dr. Durga Charan Deka, V.O. at Assam State Zoo Guwahati, explains that in case of Indian Rhino, hair follicles are modified as cuticles, which help in transmitting heat. The thick skin of rhino works as thermostat, regulating the body temperature. Rhino has a heavy body which weighs upto 2500 kgs. Its normal life span is 30 to 40 years, though few rhinos in the zoo have also lived more than 40 years.

INTELLIGENCE

It is observed that compared to its large body, rhino has comparatively smaller brain. It sometimes shows its forgetful nature, both in the wild as well as under captivity. It somehow lacks the mental alertness as is observed in many wild animals. When the rhino faces some danger, it tries to charge, instead of trying to hide for a safer place. This habit has been responsible for a large number of rhinos, meeting their death at the hands of poachers. Rhino like even forgets its offsprings. Many rhinos have been killed due to the habit of charging on the poachers, but it still continues with this fool-hardy habit. All along, rhino had no serious enemy in the wild. Therefore, it has not developed any natural instincts of self defence like tiger or leopard or even elephant. Indian rhino does not even use its horn for the purpose of defence or for attack during fights. It rather uses its teeth for fighting other animals. For Indian rhino, the horn is only a showpiece.

COMMON LATRINES

Rhino has been observed to defecate at some fixed place, usually along the road/*dandi* or some high land. Most of the rhinos in that area would come to that point to release dung. Gradually, the place takes shape in the form of dung heap. During my visit to Kaziranga, I have observed huge dung heaps. Such heaps attract the rhino, which may be going nearby. Due to dung



Dung heap—in the making.

odour, rhinos display some urge to defecate at the spot. I had been discussing this issue with several persons, who have managed the rhino habitats for many years. P. Lahan believes that dung heap marks the territory of a rhino or a group of rhinos. He has observed that after defecating, rhino also passes some urine on the dung. Each rhino urine has a typical odour. Many scientists and



Common latrines—Kaziranga.

foresters believe that since rhino spends lot of its time in grazing and feeding, it would like to have the grazing areas comparatively clean. Thus, they choose to defecate on a few places rather than releasing dung all over the place. It is also observed that the rhino approach the dung heap in reverse fashion. Perhaps, the rhino would not like its legs to be soiled, while passing dung or urine.

Since, rhino is a coarse feeder, its dung contains some portion of partially digested grasses and small branches, which are often consumed by it. Forest staff, working in the field, easily differentiate rhino dung from the elephant dung. While the dung released by the elephant is more compact, slightly darker and spread at many points, rhinos usually release dung only on a few dung heaps and is not so compact as in the case of the elephants. It usually breaks easily once it drops on the ground. Since, rhino spends long time in lakes, water bodies or swamp it does not defecate while wallowing.

VORACIOUS FEEDER

Great Indian one-horned rhino is really great in many ways. To feed and maintain its huge 2500 kg. body, it would need about 200 kg of fodder every day. No wonder, this large pre-historic mammal is always seen grazing and feeding except when it is in lakes or water bodies for wallowing. During scarcity period, it is sometimes seen feeding on water hyacinth even while wallowing. Indian rhino—the pride of Kaziranga, is seen grazing almost the entire day excepting mid-afternoon when it is too hot to be in the open. Rhino being a strong, resilient animal, is known to change its food requirement as per the

Rhino also eats water hyacinth during pinch period.





Enjoys burnt grasses—rich in phosphorous.

season. In dry season, its bulk intake is from grasses like *Hemarthia compressa*, *Arundo donax*, *Phragmites karka*, *Cerex-rubro-brumee*, etc. At times, to have a new taste, it is also seen consuming small quantities of grasses like *Cencharus ciliaris*, *Chrysopogon aciculatus*, *Schelristechya fueshe*, *Saccharum spontanium*, etc.

During monsoon, when large parts of the park are flooded, the food shortage forces rhino to take shelter on mounds and

higher grounds. These areas do not have usual type of vegetation as in the low land. During such scarcity period, rhino temporarily becomes a semi-browser. It is seen chewing leaves of cane and also barks of some trees. Plants like *Flemingia* and *Albizzia* provide substantial food for rhino during this period.

Sometimes, difficult local conditions force few animals to adopt new techniques of feeding. During floods, rhinos sometimes take a dip in water and eat submerged tropical plants. Rhino can continue its underwater search for a few minutes before it comes to surface again for fresh air.

Like all of us, rhino gets attracted towards lush paddy cultivations near outer boundaries of the Park and sanctuaries. Rhino straying to paddy fields may be because of hunger or its being pushed out of the park by another stronger rhino. Sometimes, rhino is also seen enjoying brinjals, tomatoes, gourds and other vegetables when they stray into villages and forest protection camps. This animal also likes to lick salt or saline soils. In Kaziranga a spot called *Gore-mati-khoa* is a common site, where several rhinos visit for their requirement of salt. It is understood that by consuming such soil, which acts as a purgative, rhino gets rid of its worms as well as cysts.

HABITAT

We discuss about the habitat in a holistic way. It includes all factors like food, water, nature of soil, topography, rainfall, humidity etc. that are vital for the animal's physical and mental well-being. It should feel free, safe and satisfied to carry on its natural activities like feeding, wallowing, herd or group formation, procreation and even inter-group fights. The habitat should be large enough for the animals to get good food, water, adequate exercise and to run to shelter in case of threat/danger from other wild animals and human beings with the fire arms. The twin factors, which form essential components of rhino habitat are plenty of tall grass, as rhino is essentially a coarse grazer, and low lands having muddy or stagnant water. Rhino likes to spend hotter part of the day wallowing to lower its body temperature and to obtain relief from ectoparasites. D.M. Singh, Director, KNP, indicates that both tall, coarse grasses and water bodies or wallow ponds are available in Kaziranga. That explains phenomenal increase in the rhino population in the Park. S.P. Singh, Director,

Manas National Park, remarks that Manas has never been ideal habitat for rhino as the foothill areas have porous soil structure which does not help formation of water body or wallowing pools. Pabitora Wildlife Sanctuary has plenty of coarse grasses like *Andropogon* species, *Imperata cylindrica*, *Erianthus ravanai*, *Saccharum elephantinus*, *Phragmites karka*, etc. and several comfortable wallow



pools. That explains the highest density of rhino—almost rhinos per sq. km. For other ungulates and herbivores, the forest has good growth of *Tamarix dioca*, *Arundo donax* grasses near the water bodies and beels. D.M. Singh explains that for a good rhino habitat, the beels should be saucer shaped so that the gradual drying up of water and lowering of water level, promotes growth of fresh and succulent grasses and plants. Considering all such parameters, the wetland eco-system around alluvial flood plains of mega rivers like Brahmaputra with marshy land or swamp, forms ideal habitat for rhino.

Discussing about the habitat requirement of other rhino cousins, Aroop Kumar Dutta mentions that African white rhino needs tall grass land but is not strongly addicted to wallowing in stagnant muddy water. It can thus survive even on hilly terrain. To ward off hot summer, it rests under the shade of trees. Dry savanna grass land is fine for it. Its non-wallowing habits can also be explained in terms of its body skin, which does not have so deep and well-formed folds like the Indian rhino, that may harbour ectoparasites if not frequently wallowed. African black rhino and Asiatic Sumantran rhino are more of browsers than grazers and thus have preference for the wood land. The Sumantran rhino also likes to wallow. But in the absence of large muddy wallow pools, it cools off in streams. It is interesting to go into the habitat requirement in relation to overall distribution of rhino species in the world. White rhino, being able to adjust in open places, savanna forests, has a wider range than the Black rhino—a grazer with specific food and habitat requirements. Asiatic Javan rhino, had much wider distribution, which extended from Occident to many parts of Orient. Indian rhino, once ranged from Hindukush in the west to Myanmar in the east as it prefers low lying flood plains and alluvial tracts of large rivers like Indus, Ganges, Yamuna and Brahmaputra.

RHINO HORN

It is reported that the Black African rhino and White African rhinos have two horns on the nose and use the horn as a means of defence and offence. Sometimes, these rhinos are also observed to use horn in the forest to clear bushes or climbers. Great Indian rhino, having only one horn has not been observed using its horn as tool of defence or to attack the wild animals or even human beings, even when disturbed or



Dried mud sticking to its body after wallowing.

receded, he observed a large rhino lying dead. Its dislodged horn was also found lying nearby. Jawan rhino has only one horn while Smaller Indian rhino (Sumatran rhino) has two small horns. Some traders had even suggested to dehorn the rhinos to dissuade the poachers from killing the rhinos. This has not been found favourable/feasible by the naturalists and wildlifers. And rhino does not have 'true horn'. It is only a mass of agglutinated hair and keratin—which gradually gets hardened by some exudation from the animal's skin and the nostrils. Initial Chemical analysis of rhino horn revealed that it has the composition like natural hair. There appears to be no chemical or medicinal content. Magical properties attributed to its horn are only a myth and a figment of fancy.

RHINO ROMANCE

Dr. Paneer Selvam of National Zoological Park, Delhi, has been observing rhinos for many years. Bonal has worked as Director, Assam State Zoo for a couple of years.



They give very useful inputs with regard to rhino's romance. Male rhino gets sexual maturity within 5 to 7 years of its birth. The female rhino becomes mature in 3 to 5 years. Like all large mammals, rhino produces one calf at a time. Inter-calving period may vary from

Escapes heat by wallowing in water.

provoked. I have observed that while under captivity, rhino rubs its horn with the trees or the walls in the zoo enclosure and thus the horn gets rounded off and shorter. For Indian rhino, the horn remains fixed on a small bony base, near its nose. By a strong blow or jerk if the horn gets dislodged, there would be some bleeding, but the horn would reappear/regrow within a year or so. Bonal mentions that in 1998 after the floods, when water

12 to 19 months, as observed in a few zoos. For female rhinos, oestrous cycle may be between 38 to 58 days, which lasts for about 2 to 3 days but is most effective for a period of about 24 hours. There is no fixed season or time for getting into heat or oestrous. Coitus time may vary from 15 to 90 minutes. Bonal has observed mating and coitus of rhinos in Guwahati Zoo, in one case the coitus from mounting was clocked for nearly 92 minutes.

MALE RHINO IN 'HEAT'

This is a complex and controversial issue. Many scientists believe that even for the male rhino, there is a phenomenon of getting into "rut" or "heat" and unless the male rhino is in "heat", it may show no interest in the female rhino, under oestrous cycle. P. Lahan mentions of a few cases where the female rhino runs after an unwilling male rhino but does not get favourable response from the male, as the male rhino is not in 'heat'. Bhattacharjee, Director, Assam State Zoological Park, Guwahati, mentions that the male rhinos, Ramprasad, Mohan and Burha, become restless when the female rhinos in the zoo come in heat. Arup Kumar Dutta, in his treatise, 'Unicornis', mentions that male rhino has generally no interest in the female rhino but shows interest for coitus only when he is in heat. He, further mentions that the female rhino, when in heat, passes pheromones, while passing urine and the male rhino gets its odour and gradually gets excited. Dutta further gives detailed description of the entire coitus process. After love game, the male rhino gets separated from the female and quietly walks away. It does not even look back at the female, who was its love-mate, just a few minutes ago.

Male rhino also gets "heat."



Lovemaking among rhinos.



AFFECTIONATE MOTHER

Female rhino displays good qualities of a loving affectionate mother. It provides all love, care and safety to the young calf for a period of 2 to 3 years till it becomes strong enough to look after itself in the wild. Mother rhino with a calf, is very dangerous, unpredictable and can attack at the slightest provocation, once it smells danger for the calf. It feeds its calf frequently. Like the cow or elephant, it feeds the young calf, while standing. Usually, the young calf approaches its mother between the rear legs and would suckle for sometime and then have a short break. Young calves are also observed suckling while approaching from front below the mother's tummy. During this stage, mother rhino is very moody and may even charge at the tiger to protect the young calf. In the wild, sometimes two tigers chase the rhino mother. While one tiger would attack the mother, the other tiger quickly nabs the calf. D.M. Singh, Director, Kaziranga National Park, reports of several rhino calves being attacked by the tiger in the wild. Sometimes, female rhino acts as foster mother too. Moving in Kaziranga on elephant back with Parthasarathy Das, we observe a mother rhino with two calves, one a few months old and the other about two year senior. Das explains that at times, some suckling rhinos adopt another calf, who has somehow strayed from its mother or the mother has been killed by poachers or a predator, mainly tiger. During floods also, few rhinos die due to starvation or drowning.

FRIENDS AND FOES

Great Indian rhino has practically no enemy in the wild. This largest mammal has guarded body, its dangerous looking horn, ability to run fast, provides it good safety and status in the forest. Even the largest mammal in the forest, elephant, gives wide berth to rhino. Tiger avoids going into conflict, thus rhino is left with practically no foes except human beings. Its main foe is its horn, which has been responsible for its



Calf with affectionate mother.

killing by the poachers. Rhino has a large number of wild friends. It is seen grazing merrily in the company of wild buffaloes, swamp deer, hog deer and even wild boar. Many birds give constant company to the rhino while it is grazing in the forests. Birds peck rhino ears and its tail to pick-up insects and would hang around the rhino for long time. It is only because of such birds that the poachers sometime locate the likely position of the rhino when it is hiding in shrubs and tall grasses. Because the rhino did not face any foe in the forest, it has not developed the basic self defence instincts, as in the case of elephant, leopard or tiger. Rhino has practically no enemy, is widely loved but is still poached for its horn, which is believed to have sort of magical and medicinal effects. There is, however, no scientific base to such fanciful ideas.

RHINO-DISCIPLINE

It follows a particular track, eventually forming prominent path called '*Dandi*'. Rhinos also use common latrines for defecation—which slowly form dung heaps. Most rhinos show and follow common latrine discipline which often goes to their disadvantage and danger. Unscrupulous poachers lay 'pit-traps' or 'electric traps' on the *dandi* or near the dung heaps. Thus, rhino, a disciplined monster, meets the painful, cruel death, due to self-discipline.

CHAPTER- FOUR

KAZIRANGA NATIONAL PARK

Where is the best-managed National Park (1985) located? Which protected area in India is listed as World Heritage site by IUCN? Millennium Award for Best Managed Park in Tiger conservation areas (1999) has gone to which Park? Which area is famous for the Big Five? Where have the anti-poaching operations shown some results? Where has a Forest Officer bagged the Fred Packard Valour Award in 1997? Where did the conservation story begin in 1908 and has received the international applaud?

QUIZ

You may hazard guess about this biological quiz. The answer is simple. We are talking about Kaziranga National Park—KNP, in Assam, where conservation efforts, launched in 1908, have shown results. Great Indian One-horned Rhino-*Rhinoceros*



unicornis, whose population had gone down to just about a dozen, in KNP, now stands at 1552 animals. How it all happened is a success story. The credit goes to the State government for bringing legislation to protect rhino and other wildlife. More credit goes to nature loving Assamese people, who responded to the law with all the zeal, enthusiasm and sincerity. A brave Range Officer, Dharnidhar Boro, posted in Kaziranga National Park, is honoured with Fred



Rhino—pride of Kaziranga.

Packard Valour Award for exemplary valour shown by him to protect wild life and forest wealth. KNP got the coveted World Heritage Site—Best Managed Park in 1985. Close on its heels, Special Award for Teamwork in handling exigencies in 1998 and Millennium Award for the best Tiger Conservation Area (1999), also went to KNP.

RHINO LAND

Kaziranga National Park in upper Assam is the home to 1552 rhinos now, which constitutes more than 65% of the world's total population of the Indian one horned rhinos. This park is famous for being the habitat for Big Five i.e., rhino, elephant, wild buffalo, tiger and the swamp deer. Bio-wealth of the Park can be judged by the fact that it carries more than half the total population of wild buffalo and about 55% of the world's swamp deer.

SUCCESS STORY

It all started in January, 1905. Lady Curzon was taken to Kaziranga forests to observe a large pre-historic animal. The Lady saw the animal from a distance and thought it was the elephant. She was later brought nearby and shown the footprints. It had only 3 toes on each foot, whereas the elephant has four toes. It was Indian One-horned Rhino, at the verge of extinction—hardly 10-12 in Kaziranga forests. The Lady persuaded Lord Curzon to take urgent steps for the conservation of rhino. Kaziranga was made Reserve Forest by M. Carter, CF, Eastern Assam Circle, in 1908. It was notified as Game Sanctuary in 1916. It was opened to visitors in 1938. The renowned wildlifer, P.D. Stracey, senior Conservator of Forests, constituted it as a Wildlife Sanctuary in 1950. The year 1968 is a milestone in the conservation story. Assam National Park Act came into being, under the stewardship of P. Barua, CCF. Kaziranga got National Park status in 1974. Credit for bringing in conservation



Male & Female Rhino in lustful mood.



Wild Buffalo—important part of eco-system.

and protection culture in KNP goes to P. Lahan, the founder Director of KNP (1985). Sincere efforts were launched to protect and save the Great One-horned Rhino, which was under threat of extinction, with the population status plummeting to just about a dozen in the wild, somewhere in 1905/1908. The mighty mammal was being poached for its horn.

Several false superstitions and fanciful ideas about the magical/ medicinal properties of its horn led to poaching. The Great Indian rhino once roamed in the forests of Indo-Gangetic plains to the Brahmaputra basin. Karbi Anglong forests and Brahmaputra basin, once formed a compact Rhino territory, which now stands cramped to only some 430 sq.km., in the Brahmaputra valley, in Golaghat and Naogaon districts. Ruthless destruction of the habitat and persecution in the name of sport and for the horn, led to sharp decline in the rhino population.

ADDITIONS TO KNP

While the Park, initially constituted in 1974, covered certain forests and flood plains of north Assam—almost foot hills of Karbi Anglong hills of the Autonomous Hill Council, efforts were made over the years to expand the protected area so as to have viable forest block for conservation and development as ideal rhino habitat. First addition (Burapahar) over 44 sq km., was finally notified in May 1997. This is an important habitat for the wild animals. The management moved for the second addition (Sildubi), another crucial corridor, but there has been little progress in land acquisition due to a High Court case. Another 0.69 sq km (Panbari) was sought to be added to the Park,

for which the compensation amount has already been deposited with the Deputy Commissioner. This area, though small, is very strategic corridor for the Park management.



Wild Buffalo family.

Fourth addition (Kanchanjuri) measuring 0.89 sq. km—corridor area, is on the anvil. This should materialize soon, once the Writ Petition in the High Court is resolved. As fifth addition to the KNP, Haldibari tract 1.15 sq.km., excellent corridor for the movement of wildlife, may be finalized soon for better management of the Park. Sixth addition is very crucial for sound management of the Kaziranga National Park. This proposal involves about 376 sq km portion of the Brahmaputra river, including *chapories*, and Panpur Reserve Forest, from, Dhansirimukh to Kolia Bhomora Bridge. Though the area was handed to the Park authorities in 1997, further progress is stalled due to a writ Petition pending in the High Court.



Water Buffalo—beware of lone bull.

BEYOND KAZIRANGA

I get inquisitive about other habitats of Great Indian rhino, other than Kaziranga. Bonal, who has served in Kaziranga Park for many years, educates me that apart from Pabitora, Orang and Manas protected areas in Assam, the burly, but loveable animal is also found in Jaldapara and Gorumara sanctuaries in W. Bengal and Dudhwa National Park in Uttar Pradesh. Rhino is also found in fairly good population in Royal Chitwan National Park and Royal Bardia National Park in the Nepal kingdom. Peeved by the declining rhino population, IUCN and the Asian Rhino Specialist Group meets at Kaziranga (Feb. 1999) to take a realistic stock of the Rhino conservation works and to decide future strategy in the face of high level smuggling of the rhino horns and consequent poaching. The Specialists Group strongly recommends that efforts should be made to build up a viable population of 2,500 rhinos at Kaziranga and at least 10 populations of minimally 100 animals each, with an ultimate optimal objective of a total wild population of 5000 individuals. Normally during the floods, the wild animals move to higher grounds, but during the 1998 floods, even the uplands were rendered inadequate to provide viable shelter to the animals. Indian army lent a helping hand in rebuilding the rhino habitat after the floods receded. They created 10 uplands/mounds for the animals to survive in the face of heavy inundation of the forest land.



Swamp Deer herd—partners of Rhino habitat.



Elephant herd in search of water.



Elephants making love.



Water hyacinth-weed menace.

DESPITE ODDS

Field staff of the Kaziranga Park deserve kudos for their devotion to duty and valour shown during anti-poaching operations. The park is under intense biotic pressure from the neighbouring human and cattle settlements. The poachers are equipped with sophisticated fire-arms and communication network. These gangs are highly mobile and organised.

Forest staff has only ordinary .315 rifle, but have enough courage to challenge and apprehend the poachers. Perhaps Kaziranga is the only Park, which has had the highest number of encounters with the poachers with deterrent results. Vigilant and duty conscious forest officials have arrested many smugglers, recovering about 40 rhino horns from the poachers. A few poachers have died during encounter with the anti-poaching staff. Several officials also lost lives during such anti-poaching operations.

LEGEND

Bishan Singh Bonal, former Director, Kaziranga National Park has interesting story on why the rhino has thick folds on its skin. As per one legend, Lord Krishna, highly highly the natural beauty

of Assam, visited Sonitpur and Brahmaputra valley. A handsome rhino went with him wherever he went. Having spent a few quiet days in the Assam state, when he was to move on, he did not find his rhino. It was happily grazing in jungles. The Lord got angry and fixed the saddle on its back forever, which are now seen as thick folds on its skin. Another legend mentions that Lord Krishna came from



Caught on the wrong foot.

Dwarika (Gujarat) to the kingdom of King Ban (Sonitpur-Assam), to rescue his son Anirudha. He rode a lovely rhino as his 'Bahan' (transport). He left his *Bahan* to graze in the plains of Assam, while he crossed Brahmaputra to wage war on King Ban. After defeating Ban, Krishna summoned his *Bahan*—Rhino by playing the flute. But the animal loved Assam forests and did not go back. Bonal also gives a story about the name Kaziranga. A young man Kazi from Karbi Anglong liked Ranga, a village belle from Assam plains. The parents would not approve of this courtship, so they occasionally met in the forests. One day they disappeared, and got penance. The forest was named Kaziranga in their memory.

BIG FIVE

Kaziranga Park is famous for fairly large populations of the big five animal species. As per 1999 figures, the park has 1,552 rhinos, and 1,192 water buffaloes. There are more than 1,000 elephants and 86 tigers in the park. Marshes and the swamps are habitat for 526 swamp deer. These big five, along with several mammals, reptiles, primates and magnificent birds lend charm and life to the park.

PERSECUTION

Rhino, the burly mammal is under threat due to heavy price tag attached to its parts. Many false myths are attached to the animal. In some parts of Myanmar, Thailand, Nepal and Middle East, rhino horn is believed to possess medicinal/magical value. Its urine is considered



In the caring hands.



Weed menace-water hyacinth.



Stray rhino stuck in mud and rescued by villagers.



antiseptic and is kept as a charm against ghosts and evil spirits. Rhino nail and bone is supposed to keep off the evil spirits. The highest price fetched for rhino horn has been 60,000 US \$ per kg. Even African black rhino horn is in demand by the quacks for misleading the innocent people.

RHINO CULTURE

Assamese love rhino. This lovable animal has become integral part of socio-cultural milieu of Assam. Rhino appears as logo on many government offices and stationary. Some Army and Border Security Force units deployed in Assam, have adopted rhino sign. It also finds special mention in local legends, folklore and literature. Several efforts have been made at the state, national and international level for the conservation of Great Indian Rhino and its habitat. Despite many odds and organised poaching gangs, there is hope for viable survival of the rhino. Our strength is several non-governmental organizations, naturalists and devoted forest officials who are totally committed to the cause of conservation of forests and protection of wild life.

WILD WONDERS

During my brief yet useful halt at Kaziranga, I

Shrinking habitat due to siltation.

get a chance for getting a fair insight on bio-wealth of the National Park. While driving from Tezpur to Kohra, P.S. Das, the "do-or-die" DFO, briefs me on various challenges that are encountered in giving proper protection to the wildlife and its habitat. Das has organized several difficult encounters, during which the wildlife staff have been able to capture a few poachers and seized several fire arms and even rhino horns. They are planning to bust an international gang allegedly involved in the poaching and smuggling of wildlife parts. D.M. Singh, Director, Kaziranga National Park, later informed me that next to drug smuggling, trade in wildlife assumes very serious proportions. We reach Bogori West Range and enter the National Park. P.S. Das is on the wheels, his curious eyes, scanning the landscape as he drives. We stop near a water body—Beel. We see several wild buffaloes foraging nicely in the company of cattle egrets. Fairly close, we also see a mother rhino with a young calf. D.D. Boro (the Fred Packard Award winner), Forest Ranger says loudly 'Powali'—calf. Under the guidance of D.M. Singh, we reach Donga watch tower, overlooking Donga Beel. Singh shows and explains the four habitat types in the National Park. These are the wetland, grassland, elephant grass (ekra) and wood land. Donga watch tower, fairly high, presents panoramic view of the landscape, live with several wild animals moving therein. While sipping a cup of red tea, we are able to sight 8 rhinos near the camp; several wild buffaloes and a herd of swamp deer and multitude of swallow birds, who always keep flying and never take rest. A pair of swamp partridge and a large red jungle fowl are seen for sometime. Viewing wildlife from Bahubeel watch tower, we find a pair of fishing eagles, perched on Bombax tree, who have encroached upon the nest of black necked stork. We spot a rhino nearby with a calf, maybe 2 years or so. The mother rhino is almost blocking the road. D.D. Boro and a few forest guards produce some hurr...hey....hey noise to drive away the Rhino in the bush. As we are driving back to Kohra



One of the big fives of KNP.





rest house, the forest guard cautions of the mother rhino hiding in the bush, preparing to charge on our vehicle. Das just speeds up the vehicle.

Day 2. It is 05.30 a.m. We reach the elephant ride point-1 for early morning sighting of wonderful wild denizens. P.S. Das is with me riding on the experienced elephant, Padmini, managed by the Mahaut, Nagen. During the next 2 hours elephant ride, we see a couple of rhinos, a fairly large herd of hog deer, a bit later, many swamp deer. We have a good view of feathered friends like red jungle fowl, swamp partridge, Bengal florican, drongo and a very large fleet of bar-headed geese. We also see a mother rhino with two calves, perhaps 2 years and 3 years old. Das considers it strange and unusual grouping as mostly the rhino moves with only one calf at a time.

NATURE TOURISM

Kaziranga has all essential inputs for nature tourism. Multitude of wildlife, rich biodiversity, extended landscape, easy sighting, closeness to road and ideal habitat for the big five. All these make Kaziranga, an ideal nature tourism destination. Assam Tourism Department have developed some facilities in the shape of Aranya Lodge, Bonani, Bonashri, Kunjban and a few tourist cottages. These are simple single bed, double bed rooms and even some dormitories for the youth group/students. Wild Grass, a star tourist resort, planned and managed by Manju Barua, a wildlife enthusiast, has about 24 deluxe rooms. Wild Grass has been developed on a concept-mix of old tradition and modern facilities. They also conduct nature tourism to the National Park and have fairly knowledgeable guides, who conduct tourists through the wild wonders of Assam. I get some interaction with Manju Barua, on boosting conservation ethics through Wild Grass so that the visitors imbibe the nature

conservation culture and spread the same when they go back to their state/country.

MANAGEMENT ISSUES

Dev Mangal Singh, Director, KNP mentions the important issues that call for serious action on short term and long term basis. Floods are a recurring problem for the Park. It does have some positive role of recharging the water bodies and to maintain



Tiger, natural death.

primary grassland vegetation. Floods disrupt infrastructure—inspection roads, bridges, buildings, etc. Major floods cause siltation and consequent raising of beds of rivers including Brahmaputra. Erosion of park areas takes place. KNP has lost about 22 sq.km since 1974. There has been some accretion too—formation of new Chaporis, yet the overall effect of floods is negative.

Poaching is another major threat for rhino conservation. Despite Assamese love and respect for rhino, trigger-happy poachers do sneak into KNP for greed of making quick buck out of rhino horn. It has major market outside India, but some parts of Assam, Nagaland, West Bengal, Meghalaya, Bihar serve as conduit for smuggling of rhino parts and inflow of money. Singh suggests for more anti-poaching action and infrastructure.

Crop raiding causes sometimes management problem as rhino, elephant, wild buffalo and deer stray out. To resolve this complex issue of man-animal conflict, wildlife needs to be provided with adequate habitat conditions to dissuade from venturing into alien grounds. Villagers also should be advised to raise such crops that do not attract the wildlife.

The migrating animals have to cross national highway-37 to reach higher forests of Karbi Anglong during the floods. Several animals have been killed by speeding vehicles on this part of the highway. Animals crossing the road are also highly vulnerable to the poachers' bullets, snares and traps.

Weed invasion in KNP is serious. Various plants and crops like Mimosa, wild rose, mikenia and water hyacinth are invading large areas—thereby inhibiting the growth of useful plants and grasses that form the food base for several herbivores.

HABITAT MANIPULATION

The total land area of Kaziranga National Park can be broadly divided into three types namely, woodlands, grasslands and water bodies. The marshy area around the beels are under short grasses. The larger part of the park is under the cover of tall



Motherly instincts.

grasses and woodlands are mostly confined to the high grounds. An important aspect of habitat management is to maintain the grasslands by preventing the invasion of tree species. Large areas of grasslands are subjected to annual controlled burning during winter month viz., December, January and February. Such burnings arrest succession of grasslands to woodlands. As the rate of vegetative growth is phenomenal in this area there is no serious deterioration of the habitat and status-quo of grasslands is quickly restored. Annual burning is most effective in areas containing tall grasses that are generally shunned by animals. Palatable and high nutrition value fresh shoots are thrown up in such burnt areas of tall coarse grasses attracting the herbivores in huge numbers. Annual burning thus results in better dispersal of the animals and relieving of the pressure from heavily grazed short-grass areas. The burning also enhances visibility for wildlife viewing and facilitates anti-poaching surveillance, especially in detection of pits that might remain out of sight among tall grasses. The annual burning of grasslands greatly improves the visibility facilitating the animal census.

Annual burning has special significance for the hardy tree species that regenerate profusely and colonise the grassland. Such species are uprooted manually to preclude invasion of grasslands by tree species.

Bunds are constructed during November and December to retain water in the wetlands mainly with a view to provide wallowing sites to rhino and to attract the avifauna which are of great interest to the visitors.

The receding water of Brahmaputra leaves behind large quantities of silt and mud in the wetlands. This gradually reduces depth and may result in their complete siltation if not desilted. Wetlands constitute an important habitat factor for rhino since they provide wallowing sites so critical to the biology of rhino. Annual removal of silt is therefore an important operation at Kaziranga National Park. The silt thus removed is deposited in the form of mounds that serve as highland shelters during floods.

APPLAUDS

Many Indian and overseas visitors have enjoyed the natural beauties of KNP and its wild denizens. Late Jagjivan Ram (Minister for Agriculture, India) visited KNP in December, 1953. He has recorded "It was a thrilling experience..... Shri Ramnath Das, Minister in charge of Forests-- had made all necessary arrangements...Efforts are being made by Forest Department to preserve the wildlife of the sanctuary.--I thank the Conservator of Forests and his officers and staff for good arrangements".

Lal Bahadur Shastri, (Minister for Transport and Railways, India) mentions "It was a delightful experience to wade through the marshy jungles, moving quietly and slowly to have a peep at rhino sitting in isolated corners... We came across not one or two but at least 10 of them..... I hope Kaziranga would soon develop into an important tourist centre."

Sir Akbar Hydary (Governor of Assam) Shillong, during his visit to Kaziranga in March, 1948 remarks

"....altogether 11 rhinos were seen by my party and we also saw two Kaziram and Kamalarani, who were recently caught and were due to go to Chicago zoo... We spent many hours on elephant going to the reserve and saw wild buffalo, swamp deer and the pig... I hope soon it may be possible for large number of people to see this interesting game sanctuary which is one of the last known homes in the world of the one-horned rhino."

E.P. Gee, the famous planter, turned naturalist had spent many years in the pristine Assam forests. About his visit to Kaziranga in January 1963, he mentions, "I came specially to accompany Mr. Schumeduer, and render him every assistance as he is representing IUCN ...see noticeable increase in the number of animals in spite of recent severe floods. Forest Department are to be congratulated on the increase in the number of animals. About introducing many more animals to Kaziranga... The indigenous animals should be shown and foreign or exotic varieties should not be introduced. Zebra, Giraffe are best seen wild in Africa or in Zoos in India. Indigenous fauna and flora of Kaziranga are what make it what it is ----- one of the best parks/sanctuaries of India."

Manmohan Singh, Member Secretary Planning Commission, Govt of India 1982 "A lovely exciting place where man and nature learn to live in proper balance."

Bimala Prasad Chaliha, ex Chief Minister Assam, during his visit in 1956, writes, "Enjoyable and educative."

And many more...

RHINO REIGNS

Too many odds. Stiff international racket for wildlife parts; false myths about medicinal properties of rhino horns, bones and urine; closeness of Kaziranga to national highway, making rhino vulnerable even from the road; intrusion of several villages and settlement within areas under additions to the Kaziranga National Park; general ethnic disturbances in the state; lack of



Nature education.



Rare sighting.

infrastructure and financial inputs. These all add up to make wildlife protection a difficult task. Yet the wonderful combination of highly devoted forest staff and rhino loving people of Assam has shown good results. The rhino population has risen from mere 12 in 1908 to 1,552 as of now. But this conservation magic has its spell mainly on Kaziranga National Park. Manas, Orang, Pabithora, Laokhowa protected areas do not show such strict protection initiatives as at Kaziranga. Can we replicate Kaziranga in other parts of India?

TOURISM TIPS

Next holiday, do plan a rejuvenating visit to KNP for a date with the Indian Rhino and the other Big Five. It is so easy to reach Kohora, the nerve center of Kaziranga. It is just about four hours from Guwahati, nicely linked to other places by air, rail and road. The nearest railhead is Furkating on NF Railways. One may even fly upto Jorhat Airport, from where the KNP is 96 kms. Rhinos and other wild denizens make good appearance in winters- Nov to April, and generally do not disappoint the keen visitors, who have the time and patience to observe the wild friends in the natural habitat. One can observe rhino and other animals from elephant back. Nice friendly elephants usher the visitors to wild wonders of the park almost at handshake distance from rhinos, sometime even tiger, if one has good luck. Fairly good accommodation is available at Kohora—courtesy Assam Tourism Development Corporation. Some private resorts have also come up to cater to the pockets of higher income groups. Wild Grass has been done up well by Manju Baruah, the Green entrepreneur. Rhino Land resort operated by the Forest Deptt has nice sylvan setting. A word of caution for the visitors. Please do not move in the Park on foot, as it is not taken kindly by the wild animals, in particular the mother rhino with a calf. Even tiger also awaits with sharpened canines and nails, for such unwary intruders in its territory. While on vehicle, keep to well defined routes, and have an armed Guide with you. One is advised to visit the park carrying binoculars, notebook, pencil and a camera to make faithful observations of wild friends. Shun from having flashy clothes and portable music sets. There are enough birdcalls and nature's music to keep you spell bound.



Indian rhino—Uncertain future?

CENSUS OPERATIONS



Total head count—enumeration party takes job seriously.

My co-author, Bishan Singh Bonal has been the Director, Kaziranga National Park (KNP) for several years. He has organised 3 census operations in KNP, during 1991, 1993 and 1999. Bonal gives useful inputs on the rationale and methodology on the animal census in the star protected area like KNP. 'Why is the

census needed and how often it is undertaken?'—I ask Bonal. He explains that census gives useful inputs on proper management of the protected area and the wild animals therein. For the large animals, census is conducted once in 6 years. Since 1984, census operations have been undertaken regularly every 6 years. We should have had a census conducted in 1996, but a special census had to be organised in 1993 as per the assurance given to the Assurance Committee of the Parliament of India. The next round falls in 1999. This is a well-planned exercise with the main field work concentrated on 8th and 9th April, 1999. Bonal adds that lot of spade work is put in before the actual census starts in the field. Several rounds of briefing and debriefing go into making this mega head count a success.

PARTICIPATORY

Bishan Singh Bonal explains that census is not a stage managed, State government show. Several NGOs, media persons and wildlife enthusiasts are invited to participate in the census so that the results obtained are objective, scientific, transparent, and



Census—largest head count of the millennium.

thus could give objective input for the scientific management of protected area. He adds that as many as 20 NGOs, 8 media persons representing Doordarshan, Akashwani, Times of India, Economic Times, North-Eastern Daily, Statesman, etc., had participated in the largest head count of the last millennium. Professional and scientific inputs are given by 41 officers

and staff of the state forest department, who take this exercise with all seriousness it deserves.

ORGANISATION

On the face of it, animal census of bio-rich protected areas like KNP appears to be a complex task. It is made easy by dividing the whole park in 8 blocks i.e., Baguri, Kaziranga, Panbari, Tamulipathar, Boralimara, Charigoria, Haldibari and Bhawani. These blocks are further sub-divided into 45 compartments, which are bounded by natural features like nallah, patrolling path, inspection path, streams, etc. The size of each compartment varies from 3 sq.km. to 12 sq.km. depending upon the land feature and density of rhinos. All out efforts are made to conduct the entire census operation covering 430 sq.km. in just 2 days' time. For large animals like rhinos, elephants, wild buffaloes, direct visual total count method is advised. Park management take-up burning of tall grass well in time to have better visibility and new flush of green grass, which attracts many herbivores, mainly the rhinos.

ENUMERATION

KNP management arrange enumeration parties with great precision. Each unit consists of an Enumerator, one Asstt. Enumerator (generally a media person or an NGO), a Forester/Forest guard, well-versed with local land features, a Mahaut with a trained elephant. The enumerator locates and records the animals on the format provided to him. The Asstt. Enumerator assists him in locating the animal. The Forester/Forest Guard (Guide) conducts enumeration party to the specified grid and keeps security and safety of entire party. Guide is provided with 0.315 rifle and a mobile wireless set for quick communication.

BIG FIVE

KNP is a famous habitat for Indian One-horned Rhino, tiger, elephant, wild buffalo and swamp deer. The census of April, 1999 was particularly focused on the Indian rhino, with all care and precision. Other animals, if they appear near the enumeration



Trying camouflage—spotted during census.

party, are also recorded. No special efforts are put in to number and status. For other animals including the large mammals like tiger, wild buffalo, swamp deer, etc., another census was conducted in March, 2000.

ACCURACY

Bonal further indicates that the methodology adopted for the census

has been fairly accurate. In his report, he has worked out that the standard error is not more than 6.44%, which appears to be fine considering a large area like KNP having difficult topographical features, shortage of adequate infrastructure and fairly large area of each enumeration block.

POPULATION DYNAMICS AND CARRYING CAPACITY

Bonal appears to be satisfied that the present pattern of rhinos is continuously exhibiting a progressive trend, so much so, that over the period from 1966 to 1999, the number of rhinos has increased from 366 to 1552. The sex composition of rhinos, on the basis of 1999 census, gives 633 males, 662 females and 257 calves. Thus, the male-female ratio works out to 1:1.045. On further analysing the census figures, it comes out that the total population consists of 1131 adults, 163 sub-adults and 257 calves. He also talks about the crucial issues of annual increment of rhinos. When we compare the population status during the last 6 years (from 1993 onwards), the rhinos have increased by 388 numbers or 33.3% with the net annual increment of 5.5%. Census figures are somewhat not that rosy as regards carrying capacity of the KNP, which has actual land area of only 408 sq.km. as against notified area of 430 sq.km. On the average, there are 3.54 rhinos in a sq.km. forest area of the park. In Baguri block, there are 9.14 rhinos per sq.km, which definitely appears to be much beyond the carrying capacity of the forest. The census figures also reveal that the annual natural death of rhinos is around 4.2% while its death due to poaching is somewhat around 1.55%. These figures reveal that there is need to translocate rhinos. This translocation should be done in a phased manner to the nearer rhino bearing areas.

RHINO CENSUS

Great Indian one-horned Rhino is a flagship species of KNP. The recent census (April, 1999) was mainly conducted to have a rational status of one-horned rhino. Enumeration parties were guided to pay special attention to census of rhinos, though they may also record other animals, which are easily visible during the census. During the census, they spot and count 852 wild elephants, in different herds. Wild buffaloes make 1192 sighting, which was represented by calves, juveniles and adults, even

solitary male. Swamp deer, another important mammal of KNP showed up 398 in different spots. Tiger, which is one of the important dominant species of KNP, was seen only 10 times during April 1999 rhino census, whereas special census for tiger conducted later during 2000 gives a estimated figure of 86 tigers. This can be compared with the figure of 80 tigers estimated during 1997 census of tigers.



Total head count—enumeration party takes job seriously.

SWEET—SOUR

Such large total visual head count cannot be all pleasant and sweet affair. In compartment No. B-7, enumeration party is attacked by a female rhino. The tusker Gabber gets frightened by the sudden attack of the rhino and runs away carrying party on its back. Pankaj Sharma, Forest Ranger, gets hit by a tree and sustains some injury. Likewise, Pradeep Bora, Forest Guard, falls down from the elephant and bitten by the rhino on the arm. Both injured persons are shifted to hospital for medical treatment. In compartment Haldibari 5-B, enumeration party is attacked by a solitary wild elephant. Mohim Hazarika, Forest Guard fires from his rifle and consequently fell down on the ground because of backfire. He sustains fracture in the arm and is shifted to Guwahati for treatment.

CENSUS SURPRISE

Critical analysis and interpretation of census figures is very interesting. Let us look at the population status of the 'Big-Five'. The Indian rhino clocked 366 in 1966, it went upto 1080 individuals in 1984 and further to 1164 + /-136 in 1993. The latest census (1999) gives 1552 rhinos in KNP. Likewise, elephants, the other pachyderms were 349 in 1966, the figure climbed to 523



Rhino census—fairly accurate.



When wheels give way to oars.

population of swamp deer is estimated on the herds basis. The last census of 1999 indicates 398 (350 to 550) swamp deer.

TIGER IN RHINO LAND

Close on the heels of rhino census, detailed tiger estimation is arranged in March, 2000. Earlier tiger census in KNP was conducted during 1972, 1979, 1984, 1989, 1993 and then during 1997. Much different from rhino census, pug mark census method was adopted for tiger population estimation. The population estimation for tigers as standardized all over the country is based on the method known as 'Co-operation Census' or commonly known as "Pug Mark Census", evolved by late S.R. Choudhury, former Field Director of Simlipal Tiger Reserve in Orissa. This method is considered cost-effective, fairly precise and has wide applicability.

While the tiger frequently visits areas around wetlands, river banks, paths of dry streams, foot path and animal tracks, it leaves good pug marks on wetlands or lands with loose soil. In some areas, where soil is not suitable to retain the pug marks and it is imperative to get some pug mark impressions, 'Pug mark Impression Pads' (PIP) are created at suitable sites. During enumeration, pug mark plaster cast and paper tracings are obtained alongwith stride and step, which gives useful information later on.

Like rhino census, this operation also needed good preparatory pre-census arrangements. Various officers and staff at Kohra were repeatedly trained to conduct census operations properly during January, February and March, 2000. Once detailed enumeration parties were constituted and each member knew his specified job, census equipment were distributed to them on 12th and 13th March, 2000. Actual census took place for about a week from 15th to 21st March, 2000. Since it involves careful estimation of a clever and highly mobile animal like tiger, who is seldom visible and leaves no pug marks in dry lands or forest areas with lot of leaf litters, it needs careful preparation and execution in the field.

heads in 1984 and then 1094 in 1993. The elephant population in 1999 has been estimated at 852 (800-1000) animals. The wild buffaloes has also shown an increasing trend from 1966 (471 buffaloes). The figure rose to 523 in 1984 and then marginally fell to 511 heads in 1993. The last census (1999) indicates an estimate of 1192 (800-1200) animals. Then, the



Wild Buffalo—about 1200 heads in Kaziranga.

The whole area was divided into 32 compartments within 7 blocks of the KNP notified area. Tiger takes long strides and does not recognise notified park boundaries. Twenty compartments adjacent to the PA boundary were selected outside the notified area of the park for tiger estimation.

Enumeration parties were nicely structured. Each team consisted of

a Co-ordinator, 2 participants, out of which one should be well-acquainted with the topography of the compartment. In some areas, a non-official participant, mostly a media person or an NGO is also co-opted in the enumeration team. During enumeration, 262 tracings were prepared of the pug marks and 137 Plaster of Paris pug marks casts were lifted, out of which after final scrutiny, 86 were retained for the purpose of studying various parameters.

March 2000, tiger estimation gives a figure of 86 striped large cat, out of which 33 are male tigers, 41 are female tigers whereas cubs number stand at 12. The park has a healthy male-female ratio of 1: 1.24 and there are 6.25% cubs in the total population of tigers. The park has a fairly high density of tigers, 18.60 tigers per 100 sq.km. or 5.375 sq.km forest is occupied by a single tiger. Mortality figure from 1977 to 2000 indicate a total death of 15 animals. There has been no report of tiger poaching in this park.

TRAGIC

While the tiger enumeration started with adequate preparations on 15.03.2000, Niren Saikia, Forest Guard and his two companions, J.N. Buragohain and Robin Nath were attacked by a female rhino with a calf, in Bagori compartment V. The rhino severely mauled Niren Saikia and spared him only when his 2 companions fired very close to the animals. It was an interior area and took some time to lift/transfer Niren Saikia to the Bokakhat hospital. The Forest Guard succumbed to the serious injuries received by the rhino attack and died on the same day. This was rather tragic and unfortunate beginning of the census operations. However, the tragedy did not dampen the morale of KNP staff and the tiger enumeration went on as planned.

KAZIRANGA FLOODS FRIEND AND FOE



In wallows, the animals huddle in the mud very close to each other, the snout of one touching the flank of another.

The Kaziranga National Park is situated in the flood plains of the Brahmaputra River and has formed by silt deposition carried out by different river streams flowing through it, over a long period of time. During monsoon season almost every year, the river system originating in the Karbi Anglong

hills and flowing through the park inundate large tracts by overflowing the banks and filling up low lying areas. At many places, the river bed, mainly of Brahmaputra river, has been raised by the 1950 earthquake and subsequently by gradual silt deposition, so much so, that the run off from the catchment area during monsoon cannot be contained in the existing water ways or channels of this river. As a result, floods have become almost an annual feature for Kaziranga. Depending upon the intensity of rainfall in the catchment areas of Brahmaputra and its tributaries, the floods of varying intensity are experienced in KNP. Due to various reasons, mainly the deforestation in the catchment area of Brahmaputra, the intensity of floods is on the rise.

Though the annual average rainfall in the entire upper catchment area of Brahmaputra river and its tributaries may not be very heavy in a year, the intensity of floods in its basin varies as per the intensity of rains in concentrated spells. When the rainfall is evenly spread over the entire 4 months rainy season (from June to September),



Mihimukh entrance of KNP-post flood scenario.

floods are weak and may not cause much damage. Sometimes, there is cloud burst or very heavy rainfall during a short time. This results in discharge of large quantity of water in the rivers. Brahmaputra and its tributaries in the plains are not able to hold so much of water. This leads to floods and submergence of large area of forests nearby.

Brahmaputra is the mightiest river in India. Hindus rever Brahmaputra as *Brahma's* son. Brahmaputra is considered as the only masculine river in India. The width of river Brahmaputra in the portion flowing along the northern boundary of the park is about a kilometre and does not have a well-defined bank all through. There are a number of *chapories* (river islands). The famous 'Majoli' island, is the largest River Island in the world. Such *chapories* are formed by silt deposition over hundreds of years.

FRIEND

The flooding of the park is both necessary and beneficial for maintaining grassland ecology and to prevent the ecological succession to climax forest types. The annual floods coupled with the burning of the grasslands are two important factors, which influence the vegetation of the park. Flood is responsible for creating different site conditions and formation, which are preferred for different types of vegetation. Such



lands, where the flood water does not dry up completely have formed swampy area or *beel* and support different type of vegetation, compared to such areas, which are annually flooded and the water dries quickly. The soil formation of different

Damage to infrastructure floods.

sites are also influenced by the floodwater. In some areas, it gives rise to clayey soil by alluvial deposits, whereas in some cases the flood controls and retards the process of soil development by depositing sand and thus creating different soil conditions, which are preferred by xerophytic plants.

Flood is thus an important factor for maintaining the present vegetation status of the park and for arresting any further progress in the process of plant succession.

During the flood periods, water bodies, lakes, beels in the park get new hatchlings of fish and other aquatic animals. KNP, thus, serves as a breeding ground for the fish and for replenishing the fish stock of Brahmaputra river. Water weed or water *hyacinth* is a menace for many water bodies in KNP. Large volumes of floodwaters, while receding, wash away some quantity of water *hyacinth*, which had been clogging many lakes, water bodies, *nalas* and *beels* in the park. D.M. Singh, Director, KNP, mentions that to get optimal benefit of receding flood waters, it is advisable to detach the water *hyacinth* from its roots and break it in smaller parts so that it can easily flow with the receding water. But this is a difficult operation, since the staff has to reach the *hyacinth* areas in country boats. And this is quite dicey in swollen rivers. Floods also recharge the water bodies and bring in fresh water year after year, which is so essential for the good health and sustenance of rhino and large number of animals and birds, which need water for their sustenance.



Mihimukh park entrance under water.



Makhna elephant knocked by truck on NH-7. Two friends help for its burial.

FOE

Floods have some negative influence on wildlife population, more so, when KNP gets heavy flood, as was experienced during 1988 and recently in 1998. At the onset of monsoon season, the animals, because of fear psychosis of getting drowned, start moving away from low-lying areas to higher reaches instinctively. As soon as the park is submerged by the flood water, the animals of low lying areas start moving towards the higher Karbi Anglong hills. Some of the animals migrating to Karbi Anglong hills have to pass through a few populated villages and also cross the national highway 37 (NH37) at many points. During such migration period, the hapless animals are highly vulnerable and make soft targets for the poachers. Many times, they are also killed by fast moving vehicles plying along NH-37. The villagers also, sometimes, lay traps or snares on the migratory paths of the animal to trap the unwary animals, which are seeking refuge at highlands to save themselves from drowning during floods. Many animals, mainly deer, perish due to being washed away during floods or due to lack of food since most of the grazing land gets inundated during floods. The floods mainly affect the grazing ground of deer and other small herbivores, which feed on short succulent grasses. Many animals die because of mal-nutrition as good, fresh grass is not available to them for a number of days during floods. There is replay of the migration dynamics once the floods recede and the rains bid good bye to Assam forests by September/October. Animals returning to Kaziranga habitat again form soft targets to poachers, snares, traps and the fast moving vehicles along NH 37. During floods, communication system and other infrastructure get badly affected. The road network and the maze of inspection paths get damaged and have to be redone every year.

FLOODS-1988

In August-September, 1988, there were heavy rains, which caused floods in Kaziranga. The park remained inundated for about 2 weeks, which took toll of 38 rhinos, 3 elephants and a large number of other carnivores and herbivores. The worst affected were the hog deer and wild boar, whose mortality figure reached upto 1,200. After the 1988 floods, a few artificial highlands were created within the park. Many

inspection paths and the roads were also raised to serve as shelters for the animals during the floods.

FLOODS-1998

This flood was really unprecedented and affected almost the entire park for good 13 weeks from June to September in 3 successive waves. There was practically no



During floods large number of rhinos, male, female and calves, are seen to congregate on highland, in a startling herd like formation.

breathing time between the waves. Large scale mortality of wildlife in the park was reported due to prolonged water logging in the park. A total of 39 rhinos perished during the floods. More than 500 hog deer, 22 wild boars and 23 wild buffaloes fell to the floods' fury. Among 7 elephants that perished during the flood, a male pachyderm was knocked down by a vehicle and the other six makhnas, subadult and calves died due to drowning. In some cases, while the adult animals could somehow reach higher places for safety, the young calves got separated from the mothers. One rhino calf, Lahorani was rescued, fed on bottled milk and later transferred to Assam State Zoological Park, Guwahati. During my recent visit to the zoo, I was happy to meet Lahorani, doing fine. In the wake of 1998 floods, army displayed good gesture by constructing 8 fairly large highlands in KNP, fairly close to national highway 37. Some of these highlands should have been constructed in interior areas in a scattered fashion.

EROSION

The mighty Brahmaputra, along the northern boundary causes severe erosion as also huge accretion by depositing silt during annual floods. These accretions gradually get consolidated as islands within the river and are colonised by tall grasses thus forming ideal rhino habitat. The parkland gets eroded by the floods. The park area is now considerably reduced. About 22 sq.km. of KNP has been lost due to flood erosion, in the last decade or so. This is the net forest loss after offsetting the accretion due to formation of new *chapories* or river islands. The park is shrinking, whereas the herbivores are increasing. This puts extra pressure on the limited food base for the animals. Brahmaputra Board, Indian Space Research Organisation, Ahmedabad, Engineering and Drainage Flood control Department, are appraised of the problem and have suggested short and long term measures to tackle the problem of recurring floods in Assam, which affects Kaziranga and other rhino habitats in many ways.

HABITAT DEGRADATION

Consequent to recurrent floods, many water bodies or *beels* have shrunk due to siltation. Deposition of sand in short grass areas, has degraded the grazing lands for deer and other soft grazing herbivores. Grasses that grow on such sandy formation are coarse, thick and not palatable to foraging animals. Large-scale invasion by weeds like *Mikania*, *Mimosa*, water *hyacinth* etc. is seen in many areas, again due to habitat degradation consequent to floods.



Sun set at KNP.



Marooned animals crossing NH-37.

RESCUE OPERATIONS

Bonal was posted at KNP during the 1998 floods. He recalls the pathetic, helpless situation during the floods. "I vividly remember that a batch of IFS probationers were on tour to KNP. The Mihi Mukh road was completely damaged by the flood. People from far-flung areas were helpless witness to damage being caused by the floodwater. KNP does get frequent floods, which inundate some parts of the Park by 2 to 3 feet. We

had never imagined that surging floods would submerge most of the park upto 15 feet.

Swamp deer and hog deer of the fringe area were trying to cross the road for migration to safer, higher reserved forests, somehow negotiating the flooded area, through Panbari, Haldibari, Kanchanjuri corridors. We could somehow control the traffic on the road and help several batches of marooned animals to higher land on Karbi Anglong side. It was virtually a day and night operation for the tired, exhausted animals. Co-operation and help rendered by the villagers and local NGOs in rescue operations is worth recording.

At Lahorani camp, a young baby rhino was seen being swept away by the surging floodwater. It was somehow rescued by the staff, who saw that the calf had some injury of a tiger bite. Perhaps the mother rhino had fallen prey to the tiger in a bid to save the calf. It was so young that the skin was still pink and soft. The calf was brought to Bagori Range and further to Kohra where it was hand reared for a few months. She was named Lahorani. The calf soon became darling of people. Whosoever visited KNP, would like to meet Lahorani. Later it found its way to Assam State zoo, Guwahati.

During the superfloods of 1998, I took stock of the situation in a speedboat. It was unbelievable that some of the protection camps were under 10-15 feet water and the staff was compelled to abandoned the camps for few days. It was during this period that KNP received national and international focus. While the animals could somehow stay put on a few highlands for sometime they had to move about for grass or fodder, which was not available due to prolonged waves of floods. Once the flood started receding, I visited various camps to assess the casualty and damage to infrastructure. It was heart rending to see many deer, wild boar and other animals lying dead. As we moved to Kholkholi camp on foot and then further to Alubari camp, more than 100 dead hog deer, wild boars, were seen. All such animals died due to surging floodwaters.

Some of my staff could see a herd of swamp deer being swept away in Brahmaputra. During my stay of 18 years in Assam and some 8 years in KNP, this was the first time

that I had seen such devastation caused by flash floods. On a high land we saw 4 dead Sambar, which were perhaps killed by the tiger. It seems that the large striped cat had good time during the floods. It would find several herbivores standing helplessly on same highlands, surrounded on all sides by water. Although many rhino, wild buffalo, swamp deer, hog deer have perished during the floods, these animals have re-established themselves in KNP. Nature has great resilience power and can rejuvenate quickly, if given proper protection and minimal biotic pressure. This is clearly brought out by the April 1999 rhino census and March 2000, tiger census in KNP.



Lahorani rescued and nursed—June, 1998.

FRIEND AND FOE

Floods for Kaziranga and other rhino bearing areas are both friend and foe. Normal floods which are almost annual feature of the mighty Brahmaputra, due to its shallow bed, loose, erodable banks, heavy human and cattle population in major villages along its banks, and vast hilly catchment, where some degradation always takes place, are welcome for KNP. The floodwaters recharge the water bodies and help in maintaining the tall grass ecosystem. Floods arrest progression to climax vegetation, which is not good for rhino and other associates, and does not make ideal rhino habitat. Excessive floods cause great havoc, death of wild animals and damage to infrastructure. Recent floods are a warning for all of us to take urgent steps to address to this problem in holistic way. The Brahmaputra bed is gradually rising due to siltation. Its tributaries bring more soil, boulders, and other materials, which result in siltation of the riverbeds and even blocking water channels. The gushing water makes new outlets and consequently more erosion occurs. All out efforts to rehabilitate the catchment and to reduce the biotic pressure may help to a large extent. Shifting cultivation and other unsustainable agricultural practices need be discouraged. Soil conservation, afforestation and other initiatives aimed at stabilization of fragile areas need to be taken up on fast track mode. Deforestation along the major rivers and opening of new habitations or other development projects should be opposed by one and all for saving the Rhino-Land.

CHAPTER- SEVEN

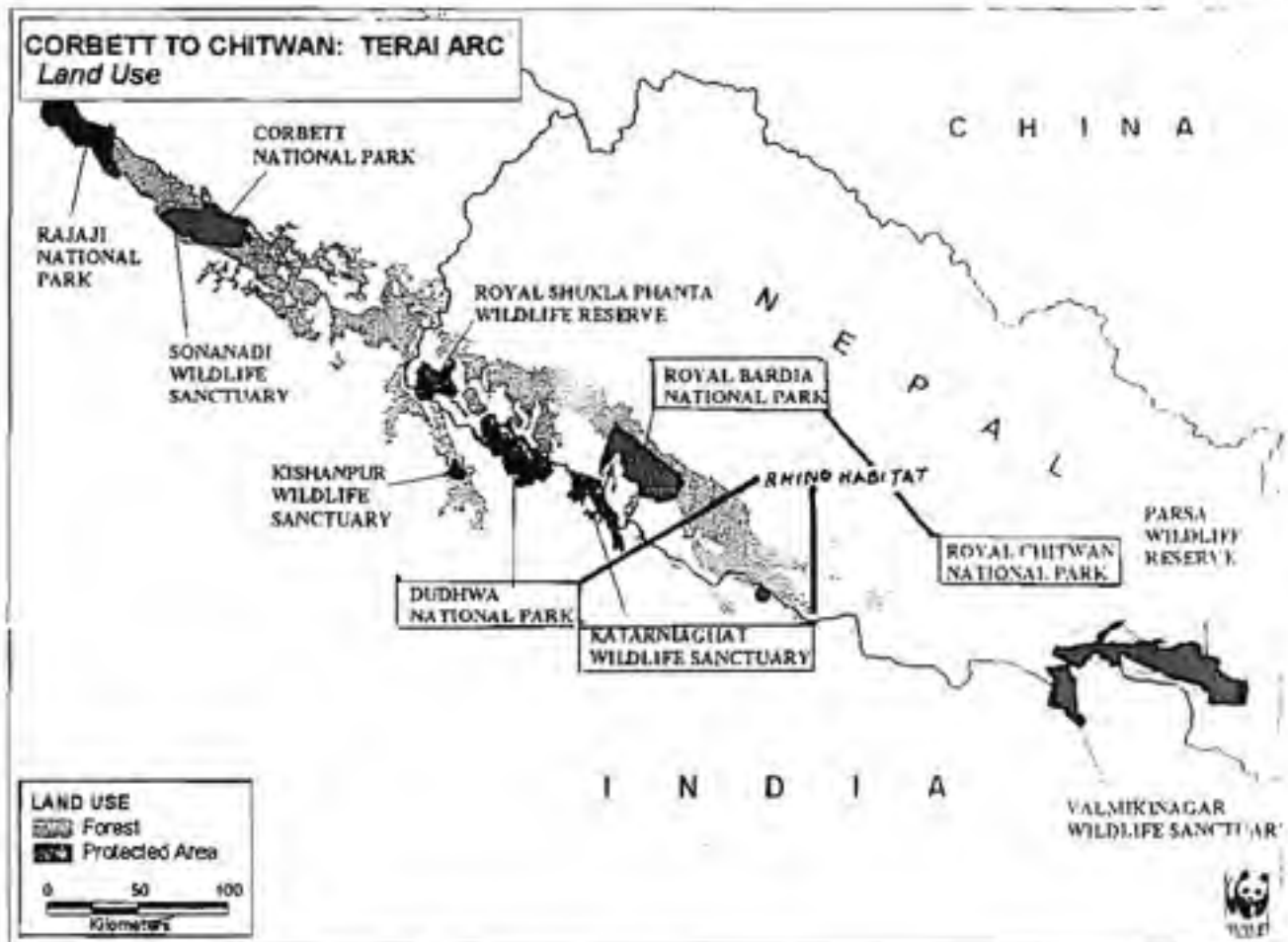
BEYOND KAZIRANGA



Indian Rhino—Jaldapara Sanctuary, West Bengal.

There is sweet and sour mix in the story of Great Indian One-horned Rhinoceros. The story has a *sour* rather sad prologue. The Indian rhino once reigned over large forests of Indus, Ganges and Brahmaputra basins and their flood plains. This monstrous animal

has been reported from Hindukush ranges in the west to Myanmar (former Burma) forests in the east. As time rolled by, the Indian rhino got confined to only the *Terai* arc, extending over vast forests and plains of Uttar Pradesh, Bihar, West Bengal and Assam. Fragmentation of the habitat, degradation and loss of forests due to population influx reduced rhino habitat considerably. Many flood plains were used for paddy and plateau lands went to tea gardens. By 1905, the Indian rhino, less than a hundred, roamed only in Kaziranga forests of Assam, with a counted few in small pockets of W. Bengal and other selected areas of Assam. Most of the rhinos have fallen because of sports pastime of the Royalties and the elite. It is understood that Col. Pollock, an Army Engineer, engaged in surveying and constructing roads in Brahmaputra valley in Assam, shot a rhino or the wild buffalo, almost daily for breakfast. Another record mentions that a British tea planter in Doars in West Bengal, shot 100 rounds on the helpless rhinos in a single day, putting one animal to sleep and injuring 25 other individuals. We Indians were not lagging in the war against nature. Maharaja Nripendra Narayan of *Coochbehar* had shot 206 rhinos during the period 1871-1907. The *sour*



story now takes a turn. Sincere efforts by the government, fully supported by many nature loving individuals, voluntary bodies, show results. The Indian rhino status rises from less than a hundred during 1905, to nearly 2500, as of now. This part is little sweet, but not *sweet enough*.

TERAI ARC

We are discussing about the present status of Indian One-horned Rhino. Suresh Sharma, the Wildlife Preservation Officer of India, explains that a few rhino populations are found wild in Assam, beyond Kaziranga, in some protected areas of West Bengal and two forest habitats of the Himalayan kingdom of Nepal. Sharma also mentions of a successful reintroduction effort made to build up the population of the *unicornis* rhino. All such areas form part of the earlier *Terai arc*, which now stands fragmented and degraded due to many biotic and a-biotic factors. Sustained efforts are needed to rehabilitate the old rhino habitats, facilitate congenial conditions, if we are serious to bring up a viable population of the Great Indian Rhino, and save it from extinction. Meeta Vyas, the Chief Executive of WWF—India, discusses with me a workplan of revitalising the *Terai Arc*, with the joint co-operation and involvement of India, Nepal and Bhutan.

ASSAM GORH

People of Assam love Rhino and take pride in protecting the affable Gorh (rhino) and its habitat. Kaziranga is a unique success story, and the Assamese have made sacrifices to make it happen. Revival of rhino from a dozen animals status to some

1600 in Assam has not come about for a song. Forest staff and protection workers have shed blood and withstood many hardships. B.S. Bonal, my colleague in the Ministry, has served in many forests of Assam. He briefs me on the rhino habitats, other than Kaziranga, where rhino was found earlier. In some of these areas few rhinos are still there but sustained protection and conservation efforts are needed to have viable population blocks in such areas. S.P. Singh, earlier Joint Director, Project Tiger, is currently involved in Wildlife management in Manas National Park. He mentions that a few stray rhinos are still found in Laokhowa wildlife sanctuary. He is rather sad on the status of Manas National Park, where rhino has seen very rough weathers due to disturbed socio-ethnic conditions in that part of the state. During the recent IUCN sponsored regional Meeting for India and Nepal of the Asian Rhino Specialist Group, at Kaziranga, S. Doley, the Chief Wildlife Warden, Assam, made a presentation on the rhino situation and action plan in Assam.

Kaziranga National Park has some 1552 rhinos. Serious anti-poaching initiatives by devoted staff and timely help by the nature-loving people of the Kaziranga and nearby villages has shown good results. The park has registered a population rise of about 350 rhinos, from the 1200 animals of 1995 to the present 1552 individuals. Despite many difficulties and lack of adequate infrastructure, the staff and workers posted at 130 anti poaching camps, are performing the arduous duties fairly well.

Pabitora W.L. Sanctuary provides home to 76 rhinos. Before we go further into this unique rhino habitat, that carries the *highest* density of rhino per sq.km, in the world. It would be better to talk about the location, lay and other parameters of this protected area. The present sanctuary was formerly only a grazing area, kept aside for grazing needs of Pabitora and other villages, under relevant provisions of Assam Revenue Code. The villagers urged the government to constitute it as wildlife sanctuary, over the forest area of 38 sq. km. Even before legally constituting it as a sanctuary in 1978, the wet alluvial grassland and the flood plains of Pabitora, attracted several wild animals including the rhino. Being fairly close to Guwahati, the sanctuary was identified to be developed as *second* home for *Sangai*, the Brow antlered deer of Manipur. I exchanged notes with M.K. Ranjitsing, who has made studies on Sangai deer. He informs that the ambitious plan of introducing the Manipuri deer in Pabitora, has probably not taken off as desired.



The entire area, under Pabitora wildlife sanctuary, is part of the Brahmaputra floodplains. Being low lying, it is subject to annual floods. There are no highlands or large hillocks for shelter during floods. Two rhino calves were lost during the floods of 1998. Gauranya

Sat Simalu in
Orang Sanctuary.



Beel and the Haduk *Beel* are the main sources of water in the sanctuary. While the floods recharge the water bodies, lot of silt load is also brought with the floods, which causes siltation of many swamps, which are the favoured wallowing sites for the rhinos. The sanctuary has about 13% treeland, 72% grassland and 11% waterlogged area. D.M. Singh, Director Kaziranga National Park, adds that ideally, the water bodies or *Beel* should be saucer shaped so that the receding water, during summer, promotes growth of new flush of plants and grasses. Population dynamics of the rhino makes interesting study. The sanctuary, which had 54 rhinos in 1987, registered strength of 68 during 1995 census, which rose to 76 animals in 1999. The core area under the sanctuary, under intensive management, is about 16 sq.km. This population density of about four rhinos per sq.km., is perhaps the *highest* in the world and calls for serious planing and protection. Some of the adverse factors the sanctuary faces, include excessive live stock grazing, which, apart from causing competition for fodder, also transmit communicable diseases like foot and mouth, rinderpest, anthrax etc. Annual floods and consequent siltation, encroachment and fragmentation of habitat is a serious threat to the sanctuary. Being fairly close, about 60 km, to Guwahati, poaching pressure is also considerable. There have been highest cases of rhino deaths by electrocution in this sanctuary. Even poisoning in 1987, killed two rhinos.

Pradeep Hazarika, who has managed the sanctuary for a couple of years, talks of good eco-tourism potential of Pabitora. It is close to Guwahati and deserves careful tending so that it forms part of tourism package with *Kamaksha* temple, *Sankardev* Cultural Centre and *Tirumalai* temple, for any one visiting the city, even for two days. We need to create some infrastructure, like reasonably priced clean accommadation, a few elephants for conducting the tourists on wildlife *darshans*. There is need to



bring Pabitora in the limelight, as the richest rhino land. We need to encourage the local people to pep up a small bed room in their house for renting out to tourists. They can conduct them to the wild wonders of Pabitora early morning and evenings on elephants, and entertain them with Assamese rich cultural extravaganza and local food in the evening. He suggests that due to limited carrying capacity of the area, some of the rhinos can be translocated to a few rhino habitats like Sonai-Ropai, Pani-Dihing, Dibru-Saikhowa, Laokhowa Burchapori. B.N. Talukdar, a keen wildlifer of Assam has served in many protected areas. He mentions that Pabitora should be managed and developed as a rhino nursery, from where rhinos may be translocated to other rhino habitats for building up viable populations with wider gene base.

Orang National Park deserves special mention. It was once considered as the second largest rhino habitat in Assam, next to Kaziranga, but has lost considerable habitat and the rhino population over the years. The Park is about 65 km from Tezpur and can be reached by NH 52. The last 25-km road is gravelled and takes about an hour to drive on this stretch. Once an abandoned village, the area was declared as a Game sanctuary in 1915. It grew up as Orang Wildlife Sanctuary, over 75.60 sq.km. in

1985. Importance of wildlife protection and conservation of natural resources, led to the formation of Orang National Park in 1999. Bankwal the young wildlifer, who has managed Orang Sanctuary when he was posted at Mangaldoi, comments that Orang has a *small* habitat for the *large* rhino. Since management of wildlife transcendent the parks limits, there is need to involve the human population living along the fringe of the protected area and make them stake holders in the protection of wildlife and its habitat. They should not see Park as competitor for sustenance. They should be helped to see the Park as complements or as benefactor. Bankwal further adds that the spearhead team of eco-development activists should have the capacity of carrying out social engineering in the fringe villagers finding an ally in the Park, rather than an adversary. Orang, which offered habitat to about 90-100 rhinos few decades back and had 65 rhinos even in 1985, carried only 45 animals in 1999. This dismal picture can be improved and repainted by making concerted efforts for eco-restoration and active involvement of people. The foremost need is to sensitise forest personnel



Orang—the flourishing rhino habitat.

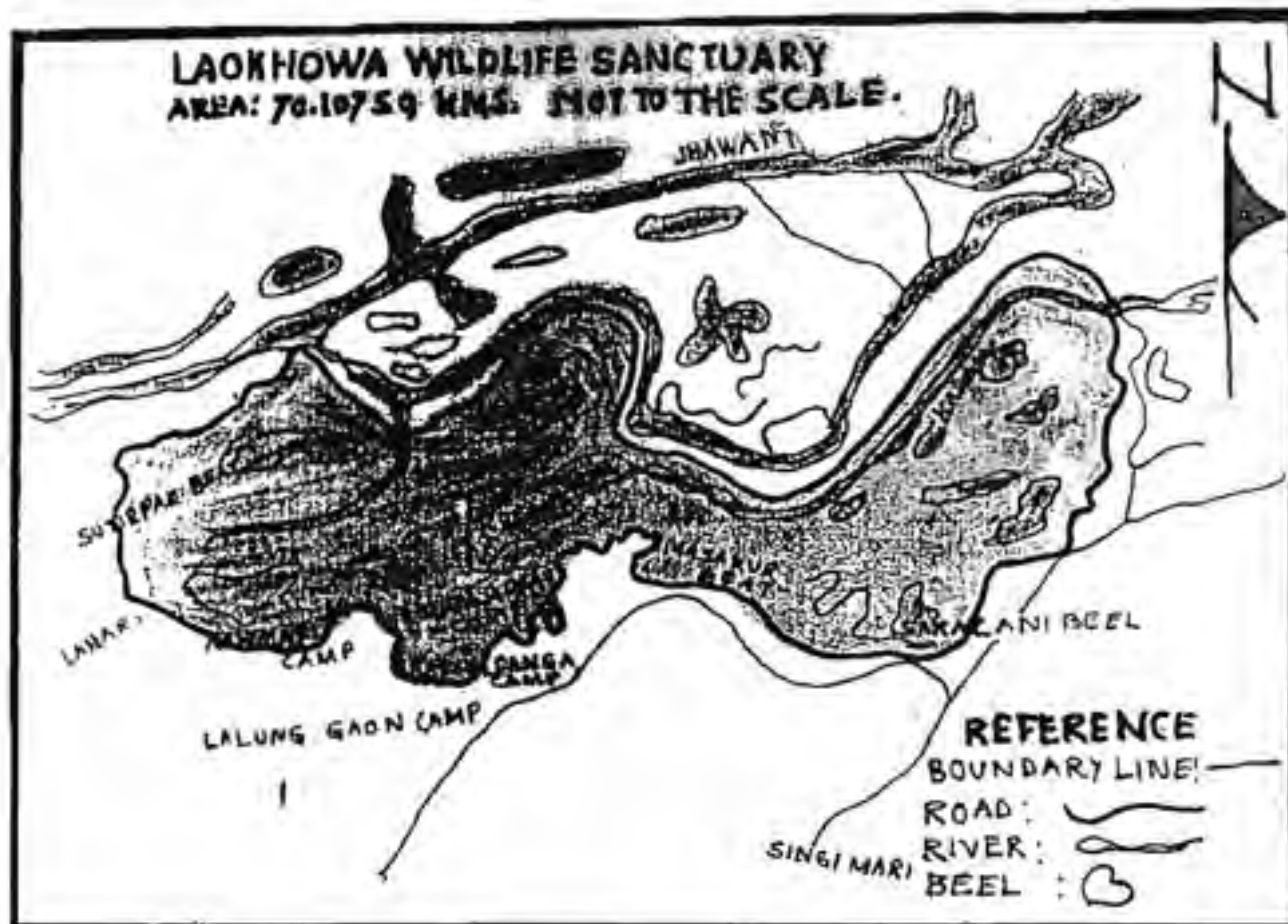


[Courtesy: Assam Forest Department]



to the desired shift in management techniques. Our forest personnel also need upgradation of the socio-economic and communication skills. Local youth and well meaning NGOs representing major social groups, need to be involved in the eco development programmes which should be demand driven rather than supply driven. C.R. Bhobora, Divisional Forest Officer Orang National Park, feels that the eco-tourism potential of the Park can be enhanced and optimally used by improving the 25 km approach road to the Park and providing simple accommodation and wildlife touring facilities. He feels that it would be better to encourage the local people to create such facilities at reasonable rates so that financial gains of nature tourism flow to them and make them stake holders in the process.

S.P. Singh, Director Manas National Park paints a gloomy picture of this protected area, which has the richest bio diversity as the habitat of the endangered species like Pygmy hog, Hispid hare, Bengal florican and rhino. Singh adds that the wild buffalo of Manas holds the pure gene pool and is much larger and imposing when compared with those of Kaziranga or other areas of Assam. Prior to the beginning of the ethno-political uprising during 1988-89, the rhino population in Manas was around 90. The present status of rhino, the pride of Assam, may not even reach two-digit figure. The Park saw the worst poaching time during 1992-94, with 11 rhino poached in 1992, followed by 22 poaching cases in 1993. The poaching spree did not end here. Another 4 animals were put to death in 1994. Things cooled down a bit later but the rhino population had reached such low figure that it became difficult to locate it even for poaching. It is now widely guessed that there may not be any rhino in the Park now. Bhattacharjee, Director State Zoo, Guwahati feels *happy* about some news that a rhino was poached in Manas about two months ago. It reaffirms that rhino *still*



exists in Manas and can stage a come back if provided adequate protection and proper habitat improvement. S.P. Singh, while making a presentation for the recent meeting of Asian Rhino Specialist Group, highlights the importance of eco restoration of the habitat as a pre condition for revival of rhino population in the park. Singh emphasises urgent need to repair the degraded habitat of Panbari and Bhuyanpara ranges. Even the habitat of Bansbari range is below the threshold level. He strongly feels that a small contingent of armed paramilitary forces, needs to be deployed at Uchilla and other vulnerable places to assist anti poaching operations. He also calls for a census in the park to assess the population of rhino. This would help in planning management of wildlife in the Park as also the need and efficacy of translocating rhinos from other habitats to build up a viable population unit in Manas.

Laokhowa Sanctuary is a sad story of annihilation of more than 40 rhinos in a few months. The year 1983 is dotted in black letters in the history of one horned rhino conservation in India, that prides in having more than 65% rhinos of the world. Laokhowa wildlife sanctuary in Nagaon district of Assam is more accurately described in the *past tense* in terms of rhino bearing area. As per Forest department records, the sanctuary virtually lost all the rhinos in 1983. The last rhino was reported dead in Oct. 1991. At one time, the 70 sq.km.

Indian Rhino—telescopic view.



MAP OF K.N.P. SHOWS THE CAMPS INSIDE THE NATIONAL PARK

Area : 429,930 sqkm



Laokhowa sanctuary had the third largest rhino status in the country, next to Kaziranga, and Orang. As per some sources, as many as 68 rhinos were put to death by poachers during the 12 years period 1980-1991, the highest being in 1983, when the poaching graph touched all time high of 41 animals. Today it is a big zero. Some people attribute this large scale slaughter to ethnic violence in the state at that point of time, it is also some laxity on the part of the park management and police personnel, who had given a good bye to the basic protection and conservation ethics and let the things just go on. Doley, the Chief Wildlife Warden, believes that it is still possible to restore the old glory to Laokhowa. Apart from the poaching threat, encroachments, cultivation and floods also adversely affect the sanctuary. During discussions, it is learnt that earlier all the four rhino bearing areas like Laokhowa, Orang, Pabitora and Kaziranga, were inter connected by corridors, often used by the migrating wildlife, including of rhino, for food, during flood inundation or other factors. Most of such corridors have since gone to paddy cultivation, tea gardens or other developmental/habitat degradation works. This fragmentation of habitat or non availability of corridors, have led to more poaching and deaths of animals apart from animals straying out in the cultivation fields, and thus increasing man-animal conflicts. Traffic India, in the study, *Under Siege*, has highlighted the extreme biotic pressure on the sanctuary due to many habitations within and on the fringe of the sanctuary, with their large herds of cattle. These cattle heads and the villagers' needs for minor forest produces and fishing constantly impinge upon the sanctity of the protected area and degrade the habitat at a fast rate. The study suggested that in order to revitalise Laokhowa, the state government may as well constitute the adjoining Burha Chapori as sanctuary so that both the areas can be developed as well knit rhino habitats.



Indian Rhino—on vigil.

forest area of 88 sq.km. The period of late sixties and early seventies recorded about a dozen rhinos, which cannot be considered as viable population. During nineties also, the figure just remains about a dozen animals. Dey cites large interface between the sanctuary and the revenue villages, due to irregular shape of the sanctuary, as the

many nature lovers between Oct. to April. This sanctuary is presently considered relatively safe from poachers, when compared with Assam rhino habitats. For Gorumara National Park, the rhino status has been below the two-digit mark upto 1964. The Park lies 80 km to the west of Jaldapara, at the confluence of Jadakha and Murthi rivers. Initially constituted as wildlife sanctuary in 1976 over an area of 8 sq.km., Gorumaru was upgraded to National Park by a notification of 1994, covering



main cause of man-animal conflict and consequent poaching of the rhino and other wild animals. Both the rhino habitats are fairly close to international borders with Bhutan and Bangladesh. This further adds to poaching of rhino and

Indian rhino happy in Gorumara National Park—West Bengal.

transboundary trade of rhino horn. Due to irregular shape of the protected areas in the state, effective protection has not been possible. Grazing of cattle from the fringe villages in the periphery of the sanctuaries exposes the rhino to cattle borne diseases. A.K. Raha, Conservator of Forests, Wildlife, during his presentation to the Regional Meeting of the IUCN SSC Rhino Specialist Group, highlighted the urgent need for establishment of strong intelligence network and creation of a secret fund so that the information can be bought, without divulging the source of the information. The anti poaching squads need to be properly armed to challenge and if needed, take on the poachers and smugglers of timber and wild life products. Due to irregular shape of the Park, surrounded by human habitations on three sides, rhino population keeps varying. Dey feels that there may now be only 19 rhinos in the Park. Such small population cannot be considered a viable unit, and all protected areas may not stage a comeback, as happened in Kaziranga and in Gir. Biotic pressures and the socio-political situations have since changed a lot.

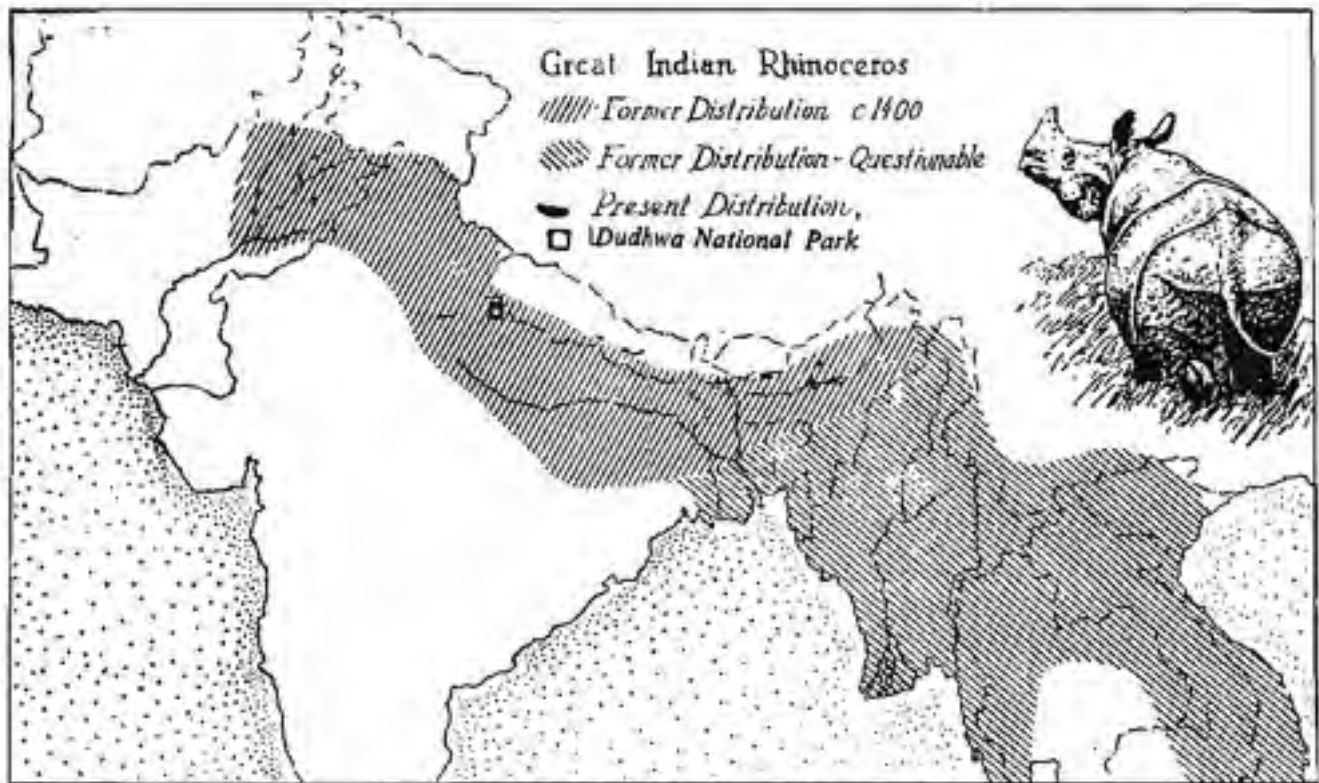
UTTAR PRADESH

Suresh Sharma, currently Director Wildlife Protection for the country, has been involved in the wildlife management in Uttar Pradesh for some decades. He recalls the reintroduction of Indian rhino in Dudhwa National Park, a good habitat for rhino. He mentions that rhino herds were found in Dudhwa and other *Tarai* forest of the state around 60 years ago. The burly animal has disappeared from the forests, thanks to trigger happy *Rajas*, ex-rulers, the British Excellencies, and the clandestine poachers. *Tarai* tract, being very fertile, many forests were diverted for cultivation and other land uses. The cumulative effect is very obvious. Rhino bade adieu to UP forests for good. Some parts of the original habitat are still intact.

The year 1983-84 saw the reintroduction of rhino in Dudhwa. First time effort, well planned and designed by national and international experts, bore results. Six rhinos of Assam and Nepal origin introduced in two stages have settled down. The present population stands at 15 mammals. Ram Lakhan Singh, the Chief Wildlife Warden gave useful inputs on the reintroduction process and the initial teething troubles therein. Few rhinos stray out to cultivation fields, and cause man-animal conflict. This population of 15 rhinos is not considered as viable gene pool. The small population



Indian rhino—Reintroduced in Dudhwa habitat.



Map showing location of Dudhwa National Park.

of rhinos as it exists today, attracts all likely threats generally applicable to a small population in the wild. A few natural events have the potential of severally effecting the future survival of the reintroduced rhino population. Owing to small population structure, a lone bull at Dudhwa often attacked other male rhinos. One bull was badly injured while the other succumbed to the injuries as a result of wrath of the angry bull. This rogue bull had also attacked an adult pregnant rhino and its earlier suckling calf. There are obvious problems of a small population in the wild. We should



Elephant patrolling outside Dudhwa fencing.

introduce more rhinos of proper mix so that Dudhwa comes up as another rhino conservation area like Kaziranga or Pobitora or Jaldapara, for that matter. R.L. Singh, Chief Wildlife Warden, says that the initial seed population of 7 rhinos (2 males and 5 females) has further narrowed due to the death of a male. He suggests evaluation by an expert committee and advise on continuation of electric fencing around the rhino reintroduction area. Singh also calls for introduction of new blood stock at Dudhwa to have a viable population unit.

KATARNIA GHAT

It is another rhino habitat, not very far from Dudhwa. Sometimes a few rhinos are seen here. Established in 1976, this less known sanctuary near the Nepal border, has good swamp deer habitat, which is also shared by rhino.

NEPAL GAINDA

Indersingh Karki, Director General of Forests of Nepal, has been asking me to visit Nepal and the Royal Chitwan Park for a quiet rendezvous with nature. It somehow did not click. He gave useful information on the wildlife conservation efforts in Nepal. Dr. Tirtha Maskey, Director General, Department of National parks and Wildlife Conservation, makes a focussed presentation on the status of rhino in Nepal, with special remarks on reintroduction of Indian Rhino in Royal Bardia National Park. This park, sited in the Terai basin has been the flagship wildlife area of the Himalayan kingdom. The Chitwan rhino population, which stood at about 1,000 in 1950, nose-dived to 60-89 by 1962. Large forest areas were cleared for malaria eradication. Poaching of the poor rhino for its horn also took toll of the wildlife in Nepal. Strict measures, however, reversed the trend. After sustained protection measures for 25 years or so, the Royal Chitwan Park now holds a viable population of some 600 rhinos. Thus there has been a growth rate of 3.7% over 1975 figure of 270-310 animals. But all is not rosy at Chitwan. Some poaching goes on in the Park due to many factors. This cruel activity went high in 1992, when 9 rhinos fell to the bullets of the cruel poachers. These dark hours' operators, fix silencer to the automatic firearms so that the mighty pre-historic mammal can be put to sleep, and its horn hacked off, with professional smartness. What a pity. Royal Bardia National Park in Thakurdwara, is another success story of reintroduction of the rhino. A total of 38 rhinos were translocated from Chitwan in 1986-88 in different phases. Nine rhinos fell to poacher's bullets and 8 calves also died. As of now, the rhino population stands at 62, which can be considered and managed as a viable population, with adequate care and protection.

SPECIES CONSERVATION

Rhino population that had nose-dived to just a dozen in Kaziranga, at the turn of the 19th century, has bounced back to somewhat respectable figure of 1,552 animals. The total population of Indian rhino in India and Nepal today is about 2,433 individuals. But this is not a viable population for a large mammal like rhino that is constantly under threat of extinction due to poaching, mainly for the horn. IUCN, Indian Rhino Specialist Group, recommends to build up a population of 2,500 rhinos in the wild in at least 10 populations of minimally 100 rhinos each, with an ultimate objective of 5,000 individuals. Both India and Nepal, partners of *Terai* arc, need to seriously strive to conserve and save the only living link with our past.

REINTRODUCTION

Late M.D. Chaturvedi, the renowned Forester of yester years and the first Indian Inspector General of Forests, in his paper "The Vanishing Rhino in India", felt rather



Assam rhino on Dudwa 'yatra'.

sad to find the Indian rhino on the road to extinction. He thus writes, "India owes not only to itself but to the world at large to save from extinction its only surviving link with its ancient past in the shape of one horned rhino. It would

be advisable to disperse this national asset in other suitable areas as an insurance against any mishap that might overtake the helpless animal in its existing haunts which are only too prone to natural calamities like earthquake and floods. If the rhino can breed at the zoos at Whipsernade and Basle, it can look after itself in other more hospitable regions of India and elsewhere."

The advice tendered by the legendary forester, wildlifer and conservationist Late Chaturvedi was blissfully heeded by Uttar Pradesh government which reintroduced rhino to Dudhwa National Park in 1984. Five rhinos initially inducted into the Park, have multiplied to 15 animals. This is one of the success stories in the field of wildlife.

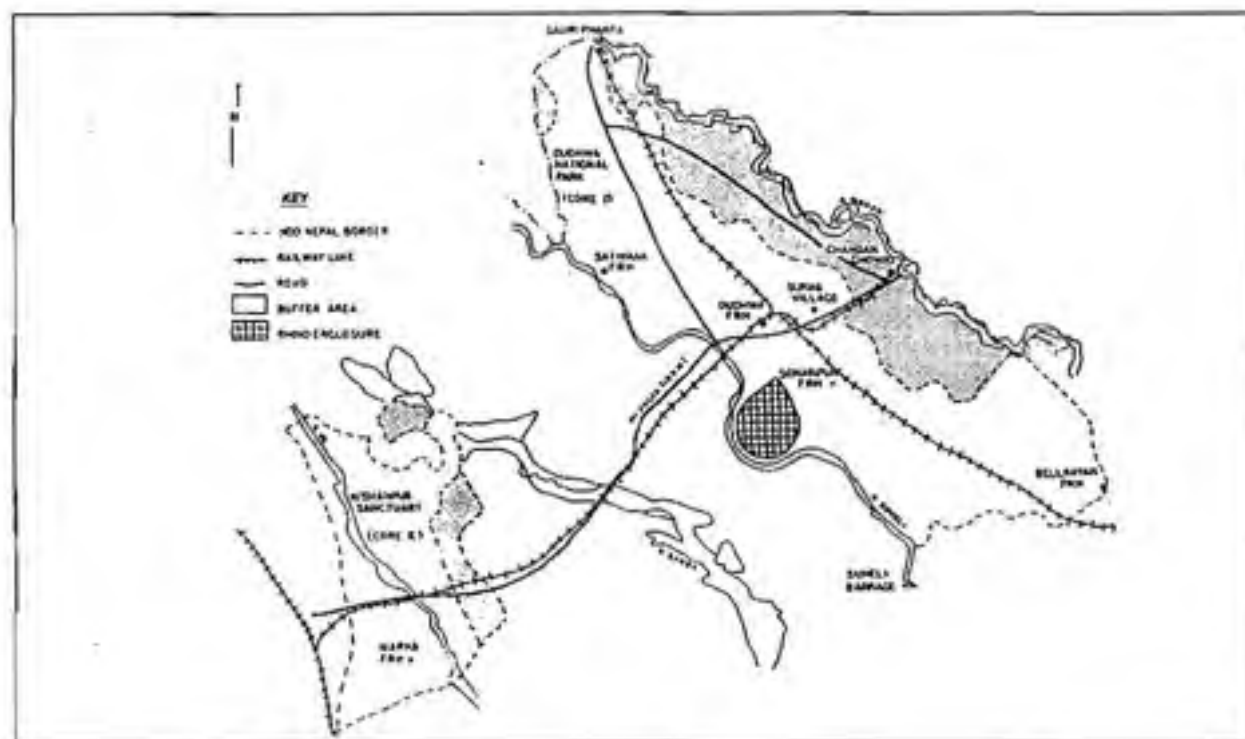


Assam rhino reaches Dudhwa.

I seek further information from Suresh Sharma, Director Wildlife Preservation, about reintroduction of species. He explains that as per IUCN specifications, reintroduction is the international movement of an *organism* into a part of its native range, from which it has disappeared or become extinct as a result of human activities. The IUCN Species Survival Commission lays down criteria for the purpose of reintroduction. Reintroduction may be tried in an area, in which it was indigenous before extermination by human activities. Such efforts are particularly useful where a species has become extinct due to human persecution, over harvesting or habitat deterioration. Further, reintroduction may be tried where the original causes of extinction have been removed. Sharma adds that reintroduction should only take place where the habitat requirements for the species are satisfied. The basic programme of reintroduction should consist of a feasibility study, a preparation phase, followed by the actual release phase and then the follow up phase. The subtle difference between introduction and reintroduction of a species is that reintroduction refers to the former range of the species.

DUDHWA STORY

The Asian Rhino Specialist Group of the IUCN met in Bangkok in 1979, to analyse the situation of the three Asian rhino species and to plan the survival of as many population units in suitable areas. In the case of the Great Indian Rhinoceros, efforts were made to identify new areas suitable to harbour additional population units of the rhino and to establish such units by translocating from over-populated areas. Among other candidate areas for reintroduction, Dudhwa Wildlife Sanctuary topped the list and met most of the parameters for reintroducing the Indian rhino. After detailed study, the suitability of Dudhwa was confirmed by Prof. Schenkel, Chairman, SSC, Asian Rhino Specialist Group. R.L. Singh, Chief Wildlife Warden, U.P. explained that



Map of Dudhwa National Park (part), showing rhinoceros enclosure.

the food status at Dudhwa was surveyed by the Botanical Survey of India, (Hazra and Shukla) who confirmed that the forest tracts of Dudhwa, could eventually support some 90 rhinos, on sustainable basis. R.L. Singh happily gave details of Dudhwa National Park, which is so close to his heart. An area of 25 sq.km, properly fenced by electric fencing within Kakhraha block, forms the Rhino Release Area-RRA. It has a typical Terai habitat of mixture of tall wet grassland and woodland with ten perennial swamps. Thus the forest tract forms the ideal habitat of grassland, some high forest, flood plains and swamps.

YATRA

Assam forest officials under the aegis of IUCN, identify about 10 rhinos living outside Pabitora Sanctuary, who were often found crop raiding and causing difficulty for protection. D-Day arrives! 11th March 1984. Three animals are captured by chemical immobilisation and transferred to the holding stockade, not far from State Zoo, Guwahati. Three more animals are captured and brought to the stockade. After initial inhibition, the animals start taking normal feed in the stockade. On 30th March the Dudhwa Yatra starts, aboard Aeroflot IL 76, Cargo aircraft, chartered by the Govt. of India. Comfortable, two hours' flight brings the monstrous mammals to Delhi. Further journey to Dudhwa is arranged by road. The five rhinos reach Dudhwa in good shape. So far so good. A female rhino takes ill. She worsens and dies after 11 days. Vinod



Crated rhino in holding stockade.

Rishi, the die hard wildlifer, explains the thrill of flying with rhino co-passengers from Guwahati to Delhi, aboard Aeroflot IL-76.

NEPAL TO INDIA

Dudhwa is propped up as a vigorous breeding nucleus. The Asian Rhino Specialist Group decides to introduce fresh stock from a different population. His Majesty's Government of Nepal are magnanimous to exchange 4 adult male rhinos for 16 domesticated Indian elephants. By selecting only male rhinos from Nepal, the reproduction potential would be increased manifold. Mating of these animals with the Assam cows should give maximum genetic vigour. Four animals are captured by drug immobilisation from Royal Chitwan National Park between 28-31 March 1985 and immediately driven to Dudhwa in separate wooden crates.

NEW HOME

Two of the total nine rhinos translocated to Dudhwa, can not stand the rigour and inconvenience of drug immobilisation, capture and long air and road journey, and perish. One elderly female had not been feeding well even in Assam since its capture. It starts losing weight and does not recover despite vitamins and other support therapy. It dies after 11 days after abortion of a dead foetus. The other female, which was in good form, develops a limp and a nagging open sore on the back. It does not recover despite minor surgery and other treatments. The other seven rhinos are in good health and have been procreating. They have since multiplied and the present rhino population stands at 15 animals. Dudhwa was an effort for reintroduction of Indian rhino in the Terai forest where it reigned even during early twentieth century. Nicely taken up and

properly followed up, the reintroduction initiative should result in the first viable population of *unicornis* in central north India. Further this venture has brought forth many unforeseen issues that should be properly resolved before such translocation or reintroduction is actually implemented.

V.V. Savarkar, Dean Wildlife Institute of India has studied the re-introduction effort for Dudhwa. He has many interesting stories on reintroduced rhinos at Dudhwa. "This population of rhinos in Dudhwa had two males; the dominant was named Raju and the other named Bankey. The latter began challenging Raju sometimes during 1987 and in one of the fights Raju lost his horn. Though the Indian rhino does not use its horn

in a fight, horn could be sometimes lost while the animals fight. The immediate change was that, minus the horn, Raju lost its rank as the dominant male and never stood his ground thereafter in the presence of Bankey. Earlier though the fights were serious, Raju had successfully defended his status. This changed dramatically after the loss of the horn. It, therefore, appears that the horn is significant in the sociology of the Indian rhino. Of course, to establish its veracity a large number of examples need to be referred to. Bankey kept chasing away Raju every time he was anywhere near. In fact, he actively sought him out, chased and proceeded to bite him severely. Several times Raju broke out of the power fence that enclosed the rhino area. There was some evidence of a process of regrowth of the horn. In the last encounter with Bankey, Raju was injured very severely and died shortly thereafter during late 1988."



ROYAL BARDIA

Another effort is made in Nepal. Over the years the population of the Great Indian One-horned Rhino, has dwindled in Royal Bardia National Park, in the Himalayan kingdom of Nepal. His Majesty's government, lays high priority to promoting nature tourism. Star attraction has been the Royal Chitwan National Park, which is habitat to nearly 600 rhinos. Royal Bardia National Park being the home of rhino for long, has adequate food base and other parameters for rhino land. After careful planning, the stage is set to launch rhino in Bardia. Let us talk first on the vital details of Royal Bardia National Park, Thakurdwara. Upto 1969, Bardia had the status of Royal Hunting Protected forest, which was later constituted as Royal Karnali Wildlife Reserve (348 sq.km.). During 1984, another 626 sq km., was added by way of extension of Babai valley and East Chisapani. Finally, the year 1988 saw the notification of Royal Bardia National Park. The Park, apart from playing home to 38 species of mammals, and 25 reptiles, has a rich assortment of about 400 birds species. The Park also offers

panoramic view of Babai valley. In all 38 animals were reintroduced in Royal Bardia National Park, 13 Animals were released in 1987, while the other 25 were released in Babai valley, during 1990. Rhinos initially find rough weather in the new home. Poachers took toll of 4 male and 5 female animals. Three rhinos died natural death. There have been 29 additions during the last decade as the breeding pairs get active to perform. Again due to inadequate nursing cares in wild, 8-baby rhino didn't reach the sub-adult stage. As of now 62 rhinos, inclusive of 10 rhinos translocated from KNP in 1999 have well adapted to the new home Bardia, and are doing well.

LESSONS LEARNT

The small population build-up at Dudhwa is susceptible to the threats generally associated with small population groups. A lone bull generally in bad moods has been attacking other animals. During these free-for-all fights, two less robust bulls were injured, one died. Another female pregnant cow and her young calf also fell to the rogue bull's wrath. To deal with such a situation, another RRA-rhino release area, Bhadital could be developed. Here a fresh batch of 2-3 female animals could be released with a bull. This RRA should receive a few rhinos from Dudhwa also, to break the bondage between individual rhinos at dudhwa. We may plan to have more animals of Nepal, Assam and West Bengal genetic base in Dudhwa and Bhadital. R.L. Singh, Chief Wildlife Warden of UP suggests that Dudhwa experiment is now about 16 year old. It is time that the reintroduction effort may be monitored by a team of Indian and International experts. The Experts Committee, apart from making an evaluation of the species survival effort, may also suggest the addition of more rhinos to the existing 15 animals, for a wider genetic base. The feasibility of removing the electric fencing in a phased manner also needs to be examined. Bonal suggests a few more suitable habitats like Sonai-Rupai, Pani-Dehing, Dibru-Saikhowa, Laokhowa-Burachapori etc., to be taken up for rhino reintroduction. We also need to develop system for close monitoring of the status and procreation of the rhinos in the RRA. Poaching, degradation of forests due to encroachment, heavy influx of secondary species of plants and unpalatable weeds like *Lantana*, *Eupatorium*, *Micania*, Water hyacinth, and *Ageratum*, have to be taken care of. In many cases rhino population has gone down due to cattle borne diseases like rinderpest, foot and mouth and anthrax. All out efforts are needed to keep the cattle away from the RRA. Though tiger and leopard generally don't have row with this pre-historic monstrous mammal, Subhash Dey cites of a few cases of the large cat attacking the calf or sub-adult rhinos.

REINTRODUCTION

Species Survival Commission of International Union for Conservation of Nature and Natural Resources, IUCN, suggest reintroduction as one of the tools for facilitating survival of certain species whose number in the wild has reached critical levels. For mega species, like rhino, there should be at least 2500 animals, in fairly large population groups, for good genetic base and some guarantee against extinction during next 100 years, with adequate protection to the species and its habitat. We need to further improve upon Dudhwa experiment and plan reintroduction in other rhino habitats.

TOURISM



Rhino view—through elephant trunk.

We are discussing nature tourism with D.M. Singh the Park Director. He explains the peak and low of tourists' inflow even during the open months of Kaziranga National Park, November to May. Nature tourism dips down whenever the ethno-political disturbances increase in the state. It takes a couple of days to re-establish the tourist flow. Singh adds that

the tourist flow is generally high during March to May months when the school or University examinations are over. These summer months also offer better visibility due to low shrubs, grasses and other vegetation cover. There are fewer waterholes, so most wild animals reach there for drinking water and for cooling off. This increases the visibility of wildlife near the water holes.

RETROSPECT

D.M. Singh prepares an interesting presentation on the inception of rhino tourism. The dawn of rhino conservation in the Indian sub-continent started in 1905, when Lady Curzon visited Kaziranga forests to observe a dinosaur like pre-historic animal. The Lady, who was observing the rhino from a distance, on elephant back, insisted that she had seen an elephant. She was brought near the area where the rhino was seen. It was explained that while the elephant has four toes on each foot, the rhino

has only three toes on the feet. The Lady persuaded Lord Curzon to take steps to protect the giant Goliath, living fossil animal. Kaziranga forest was constituted as Reserved Forest by M. Carter, Conservator of Forests, Eastern Assam Circle, in 1908. The conservation spirit took roots and it was formed into Game Sanctuary in 1916, during the tenure of WFL Totten, Conservator of Forests. A.J.F. Milroy, for the first time opened the Sanctuary for public in 1938.



Independent India, witnessed formation of Kaziranga as Wildlife Sanctuary in 1950, which was further upgraded to National Park in 1974, to properly plan and handle nature tourism affairs. KNP is getting popular with the visitors who throng to Kohra for a date with rhino and its associates, elephant, tiger, swamp deer, wild buffalo and a wide range of animals and birds. The sylvan and idyllic ambience of the park is good attraction for the nature lovers.

RHINO TOURISM

With rhino at the apex of all activities, nature tourism has picked up in Kaziranga National Park in a big way. The potential is even higher. Assam Tourism Department operates a few tourist resorts and cottages at Kohra suiting to different pockets. Araneya lodge has 24 two-bedded rooms. DD Boro, Range Officer, conducts me to Bonani lodge which operates 5 AC rooms, apart from a lobby and conference room. *Banashree* and *Kunjavan* are other resorts that offer two bedded rooms and dormitories. Assam Tourism Development Corporation are now constructing three executive cottages. These independent cottages oversee the vast expanse of evergreen forest with a few open grasslands. Parthasarathi Das, the Divisional Forest Officer, escorts me to *Wild Grass*, the privately managed exclusive tourist lodge nicely tucked up in a village some 5 km from Kohra, the operational headquarter of Kaziranga National Park. Maan Barua, the teenager son of Manju Barua, the owner of *Wild Grass*, receives us as we reach the resort. The young lad has good knowledge of the birds found in Kaziranga and around it. He has been able to identify and inventorise some 470 species of the birds, endemic to Kaziranga, including many migratory guests. Almost all volumes of Salim Ali and Ripley books on the birds of Indian sub continent are his all along companions. Hope he can devote some time for his Board exams., which are just a couple of months away. Maan conducts us to his *ante room* where we are introduced to various facets of Kaziranga Park. The joys and sorrows of wildlife protection are presented on a class video film shot by BBC. I understand that BBC crew spent a few months in the Park to shoot some rare scenes. Even the reconstructed footage of a tiger attacking a Forest Guard and dragging him in the bush looks so real. The film projects some ecological aspects of the flagship-protected area, the home of Indian rhino. The difficulties faced by the staff in protecting the natural assets despite all odds have been well brought



Rhino—Bahan of Lord Vishnu.

out. I later meet Manju Barua at Guwahati and urge him to pep-up *Wild Grass* as a class nature interpretation centre. This resort attracts many naturalists, bird watchers, and wildlife enthusiasts from different countries. We make a second visit to *Wild Grass*. Ronesh Roy, the well informed manager, greets us. I get impressed by the lovely Assamese

names of trees and plants that are part of the Wildgrass habitat *Bignonia ventura*—Golden Shower, is blooming as *Anguli phool*. Another tree *Bombax ceiba*—Silk cotton tree is depicted as *Ronga Simolu*. Even rooms in Wildgrass are named after anti-poaching camps of Kaziranga National Park. Some suits are named Mihimukh, Borbeel, Mona, Doonga, Ajar, Daflong etc. The tourist resort has 18 double-bedded rooms nicely sited to catch the morning sunrise and even crimson NE sunset. To lend ethnic ambience, three thatched roof cottages are built. The resort gets more than 70% occupancy during the season. Ronesh Roy adds that even during off season—June to Nov., the resort attracts family groups and excursions package groups. I suggest Roy to place catchy slogans and captions with all display items, like indoor plants, curios, animals pictures, even reconstructed Ronghar ancient monument. Attractive pictures of Brahmaputra dolphins, turtles, crocodiles and water birds can form important part of the swimming pool. A modern interpretation centre at Wild Grass should give brief overview of the wild wonders that the tourists are likely to find when they visit the world famous Kaziranga Park. *Wild Grass* should emit strong messages of nature conservation and dispel the myth of certain magical/medicinal powers associated with rhino horn, blood, flesh and even urine. Such nicely structured awareness package and clean up drive, should go a long way to save many rhinos, which are put to death for the horn, nail and bones. The overseas tourists should get back to their country as ambassador for nature conservation and passion for wildlife. D.M. Singh apprises me that despite some political unrest in the state, many nature tourist will visit the Park for spending a couple of hours, observing and assimilating the rare beauties of nature in the company of loveable wild animals and lovely feathered friends. During 1998, 17117 Indian tourists visited the Park and 1208 nature lovers from overseas made a beeline to Kaziranga for a quiet rendezvous with nature. As many as 39,319 nature tourists visited the park during three months' period November 2000 to January '2001.

RHINO LAND

We next visit Rhino Land Complex, some 20 km from Kaziranga on NH-37, towards Guwahati. A huge almost double the life-size replica of Great Indian One-horned

Rhinoceros, is nicely built on a high pedestal. It attracts any passer-by on the road. I was surprised to see the rhino chained and pulling a huge chariot shaped structure. Next day I meet D.P. Neog, earlier Principal Chief Conservator of Forests, who had visualised and constructed Rhino Land. He



Rhino land rest a while.

explains that the Indian rhino is revered as *Bahan* or carrier for Lord Vishnu. The Rhino Land building is constructed in the form of a chariot, and the mighty rhino pulling the chariot. The rhino and Vishnu are looking towards Kaziranga, blessing the protected area with good biological health for posterity. Rhino Land complex has three rooms, a dining hall and restaurant and a nice conference hall. At present the tourist complex is leased to Kalyan Sonwal, who sees good nature tourism potential. I suggest he should label important trees and plants in the area and operationalise row and pedal boating in the water bodies, nearby. He should also display common legends on rhino and a short but crisp write up on occurrence of all rhinos in different habitats of Asia and Africa.

PABITORA

It is a beautiful rhino habitat that sustains the largest population per unit area and is just about two hours from Guwahati town. Properly planned and nicely executed, this sanctuary can form an excellent nature tourism destination. It needs infrastructure development to usher nature tourists to prime rhino niches within the sanctuary. Participatory nature tourism management efforts should come into play. Local people may be helped to pep up a room in their houses for clean, reasonably priced accommodation for the tourists. Mostly tourists only ask for clean bed, bath and simple local food. The local villagers may be trained to conduct tourists to various parts of the sanctuary on elephant or gypsy vans/Canter mini trucks. A wildlife *yatra* before sunrise and another before dusk should have fair chance of seeing wild animals from close quarters. Having seen many wild animals from the largest land mammal elephant, downwards, and scores of feathered friends the tourist will return with strong message for nature conservation and compassion for wild animals. With about four rhinos to a sq.km, Pabitora has vast potentials to attract tourists, like Kaziranga.

ORANG

It is a National Park about two hours from Tezpur, another important town and heritage of Ahom kngs. It has good rhino habitat and can be helped to revive its past

glory and fame of being the home to about 80 rhinos, which have now gone down to some 45 animals. Orang really needs greater care from the wildlife managers and more funding. The park should be better equipped to deal with the inflow of tourists and to arrange strict protection of the habitat and the good faunal wealth, more so because the park is almost surrounded by large human and cattle population who exert considerable biotic pressure on the park. Encroachment over forestland are great threat to most of the forests in Assam, more so in Orang. The Park Manager needs to physically and mentally be present at Orang so that he can guide and instil confidence among the field staff. Protection staff, who have to perform very difficult and risky job need special pat from the director.

JALDAPARA

Lying at the foot of the Bhutan hills, Jaldapara Wildlife has special significance by maintaining the last remnants of the *Teral* tall grassland ecosystem that forms the habitat of highly endangered Indian rhino. Great One-horned Rhino, which once existed in good numbers in *duar* grasslands and *chaurs*, has almost vanished except some parts of Jaldapara and Gorumara protected areas. The loss and degradation of rhino habitat has also resulted in near extinction of wild buffalo, swamp deer, swamp partridge and pink headed duck in the Duars. Rhino is the flagship animal that forms the main attraction for the tourists. Other specialities are the elephant, Indian Gaur, four species of deer, Sambhar, Cheetal, Hog Deer and the Barking Deer, not forgetting the wild boars that keep ploughing the forest in search of food. Approach to the Sanctuary is via Madarihat located along NH 31, about 130 km from Siliguri, and 80 km from Coochbehar, the District town. The idyllic Holong Forest Lodge has 6 rooms. Madurihat tourist lodge, near the entrance of the sanctuary has 10 rooms in the service of nature tourists.

GORUMARA NATIONAL PARK Located in Jalpaiguri district of West Bengal, this Park is famous for being home to pre-historic Indian rhino. Floodplains of Murty and Jadaka rivers form the core of rhino habitat in the Park. The landscape consists of tall grassland, shallow pools, marshes, and clear rippling stream. Indian Rhino, an

endangered species comprising a small population of 16 animals, keeps to the grasslands and swamps. Other key animals are Asiatic elephant, Indian gaur, four deer species, and wild boar. Leopard is the main predator, though a few tigers also make surprise yellow and black appearance.



Rhino Land-Indian rhino pulls Lord Vishnu's chariot.

More than 300 species of birds add colour and music to the sylvan ambience. The Park is approachable by bus or other modes of transport from Jalpaiguri (52 km). Reaching by rail, the nearest forest house plays warm host to nature lovers. Murty Interpretation Centre has good dormitory with 12 beds.

DUDHWA

This Park represents typical terai grassland eco system with several swamps and patches of woodlands, Dudhwa National Park in district Lakhimpur Khiri in 1977, and was later taken under Project Tiger, along with the adjacent Kishi anpur Sanctuary. The Park is about 240 km from Lucknow and some 450 km from Delhi, and is approachable by rail and road. Dudhwa was once home of Indian rhino. The last rhino was shot in 1878, in Pilbhit forest near the border of Dudhwa. The Park has special importance as the site for reintroduction of Indian rhinos in 1984. This is a success story of reintroduction large mammal. Drawing lessons from dudhwa, rhinos have also been reintroduced in Royal Bardia National Park in Nepal.

MANAS

S.P. Singh, Director Manas National Park feels that presently the park is in disturbed state, due to ethno-political disturbances in that part of the state which took a heavy toll of the rhinos. At one point of time Manas could take pride of having some 90 rhinos whose population have fallen to single digit figure. Singh feels that the biodiversity of Manas is even richer than that of Kaziranga. Rare and endangered species like Pygmy hog, Hisped hare, Bengal florican, water buffalo, are special attractions of the park apart from rhino, elephant and hog deer. Given better political stability and peace for a few years' adequate infrastructure, and high voltage publicity, Manas can come up a unique nature tourism destination.

PARTICIPATORY

Nature tourism can be self sustaining by involving local people in arranging infrastructure like clean and reasonably priced accommodation, transport, nature guides, sales outlets for souvenirs and gifts. Let the financial gains of wildlife tourism flow to the people of the area. People should become stakeholders in the nature tourism exercise. Only then would they strive to conserve the forests and protect wild animals. I am impressed by the



Banani tourist lodge—home away from home.



Mihinukh-elephant riding camp.

the tourists to conduct themselves in a decent, disciplined fashion while going to the forests. Wild denizens are so sensitive to noise pollution, flashy clothes, and loud playing of film songs or Bihu chorus, on the portable music system. Wild animals expect decent behaviour from human beings. Say 'No' to funny flashy clothes, music sets and creaky noises in the Park. Do carry a notebook, pencil, binoculars, a camera, preferably with telephoto lens and capture the wild wonders on the paper. Some studies were conducted in Royal Chitwan National Park in Nepal, where tourists sometime venture too close to the wild animals. The study's results are for us to see and ponder. The rhinos in the Park spend more time in keeping alert and moving away from the direct sight of the visitors and spend comparatively less time in feeding and foraging. This is not a healthy sign.

ECO TOURISM

Kaziranga has all the potential for nature tourism. We need to ponder on various aspects, which should become integral part of the tourism package. Rhino and its

nature initiatives in Nal Sarovar Bird sanctuary in Gujarat. About 300 boatmen operate row boats to usher nature tourists and bird watchers near the birds colonies and nesting areas where the lovely feathered friends can be observed more closely, without infringing in their privacy and safety. Thus these 300 boatman and their families contribute significantly for the protection of the wild birds and their habitat. Similar participatory initiatives can also be planned at Kaziranga. It should give some income to the people living on the fringe villages. This should make nature tourism a success, more so because Kaziranga holds special importance in the history of conservation of wildlife, and people from different parts of the world visit the Park in large numbers despite ethnic disturbances.

TOURISM WITH CAUTION

Parthsarathi Das feels that we have not been able to train



Rhino land—Indian Rhino pulls Lord Vishnu's chariot.

associate, big five, are the star attractions. A large assortment of birds makes the Park a birdwatchers heaven. Hoolock gibbon a speciality of evergreen forest is there to extend warm welcome to the visitors. Assam has a rich cultural and ethnic heritage. Local handicraft and muga silk work has a name and fame. *Kamaksha Devi* at Guwahati and the mighty *Brahmaputra* are unique features of

Assam we can link up all attractions and develop a well-laid out tourism package. While Kaziranga offers enough in ecotourism for about six months a year, the tourism promoters may also plan for the lean period- June to November, when it is the rest period for Kaziranga. How can the tourism infra structure be made use of during this period. Meghalaya and Arunachal Pradesh are two idyllic states, which can be reached within a few hours from Assam. Can we have some dialogue with the tourism people to extend tourism beyond the limits of the state. All well meaning persons, who love rhino, and its habitat, should sit together and discuss on such thematic issues. People of Assam are simple, nature loving ethnic groups. The benefit of nature tourism must flow to the local people if tourism is to succeed in real sense.

TRADITIONAL

Assam ethnic culture has rich traditional forest related knowledge -TFRK on nature related issues. We need to learn from them on sustainable management of natural resources. They have very good knowledge of wildlife and its habitat. Some of them can offer good explanation for rare ecological wonders. Use of herbs as medicine has deep roots in Assam. Through a carefully structured ethno cultural awareness package, the tourists can be exposed to such TFRK, treasure of Assam. It is an important aspect and strength of Assam and may be considered for nature tourism package. Perhaps *Jatinga* mystery of suicidal birds can also form part of tourism package. Traditional *Shankerdev* cult, which has many inputs for nature conservation and passion for wild animals and birds can also be highlighted. The largest River Island in the world, *Majoli* and *Bihu*, the traditional communities dance and music, may form a component of tourism package.

HISTORICAL FLAVOUR

Rich ancient culture is presentable on a platter at Sibsagar, just a few hours from Kaziranga. Nature tourism can be nicely dovetailed with a peep into the old traditional culture of Assam during the period of Ahom kings. The world famous *Ronghar* and the *Korenghar*, are still there in all splendour despite centuries of weathering and lack of

care and maintenance. The plethora of old temples is a great attraction due to architectural finesse and cultural richness of the days bygone. Another historical place not far off is Tezpur, the former Sonitpur, which was the hub of cultural and commercial activity in North Assam for many years, before Guwahati came to limelight, after the construction of Pandu rail-cum-Road Bridge over the mighty Brahmaputra. Heritage of *Ahom* kings is writ large on this important town, before the tourists ascend the hills to reach Bomdila.

CRAFT TOURISM

Assam is famous for traditional *Muga* silk and the *Endi chaddar*. The fibre secreted by the silk worms and made into yarn has all qualities of being light, elegant, durability and suiting to warm and moist climate. Assamese women generally don't wear *Sari*. Instead they are happy in *Mekhla* and *Chaddar*. Men wear *Kurta* and *Dhoti*, all locally made. Tourists can be ushered to craft and culture extravaganza. Local artisans prepare beautiful wooden artefacts, mainly on rhino, elephant, Great Indian hornbill, other animals and birds and even goddess Durga and other legendary characters. Such pieces of Assamese art can be even souvenirs for the tourists. Specially *Bihu* dresses can also be a good sale for the visitors.

WILD WONDERS

Bonal, who has worked in Assam on different assignments for about two decades, gives useful inputs on larger nature tourism circuit. The nature tourists can be conducted to Garampani Sanctuary, which is rich in elephant, hoolock gibbons, apart from a rich variety of birds. On way to Tezpur, one may also observe a few dolphins from a distance. Drive over the Bhramputra bridge gives overview of the vastness and green riches of Brahmaputra basin. A visit to Nameri National Park is well rewarding for the effort made in reaching this protected area. It is famous for the white winged wood duck. Tourists may be conducted to Bhalukpong on the border of Arunachal Pradesh, the only railway station in the hilly state, and further to Tipi. Orchid Research Station at Tipi has rich collection of species of Orchids in the state. Dr. Rao and Dr. Hegde have also developed new varieties of orchids by genetic engineering and tissues culture. Bomdila, the District town of W. Kamang district is just 4 hours drive from Tipi and offers rich Buddhist culture in its past glory. The nature tourism circuit offers panoramic views at *Se La Pass* en-route Tawang, the mountain town at about 11,000 feet above MSL and the place of the ancient Monastery, a pilgrimage place for the Buddhists. Tawang is just stone's throw from Indo-Chinese border. One can have many sightings of the Arunachal *Mithun* and the Tibetan *Yak* near Tawang, apart from an insight to Tibetan culture and Buddhist' shrines. Some of these should be dovetailed with Kaziranga *yatra*.

RHINO TOURISM—INDIA AND NEPAL

<i>Name of Rhino-bearing area</i>	<i>Designation of Chief Manager</i>	<i>Headquarter</i>	<i>Phone No.</i>	<i>Nearest Station</i>	<i>Species available</i>	<i>Facilities available</i>
1. Orang National Park	DFO (Wild Life), Mangaldoi Division Dist. Darang	Mangaldoi	03713-22065	70 kms. north of Guwahati; 75 kms from Tezpur	Rhino, Tiger, Elephant, Hog Deer, Wild Boar, many birds including Bengal Florican	Elephant ride Forest IB—2 Nos. (4 rooms) Dormitory—1 no. Assam tourist lodge - 8 rooms (double)
2. Pabitora Wildlife Sanctuary	DFO (Wild life) Wildlife Division	Nagaon	03672-23104	55 kms from Guwahati	Rhino, Hog deer, Wild Boar and many bird species	Forest IB—1 No. 2 double bed room Tourist lodge under construction.
3. Manas National Park	Field Director, Project Tiger, Manas	Barpeta Road	03666-	20 kms. (Basbari) Barpeta road 75 kms. from Guwahati	Tiger, Bison, Rhino, Pigmhog, Bengal florican, Hog deer, Asiatic water buffalo	Tourist lodge—Barpeta road Mathangiri Forest rest house.
4. Kaziranga National Park	Director, Kaziranga National Park	Bokakhat	0376-68095 (O) 68086 (R) 68007 (Control room)	250 kms. from Guwahati 72 kms. from Jorhat 100 kms. from Tejpur	Rhino, Elephant, Buffalo, Swamp deer, Tiger, Bengal florican, Bison and many bird species	Aranya lodge Banari Basari lodge of Assam Tourism Wild grass Private resorts.
5. Dudhwa National Park	Field Director, Project Tiger, Dudhwa U.P.	Lakimpur Khiri, UP	2106 262902	260 kms. from Lucknow Rly. Station-Dudhwa	Swamp deer, Tiger, Leopard, Rhino, Sloth deer, Chital	Forest rest house, Dudhwa Sathiana Tiger heaven
6. Jaldapara	DFO, Wildlife Division, Jaldapara	Jalpaiguri		Madari hat—43 kms Dist. Coochbihar	Rhino, Tiger, Bison, Leopard, Hog deer Sambhar, Elephant, Bengal florican	Holong Forest rest house
7. Gorumara	DFO, Wildlife Asian-II Aranya Bhawan Jalpaiguri	Jalpaiguri		Madari hat—43 kms. Dist.-Coochbihar Chelsa-10 km.	Rhino, Tiger, Bison, Leopard, Hog deer Sambhar, Elephant, Bengal florican	Forest rest house
8. Royal Chitwan National Park	Director, C.N.P.		9775629404	Razant (India)	Rhino, Tiger, Leopard, Elephant	Private lodges Tiger top resorts
9. Royal Bardia National Park	Director, BNP, Thakurbari	Thakurbari (Bardia distt.)	9778429712, 29719	Katarnia (India)	Rhino, Tiger, Elephant, Bison swamp deer	Private lodges, Tiger top resorts Karnali tent camp.

RHINO HORN

Rhinoceros Unicornis, with its burly, prehistoric, armour plated body, a long pointed dangerous looking horn on the snout, inspires awe and respect from all other animals in the wild. The largest terrestrial mammal, elephant, gives it a wide berth in the forest. Tiger, the unchallenged lord of the jungle, takes a different track on seeing the rhino. The crafty leopard hides in the bush to avoid any encounter with the unpredictable rhino. Thus rhino did not develop special instinct or defence mechanism

since it always felt it invincible and super strong, with no enemy in the wild. So the rhino created its own *enemy* on its nose in the form of the horn, which has been the cause of its near doom. The problem is further compounded due to its low memory, somewhat poor eyesight and lesser intellect. Whenever it smells danger, it comes in the open to charge with all its might, exposing itself more to the devilish, selfish, trigger happy poachers. Other crafty animals like tiger or leopard, take to cover immediately on sensing danger. Due to somewhat poor memory the rhino commits the same



Fake rhinoceros horn.



Rhinoceros (African Rhino) horns seized in the UK in September, 1996.

suicidal mistake again and again. The simple fellow is punished for its disciplined life style and clean habits. Rhino uses the same path *dandi* for reaching foraging sites or wallow pools and defecates at the same place for a long time, thereby keeping most of the foraging and wallowing areas clean. Such community defecating places and the *dandi* make it highly vulnerable to the poachers shots or electric trap. Traditional poachers dig pits along the *dandis*.

REVERENCE FOR ANIMALS

In many ancient civilisations, different animals are associated with religious mythology. In ancient Greece and Rome, gods and goddesses were symbolised with animals. Zeus or Jupiter is associated with eagle, Neptune is symbolised with horse, while Hera or Juno by peacock. Worship of cow was common in Persia, Africa and ancient Greece. Veneration of animals was an important feature of ancient culture of Europe, parts of Asia and primitive tribes of Americas and Australia. In India, association of gods and goddesses with animals has been an element of cultural ethos. The myriad gods use animals as their *Bahans* (means of transport). *Lakshmi*, the goddess of wealth, has owl as *Bahan*. *Saraswati*, the goddess of learning is associates with white swan. *Durga*, the goddess of strength, keeps lion as transport. *Ganesha* the pot-bellied benefactor, has the elephant head over a human body. *Shiva*, the destroyer god, and important part of the Trinity has serpents rolling over his body and uses bull as *bahan*. *Vishnu*, the highly venerated Hindu god appears in different animal incarnations as fish, tortoise, boar and even half lion form-*Narsingha*.

SUPERSTITION AND GREED

As time rolled by, man understood nature more intimately. He attempted to capture different elements of nature including wild denizens. His greed led him to exploit animals and their parts for his comfort. Use of animal skins and hides for body apparels, beds, footwear, utensils, even shield and armour came to fore. Animals were hunted for food and protein. Apart from use of animals for the sustenance of man, certain superstitions and myths played unfair with the hapless and helpless animals. The poor rhino, the grotesque, out of the world, powerpack, having the strongest mating capability, fell to the man's short-sighted greed and desire to capture the nature and wild animals. The rhino, some how, got associated with Unicorn, the mythical creature with the body of a horse, and one horn on its forehead. Unicorn has appeared in the art and legends of India, China, the Middle East and medieval Europe, where they were associated with the Virgin Mary and Christ. Thus the rhino horn became a symbol of magical powers. Later, rhino parts like urine, blood, flesh and even bones were claimed to have magical and medicinal powers. Some times, *deification* of an object or person eventually leads to its doom. This has also happened in the case of

poor rhino. Its association with the legendary Unicorn and later with *Virgin Mary* turned to attaching supernatural powers to rhino and its parts. Thus started the persecution and consequent poaching of rhino for the horn, blood, bone and the flesh. Man has keenly observed procreation or the mating game of the burly rhino, which clocks the longest mating time, apart from the initial love foreplay and other gimmicks. People



Cure with cruelty.

quickly bought the story that rhino horn in the shape of *Linga*, or the male organ, has magical aphrodisiac properties. Bishan Singh Bonal who has served as Director Assam State Zoo, Guwahati, for some years, has observed a single rhino love game and mating encounter lasting for more than 90 minutes. Perhaps such copulation performance by rhino has made people believe that rhino horn formulations can impart prowess to their dwindling libido. Today, despite our pride of functioning by scientific principles, rationalism and logic, false myths and superstitions still have much say in out lives.

MYTH, MASCULINITY, MEDICINE

Curious stories and myths float about the magical powers of the horn. Certain communities prepare rhino horn cup or goblet. Water kept in this magical container, is highly valued as an elixir, medicine and aphrodisiac. It is served to pregnant women for safe and easy delivery. P Lahan the PCCF, recalls a case. A woman, known to him was given this elixir several times. She had the most complicated and painful delivery. She just survived. Many persons, who are in possession of rhino horn, make money by renting it for placing below the bed of pregnant women. Certain people from South-East Asia and Yamen believe that a rhino goblet can detect any poison. When a liquid having any poison is poured in rhino horn cup, it should split, as per the myth. In the oil rich countries, mainly South Yamen, the horn is used to make dagger handles. In Arabs, a dagger made out of rhino horn is considered pious and prestigious. In certain tribes, rhino horn rings are worn by childless couples, lunatics and others suffering from nagging ailments. The fanciful belief that powdered rhino horn sharpens jaded sexual appetite and restores masculine vigour has resulted in brutal killing of hundreds of rhinos.

TRADITIONAL CHINESE MEDICINE (TCM)

Rhinoceros is in serious trouble due to myths attached with its horn having magical or medicinal properties. Chinese pharmacopoeia has several herbal medicines, having some input of animal parts, howsoever small. In TCM, greater medicinal properties



Rhino feet artefacts—shameful vanity.

are believed in the horn of Indian rhino than the African rhino. It mentions of *fire horn* from Asian rhino and *water horn*, from African rhino. To a lesser extent, rhino horn is also in Tibetan medicine. They also use other rhino parts like blood, stomach, penis, flesh, urine and bones in traditional folk medicines for some nagging ailments. Substitutes are also found for rhino horn. Some communities use buffalo

horn and horse tail for some magical medicinal purposes. Chinese National medical dictionary also mentions of findings and using alternatives to rhino horn.

STATUS SYMBOL

Many rhino are put to death due to thoughtless acts of human beings. Lust for status and false notions of ego and prestige takes toll of many innocent, meek rhinos. Chinese used to carve rhino horn into cups, plates, bowls, and figurines. It was believed to detect poisons when used as a container. In Yemen, men used *Jambiyas* (dagger like knife) as part of their traditional dress. Royalty and elite prefer rhinoceros horn for *Jambiya* handle because it is light, durable and its lustre increases as it goes old. Having an old and costly, *Jambiya* is a status symbol. Likewise in Oman the *Khanjar* or dagger with rhino horn is considered prestigious.

Surprisingly, horn is a status symbol for the rhino too. V.V. Savarkar, Dean Wildlife Institute of India has made some studies on the reintroduction efforts at Dudhwa. He relates the importance of horn for the social status of rhino. "This population of rhinos at Dudhwa had two males, Raju and Bankey. The latter starts challenging Raju, and in one of the encounters, Raju lost its horn. Minus the horn Raju also lost its rank as dominant male, and thereafter it never stood ground in the presence of Bankey. It therefore appears that the horn is significant in the social status of the rhinos. Of course establish its veracity, a large number of case studies need be made. There was some evidence of the horn regrowth. In the last encounter with Bankey, Raju got seriously injured and died shortly thereafter."

RHINO HORN

It is not a horn, but a mass of agglutinated hair. It is a mass of several thousand hairs and the epidermis of the hair, that gradually form horn like structure due to combined effect of sweat and other exudation from the animal's snout. It is composed mainly of keratin tissues. In the case of great Indian rhino horn, the appendage is external to body main, and can be dislodged from the beasts' body by a strong blow.



Horn—Rhino's enemy at its nose.

Once removed, there is some bleeding but the horn reappears after a year or so. Bonal mentions that during the 1998 floods, a rhino was found dead when the water receded. Its horn was found dislodged at some distance from the animal. Dr. Paneerselvam explains that the male horn is somewhat wider and roundish at the base, but the female horn is more pointed and little longer. The horn starts appearing when the sub-adult animal is 4-5 years old. It is also the stage when the animal develops sexual hormones. African Black rhino (*Diceros bicornis*), African White or Square lipped Rhino (*Ceratotherium simum*) and the Asiatic Sumatran (*Didermocerus sumatrensis*) have two horns on the snout. Great Indian One-horned Rhino (*Rhinoceros unicornis*) and its Javan cousin (*Rhinoceros sondaicus*) have a single horn adorning its nose. The size and weight of the horn also varies. The Indian rhino has only one horn, which is generally 20-25 cm. and may weight 0.75 kg. Black African rhino has two horns. The anterior horn grows to some 50 cm. and can weigh unto 4.0 kg. The White African rhino has the longest horn (60 cm.) and can have 4.0-kg weight. The Javan rhino has a small horn of about 15 cm., and may weigh to 0.65 kg. Sumatra rhino has two horns. The main horn has a length of 15 cm and average weight of some 0.30 kg.

IN PERIL

We have mentioned earlier that due to its massive figure and power packed body, the rhino has no enemy in the wild. Nature has created its enemy on its nose in the form of horn. Many rhinos are killed and poached for its horn. In Kaziranga National Park, the home of Indian rhino, 235 rhinos were put to death by unscrupulous poachers



The great Indian One-horned Rhinoceros.

during the period 1983-1989. The all-time high tally of 44 animals killed by poachers, was reached in 1989. Great Indian one horned rhino appears on the Red Data Book of the IUCN. This Book keeps count of those animals or plants, whose population has gone below the threshold 2000 heads. Such species are considered endangered and need special conservation initiatives to save them from extinction. IUCN Asian Rhino Specialist Group advises to build up some 2500 population at Kaziranga and another 2500 in protected areas of Assam, West Bengal, Nepal and UP. Then only the total 5000 rhino status can give some stability and somewhat wider genetic base to the endangered Indian rhino.

FAKE HORN

We are discussing at Kaziranga about encounters with the poachers and consequent seizure of arms, and rhino horns. I request P. Das, the DFO to show me some horns. Very soon D.D. Boro, Range Officer, brings two horns from the Range strong room. As I keep admiring a well-formed horn for its value, almost at par with gold, DD Boro is smiling. He reveals later that it is a fake horn. The other piece is the real horn and does not look as impressive as the fake one. He adds that the horn dealers make this trophy out of bamboo or the buffalo horn. To give it semblance of reality, they attach some pieces of rhino skin near its base. And there is big profit margin in the deal, as the sale is conducted in a fast track hush-hush mode. The purchaser is given very

less time to verify the genuineness of the magical horn. Bonal explains that the most distinguishing part of the real rhino horn is its pock marked base, but the traders manage to create such marks also on the fake horn, thanks to ill directed ingenuity of the dark hour artisans. Some craftsmen use bamboo root, nicely carved out as rhino horn base. It has pockmarks somewhat similar to rhino horn base.



Easy target for poachers.

DISPEL THE MYTH

Although the man has reached the moon and is exploring other wonders of the universe, he is still in the grip of baseless myths and fanciful beliefs. There is need for concentrated efforts to dispel such false myths and fantasies, which are telling badly on the existence of natural resources. Rhino has as much right for life as we human beings. Let there be a mass movement against the poaching of rhino for its horn, blood, nails, urine or bones. The International Union for Conservation of Nature and Natural Resources- IUCN, have analysed some samples of rhino horn in, 1967 and reported that it contains no aphrodisiac components. Such tests conducted at the chemical research laboratories at Basil, in Switzerland indicate that the rhino horn is composed of keratin tissues, the chief constituent of hair. It is inert and has no medicinal properties. Thus the so-called medicinal and aphrodisiac charms of the horn are only figments of imagination. Wildlife Institute of India, Dehradun, is conducting further study on chemical composition of the horn and detection of rhino trade in its powder form. Arup Kumar Dutta, the famous writer and freelance journalist, of Assam, in his classic treatise, *Unicornis*, is rather blunt and suggests, "One might just as well eat one's own hair for all the medicinal and aphrodisiac value it possesses. Only when this reality sinks home among the users, will the beleaguered Great Indian rhino find real safety in an increasing inimical world." Another conservationist mentions that the goat's blood or the dog's urine, which have the same chemical composition like rhino parts, may have some medicinal value, if rhino has. So why kill the poor rhino for no fault. In some parts of Asia, horse's tail or water buffalo's horn is used for certain magical effects and to ward off evil spirits. Let us create mass awareness against poaching of rhino for the horn and blood. A strong tirade needs to be created against false and fanciful idea of magical or medicinal powers of the horn. We should go all out to protect Indian rhino, the pride of Assam, and our only living link with our ancient past.

ANTI-POACHING OPERATIONS

During my tour to Assam, I get time to discuss with Parmanand Lahan, the Principal Chief Conservation of Forests, Assam, who has served in Kaziranga forests, on four tenures. He has rigid and fixed convictions about anti-poaching operations and how to deal with poachers in a sensitive, bio-rich forest like Kaziranga. He does not mince words and prescribes deterrent action against the cruel, trigger-happy poachers, who put the meek pre-historic animals to sleep, for sheer greed of fast buck by sale of horn, bones or even flesh. Similar hard-liner views are also expressed by Dev Mangal Singh, Director KNP, Parthasarathi Das, the *do or die* DFO and D.D. Boro, who usher me to the wild wonders of KNP, on elephant back, and sometime by Gypsy. Bishan Singh Bonal, former Director, KNP, and now Director, National Zoological Park, Delhi, has led many anti-poaching encounters. He also advocates ruthless and prompt action against the poachers, if we are serious about protecting Indian rhino and saving it from the dooms track walked by Cheetah and pink headed duck.

I later have long sessions with Subash Dey, Secretary General, Global Tiger Forum,



who has managed many wildlife areas in West Bengal, and had a stint even in Jaldapara Wildlife Sanctuary, which is a good rhino habitat. He talks of several unconventional methods taken to combat poaching and deter the clandestine operators from sneaking in protected

Rhino natural death—nasal bone intact.



Rhino killed and dehorned.

areas. Vinod Rishi, another die-hard wildlife, former Director, Project Elephant, is highly vociferous and asserts that strict, innovative approach is needed to deal with the uncouth poachers who have no respect for the fauna, flora or the laws of the land.

The dedicated wildlifers of Kaziranga Assam have, over the years, set high traditions of protection of rhino and its habitat. Late Sanjay Debroy, has managed wildlife and forests protection. He was keen advocate of *kill or get killed* approach, during anti-poaching operations. Manas could somehow contain poaching to a large extent for long time till the Park came under heavy ethnic disturbance and unrest. Heavy poaching and organised attacks on forest establishments took toll of animals during Bodo disturbances, when the law and order machinery virtually collapsed in the area. The population of Indian rhino fell from 70 animals, to a counted few, that do not even reach the two-digit figure. Bonal briefs me on anti-poaching management in KNP. This Park is considered one of the best-protected area in the State, and perhaps also in the country. The anti-poaching activities in KNP are generally taken up in three phases to have proper focus on each phase.

During the *pre-entry* phase, the pro-active action include intelligence gathering on the movement and activities of the poachers. Efforts are made by the management to quietly involve the local people in gathering and passing it to forest officials.

At the *post entry stage*, reactive action is called for, which involve tracking down and apprehending the poachers. Here all out efforts are made to minimise the damage, likely to be caused by the poachers. This track down action has its inherent risks involved and calls for radical improvement of the existing infrastructure, facilitating services like communication network, fast and rugged transport, upgrading of arms and ammunitions, improvement of anti-poaching camps, and augmentation of surveillance facilities. Bonal adds that Mobile Squad should react immediately, in case of any emergency.



Poor rhino dehorned.

law-enforcing wings, like Police, Legal section, other government departments NGOs and media, who play important role in creating environmental awareness. Bonal adds two more dimensions to the post exit strategy. In the heat of pursuit and hot chase after poachers, forest officials, sometime get injured by the poacher's bullet, or get on the wrong side of the wild animals they strive to protect. A few forest officials and workers have been bitten and mauled by rhino, tiger and even wild buffalo, during anti-poaching operations or patrolling. The present medical allowance the staffs get, is too meagre to provide them even satisfactory first aid, leave apart the complications arising out of multiple bullet injuries or mauling by the wild denizens. As such, an efficient medical back up is essential to treat critically injured or sick staff, workers and even poachers, whenever such need arises.

Dev Mangal Singh, Director, KNP, explains the anti-poaching network, developed over KNP, over the years. This mainly involves improving of infrastructure, information gathering, capacity building, upgradation of technology and improvement of firepower. Bonal gives some details of anti-poaching support system.

KNP gets floods almost every year and high floods once in 10-15 years. The last flood caused extensive damage and total disruption of management operations. On the onset of heavy rains, most of the animals migrate to higher forest tracts of Karbi Anglong District Council area, where KNP management can exercise very less protection. The helpless animals have to cross NH 37 to reach higher lands. During such migration, the tired and partially starved animals make soft target to poachers' ill designs. High lands provide transit place for the animals for a few days during migration to a less protected area. In 5 Ranges of KNP, 68 uplands have been created over the years, apart from 10 highlands constructed by Army authorities after the 1998 floods.

Floating camps: Two floating camps, *Hawk float* and *Samrat* provide useful surveillance and patrolling support along the banks of the mighty Brahmaputra. This has been inducted to outwit the poachers who may make use of fast boats and hit at the wild animals, including dolphins and rhinos, through north of Brahmaputra.

Post exit works are very important and have direct impact on the future poaching incidents in the Park. This is the investigative and prosecuting action after the poachers escape from the park, with or without the booty. Suitable action is also called for when the poachers are killed, injured or arrested in the park. This phase consists of co-ordination with

Country boats. Around 100 country boats facilitate anti-poaching operations as well as provision on rations and other material to anti-poaching camps in KNP crisis crossed by several seasonal streams.

Speedboats. Four speed boats fitted with outboard motors provide useful mobility in shallow water streams in the park. They do need occasional repairs and maintenance.

Elephants. Well trained departmental elephants form the lifetime for the upkeep of park and during the anti-poaching operations. The pachyderms are very good help for patrolling mainly during the rainy season. There are 49 elephants in the park, 29 adults and 9 sub-adults form staff of the park. The 11 calves are yet to be brought on the staff strength.

Wireless. Efficient communication system is vital to avert, contain, and apprehend poachers. While in KNP, the present wireless communication consists of 9 JBS fixed stations, 9 LTS mobile stations, 105 SXA portophones, 2 SBS repeaters, and 8 VHF trans-receivers,

there is scope to further update the technology, and provide easy and fast communication with the Range office and the Divisional office.

Arms and ammunition. The main fire power for the field staff are .315 rifles. Senior officers and Range Officers are provided with revolvers. SBBL and DBBL guns are also used.

Intelligence network. There is no regular network in KNP. However, the Park management collect information from all possible sources including Police sources and make use of the same for pre-entry action and post entry operations. Information collected from local villages becomes very handy.



Patrolling Forest Guard—
safety innovation for touring cycle.

ANTI POACHING OPERATIONS

Over the years, KNP has developed a dynamic anti-poaching system, which is changed/modified as per need of the time, and density of animals in a particular area. The strategy also gets changed to match the style of poaching adopted or likely to be adopted. It is observed that the intensity of poaching is proportional to the demand and consumption of the animal part in the main national/international market, which controls the price and sale of the booty.

Till a few decades ago controlled hunting was allowed in the state with the permission of the Chief Wildlife Warden, when Kaziranga was only a *game sanctuary* and there

was plenty of wildlife in the forest. Later it was elevated to Wildlife Sanctuary and hunting was banned. Wildlife protection got further impetus under the provisions of Wildlife (Protection) Act, 1972. Anti-poaching duties were performed by the limited staff, mainly on foot, close to the animal path or *dandis*, to detect the pits, generally used to trap the large animals like rhino. Patrolling on elephant back started much later to spot the animals and the poacher's movement even through the tall grass. During rainy season boats are the only means of communication, for which boat lanes or channels are cut before the onset of rains. During the floods patrolling is reinforced with speedboats. Anti-poaching staff are very sincere, duty conscious and would remain to the camps even in the interior area where life is rather difficult.

During early sixties, KNP was under the administrative control of DFO Sibsagar Division (Jorhat). ACF in-charge of the Range, looked after wildlife management. Bokakhat Wildlife Division was formed later, which looked after wildlife management in both Kaziranga and Manas sanctuaries, with headquarters at Guwahati. There were hardly 20 protection staffs.

As time rolled by, it was felt difficult to manage the wildlife areas of Kaziranga and Manas from Guwahati by a single officer. Thus 3 Wildlife Divisions were created as Eastern Assam Wildlife Division, Bokakhat, Western Assam Wildlife Division, Guwahati and Assam State Zoo Division. Later the Western Assam Wildlife Division which had the mandate to manage Orang, Nameri and Manas, was further bifurcated. Director Project Tiger was assigned to look after Manas, and Eastern Assam Wildlife Division in Bokakhat was vested with the responsibility of Kaziranga sanctuary, which was later upgraded to National Park in 1974. The year 1977 saw the creation of the post of Chief Wildlife Warden in the state. During this period, KNP was having only 37 camps, which was managed by 185 staff and 20 departmental elephants. Wireless communication was established in the park, which gave dependable and fast communication anti-poaching network to the park.

RHINO CONSERVATION

Bishan Singh Bonal has served in KNP on several occasions. He describes the dynamic protection strategy as follows. "A Centrally Sponsored Scheme-CSS was



launched in the 7th Plan dedicated to rhino conservation and protection of habitat. This CSS was later on transferred to the State government in 1992, which upset the assets created earlier during the Plan period. By now even the poachers

Rowman camp.

had changed from the traditional pit method to electrocution and later to shooting by deadly firearms. The Park management therefore modified anti-poaching operations to match the changing tricks of the poachers.

Central Camp System, equipped with some staff strength, workers, wireless sets, arms, ammunitions, elephants was organized which gave good results for sometime. Later a few sub-camps and splinter camps were also set up in areas where rhino population was rather rich. The poachers got scent of this system, so we had to change our approach and system. We developed human barrier, which acted as second line of defense, by establishing anti-poaching camps along the Park periphery. Villagers, being the first line of human barrier, the number of anti-poaching camps was raised to 100, then to the present 135, having camp jurisdiction over 20 sq.km. or so. Late eighties and early nineties the emphasis has been on the pro-active action, with further augmentation of camps, arms and ammunition, developing information system, improvement in living condition of staff, mainly the anti-poaching staff and construction of more permanent/semi permanent houses. This was done out of funds under different schemes and by the help provided by NGOs, local groups and naturalists from other parts of India. The villagers around the Park were the worst sufferers because of non access to the Park for firewood, bamboo, small wood grasses etc., and due to crop raiding by the wildlife, mainly rhino, elephant, deer, water buffalo, and even wild boar. So the villagers had to be kept in good humour through Eco-Development Scheme, by providing them alternative occupation and benefits so that they willingly contribute for the rhino protection and conservation of habitat. During nineties a new method of rhino poaching, by electrocution, was taken up by some poachers. We had to improve upon protection strategy to save the rhino and the protection staff from the high voltage electric shocks.⁹

KNP is perhaps one of the best-protected area, in the country with around 403 staff, which also includes a few office staff. The dedicated team of the Director, assisted by a DFO, 2 ACFs, 7 Range Officers, 4 Dy. Rangers, 39 Foresters, 226 Forest Guards/ Game watchers, and some casual workers provide the main protection inputs. In the difficult flood prone area, like KNP, very good help is rendered by 51 Boatmen, 34, *Mahauts*, 13 vehicle drivers, who help the protection staff to reach and patrol different parts of the Park. Forest Veterinary Officer and his team keep the fleet of trained elephant in good shape, since these pachyderms form the lifeline for protection and patrolling and conservation of natural resources. The elephants' special role in providing rations, medical aid and essential stores/equipment to the far off, interior camps is laudable. They also, sometimes help in relief operations, for the staff, even for rhino, stuck up in deep nala, or loose sticky mud.



KNP Alert staff keep vigil.



Anti poaching camp along Southern boundary Harimoti.

POACHING AND POACHERS

Poaching of rhino has been a major threat for all major rhino habitats. The style and apparatus used for poaching has undergone much change over the years, with more rhino and other animals falling soft target to the modern firearms.

Traditional. Capturing and poaching rhino was done traditionally by using the pit method. They dig about 2×1.5 m pit deep enough to accommodate the adult rhino. This rectangular or trapezium shaped pit is camouflaged with grass and thatch. They even smear rhino dung over it to attract the unwary rhino. Some poachers even fix sharpened bamboo sticks on the floor and wall of the pit so that the poor animal gets injured and has no strength to come out of the pit. Once the rhino falls in the pit, the poachers quickly move to the pit and chop off the horn, leaving behind the helpless, bleeding rhino, writhing in pain.

Electrocution. Ingenuity of man can show wonders if it is utilized properly. The same ingenuity and intellect can play havoc, if used for destructive end. Some poachers in Assam, mainly in Pabitora have developed skill of putting rhino and other animal to death by electrocution. They hook a long electric wire to the main high-tension wires. The lower ends of the wire are spread on the path-*dandi*, commonly used by the rhinos. Sometime poachers also leave live electric wire near the rhino dung heaps. The moment the animal steps on the live wire or its body touches it, the large beautiful animal gets reduced to just a heap of dying flesh. The poachers move in quickly and hack off the horn or nail or tail with professional expertise and just vanish, leaving the dead rhino under the care of eagles, vultures and other animals of prey and scavengers. Traffic India, in the report, *Under Siege*, have recommended that there should be no

overhead power lines within 3 kms. of the protected areas, if we are keen to protect the wild animals.

Poisoning. Such method of rhino poaching has not been reported in KNP though there have been some cases in Pabitora, Orang in Assam and Royal Chitwan Park in Nepal.

Snaring. Perhaps there are only one or two case of rhino poaching by snaring. Bonal puts it like this. "It was in 1988. The field staff of Manas National Park were on patrolling duty, when they noticed a rhino struggling for life, pulling a huge log. When the staff immediately informed the Range Office at Bansbari. Range Officer, A.K. Brahma, and his staff reached the spot and desperately tried to save the trapped animal, but alas! The helpless animal succumbed to the deep wounds. It was later discovered that the snare made of thick wire was fixed near a water hole, frequently visited by the animals. The noose got tighter as the rhino pulled the log in its bid to free from the fatal snare. It had deep wounds on both the dorsal and the ventral side.

Shooting. Poaching rhino by using firearms is a recent development. Normally poachers are hired gunmen, working for financiers or rhino horn dealers, who are generally accompanied by guides, usually persons living in near by villages. One of the major factors that have contributed towards escalation of poaching during the eighties is the free access to clandestine arms. Possession and movement of illegal arms in areas like Naojan, Anjurpani, Behali, Rangchali, Dolamara are to be checked by proper networking between civil police and forest departments in Golaghat, Nagaon, Sonipur and Karbi Anglong Districts.

POACHING INTENSITY

Bonal, during his presentation at the IUCN Asian Regional Meeting of the Rhino Specialist Group for India and Nepal, gave trends of rhino poaching since 1974. The figures are both revealing and hair raising. There was very less rhino poaching in India upto 1979, when the figures were below 5 animals per year. The figure moved to two digits in 1980 (11) and then more rhinos fell victim to poachers greed, with very high figures during 1986 (45). The state government's sincere efforts showed some results in 1997 and in subsequent years. There have been 4 rhino poaching cases in 2000. Again analysing the poaching figures, it comes out that out of the rhinos put to death, more than 70% are adult males, or females animals, while 25% may be sub-adults, and a few calves also form soft targets to poachers' greed. During the year the incidence of poaching is more in particular months. We take 1985 as a sample year. During the first three months-Jan. to March, 14 rhinos were killed by the clandestine operators. The next quarter saw the poaching of 9 animals, while during the third quarter, 12 innocent rhinos fell to the greed of cruel poachers. During the winters Oct. to Dec., 16 rhinos were killed by the poachers. Almost similar



Patrolling boat—ready to nab poachers.

picture appears for 1992 when the poaching touched all time high of 48 rhinos. 14 Rhinos fell during first quarter, 11 animals during the second quarter, 7 animals during the third quarter and a high number 16, rhinos during the last quarter of 1992. This was the period when all rhino bearing areas, including those in Nepal, and African countries, also passed through the dark period, reducing the Black rhino population from 20,000 to about 5,000. Similarly, the White rhino suffered badly during this period. Manas saw the great rhino loss reducing its rhino population to single digit figure.

PROTECTION PERILS

Conservation of nature and protection of animals is a tricky and dicey task. There are inherent perils and risks involved while dealing with poachers, more so when countering organised hard core poachers. Bonal has organised and led many anti-poaching operations, and narrates a number of incidents, where timely action by the dedicated staff and workers has helped in containing poaching of rhino and other wildlife. Bonal puts these experiences as under:

Rong Torang Episode. This was a hair-raising encounter. Karbi Anglong hill of Autonomous Council runs all along the southern boundary of the KNP. The foothill area has become the favoured and mostly frequented area of the KNP wild animals for shelter during the floods. During the rainy season, elephants, rhinos and other animals are hardly seen in the park, as they migrate to higher forests of Karbi Anglong Council. The wild denizens return to the Park only by September/October month. I got the news that a gang of 6-7 poachers was hiding in the foothill forests, waiting for a chance to poach a few rhinos, having good sized horn. It was learnt that they had

Forest personnel in a mechanised boat, Kaziranga.



.315, .303 rifles and other firearms and ammunition to do a swift and smart poaching job. One of my confident informers had become friendly with the poachers and won their confidence. He also assured them of safe entry in the Park during the wee hours. The poachers, with the help of a middle man constructed a hide out at a vantage point so that they could see all around. Having decided to have a raid on the hideout, I, accompanied by a few trusted staff and some Police personnel reached the area after midnight. It started drizzling, then it rained. This in fact saved us from the village dogs, who normally raise loud alarm, when a stranger enters the village. Here, due to rain, the dogs were mostly in the huts or other sheltered places. The leaves were wet, so we could go very near the hideout without any sound. We were crawling, moving slowly on the fours. We decided not to open the fire first. Two raiding sub-groups led by the ACF, Sh. Rao and D.D. Boro, Range Officer, and Police Circle Officer swarmed the hideout from different flanks, with guns cocked up in the fire position. The others could run away under the cover of darkness, but after firing indiscriminately. One of the poachers was killed during the encounter. While further scanning and patrolling the forest, we heard a person crying for help. He was brought out of the bamboo grove for identification and interrogation. To our surprise we saw one of his legs missing. This puzzled us as there was not much blood on the stump of his leg. Later we learnt that one of his associates, while fleeing away had fired a few rounds on his leg, which almost tore away his leg below the knee. He was removed to the nearby hospital where he died due to fatal injuries he had received. From the hideout the remains of a dog which was killed and cooked on the previous evening were found. By the arrest of some poachers of this gang, our staff's morale was raised which could save a few rhinos from the poacher's bullets.

Nepali Gaon Encounter. We sometime send a confident staff or a decoy to unearth the poachers gang. It was November, 1992. My informer brought the news that a few persons had come from Dimapur with more than three Lakh Rupees to get rhino horns. The informer, as decoy horn dealer, assured them that the rhino horns are available. We chalked out a plan to nab the rhino horn smugglers. Police Circle of Bokakhat helped us to finalize the operation to raid the house in the Nepali Gaon village where the poachers were halting. I trusted my informer and handed over a good rhino horn to him as a ploy to nab the poachers. I personally led the party and surrounded the house from a distance. We waited a signal from the informer who was to approach the house from a different route. As time rolled by, I felt uneasy since no signal was coming from my informer. Has the informer run away with our stuff. After an hour, the informer came and said that he was expecting a person from the house with a message before he took the rhino horn to the house to make search. While we raided the house rhino horn smuggler putting on the leather jacket as earlier described by the informer, nothing incriminating could be found on his person. This was an unsuccessful encounter, none-the-less, the lesson learnt through such failures made us more careful and vigilant for the future.

Mridoloni Encounter. Like many other camps in KNP, staffs of Mridoloni camp have a common mess to cook food for all staff posted there. On the morning of 2nd of August, 1997, Sh. Sagarmura, the Camp In-charge went out to purchase ration for the mess. As he reached Ikroni beel, he saw some human footprints and could guess that these were not the footprints of the camp staff. He immediately returned to the camp and informed the Range Officer about his observation. The Range Officer B. Talukdar immediately sent additional staff to the Southern boundary forests of the

Park. Sagarmura himself, helped by two other dedicated staff Jadav Bora, and Mokeer Chetiah, followed the footprints to nab the poachers. They reached Kerasin Katoni (woodland) by past midday. Here they got some smell of smoke indicating the presence of some persons. Our staff had few .315 rifles and wireless sets with them. Sh. Sagarmura tried to peep in the tall elephant grass. He could see a few persons taking rest under the cover of the grass and other shrubs. On his challenging the poachers to come out and surrender, there was firing from the poachers end. He had the presence of mind and fired few rounds on the poachers from the lying position. The firing continued for about half an hour. He later recalls that some rounds literally grazed just a few inches from his ears. After the firing stopped, he along with his friends started combing the area. He realized that the poachers were hardly 15-20 meters away from them when the firing was going on. During search, they recovered a dead intruder with a .303 rifle, a bag having some bullets, catables, salt, onion, and two car tubes. The poachers often use the inflated tube to negotiate small rivers and water bodies. It was only due to the presence of mind, dedication and total devotion to the cause of conservation, that few poachers were eliminated. We are proud of such staff who work tirelessly for the protection of rhino and its habitat.

TIGER IN AMBUSH

Bonal has another story where a staff on patrolling duty got hurt grievously by a tiger in KNP. We hear it in Bonal's words like this:-

December 22nd. The shortest day of the year. It gets dark by about 4 PM in North East India. After dealing with important office work I entered KNP from the Eastern Range Agratoli, for patrolling and reached Rangamati Beat. The bridge over river Rangamatia was dismantled for repairs, so I had taken the longer route via Pohumari to reach Kilakili camp and assess the anti poaching activities taken by the staff and the status of wildlife. A staff came running, highly disturbed and in panic. From a distance, he shouted "Eta Gol" meaning thereby that one is gone. My immediate reaction was that the poachers killed a rhino. I was apprised that it was not rhino but a staff who was mauled by a tiger. I immediately rushed in the camp and saw Nasiruddin Ahmed, Forest Guard profusely bleeding and tied by a gomcha or towel around his neck. I assured him that he would get proper medical help and nothing would happen to him. On wireless, I immediately informed D.D. Boro Range Officer, Agratoli to contact Bokakhat hospital, and arrange for a bed for the injured Forest Guard and keep the life saving drugs including anti gangrene medicine. He was asked to purchase a bed from the market if it was not available from the hospital. We put the injured staff in the vehicle and left for Bokakhat. Since the bridge over Rangamatia river was dismantled, we had to take the injured Nasiruddin Ahmed on a separate vehicle from Rangamatia. D.D. Boro had made all arrangements well in time. The Forest Guard was lucky to get proper and timely medical care at Bokakhat. Nasiruddin was out of danger soon and recovered in a few weeks. The staff, who were with him at the time of tiger ambush, later narrated the incident to me, as under:-

"We were on patrolling duty on the fateful day. I was carrying a .315 rifle with rounds. Nasiruddin was at the end of the row. When we reached the vulnerable point, where the population of rhino is generally high, we never imagined a tiger lay in ambush, in the tall elephant grass, by the side of the patrolling path. The tiger quietly

let me and another staffs go unhurt. It suddenly jumped at Nasuriddin and caught him from the back and Nasuriddin was terrified. He, however, kept his nerve and started hitting the tiger with his Khukri-hatchet. The tiger left him briefly and moved away but again charged at him and pulled him inside the tall grasses. We heard his cry. Looking back we found our colleague missing and followed them towards the tall grass. We fired several rounds in the air to scare away the tiger that left the bleeding Guard and disappeared in the forest. We bandaged the wounds with Gamcha and other clothes to stop bleeding and were planning to carry the injured Guard on a makeshift stretcher or elephant. We thank God that just in time you reached our camp and our friend was timely taken to Bokakhat Hospital for giving medical help.

PROTECTION

Dedicated staff try to save rhino and its associates at all costs. Despite infra structure inadequacies, Forest officials, along with Police personnel go head to challenge the poachers, and even apprehend some during the encounters. Some die-hard poachers resort to indiscriminate firing to kill our staff. A few poachers also get killed during the blind battle and firing. Bonal briefs me that 66 poachers have lost life during poaching misadventures during the last 15 years. Around 500 poachers and their aids were arrested. A large cache of arms and ammunition was recovered during anti-poaching operations. Around 70 rhino horns were also recovered from the poachers. Forest officials and police personnel strive to put their best to contain poaching, but such efforts should be reinforced by active public support, and timely information and other inputs from NGOs, who generally have more knowledge of the poachers' pulse.

RHINO CONSERVATION



Indian Rhino—worried for future.

Bhupen Hazarika, the great music maestro, Chair person of Sangeet Natak Academy, gets rather emotional in his recent music album *Honali Yoger Gaan*—Song of the Golden Era. He devotes a song to *Gorh-rhino*, and its habitat Kaziranga. English transcript reads like this, though original Assamese version brings out the real feelings of Hazarika's heavy heart.

Kaziranga is green dream-Kohora and Bogori are close to my heart.

Luit and Diffolu are my near and dear-so is my beloved cottage.

My Kaziranga is special.

Kaziranga is neither dreadful nor dense forest.

Human forest is more dreadful than this Kaziranga-O-Kaziranga.

It is sad that Indian rhino, the gigantic Goliath, which, just a few hundred years ago reigned over most of the *Terai* forests, now remains cramped to just a few pockets of small habitat in east and north-east India and southern Nepal. Somewhat

viable population of the unicornis now exist only in Kaziranga National Park of Assam and Royal Chitwan National Park of Nepal. Other smaller population groups at Royal Bardia, Nepal or Jaldapara and Gorumara in West Bengal or Pabitora, Orang or Manas, protected areas in Assam, can not be considered viable by IUCN standards. Rhino is the apex species, maintaining ecological conditions in the *Terai* forests and flood plains of Ganga and Brahmaputra basins. Being a coarse feeder, it selectively weeds off coarse grasses and facilitates growth of fine grasses and plants for the ungulates, deer

and other herbivores. A simple, dull witted *Dodo*, it makes the star attraction in the nature tourism destinations like Kaziranga, Royal Chitwan or Jaldapara Parks. Rhino is essential part of our cultural fabric. It deserves all protection and compassion.

The *Rhinoceros unicornis* is one of the world's most magnificent animals and a source of awe and wonder to all, who see it in its natural habitat. It is a harmless creature yet no animals dare



Guarding its territory.

to measure its might. It is sad that the innocent mammal has been brought to the brink of extinction due to self centred and thoughtless man. It is the only living link with our ancient heritage. If due to unabated persecution, rhino goes into oblivion, or becomes part of the natural history museums, it would be an irreparable loss for the humanity. We certainly cannot be so uncouth to natural heritage and shy away from our obligations towards the future generations.

PROTECTION

So long as the baseless myths about the magical/ medicinal properties of the rhino horn exists, the demand for the horn will continue, so also the persecution and merciless annihilation of the most coy and meek animal. So there is urgent need to dispel and demystify this anti-rhino myth. Effective awareness should be created against the use of rhino horn, nails or flesh, by exposing the futility of such usage.

UNDER SIEGE

Traffic—India, in the study on the poaching and protection of Great Indian One-horned Rhino, has brought out the crisis situation caused by the hunting of the animal for its horn and other parts. Vivek Menon, who has conducted the study during 1994-96, feels sore on the precarious status of the Indian rhino. The Great Indian One-horned Rhino is perhaps the most endangered species of Indian megafauna. The number of animals in the wild is less than half that of tigers, one-tenth the number of elephants, in India. Poachers are displaying more ingenuity, using novel methods, such as electrocution. With the influx of arms into Assam since early 1980s because of political unrest in the region, killing of rhino has become easier for the poachers. During the period 1989-93, 266 rhinos have been killed as per the official records. This accounts for almost 15% of country's total rhino population. This is a grave situation and calls for action on urgent basis.



Small is beautiful—part of conservation.

INFRASTRUCTURE

I occasionally confer with Bishan Singh Bonal, who has worked in many protected areas of Assam. He asserts that most of the forest staff are sincere and hardworking and would go all out to protect the rhino and its habitat. We only need to provide them minimum infrastructure and facilities to perform their duty. Kaziranga Park is perhaps the best managed

area, but here also we find some protection camps without adequate transport and communication means. Funds are short for regular repair of the camps and to provide them the basic medical cover against malaria or dysentery, which are very common in the wet ambience of Assam. Can we not arrange to provide them free rations and potable water in the camps itself as done for para military forces, instead of the protection staff, ferrying the dry rations from Kohora or Bokakhat market on cycle or combination of cycle and boat.

CARROT AND STICK

Working in such arduous conditions like Kaziranga or Manas or Pabitora is no bed of roses. Good and sincere staffs do need a pat on the back for the good work done by them. They may be honoured with suitable awards for the commendable work done to protect the forests and wild animals. In fact such dedicated officers, who show exceptional courage and initiative to protect wild animals, may also be considered for accelerated promotion. Likewise inefficient staff or those without commitment for conservation and protection of wild animals may be sacked.

INTELLIGENCE

It is well known phrase that knowledge is power. It is truer when one is dealing with issues like poaching of wild animals like rhino, tiger, elephant or black bear for its horn, bones, tusks or the bile. To have a proper protection system in place, a sound intelligence network is not an option but is imperative. Complete database on important poachers and their henchmen, field level hunters or trappers, type of firearm or the method of poaching, needs to be built up and constantly updated. Adequate information also needs to be got/purchased on the possible entry points and the escape routes likely to be used by the poachers. Their transit places/shelters in the nearby villages where they congregate for a few days and then launch the offensive against the innocent helpless animals, needs to be identified. Rhinos are no match to the cunning moves, sophisticated firearms or the deadly high volts electric traps that lie ahead for them. Similarly information on the main wholesale and retail market of the animal parts and its formulations is very helpful in planning the anti-poaching strategy. A few

trusted informers should be always on the prowl for catching any news about the likely moves of the poachers' gangs. To keep up the interest of the informers, a suitable secret fund may be created to give rewards/incentive to the informers, whose information helps in nabbing the offenders, and seizure of wildlife parts.



Galloping beauties.

AWARENESS

Vivek Menon, in his report on the protection and poaching of rhino, highlights the urgency to create awareness among the people about the role-played by the forests and the wild denizens in our very survival. In fact for the forests of Assam and other rhino habitats, unicorn is the critical apex species which acts as an indicator of the health of the eco-system. If the status and the health of rhino is sound and happy, the forests will also be in good shape and so also the sustenance for the forest dwellers and the poor people. Once the love for conservation of natural resources is generated, half the war, in fact, is won. Let every villager become a partner with the government machinery to preserve and enhance the legacy and the natural heritage. Our people have to realise that rhino is as precious and pious to the state, as are *Bihu* or the mighty *Brahmaputra* or the *Kamaksha* temple, they would themselves rally and organise to protect the rhino and its sylvan habitat.

LEGAL BACK-UP

Durgaprasad Neog, a keen, down to earth, naturalist, cites a case. A known poacher and forest offender was caught by the forest staff in the buffer zone around the park with firearms, four celled torch, a large gunny bag, a hatchet and other tell tale equipment for committing the offence. But he could not be convicted by the trial court, just because there was no independent witness and the offence had yet not been committed. Vivek Menon pleads that there is need to sensitise the legal system and the judiciary about the importance of forest and wildlife for our very existence. India, is one of the twelve-mega bio-diversity countries of the world. And NE India is one of the two identified hot spots of India. Nothing will be left if we can't look after such bio-rich niches, which are sustenance for very large number of forest dwellers, tribals and the rural poor. It is here that judiciary can play a pro-active role. Forest offence cases need to be decided quickly, so that the deterrent punishment awarded to the offenders send right signal down the line. Then only we shall make some progress in combating the growing lust for the animal parts and the quick buck.

FUNDING

I am discussing with D.M. Singh, Director, Kaziranga National Park, about the poor state of interior antipoaching camps. He apprises me that the Park management are not able to carry out timely repairs of the buildings or provide adequate camping facilities to the staff due to insufficient funds. In consideration of the good track record of Kaziranga, many voluntary bodies and NGO's come forwards to assist in conservation of natural resources. I later interact with Manoj Misra of Traffic India on the issue. Traffic India has been extending a helping hand in encouraging some highly devoted forest staff by way of awards and rewards. WWF India has also been lending techno-financial help to Kaziranga and rhino conservation. While such philanthropic initiatives are welcome, wildlife management can be taken up on sustainable basis if funding by the state gets a fillip. The government has to give due priority to ecological security of the Country/State like defence security or law and order security. I recall the recent National Forest Ministers' Conference at Coimbatore. All Ministers made a strong recommendation to enhance the allocation to Forestry and Environment sector to at least two percent of the total annual budget of the state, from a meagre, less than-one percent, as of now.

MEGA SPECIES

The role of bio-diversity in maintaining the ecological security of the country and ameliorating the climate is globally realised. Species like rhino, elephant, tiger, lion deserve special focus in the conservation efforts as these species indicate the health of the eco-system. Only very rich and diverse forests can support good population of these species. IUCN are making sincere efforts on conservation and revival of species nearing extinction. In 1959, Lee Talbot of the IUCN said that the *Hangul*, Kashmir stag (*Cervus elephus hanglu*), rhino and the Asiatic lion were on the road to extinction. Fortunately for rhino, the march towards extinction is somewhat halted. But we can not be complacent. Efforts to step-up the population of Indian rhino should continue. Once such mega species get adequate protection, other associated species will be automatically taken care of.

CARE IN CAPTIVITY



Two is a company.

Priya Ranjan Sinha, Member Secretary, Central Zoo Authority, gives useful inputs on the status of Indian Rhino in various zoos in India. The unicorns are found in different geo-climatic zones, from Gujarat in the west, to Tripura in the east. Its ex-situ conservation is also taken up in South Indian states. Thus 36 Indian rhinos strike awe and

admiration in 15 zoological parks in the country. Assam State Zoo at Guwahati has the largest number of rhinos. Ten rhinos of different ages oblige the visitors by presenting good poses for photography and videography. D.M. Singh has served as Director Guwahati Zoo for some time. He presents status of rhino in the zoo and brings out certain facts nicely in the light of some matter published in the International Stud Book on Indian rhino and the recent publication of Zoo Print. B.S. Bonal, who was also Director KNP till recent past, recalls that during the 1998 floods, a young rhino calf, hardly a few days old was rescued by the KNP staff. It had pink skin, no folds and had some tiger bite injuries. It was hand reared at Kohra for a few days and then shifted to Guwahati Zoo, where it is doing fine.

Bonal has been toying with the idea to bring more rhinos in the display area in the National Zoological Park, Delhi. Initially he has been able to release two compatible rhinos in the display area. Waiting for a few days, he plans to send two more rhinos in the moated enclosure in order to provide more open area to each animal. Now there is

trouble. Bonal describes the episode as follows.

"Traditionally, only one rhino is released in the moated enclosure in Delhi Zoo. Two compatible rhinos are sometime released together, when one animal comes to heat. I am trying that animals spend minimum time in its cubicle and can move about freely in the larger enclosure.



Ayodhya, Maheshwari & Mohini NZP Delhi.

With this idea, I have tried to study if the animals of same sex can be safely released. Taking adequate care I release Mohini, a female rhino with Maheshwari, and Ayodhya. Mohini adjusts with Maheshwari and Ayodhya after initial minor fight. I observe this good behaviour for a week and then on a Friday (zoo holiday) the adult rhino Dabbu is also released with other animals. The trouble starts now. Dabbu enters the arena, and starts fighting with, Ayodhya, its son. They have serious scuffle for about 3 hours. Sometime they stop fighting just to gain breath. During the fight the animals try to bite and push each other. All efforts to get them separated fail. The zoo staff even bring in the burning *mashal*—torches to scare them away bear no results. Maheshwari appears scared of the fighting males, and retreats to one corner of the enclosure. Both Maheshwari and Mohini gradually retreat to the feeding chamber, leaving the two robust males, father and son, fighting to settle the scores. Somehow by 2 O' clock, noon, both the animals enter the wet moat for wallowing, perhaps to say 'quit'. Slowly, Ayodhya turns back, smells Dabbu, as if communicating for a few seconds and gradually withdraws to the animal house, leaving the victorious Dabbu alone. The animals get superficial injuries. The Vet nurses them with animal analgesic and support therapy of multi-vitamins and tetanus toxide. They also get a bucketful of drinking water reinforced with vitamin powder. Next day, they are fighting fit and fit to fight."

ZOO INPUTS

I have been taking interest in the care and maintenance of rhinos in some zoos in the country. Dr. Paneerselvam, the experienced veterinarian, who has handled wildlife husbandry in Vandalur Zoo and now at National Zoological Park, explains the sensitivities of looking after burly animals like rhino or elephant. He mentions that under the zoo conditions the rhinos rub the horn with the enclosure walls or some trees. So we find zoo rhinos with comparatively smaller and stump shaped horns. He clarifies that rhinos don't have real horns. This is only a mass of thousands of hair and the epidermis, keratin which eventually takes shape as a horn due to the combined effect of sweat and some exudation from the animal's snout. I am curious to find out the feed requirement of the three tonne animal, who is always seen foraging in the wild. The zoo Vet explains that 75 kg green fodder, 50 kg Ficus leaves, make its staple



Fore play Ayodhya & Maheshwari.

food under zoo condition. It also relishes about 5 kg *Khichdi* prepared from rice, *Dal*, jaggery and little salt. To top it all, it takes a dozen bananas. Rhino is animal of different moods. When off mood, it would seriously chase the zoo staff, even its keeper who feeds it daily. Earlier it is mentioned that it has fair intelligence and tends to slide the feeding

chamber gate with all its might. The gates have to be properly locked. Very interesting observations are made on its behaviour under zoo conditions. The female comes to heat on a cycle of 45-50 days and would then excite the bull rhino. The male, initially shows very little interest and tries to avoid the cow. Persistent invitations from the female in heat somehow brings the reluctant male to the arena. Some Vets and biologists think that the male also comes to some sort of heat. Copulation takes place only if the heat periods of both the players coincide. Why does the rhino have such a small tail, considering its mammoth body size? I am apprised that the rhino feels happy wallowing the entire day. It gets a thick coating of mud that keeps the flies off. Other insects and ticks which would have cosy breeding home under rhinos body folds and armour layers, are also taken care of by wallowing. It does not have to wag its tail frequently to ward off the flies. So due to long disuse its tail has become shorter over millions of years, Paneerselvam explains. The animal uses the tail to avoid infection near the anus or vaginal opening. It uses the tail to wipe off and dry up such sensitive parts.

GUWAHATI ZOO

During my visit to Assam, I spend sometime in the State Zoological Park at Guwahati to study the behaviour and other traits of Indian rhino. This zoo has the largest in-situ conservation programme for rhinos and gives useful inputs. Apart from a few Indian rhinos of different age profiles, the zoo has Mohan, the African White rhino, that lends charm and awe to the zoo visitors. We first visit Mahesh, the 10 years old rhino, who is fed on the balanced diet of horse gram, polished rice, and lot of green grass and *Ficus* leaves. Mahesh is somewhat ill tempered as corroborated by Bhattacharjee, the Zoo Director. Dr. Durga Charan Deka, the zoo Vet and Head Animal Keeper, Nasruddin Ahmad are with us during the visit. We next visit Reeta and Loharani, the female rhinos rescued from Kaziranga. They are in good shape. Loharani was brought to the zoo when it was just two months old. Its mother was probably washed away during the 1998 floods. The next visit to Vishnu (male) and Baghakati (female) gives good inputs on the family and procreation of rhinos. The two had copulated some 49 days ago. The actual mating took place at 2.45 a.m. and continued for about

40 minutes or so. *Baghakati* literally means bitten by the tiger. This rhino was rescued after a tiger attacked it a few years ago. She is about 10 years age while her mate Vishnu, is two years senior to her. Pointing out to the thick skin armour on Vishnu, Dr. Deka adds that the thick skin with folds acts as thermostat for the rhino. I seek to know as to why rhino has



Ayodhya & Maheshwari—enjoying Delhi Zoo ambience.

three toes, unlike elephant that has four toes or the camel having only two toes. Deka explains that rhino is more close to pig. Such perisodactyle animals have odd number toes in the feet. Burha is the oldest—20 years rhino in the zoo. There are just 3 females for 6 male rhinos in the zoo. So many males do not get chance for mating. Dr. Deka explains that when females in the zoo go to heat, Burha feels somewhat disturbed and bangs its head against the enclosure walls. The same condition is reported of Ram Prasad, another 22 years old Rhino. Mohan, the lone African white rhino, appears restless. It dashes the stone wall with all its might and has blunted its both horns. Mohan is not *white*. It has pink coat with out any folds or armour or tubercles. The skin is somewhat like *Mithun* or a large bull. It lacks the typical looks of a pre historic animal or a gigantic Goliath. It has much wider jaw compared to Indian rhino. Some biologists feel that the word *white* is the corrupt form of *wide*, as the African white rhino has a very wide jaw. Deka mentions that during heat, rhino generally shows such wrath, keeping its tail curled up. The zoo managers reduce the food supply to the animal for a few days to cool it down.

RHINOS INTERNATIONAL

Central Zoo Authority sends me the International Studbook on Great Indian One-horned rhino. It makes interesting reading to trace the family tree of a particular animal that may be presently in Negoya zoo, Japan or Cologne zoo, Germany. Many Indian zoos and sanctuaries, mainly Kaziranga, Assam State zoo, Guwahati, National Zoological Park, Delhi, Mysore zoo, Calcutta zoo, Hyderabad zoo, Kanpur Zoo, etc., have sent several rhinos to zoological parks in the USA, Germany, Canada, Belgium, UK, Switzerland, Italy, and other ex situ conservation facilities. This has been possible under the international exchange programme. Kamalrani, the female rhino from Kaziranga, was sent to Brookfield zoo in USA, in June 1948. This pre-historic Goliath was great attraction for the visitors for two decades. It died in May 1968. Harry, a robust male rhino, was sent to St. Luis zoo, USA, during Jan. 1934. It lent surprise and awe for 27 years till its death in Dec. 1961. Many Indian zoos are practising in-situ rhino conservation initiatives. State zoo in Guwahati has 8 Indian rhinos and one

African White rhino. Other zoo that has African rhinos is, Chamaraja zoological gardens, Mysore, where a male and two female rhinos are special attraction for the visitors.

TENDER CARE

Medical and special assistance to a large mammal is a complex task, which the vets and wildlife officers have to often perform.

In large mammals like elephants or rhino, it takes a couple of days before the symptoms are really shown up by the animals. Large burly animal has lot of stored energy and can tolerate the inconvenience and pains due to the disease for a number of days. It is only at a late stage, when the pain becomes almost unbearable, it shows some signs of not being well. Sometimes, we come across incidents where wildlife managers perform excellent job, even by using unconventional methods.

The female rhino, Hartali at Sanjay Gandhi Biological Park, Patna, was suffering from labour pains on 26th July, 1994. The zoo staff had earlier seen Harthali getting chummy with Raju, her father, on a fairly long and useful copulation on 14th January, 1993. Hartali was getting frequent labour pains from 10.00 a.m. but she was not able to properly deliver the calf, whose hoofs and part of lower legs were seen coming out of amniotic sac. The Zoo Director, Vet and other personnel were watching the helpless Hartali producing louder, painful grunts and having some problem in proper and smooth delivery of the calf for some time, decided to physically assist the delivery. Zoo Director, the Vet and 4 workers jumped into the cubicle and tried to pull the calf out of amniotic sac. The mother rhino, who was all along lying on the ground, stood up with a jerk on her legs, leaving the new born calf on the ground, the zoo workers still holding its hoofs tightly. Next 70 minutes, the calf



Rhino love in water.



Burha—Alone in an Indian Zoo.



Oh ... Relief from labour pains—Sanjay Gandhi Zoological Park, Patna.

stood up and was duly accepted by the other. The mother and the young calf got little honey as a welcome 'drink' from the zoo staff. The calf, named Rani is now in good shape (excerpts from Manual Delivery of a Captive Indian Rhinoceros calf at Sanjay Gandhi Biological Park, Patna—P.C. Misra, Director, SGBP, Patna).

B.S. Bonal, Director, KNP got the news of an adult rhino injured near Sagoli beel in Burapahar range of the KNP. The large mammal was limping as a result of gun shot around its shoulder. Perhaps, it got the bullet from a poacher, who had greedy eyes on its well-formed horn. The park management decided to somehow help and save the rhino from the painful agony of a dirty bullet wound. They decided to immobilise the animal and give suitable dressing for its early recovery. They also planned to remove the bullet from the gaping wound, which was the cause of all misery to the poor animal. They administered 1500 mg. of Xylazine to the rhino, which helped in complete sedation of rhino in about 8 to 10 minutes. But the rhino was lying in the shallow wallow pool on the wrong side with bullet wound completely hidden under the mud. Two large well-trained departmental elephants, Jayaraj, a tuskier and Devilal, a makhana, were requisitioned near the duped rhino. Both the elephants very skilfully pushed the limbo rhino out of the swamp and turned it so that the Vet could clean the wound properly. The forest Vet made a few futile trials to locate and extract the bullet. The wound, fairly large, was smelling of pus, which was drained out and dressed properly with tincture of iodine. The rhino was also administered long acting antibiotic doze, which was injected intramuscularly. The mini-surgery and dressing up went for 40 minutes, after which, the rhino was slowly revived. In a few days, the animal was up on its legs and again part of the Kaziranga habitat.

WHY PROTECT RHINO?



Elephant Skull—Kind Remembrance.

I have been discussing this mind-boggling issue with many naturalists, wildlifers and persons who love rhino. Why at all should we take lot of effort and spend money just to protect a large animal species? Why should international organisations like IUCN be so much concerned about the protection of rhino? Why should the people of India make sacrifices to protect the Indian rhino? Why does rhino stand high on the priority of Assam, West Bengal and Uttar Pradesh governments, where several dedicated Forest and Police staff have died or shed blood to protect this animal?

GENE POOL

S.P. Singh, Director Manas National Park, is travelling with me to Guwahati. I pose this *question* to him. He highlights that rhino is a representative species of the unique Terai eco system, characterised by marshes and tall grassland habitat. Rhino is thus indicative of health and

ecological conditions of the grassland ecosystem and wetlands of flood plains. If rhino goes to oblivion, it would signal doom of such grassland systems, very few of which remain along the foothills of lower Himalayas and Shivaliks. He further adds that loss of rhino would mean loss of a particular gene pool forever.

Singh has spent about two decades serving in various Forest Divisions and protected areas in Assam. He mentions that rhino is an integral part of the socio-cultural ethos of the people of North-east India. One horned rhino is the pride for the people of Assam. Government of Assam have adopted rhino as state symbol. Rhino appears as insignia of many Army and para-military formations, as it signifies strength and valour. This

imposing animal is also taken as logo by Assam Oil Company. Rhino is the star attraction for thousands of Indian and foreign tourists visiting for an exciting rendezvous with nature. Visits to Kaziranga Park and Kamakshi temple are important element of their tourism itinerary. Without rhino on the centre stage, nature tourism may take a downward plunge. Singh also talks of ethical value. All animals howsoever large or tiny, have a role in the eco-system and have a right to live in particular niche. It would be highly unethical to eliminate a particular species, more so the grand, burly rhino. Extinction of any animal may trigger serious irreversible imbalance and effect the survival of other species in future. Rhino has tremendous future potential, which we are not able to appreciate as of now. As an important part of biodiversity, rhino deserves all protection and compassion. *Terai* habitat harbours other associate species like swamp deer, swamp partridge, water buffalo, hispid hare and even Bengal florican, to name a few. Thus when we strive to protect rhino, other wetland species and the floodplains get protected automatically.

SPECIES CONSERVATION

I further discussed this issue with Subhash Dey, Secretary General, Global Tiger Forum and my former colleague in the Ministry. He highlighted the basic reason for protection and conservation of rhino from the species conservation point of view. IUCN-Species Survival Commission, takes initiatives to facilitate conservation and survival of species, more so of large mammal that has reached below the threshold level of 2500 animals in the wild. As per IUCN parameters, a large species should have minimum of 2500 individuals in the wild. This should provide for a sound healthy genetic base and some sort of guarantee for its survival for another 100 years or so, provided concerted efforts are made to provide congenial habitat in the wild and sense of security to the animal. He further adds that rhino, being a coarse feeder, keeps control on thick and coarse grasses and weeds that otherwise retard the growth of fine grasses and plants. Such fine grasses make the main food base for deer, bison and other herbivores co-habiting the same habitat. If rhino or other coarse feeders are completely removed from the scene, there would be large-scale invasion by coarse and hard grasses that would put the sustenance and survival of deer and other herbivore to jeopardy. Rhino is an animal reminding us of the pre-historic dinosaurs. It is a living fossil, a giant Goliath. Its armoured body with several artistic folds and many warts/tubercles is a sight to behold. It is an amicable animal that does not easily attract the wrath or apathy from the people. There have been very few cases of rhino causing injury to people or of crop raiding. It has practically no enemy in the forest (except the horn on its nose, responsible for its killing). It does not even use the horn for defence or offence. By far, rhino is a good nature animal except in stray cases when rhino mother tries to provide care and protection to its calf. Dey recalls that in W. Bengal, a rhino somehow strayed out of Jaldapara Sanctuary and reached a tea garden. Here it slowly got used to seeing many people around and allowed garden workers and villagers to venture very close, almost at handshake distance. The tea garden Manager had a photograph of a few children riding this sweet nature rhino. From all angles, scientific, ethical, aesthetic, humanitarian, rhino deserves compassion and care from all of us. Dey recalls his days of working in rhino habitat in Jaldapara. He could recognise most of the mega mammals with 70% accuracy. He adds that the lay and pattern of body folds, warts, size and shape of the horn and ears are distinct for each rhino.

HERITAGE

I talk to Bhupen Hazarika, the renowned writer, singer and folk musician of Assam on the protection of rhino. He accords high status to rhino, the symbol of strength, valour and a friendly imposing creature, which is integral part of cultural ethos of the people. Many Assamese songs and lyrics are woven around rhino



Holistic protection—Indian Python.

and Kaziranga. People worship rhino as Bahan of Lord Vishnu. In some parts of Assam, agriculturists have celebrations if rhino steps on their fields. Lovingly, they call it Gorh. Farmers view rhino as harbinger of good luck and bumper crop, once rhino steps on their field. Similar fables are popular on Kaziranga, the prime habitat of rhino. As per one version a Karbi Anglong belle, Kazi had liking for a plains tribal lad Ronga. Their parents did not approve of such friendship. They often met in the forest. One day, they just vanished and got penance. The forest was named Kaziranga after the romantic nature lovers. In his recent audio cassette, *Kaziranga-O-Kaziranga...*, Bhupen Hazarika eulogises the inherent strength of Kaziranga and its wild animals. He stresses that there is nothing fearful about the forest, Kaziranga is *Abayaranya*—forests where wild animals move about fearlessly. Hazarika adds that the jungle of falsehood, violence, hatred, jealousy in which we live, is much fearful and dangerous than the forests which sustain wild animals. Various wild animals like deer, buffalo, rhino, birds live and dance together in the forest. Thus forests give us the message to live happily together and let every species grow and prosper in its niche.

ECO-SYSTEM

I keep getting more inputs from environmentalists, animal rights activists, wildlifers, and scientists on the rationale of protecting rhino and to conserve its habitat. Suresh Sharma, Director Wildlife Preservation of India, explains that rhino being the apex species of tall grassland eco-system, is indicator of the health of the tall grasslands, swamps, wetlands and floodplains. Though it does not figure directly in the food web like tiger or lion, rhino does ensure availability of good, fine and succulent grasses for the swamp deer and other herbivores, by keeping tall aggressive grasses under check by grazing almost 16 hours a day. He adds that large animals like rhino, tiger, elephant and lion can survive only in good large forests. Thus conservation of the habitats results in protection of the large animals and their associates and healthy ecosystem. And rhino doesn't dirty the forests and grazing areas. It defecates at a few dung mounds in the forests, mostly on some higher ground. Various animals are evolved in the universe to perform certain specified functions.



Kaziranga-O-Kaziranga, home of Indian Rhino.

Ajay Saxena, a keen wildlifer, explains that rhino is a symbol of bio health of a particular forest. When we talk of protection of rhino, it encompasses protection of water buffalo, swamp deer, hog deer, egret, bar-headed geese and other associates of the mega animal and of course, the conservation of habitat. Once the forest is conserved and its wild denizens feel adequate sense of security,

other benefits like water and soil conservation, sustenance to local fringe area communities, nature tourism etc. start flowing automatically. There is a feeling of well being and prosperity all around. Healthy forest system supports good agriculture, horticulture, fisheries and animal husbandry. It also provides some employment to large strata of rural people. Thus when we strive to protect rhino, all such line benefits flow as natural off shoot.

Bishan Singh Bonal feels rather disturbed at the poaching of rhino and other wild animals. He adds that from ages the rhino has survived despite many odds. Except rhino, almost all animals of Palaeozoic era, have gone to oblivion. Rhino, due to its internal resilience, has somehow traversed some 40 million years on the time horizon and reached us. We should not become a party in its annihilation. Rhino, the living fossil, the only living linkage with our past, strongly deserves to be protected and saved from extinction. An imposing species, reminder of dinosaur, symbol of might, yet so affable, must be given all compassion and protection at all costs. Rhino, a prehistoric Goliath, is relevant to our cultural ethos even today. Disappearance of rhino from a particular forest spells doom for the ecosystem and a grave signal that other species are also shortly heading towards the brink. If rhino goes today, the extinction of water buffalo, swamp deer, elephant, tiger, pygmy hog, hispid hair and hog deer is not far off. Then follows the dreaded catastrophe of complete collapse of ecosystem and the sustenance source of rural poor, tribals and forest dwellers. Are we to hand over such tottered forest system to our children? Our forefathers gifted us green, lively vibrant planet to live and enjoy its beauties. Are we so ungrateful and irresponsible that we can not even maintain properly the biowealth we have inherited through sacrifice, compassion and sympathies of countless generations of our forefathers. It has lent colour and charm to us all along. Let us conserve and enrich it and hand it to future generations to whom this biowealth belongs.

UNSUNG HEROES

Kaziranga is a success story with very few parallels in the world. E. P. Gee, in his book "The Wildlife of India", has mentioned "Kaziranga would not be what it is today, but for the good work done by P.D. Stracey, a man of boundless energy, who took over from the last British Chief Conservator of Forests in Assam". He further goes on to say that no other Chief Conservator in India, has shown great keenness in wildlife than Stracey. Kaziranga in particular and Assam in general, have been fortunate to get several forest officers in succession, which had total commitment to conservation of wildlife. A few names that come to our mind are A.J.W. Millroy, P.C. Das, Sanjoy Debroy, R.N. Hazarika, and the present Principal Chief Conservation of Forests,

Parmanand Lahan. To such officers, conservation of rhino has not been merely an official duty. It was a passion and love emanating from heart. During his last days, when Sanjay Debroy was struggling for life against the deadly cancer, at Delhi, and realised that death was imminent, he requested to get a few drops of *Manas* river water. Once he got this holy water, the eminent wildlifer breathed his last.

The senior officers of Assam Forest Department have always led wildlife staff and infused among them the spirit of do or die. The lack of resources and inadequate facilities has never dampened their spirit. During 1998, there was serious flood in Kaziranga and entire country was worried about the safety of unique bio wealth of Kaziranga, mainly the rhino. Undeterred with the turbulent floodwater, the staff of the Park was trying to provide security and relief to the animals, almost bare footed, round the clock. During these risky relief



Fred Packard Award—D.D. Boro, Forest Ranger.



Nasiruddin Ahmed Forest Guard,
mauled by tiger.

operations, Deben Chacha, an ace Boatman, got drowned while negotiating the turbulent Difloo River. Many temporary protection camps were washed away. Forest officials and other workers had to somehow adjust in the limited space, but they stuck to their protection and relief duties like brave soldiers. There was no sign of complaint or cribbing on their face.

The anti-poaching infrastructure of the KNP can well be rated to be one of the best in the country. Dharani Dhar Boro, Forest Ranger, is well known for his valour and bravery. He has been honoured with Fred Packard Award, and WWF Tiger Conservation Award. But his is not an isolated case. There is a series of foresters associated with rhino conservation in Assam.

The population of Great Indian One-horned Rhino that had gone down to just a dozen, in 1908 in Kaziranga, has bounced back to about 1500 individuals as of now. It has not come about by itself. Many committed forest officials have toiled hard to protect the Indian rhino from the poachers, who put the innocent, meek

animal to death for its horn. Several good, nature loving individuals, organisations also raised tirade against killing of the prehistoric animal for sport, game or a show of chivalry. During anti-poaching operations, some police officers, Home Guards of National Volunteer Force also participated with forest staff, whose contribution for protection of rhino has been significant. Above all, people of Assam, more so the villagers around Kaziranga, took upon the noble task of protecting rhino and its habitat, as they regard rhino as *Bahan* of Lord Vishnu. Indian rhino is part of the cultural ethos of the people and they made all possible sacrifice to protect the rhino. It is the total commitment of these people that has gone to bring back the living fossil from the stage of near brink.

As I go into this subject deeper, I get useful inputs from several forest officers and others who have served in rhino habitats or were connected with efforts for the protection of rhino and other wildlife. Parthsarathi Das, the *do or die* Divisional Forest Officer, gives many instances of encounters with the poachers, who sneak into the forest with the ill designs of smuggling of rhino horn or other animal parts. During such encounters, many staff have died or got seriously injured or sustained permanent disability injuries. Bishan Singh Bonal has served in many protected areas of Assam and has participated in such encounters. He gives hair-raising details of anti-poaching operations and the part played by the dedicated forest staff and the help by the rhino loving people of Assam. Subhash Dey, Secretary General, Global Tiger Forum, cites of special role of the Government and staff of forest department of W Bengal, to protect the rhino in Jaldapara and Gorumara forests. Ram Lakhan Singh, the Chief Wildlife Warden of UP, mentions that although, the rhino, sometime strays into cultivation fields in the *Terai*, near Dudhwa, the villagers generally do not kill the imposing animal.

They inform the wildlife staff of the rhino movements, which helps in herding the burly animal back to its habitat. S.P. Singh, Director Manas National Park, gives heart rending details of many dangerous encounters with the poachers' gangs and the way forest officials and workers have defended the rhino territory till their last breath. As of now,



Memorial Park at Kohora.

Manas is one of the most complex areas so far as rhino conservation is concerned. Manas has seen bad days during 1992-93, when rhino population nose-dived from some 80 animal to just a few heads which do not even reach the two digit mark. Severe ethnic disturbances and underground activities took toll of rhino and other animals, during this dark period, whose after effect is still felt at Manas and surrounding areas.

IN MEMORIUM

In the memory of brave and dedicated staff and workers, who have made sacrifices to protect rhino and other wildlife, a Memorial Park has been constructed at Kohra, where the visitors pay homage to the *unsung heroes*. The Park was created in 1986 by the Assam Forest Department. Names of the staff, who have laid down life for protection of rhino and Kaziranga are nicely engraved on black granite pedestal. Many visitors to the wildlife retreat pay homage to the *unsung heroes*, who laid down life for protection of wild animals and its habitat.

FORESTERS

It is rather difficult to enumerate all direct and indirect sacrifice made by the brave forest staff for protecting rhino and conservation of natural resources. The difficult working conditions under which they perform and the arduous and risky anti-poaching operations they execute, are itself not less than any sacrifice. Many interior protection camps do not have even basic anti malaria medical back up. In some camps winter clothing is not there, nor good jungle boots. Clean potable water in some interior camps is a luxury. Despite such odds they give tough fight to the poachers' gangs and in many cases they succeed in arresting the clandestine rhino enemies. In some cases the foresters get killed and get serious injuries.

Late Bolaram Dutta, Forest Guard, tops the list of martyrs who laid down the life to protect the bio-wealth of Assam. The dare devil Forest Guard was killed during the encounter on 25.2. 1968. Salutations and *Namaskars* to Bolaram Dutta, the hero of Kaziranga forest protection tirade.

Pradip Pradhan, a devoted Game Watcher, was attacked by a tiger while performing patrolling duty on 2.11.72.

Late Motiram Borah, Forest Guard, was killed by some poachers on 28.3.1985. Forest staff sometime get seriously injured or killed by the wildlife, which they strive to protect.

Niren Soikia, Forest Guard, got killed by a mother rhino, in Kaziranga, recently on 15.3.2000. These are, but a few names, that figure on the martyrs list of KNP.

There are more staff, daily paid workers and public, who have made commendable sacrifice to protect the bio wealth of KNP. Liladhar Gogoi, an able Boatman, under KNP, was attacked by a lone wild buffalo. He died on 01.07. 1979. Deben Chacha, another ace Boatman got drowned when he was negotiating the turbulent Difloo water on 20.06.1998.

Manas being an extremists infested area and sited along the international border with Bhutan, faces more problems when compared with Kaziranaga. It does not have the *do or die* tradition or the *kill or get killed* spirit among the protection staff to the extent it is manifest among KNP political reasons. Yet many brave protection of natural assets as the Manas National Park Director, around Manas forests. In some the Mahauts and even the bullets of miscreants, but only



D.D. Boro—Range
Officer— Fred Packard
Award for Valour

Well-equipped poachers gang patrolling party consisting of elephants, Premlal, Lachit, was 8.10.1992. During Nath, Game Watcher, got killed Rava, Forest Guard, also got bullet injuries. Others, Gangadhar Thakuria, Game Watcher, Haricharan Burman, Forest Guard, Orkey Ram Boro, Forest Guard also got serious bullet injuries. Elephant Premlal, a *staff* of the patrolling party was injured during cross firing. It was found next day dead with multiple bullet injuries. Suren Basumatari, Mahaut, was injured due to firing by the miscreants. He died in Guwahati Hospital thereafter.

HEROIC

The episode of A.K. Brahma, Range Officer of Central Bansbari Range is heart rending. Third March 1993, a large group of militants stormed into Range Officer's residence and dragged him to Range Office, where some staff was on wireless duty. At gunpoint they forced the Range Officer to open the strong room. He was stabbed several times in the process. Brahma's hands were tied while the militants made away with the rhino horns, elephant tusks, arms, ammunition and the cash money. Hearing Brahma's cries, other staff reached and saw him lying in a pool of blood. They somehow shifted him to Guwahati Medical Collage. Timely medical help and nursing helped Brahma. He was discharged from the hospital on 20.3.1993. Instead of asking for leave, Brahma joined his duty to revive the combating spirit of the staff.

Another incident that briefly disturbed the protection activities of the Manas Park came about in August 1990. A large crowd of people, armed with firearms and other lethal weapons attacked Bhuyanpara Range office in broad day light. The staff was just taken by surprise. Some staff ran to the nearby Uchila Beat to get assistance. Bansbari Range was also informed of the gruesome attack on Bhuyanpara Range. Dilip Barua, Forester ran to get his gun. He was shot dead. The miscreants burnt all the buildings in the Range office, looting the weapons, wireless equipment, and even the salary of the staff. The Park Deputy Director with Police contingent reached after some time. By now the staff had brought the body of Dilip Barua, Forester, to Barpeta Road.

To locate the hideouts of extremists and the poachers, forest staff has to literally scan the entire forest. It is a difficult assignment involving many risks and uncertainties. Uchila beat-11 members were on patrolling duty on elephant back to locate the hideouts and camping sites of insurgents. The miscreants suddenly opened fire on them, seriously injuring B.K. Khandekar, Boatman, and some other staff. Khandekar was shifted to Guwahati Medical college on the same day 30.6 1996, where he succumbed to the serious wounds he got due to gun shots. The ace elephant *Narmada* also got bullet injuries in the stomach, but could be saved due to timely care by Veterinary Science College, Khanpara, near Guwahati.

GRUESOME

December 1998. Some two dozen militants attacked Kahitama Beat at night when most of the staff had gone to sleep after the tiring patrolling duty. The miscreants opened fire and killed three staff in cold blood. They looted 18 rifles, ammunition, wireless sets and the salary and savings of the staff. The Beat is interior, about 17 km from the nearest bus or other means of communication. Some staff could somehow reach Labdanguri Police outpost. The Police help could arrive only the next day. Bentik Sangma, Havildar and C.K. Gogoi, Constable of Assam Protection Force were dead. B.C. Kalita Forest Guard, was on the last legs and breathed his last before the Police contingent, which had arrived for help.

A.K. Brahma, Range Officer Bansbari, was attacked several times. The miscreants had planted a timed bomb on the road where Brahma was travelling to meet the Field Director at Barpeta road. As luck would have, the bomb exploded just a few minutes after Brahma's vehicle had crossed that spot.

RANSOM

Panbari Range of Manas National Park was the first forest office to be effected by the Bodo insurgency. The Range was totally ransacked first in Sept. 1989. Owing to repeated attacks and disturbances by the militants, Panbari Range was closed, and its staff in Beat Offices was withdrawn. Late Ibrahim Ali Khan took over Panbari range in March 1995 to revive the sagging morale of the staff and to somehow make the Range functional. Under his leadership, the staff regained some confidence and dealt hard with the poachers. One dreaded poacher was killed during this period. Ibrahim Ali Khan also tried to evict encroachments from the forest area. To pep-up the morale of the staff, Ibrahim Ali, often stayed in the interior Goburkhanda camp, heavily infested by militants. On 4th June 1997, the militants kidnapped Khan when he was going to Panbari Range. Khan's family members received a note from the

extremists asking for heavy ransom for his release. They killed him on 6.8.1997 in Bengtall area in Kokrajhar district. This incident was a setback to the restoration process of Manas Park.

POLICE/HOME GUARDS/CASUAL WORKERS MARTYRS

For the protection of rhino, Kaziranga and other habitats, many Police personnel have also shed blood along with forest staff. Sarhi Kalita, Home Guard was killed by a lone bull rhino while performing anti-poaching duty on 16.11.1978. Another Home Guard, Bidya Lasker, died on 24.11.1978, when a lone buffalo bull charged at him. Khagen Neog, Home Guard, got drowned while performing patrolling duty on 26.6.1982. A young Home Guard, Tuleswar Saikia, was killed by accidental bullet injury, on 23.01.1982. Dharmeshwar Kalita, Home Guard, died due to serious injuries he received when a large male rhino ran into him on 17.02.1983. Abdul Hamid, an upcoming Home Guard, was killed by a wild buffalo, while on duty, on 29.01.1992. In 1986, Arun Sharma in 1988, Kalu Barla, killed by elephant. Damodar Roy in 1993, Silowar Hussain by tiger in 1994.

WELFARE SOCIETY

Anything being done for the welfare of the staff and the families of Kaziranga!, I ask Partasarathi Das, the Divisional Forest officer. He apprises that an attempt in this direction has been made in the form of Kaziranga National Park Staff Welfare Society, recently, I get more input from Bishan Singh Bonal, during whose tenure the Society was set up. Broadly the main objective of the Society is to provide benefits to the personnel working in KNP. It also aims to provide aid and assistance, grant in cash or kind or both, to members.... as well as degree of risk to which they are/shall be exposed or by which they were/are harmed or liable to be harmed. The objectives mention of providing assistance for medical aid, legal aid, education of children, welfare of dependants, etc. The Society is still in nascent stage and needs generous help from all nature lovers and friends of rhino, the only living linkage with our ancient culture. We have attempted to list a few representative persons who have made sacrifice to save the rhino and its habitat. Many more nature lovers, villagers, public, government staff and NGOs have also helped Indian Rhino to come out of near extinction. Our salutation and reverence to them.

UNSUNG HEROES

We need to do much more for the brave staff and workers, who have shed blood for conserving the bio wealth of Assam and to protect the rhino, so closely linked to our socio-cultural ethos. We need to support them morally, financially, socially and give proper recognition to their selfless service to the cause of nature conservation. S.K. Sen, Conservator of Forests, has served in KNP for many years. He sings a few lines from a song composed by the KNP staff, to eulogise the heroic works done by Bolaram Dutta and several others in Assam, who have made great sacrifice to protect KNP and its wild denizens. The English transcript of the Assamese song goes like this:

*Kaziranga, Oh, Kaziranga,
I have heard heart-rending story
Piercing of your devotees' heart.*

*Who has made you red with blood?
 Oh Kaziranga has become red with blood
 With the blood of Bolaram Dutta
 Water of Boro bill has turned red
 With fresh blood of Motiram, red river in the green grass
 Bereaved woman's blank forehead
 This is the life story of Kaziranga.*

Bhupen Hazarika the famous music maestro, who preaches peace and tranquillity, love and brotherhood, is greatly disturbed to see the degradation of forests and difficult sustenance for rhino and other wildlife. Hazarika has sung in the praise of unsung heroes. A few lines from Hazarika song, translated from Assamese are as follows. It is heart rending to hear the great writer, music director, and singer, live. He pours his heart's feelings in the song.

*Kaziranga—Kaziranga
 Kaziranga is not dreadful dense forest.
 Human forest is more dreadful than this
 Kaziranga—Kaziranga
 Evergreen ambience of Kaziranga is home of elephant and tiger,
 The world admires one-horned rhino, birds' melodious songs,
 My Kaziranga is not wild
 Rhino and deer play together in Kaziranga
 Alas; The cruel in human forest when will learn it?
 Is civilized man honourable?*

It makes one sad that the Government, somehow, has not been able to do much for these unsung heroes. Sometimes they do not get even the basic prerequisites like uniform, boots, torches, raincoats etc. for performing protection and management duties. It is pathetic that the untiring officials, delivering their best, almost round the clock, have to depend on organisations like Environmental Investigation Agency-EIA, Wildlife Trust India-WTI, Worldwide Fund for Nature-WWF, for jerseys and windcheaters to fight the biting cold. We do realise that the State Government is under financial crunch, yet we have trust that the Chief Minister, Chief Secretary, Commissioner Forests, and others at the helm of affairs, having deep commitment for protection of *Gorh*, would be able to give better deal to wildlife officials in Assam, soon, before this magnificent pre-historic Goliath is relegated to natural history museums or a few scientific journals.

MADE FOR EACH OTHER



Gorh—inspiration of Bhupen Hazarika songs.

My interest in Kaziranga started some 22 years ago on my first posting to NE India. I was posted as Divisional Forest Officer, Bhalukpong in Arunachal Pradesh, the *Land of the Rising Sun*. For most of the stores and food items purchase, we frequently drove to Tezpur or Guwahati, in Assam. Some of the archaic items like the circular wick or tall glass chimney for the

Alladin's kerosene lamp, were available only at Guwahati, in Paan Bazar. Thus I could visit Kaziranga, the rhino land, a few times during a year, driving to Guwahati. During these visits to Kaziranga we could get some experience of the rich fauna and flora of the world famous home of the Great Indian One-horned Rhino, more famous as *Gorh* in Assam. Slowly I learnt about the myths and fanciful ideas about the rhino horn and the poaching of the imposing animal for its horn, nails and other parts.

RHINO LAND

Bishan Singh Bonal, my co-author, has served in several wildlife rich areas of Assam. He has also attempted to have some idea of Assamese people's love for nature and a sense of adoration of nature and living beings. Nature and wild animals have a place in cultural ethos of Assam. Bihu, Brahmaputra and *Gorh* are three ethno-cultural symbols of Assam. The traditions and culture of Assam revolve around these cardinal



Gorh (Rhino)—appeals for protection

symbols. The *Bahan* or carriage of Lord Vishnu, Indian one horned rhino is affectionately called *Gorh* in Assam. They identify themselves with the prehistoric relic and take pride in being the custodian of the pre-historic animal. The people living around the actual address of the rhino, KNP have never hesitated to make sacrifice for the sake of rhino. Such heroic

deeds have placed them on a high pedestal among the international nature conservation community. The government of Assam, through Forest Department, have always attached the importance and urgency to the affairs of the rhino and KNP. To focus the need for sincere conservation efforts, KNP has been adopted as a World Heritage Site, under the aegis of the UNESCO. KNP is success story for the conservation of a charismatic species in the wild. The two biological entities, KNP and rhino have grown as synonymous and draw existence from each other. Many songs and legends are woven around rhino and KNP. The two are tied with delicate biological linkages, sustaining and grooming each other. A perfect match for each other in-deed.

ETHOS

Gorh has occupied a place of pride for the people of the country. Though Kaziranga lies in the Assam state, rhino has much habitat in the heart of our people across the country. Many communities in India and the neighbouring Nepal affectionately call it *Gainda*. Many legends and folklore are woven around rhino. *Gorh* appears in some Bihu songs, in conjunction with Kaziranga. When Dr. Bupen Hazarika the great music maestro, representing the spirit of Assam, sings his composition, *Kaziranga-O-Kaziranga*, fond reference is also made of *Gorh*, without which, Kaziranga is not complete.

Kaziranga-O-Kaziranga
Rhino and deer mix up and play together in Kaziranga
Alas! The cruel in human forest when will learn it?
Is civilised man honourable.
Evergreen ambience of Kaziranga is habitat of elephant and tiger
The world famous Indian rhino- birds' melodious expression
My Kaziranga is not wild or dreadful
Kaziranga-O Kaziranga.

DREAM LAND

Kaziranga is the ideal rhino habitat with several water bodies, locally called *beels*, which form the main wallowing sites for the rhino. The Gorh likes wallowing a lot and spends most of the time in grazing or wallowing. Typical flood plains of Brahmaputra get fresh recharge of water every year during the floods. The annual floods also bring silt load, that helps formation of new islands or *pokharies*, with primary grassland vegetation. It is this flood plain situation that controls succession of primary vegetation to trees thereby helps in perpetual tall grassland vegetation, (collectively called elephant grass), most suited to rhino.

KAZIRANGA FOR RHINO

Nature makes some strange and interesting designs, which we human beings are not able to comprehend easily. The recent report of the IUCN- Species Survival Commission, Asian Rhino Specialist Group indicates that the Indian rhino reigned over forest along the Terai Arc till about 19th century. Earlier Indian rhino has been reported in large numbers in the forests, extending from Indus or Hindukush in the west to Brahmaputra basin and even upto Myanmar in the east. The habitat has subsequently been degraded and put to other land uses like paddy, horticulture or tea gardens. While rhino has vanished from most of the habitats, it has somehow survived in Kaziranga. As per E P Gee, the famous planter turned naturalist, the unique marshy-swampy topography, difficult terrain, unhealthy climatic conditions of Kaziranga forests prevented people from bringing this dense moist evergreen forest to some other land use. Other tracts of Terai arc in UP, Bihar, W Bengal were gradually developed for agro-horticulture and the plateau went for tea gardens. Kaziranga was somehow spared of the woodsman's axe. This facilitated survival of the rhino, despite many odds. The maze of malarial mosquitoes, leeches, poisonous snakes further proved disincentive for the tea planters, paddy cultivators, and colonisers to venture into the rhino land. Thus the typical flood plains tall grassland eco-system, the ideal rhino habitat could somehow sustain in wild pristine glory. So also *Gorh*, the pride of Assam, though its population dipped to critical low figure of just a dozen.

RHINO FOR KAZIRANGA

Gorh and Kaziranga are made for each other. KNP forms the niche and habitat for the sustenance and survival of rhino. It is mostly in KNP that the rhino gets some sort of ecological safety and food security. Here rhino feels at home, in literal and proverbial sense. In fact rhino and Kaziranga



Gorh and Kaziranga.

mutually sustain and support each other. It is the *Gorh* which has bestowed special importance and limelight to KNP. Many international nature conservation organisations strive to do something for protection of rhino and to conserve its habitat. It is perhaps due to greater national and international focus on rhino, that fairly good efforts are being made for protection of rhino habitat—KNP. Even in the face of funds crunch, some assistance does flow to KNP from many conservation organisations, NGO's and international agencies. IUCN, WWF, Environmental Investigation Agency, US Fish and Wildlife Service, International Rhino Foundation, Global Environment Facility, Asian Rhino Specialist Group, etc have lent a helping hand for improvement of infrastructure in KNP, just because it is the habitat of the Red Data Book endangered species, rhino and carries somewhat viable population group of Indian rhino.

PEOPLE'S RHINO

It goes without saying that rhino conservation is the prime mandate of Central government and the Assam government. This animal being a mega pre-historic mammal, attracts the attention of all nature lovers, conservationists and non government organisations at the regional, national and international level. Bibhav Kumar Talukdar of Aaranyak Nature Club, meets me at Guwahati to discuss about initiative being taken up by the Club to create nature awareness among people with a view to solicit their willing support in protection of rhino and other wildlife and to conserve its habitat. He talks of the Club's Public Interest Litigation to Guwahati High Court, seeking to ban felling of trees and degradation of forests in Assam. The Rhino Foundation is also doing good job for ecological renaissance in NE India. International nature conservation community has also lent a helping hand in providing technical and financial support for the rhino conservation programme in Asia. International funding agencies like WWF, UNESCO, EIA, has come up with financial support for taking up rhino protection and conservation of habitat in Kaziranga and Manas.

Assamese people have made sacrifice to protect *Gorh*, the king of Kaziranga. Bolaram Dutta, Forest Guard lost life for the cause of rhino protection. Staff of KNP pay tribute to Bolaram Dutta, through a song written and composed by them at Kohra.

*Kaziranga-Oh- Kaziranga.
I have heard heart rending story
Piercing your devotees heart,
Who has made you red with blood
Kaziranga has become red with blood
Oh Kaziranga has become red with blood,
With the blood of Bolaram Dutta
Water of Bollobil has turned red
With fresh blood of Motiram, red river in the green grass,
Bereaved women's blank forehead
This is the story of Kaziranga.*

Kaziranga and rhino are culturally, historically and biologically connected to each other. KNP forms ideal habitat for the *Gorh*. On the other hand, Indian One-horned Rhino has given much focus and limelight to KNP. Both are inseparable like body and soul—*made for each other*.

BIBLIOGRAPHY & REFERENCES

- Bhattacharjee Ratnesh,—Cost of Conservation—Frontline Dec., 1999.
- Bonal, B.S.—Kaziranga Joys and Sorrows of Floods—Tiger Conservation Programme Thirty Years and Beyond-WWF.
- Borthakur S., Bordoloi C.C.—Gross Anatomical Study on the Skull of Adult Rhino-Indian Vet Journal, 1997.
- Central Zoo Authority—India—Inventory of Animals in Indian Zoos, 2000.
- Chaturvedi, M.D.—The Vanishing Rhino of India-Cheetal Vol. 39 No.
- Choudhry, Anwaruddin—Distribution of Indian One-horned Rhino, 1984.
- Choudhry, Anwaruddin—Indian One-horned Rhino *Rhinoceros unicornis* Ligneous 1758, in Aruachal Pradesh—*BNHS Journal*, 1997.
- Choudhry, Anwaruddin—Railway Threat to Kaziranga-Oryx Vol. 2 No.3, July 1987.
- Choudhry, Anwerddin—The Status of Sumatran Rhino in NE India, Rhino Foundation for Nature in NE India.
- Cornwal, I.W.—Prehistoric Animals-Ungulates: the Perissodactyla-horses and rhinoceroses.
- Daniel, J.C.—Extinction-NCSTS-Hornbill Natural History Series, 1997.
- Debroy, Sanjoy-Manas Tiger Reserve-Position Paper.
- Dinerstein E.—Seed Dispersal by Great One-horned Rhino and the Flora of Rhino Latrines—Mammalia 1991.
- Dutta, Arup Kumar—Unicornis The Great Indian One-horned Rhinoceros-Konark Publishers Pvt. Ltd. Delhi, 1991.
- Gee, E.P.—Indian Wildlife, 1965.
- Ghosh, Deepak K.—Crop Depredation around Jaldapara Sanctuary by *Rhinoceros Unicornis*—An Indicative Trend—India Forester Oct., 1996.
- Grzimek's Encyclopaedia of Mammals, Vol. 4 McGraw Hill, New York.
- Government of India—Environment Deptt. India's Rhino Reintroduction Programme, 1984.
- IUCN Species Survival Commission—Report of the Regional Meeting for India and Nepal of the Asian Rhino Specialist Group Feb., 1999.
- Kushwaha, S.P.S., Lahan, P., Baruah, P.—Land Area change in Rhino Habitat Suitability in Kaziranga National Park in Assam-Tiger Paper June, 2000.
- Mainka, Susan—Traffic Network, CITES-Rhino Progress? 1997.
- Martin, Bradley Esmond—Conservation Crisis—the Rhinoceros in India-Oryx Vol. 21 No.3 Oct., 1987.

- Mary, P.O., et al.—Observations on feeding and Terrestrial behaviour of Indian Rhino in Kaziranga National Park Assam-India.
- Menon, Vivek—Threats of Rhino Horn Trade to the Species in India-CBI Bulletin Feb 1996.
- Menon, Vivek—Under Siege-Traffic Network Report-WWF 1996.
- Mukerjee, S. et al—Rhino Poaching in Jaldapara Wildlife Sanctuary, North Bengal, India.
- Mukerjee, S. et al—Census of Great Indian One-horned Rhinoceros at Jaldapara Wildlife Sancturay, Cooch Behar Forest Division, W. Bengal, India.
- Nath, Nabin C.—Milk characteristics of a Captive Indian Rhino—Journal of Zoo and Wildlife Medicine.
- Pandit, P.K. and Yadav V.K.—Management of Jaldapara Wildlife Sanctuary, W. Bengal, India-Tiger Paper, Oct-Dec., 1996.
- Patar, K.C.—History and Economic Value of One-horned Indian Rhino Kaziranga National Park, Assam, India.
- Patar, K.C.—Some Observations on Behaviour of One-horned Indian Rhino in Kaziranga National Park.
- Rangarajan, Mahesh—The Oxford Anthology of India Wildlife. Oxford Uni. Press, 1999.
- Rangarajan, Mahesh—India's Wildlife History —Permanent Black & Ranthambhor Foundation 2001.
- Ranjitsing, M.K.—Beyond the Tiger, 1997.
- Rookmaakar, L.C.—The former distribution of Indian Rhino in India and Pakistan. BNHS Journal, Vol . 80.
- Sahoo, A.K. —Drug Immobilisation of Indian Rhino - Indian Forester, Dec., 1990.
- Sale, J.B. and Singh Samar—Reintroduction of Great Indian Rhinoceros in Dudhwa National Park—Oryx Vol. 21 No. 2 April, 1997.
- Sale, John B.,—Rhino Re-established in Uttar Pradesh—Indian Forester Oct 1986.
- Singh, D.M. et al—Present Status of Rhinoceros in Assam State Zoo, Guwahati- Zoo Print Aug 1992.
- Singh, S.P.—Voices from the Field-Tiger Conservation Programme- Thirty Years and Beyond.
- Talukdar, S.R. and Bordoloi—Gross Histological Study on the Thyroid Gland of a Week-Old Rhino Calf-Indian Vet J 73, Jan 1996.
- Talukdar, B.K.—Tiger Paper Vol.26, No.1 Jan-Mar 1999.
- The Telegraph—Kaziranga sets a Milestone in Conservation-3rd Sept 1999.
- Waller Richard—The Great Indian One-horned Rhino, with special reference to its main Sanctuary—Kaziranga in Assam, Cheetal, Vol. 15 June 1972.
- West Bengal Worldbank Forestry Project—Present Status, Population and Distribution of the Great Indian One-horned Rhinoceros.

EPILOGUE

Great Indian One-horned Rhino is a giant prehistoric animal of dinosaur class. It has been part of socio-cultural ethos of this country for ages and is popularly known as *Gorh* in Assamese and *Gaında* in other languages. Gentle by nature, it has the might and courage to challenge and scare away even the largest elephant. Because of its might and fast speed, it has been always revered as *Vahan* (carrier) of Lord Vishnu.

Great One-horned Rhino reached the verge of extinction by the beginning of last century due to indiscriminate killing by poachers for its horns and other body parts. Decline in the quality and spread of habitat further compounded the problem and the animal, which once survived in the entire *terai*, of Indo-Nepal region in thousands, was left limited to about a dozen animals in Assam and more or less equal number in Nepal. Determined and continuous efforts of conservation reversed the trend. Today there are more than 1700 animals in this country of which about 1550 are in Kaziranga alone. The journey has not been smooth. Several dedicated forest officers have laid their lives to protect one horned rhino. It is the unconditional support of the political bosses, police officers and local communities that has motivated the forest officers for action, even in the deepest crisis for conservation of the Rhino and its habitat.

However we can not afford to be complacent because of the success at Kaziranga. The situation appears to be going out of hands at Laokhowa, Orang and Manas. Unless the State Government and Central Government show necessary will power and combat the poaching mafias, the possibility of these mafias invading Kaziranga in near future cannot be ruled out. Assam Government, in the interest of long term conservation of the species, spearheaded the movement for creating alternative homes for Rhinos in other parts of the country.

Global community has a responsibility to carry out education and awareness programmes to blow off false myths regarding the magical or aphrodisiac properties of rhino horns and other parts.

Let each one across the globe contribute his/her bit for the security and long-term survival of this mega species.

ERRATA

- Page 18, 1st Para, 17th Line 'almost rhinos' read as 'almost 4 rhinos'.
 - Page 78, Manas National Park 'Pigmhog' and 'Mathangiri' read as 'Pigmy hog' and 'Mathanguri'.
 - Page 78, Kaziranga National Park, 'Banari Basari lodge' read as 'Banani Bansbari lodge'.
 - Page 91, 2nd Para, 10th line 'defense' read as 'defence'.
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PHOTO CREDITS

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Environmental Investigation Agency, UK
Govt. of Assam
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IUCN/SSC/AsRG-1999
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