

Wilderness and Diversity of Life in Nepal's Chitwan National Park

(With Ecology and Natural History of Nepal's Terai Parks)

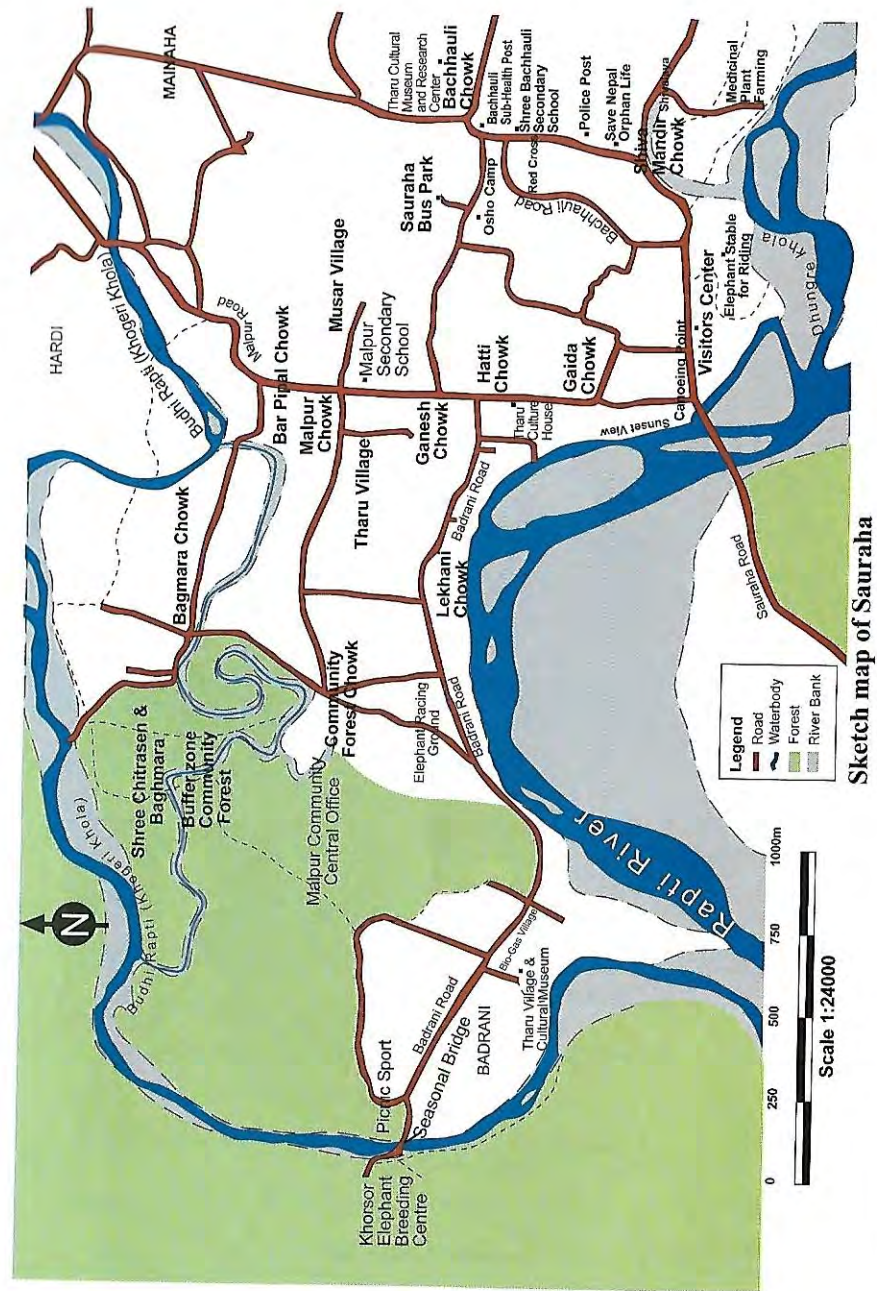
WITH COLOUR PHOTOGRAPHS BY THE AUTHORS

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and biological resources. Furthermore, Nepal is a party to eight major international agreements and conventions on biodiversity conservation. Mechanism for transforming international treaty norms into internal laws are now in progress in Nepal.

Nepal is involved in international conventions, treaties and global affiliations pertinent to biodiversity conservation and sustainable development. The country has been affiliated with the World Trade Organization (WTO), the World Conservation Union - IUCN, and the Global Tiger Forum. Nepal has also followed the spirit of the World Conservation Strategy 1980 and the World Charter for Nature 1982.

By using the authority invested by the 1973 National Park and Wildlife Conservation (NPWC) Act, and in response to international conventions and treaties, the Government of Nepal has established a network of more than 20 protected areas (ten national parks, three wildlife reserves, six conservation areas, and one hunting reserve). In the sensitive areas, buffer zones have been established in national parks and wildlife reserves.



Mighty pachyderms roaming in Chitwan National Park. Note the uniqueness of head, hoof and the torso.

Introduction to Chitwan National Park

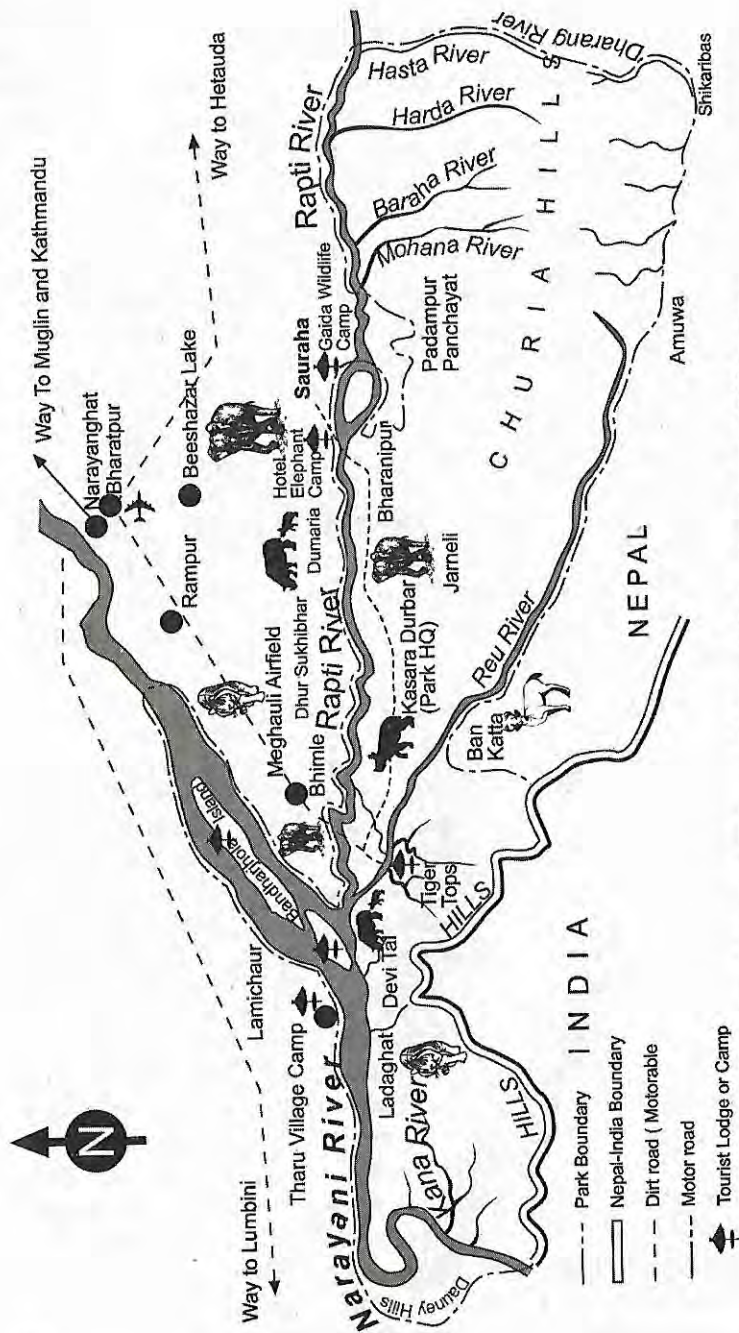
Chitwan National Park (CNP) has long been one of the treasures of natural wilderness. The park is situated in south central Nepal, covering 932 sq. km. in the subtropical lowlands of the inner Terai. The area comprising the Tikauli forest by Rapti river to the foothills of the Mahabharat extending over an area of 175 sq. km. was declared Mahendra Mriga Kunj (Mahendra Deer Park) by the late King Mahendra in 1959.

In 1963, the area south of Rapti river was declared as a rhinoceros sanctuary. The area was gazetted as the country's first national park in 1973. Recognizing its unique ecosystems of international significance, UNESCO declared CNP a World Heritage Site in 1984. In the year 1996 a separate 750 km² area surrounding the park was added as a buffer zone which consists of forests and private lands. Here, park authorities and the local people jointly initiate community development activities and manage natural resources in the buffer zone. The area represents pristine natural wilderness and ecosystem and cultural scene and undiminished glory, this park is designated and managed by government of Nepal. The park is located in riverine flood-plain, starting from an elevation of 150 m and going up to more than 500 m at the crest of Churia hills.

Topographical Significance and Connectivity with Terai landscape

The park is situated in the south-central inner-Terai of the country. It contains flood-plains of Rapti, Reu and Narayani, and Churia and Someswar hills, mostly in the western part. There are more than 20 ox-bow lakes including Lamital, Tamortal, Devital, Nanda-Bhaujutal, etc. The flood-plains start at an elevation of 150 m. The land rises up in the eastern half of the park to more than 500 m at the crest of the Churia range. The Someswar hills in the south-west of the park are considerably more broken than the Churias, with steep, eroded, slopes cut by deep ravines.

Chitwan is linked with the trans boundary Terai Arc Landscape (TAL) program declared by the Nepal Government in 2001. The entire program extends over 900 km to the Bagmati river Nepal in the east to the Yamuna river in Uttarakhanchal Pradesh of India in the west, covering an area of 51,002 km². This program inside Nepal covers 24,710.13 sq. km which spreads 18 important districts connecting Chitwan and Annapurna (CHAL). The TAL program makes for the first time landscape-level approach, to conserve and manage Asian large mammals, birds, reptiles, amphibians and fishes. The TAL program includes three national parks and two wildlife reserves and one conservation area and with buffer zones, each connected by forest strip of Churia range.



Sketch map of Chitwan National Park, showing wildlife areas

Biological Significance

The park encompasses the climax forest mostly dominated by Sal (*Shorea robusta*), a deciduous hardwood, which represent about 70% of the vegetation. As much as 570 species of flowering plants are recorded and several of them are rare species such as tree fern, screw pines, and rare orchids. The Sal forest is interspersed with grasslands, which are about 20%, riverine Khair-Sissoo forest is about 7%, and Chirpine and Sal forest about 3% in Churia hills. Some of the associated, tree species are *Dalbergia sissoo*, *Terminalia tomentosa*, *T. belerica*, *Adina cordifolia*, *Syzygium cumini*, *Lagostromia parviflora* etc. The grasslands consist of over 50 species of grasses and some of those are *Saccharum spontaneum*, *Themeda arundinacea*, and *Imperata cylindrica*.

Climatology

The park exhibits a wide range of climatic variations, each providing a unique experience. Generally, October through February with an average temperatures of 25°C offer an enjoyable climate. From March to June temperature shoot up as high as 45°C. The hot humid days give away to the monsoon season that lasts from late June until September. At this time, rivers get flooded and roads are impossible to cross easily.

By late January, local villagers are permitted to cut thatch grasses to fulfill their basic needs, which offer a better viewing of wildlife to visitors. Furthermore, between September to November and February to April, great swarm of migratory birds mix with the residential birds and create spectacular bird watching opportunities. After spring, summer season starts the monsoon rains that bring lush vegetation, most trees flower in late spring. The full bloom of the dazzling trees locally known as Palash (*Butea monosperma*) attracts many birds. It is also known as the "flame of the forest." Silk cotton tree (*Bombax ceiba*) has spectacular crimson flowers that can be seen from a distance.

Site Specific Feature

Chitwan National Park supports diverse and one of the loveliest landscape on the earth. It includes vast forest wilderness area and the flood plains of the Rapti and Narayani Rivers. The Churia hills rise slowly towards the east from 150 m to 800 m. The western aspect of the park is comprised of the lower but more rugged Someshwor hill. The park shares its eastern boundary with the Parsa Wildlife Reserve. The Chitwan valley contains a mixture of tropical and subtropical forests. Sal forest covers 70% of the park. Grasslands cover 20 percent of the park. There are more than 68 different species of grasses, including the elephant grass (*Saccharum spp.*), well-known for its immense height. It can grow up to the height of 6 m. The shorter grasses (*Imperata spp.*) are used for roof

fall the woolly evening mist forms, enveloping the little encampment in silence and darkness. Sometimes afterwards one often hears the footsteps of rhino moving calmly from the riverine savannah towards the rice field for its nightly meal. He pauses curious but suspicious to inspect the tent into which he has nearly blundered and then moves on. Half an hour later a burst of yelling and a clatter of tins reveals the watchful Tharu protecting their field from a marauder, to be repeated at an interval as night advances. In early morning, the calling of rhino to one another in savannah forest behind mingles with running alarm call of Chital at a glimpse of a hunting tiger, and piercing call of swarms of peafowl sailing down from their roosting places for their daily food in rice fields."

Chitwan was indeed a magical place, long been famous for the diversity of wildlife of any area in Asia. Chitwan was hot spot of malaria, so life of local people was short. Fear of contacting the disease kept the hill people above the level of the swamps and stagnant water in which the mosquitoes breed, and the only humans that survived in the valley were the Tharus. The indigenous tribe that lived in small clearings in the jungle and who, over hundreds of years, had apparently developed some natural resistance to malaria.

During the nineteenth century, agriculture activity in the valley was prohibited by the Government of Nepal in order to create a barrier of malaria infested forests as a defense against invasion from invasive forces and enemies. Then for the century between 1846 and 1950, the Rana rulers kept the land reserved for the hunting and relaxation of ruling class. At that time, penalties for poaching were severe and the wildlife in the area thus received an excellent protection.

Tiger and Human Interaction in Past

Once upon a time tigers were plentiful in Chitwan. People were afraid of tiger so they use to inform rulers (Maharajas) to hunt. Maharajas had made official arrangements to reward tiger killer and appreciate his effort in protecting human lives. At that time tigers were seen easily so tiger killer is rewarded with the gift of new white turban or Pagari with title of Baghmara or a tiger killer.

Big Game Hunting in Terra Nipalensis

In the past, from time to time great hunts for tiger and rhino were organized during the cool, mosquito-free winter months starting from December to February. The former rulers of Nepal invited royalties from Europe and the princely states of India, as well as other foreign royalties to take part in these grand maneuvers, which were organized on a magnificent scale, often with several hundred elephants being marshaled to round up the game.

British Hunting Expedition

It was in 1911 that King George V visited Chitwan and his main camp was pitched up at Kasra which is now the headquarters of park. King George V bagged 10 rhinos and 21 tigers whereas his party bagged 37 tigers, 8 rhinos and 4 bears. As stated by Perceval Landon, "The royal shooting camp was provided with all comforts of civilization including electric light, hot and cold water. On His Majesty departure a token given from tiger land of Chitwan to the King included calf rhino, baby elephant and tiger cub which were later handed over with great care to Zoological Garden in London". The King personally communicated to his biographer that those ten days which he spent in natural wilderness in Chitwan were one of the most exciting and memorable incident in his life.

Prince of Wales in Chitwan Sikar

Next important royal visitor to Chitwan was the Prince of Wales in 1921. The camp of Prince of Wales in Chitwan was laid down at the embankment of Rapti river shaded with giant trees river was well decorated with hides and hooves of jungle animals particularly of rhino.



HRH Prince of Wales (in center) with his first tiger hunted in Chitwan.

For example, the floor of mess tent was carpeted with leopard skin, pieced together as great mat. Writing table was made from rhino hoofs, horns and hide and waste paper basket were made from lower joint of rhino legs.

Prince's team bagged 18 tigers, 8 rhinos, 2 bears and 2 leopards. One rhino had been tracked and shot by the Prince of Wales. Vice - Regal of India, Lord Mountbatten who was also in the entourage also had shot a tiger. A special arrangement made for his visit included the opening of "36 miles of motorable road from Bhikna Thori at the border and 32 miles and linking this remote area with telephone line" and 428 elephants had been gathered. In his historical official biography, work of celebrated biographer Ziegler may be consulted (Ziegler, King Edward VIII, Official Biography, Harper Collins, London, 1990) writes that the enormous amount of money was spent in constructing the camp.

Lord Linlithgow Expedition

During the 1930s, three major hunting expeditions were held in the valley. The third hunting operation staged in 1938-9, in which Lord Linlithgow, the Viceroy of India, participated, broke all previous records with a bag of 120 tigers, 38 rhinos, 27 leopards and 15 bears from Chitwan valley and the surrounding areas. Naturally, after hunting on such a massive scale, it took the animals several years to regenerate their numbers; however, since the hunting took place randomly, and in different areas, their populations gradually recovered. The main secret of their survival was the fact that their habitat remained 1,000 square miles of virgin forests, swamps and grasslands.

Finland Hunting Expedition

Finish tiger hunting in Nepal is also noteworthy incident. The first hunter from Finland was Marshall Mannerheim, the Finish National Hero, who visited Nepal twice in 1930 to hunt the tiger as a guest of Maharaja Juddha Shumsher, the prime minister of Nepal. He stuffed tigers and deer's which are still proudly displayed in his residence in Helsinki, which has now become a museum and national shrine of Finland. The senior author had opportunity to visit the museum to admire and study age old stuffed collection of Nepalese tigers and deer. Mr. Mattson, Honary Consul General kindly took the author to museum and Helsinki Zoo during his Finland visit.

King Mahendra and Tiger Shoot

Chitwan was regarded as hunting ground of royal family of Nepal. The then King Mahendra (M.B.B. Shah) in 1962 declared this park as hunting reserve. There were many hunting activities by him using muscles of elephant trunk during royal Sikar in his days. King Mahendra's life time

experience on hunting is transparent from the following paragraphs quoted from his book "Handbook of Big Game Hunting in Nepal": The book begins with some succinctly written introductory material about hunting in Nepal by His Majesty M.B.B. Shah, that attests clearly big game abundance and lure of game hunting in Nepal and other parts of the world. The size and dimension of varied forms of game animals from different parts of the world have been meticulously recorded. He also realized habitat changes and limitation of food and shelter of big game threatening their survival and affecting their size by stunting growth. The records made by the author provide first hand information to serious hunters. The book was dedicated to "all the fine sportsmen throughout the world with very best wishes of the writer."

While going through the book, present authors found a strong passion for hunting and conservation of big game, which has been well reflected in introductory part of the book. It showed clearly how kings and law givers of Nepal have maintained spirit of conservation. They played dual role as hunters, regulators and conservators in the wild. The author gives a list of hunting ammunition to be rifle, spear, Khukuri, bow and arrow, net and lure that are useful for hunting game in Sal forests of Terai and mountains. The writer of the book also highlights the passion of up keeping stuffed trophy game animal against inclement weather conditions and intrinsic value of taxidermy for exhibition and scientific research.

King Mahendra was impressed with tiger shoot in past done encircling tigers with white 5 ft high cloth wall. The wall is surrounded by elephants. The book of MBB Shah vividly describes such original form of ring shooting in Nepal. He describes tiger psychology also, why tiger is unable to jump out or evade the white clothing (Bhit). King Mahendra always stressed on regulated hunting and conservation, the statement quoted from his book runs as follows "To kill wildlife is no lesser crime and sin than to kill our own character and morality."

"Many hunters of the world will value his trophy records made in Nepal and elsewhere. For those who want a comprehensive account about the size of trophy, this book will remain classic for many years. A number of hunting outdoor photographs provide glimpses of species and their target point with special interest. Each treatment takes the form of narrative, integrating the history with description infused with natural history lore. Everyone who values his synthesis of hunting in remote Nepal surely has his appreciation of original form of ring hunting of tiger evolved in historical past in Nepalese soil." Readers of this work should take pleasure in seeing big game hunting taken from MBB Shah's work

"Big Game Hunting in Nepal" with new eyes and minds of Sikhari and conservationist in following lines.

Throughout the world, many devices are used when going on a hunt. For example, it very often depends upon the type of terrain of the place one goes to for his shoot. May be, sometimes, one will have to go on foot or knees and hands. At other times on a boat, jeep or land rover. In mountainous and rocky or wet places, the horse or the mule may be more comfortable. The elephant is of much use where the tall elephant-grass and swampy grounds are unmanageable on foot or with any other conveyance. Besides these, one could also wait on a tree-top, or near a waterhole or even in a bunker or machan. The blind is also used in places where we camouflage ourselves from the animal. Paths and tracks known to be very often frequented by animals are also favorite places for hunters. The system of beating or driving your game out of bushes is also a skill used when you are sure of having good hunting games.

It is an interesting thing to note that people use many handy weapons besides the rifle for hunting. The spear, the bow and arrow are very common in this respect. Of course, there are many others besides these, including khukuris, and bayonets and also many kinds of nets and traps with the lure of the calls.

I feel that to go on a night shoot is not an act of a sportsman for at this time you practically have the animals under your spell when once you put your dazzling lights on them.

The use of dogs, hawks, cheetah, etc. is also a favorite way of getting the game. A good trained dog would never leave whatever it is chasing and will as far as possible bring the game within its master's shooting range.

The tiger shoot in Nepal is a unique thing and thus for this reason the shoot itself is one, which has many unique techniques, which are not used in everyday shoots anywhere else in the world.

As I have already mentioned, the tiger shoot which is done here is one with many unique qualities. I feel I should elaborate my point for the knowledge of my readers. Many of us may be very good hunters but how many of us, I wonder, have had the privilege of experiencing a tiger shooting in Nepal, which is not only exciting but also something worthwhile watching?

When we are sure that there is a tiger in the locality where we are already having a shoot, we, first of all give it the bait of a buffalo. It is generally placed on the natural track of the tiger or near the water holes. Early next morning, we go to the bait to see if the Tiger has come and killed it. After this, a close study is made for paw-marks of the tiger, or leopard."

Next, the area near about the buffalo kill is surrounded with elephants. Then a long piece of white cloth about 4 or 5 ft. high is put up as a wall which we call a ring to surround the tiger. Then trained elephants go into the ring and move around in the bushes and the thickets. Once the tiger is disturbed, it always makes an angry growl. Thus, we finally know that the tiger is in our ring, and everyone becomes alert. Seldom are we unlucky enough not to locate it. Then the person to whom the tiger is allotted is informed. Once he arrives at the ring, he mounts a special Shikari (hunting) Howdah (a high seat on an elephant's back) from where he can get a good and clear view of any movement directly below him. Then an area is cleared, and those trained elephants with their skilled riders begin their drive towards the hunter. The elephants start their pushing and beating and as far as possible the tiger is made to come to the clear spot where it is shot at.

It looks a very easy thing but in reality, it is quite exciting and not so easy. For many times, if a novice misses the tiger when it first appears, the beast gets wise and rarely comes to the clear spot. In truth, it takes skilled men to be able to drive the tiger towards the required spot where it comes into a clear view of the shot, giving him a good and clear shot. Often, the tiger is unable to jump out of the white cloth ring, and also sometimes it is known to get wild, even fiercely attacking and mauling the elephants. After one of these shoots, one realizes the majestic role of the Tiger and only then understands the full grandeur of the tiger shoot in Nepal's forests. Generally, we shoot tigers from November through February. Also, March, April and May are good for big game hunting but the climate may be hot and dry. Good Luck and Good Hunting!

To my knowledge, when nature is left alone, only the best, finest and strongest forests and wild life can propagate the good species. When, however, man tries to impose his superiority upon nature's law, he usually makes a mess of things. Non-hunters often tend to believe that hunters simply slaughter animals for fun, but they forget that hunters regard this as a sport and for this very reason they rather preserve the game.

In fact, this is not all; for all huntsmen believe that hunting is something they enjoy, as an author enjoys writing a piece of literature or a billiard player enjoys the pleasure of hitting his first cannon. On top of this, the true hunter fully realises that his sport gives him a chance to relax and it definitely heightens his power of concentration. Non hunters sometimes think that to watch and wait for game is unnecessary trouble and a waste of time, but the true hunter alone realises the pleasure and peacefulness of nature's environment even as the devotee enjoys the divine expectation of God's grace. Indeed, it would not be an exaggeration if I say that in my experience there is no finer temple than nature and man is closer to his God when calmly enjoying the glories and grandeurs of enchanting scenery of green forests, high peaks of mountains and flowing rivers than in any man-made lofty shrine".

Queen Elizabeth's Sikhar

King Mahendra, organized, Queen Elizabeth's 1961 Big Game Hunting in Chitwan with great pomp and show. Her hunting was quite different from her grandfather's (King George V of England) 1911 hunting. This historical event took place in Meghauli Royal Hunting Camp, at Western part of Chitwan. About 400 elephants were used in hunting many of them were set with regalities of well decorated howdahs. At the same time elephants were trained to raise their trunk and trumpet to salute to queen. It was a greatest adventure in the lives of queen and her husband Prince Phillip. The royal couple actually did not take part in formal hunting business but they shared great delight with their camera and telephoto lenses. In this joint expedition the royal couple of Britain introduced new concept of photo-culture of wild side in the wilderness of Chitwan. This hunting expedition also shows clearly from historical past the kings and lawgivers of Nepal have maintained spirit of wild game conservation by preserving wilderness. They played dual role as hunters, regulators of prolific games and conservators of the wilderness and plenty. Soon after this event King Mahendra declared this park as royal hunting reserve in 1962.

Glorious Wilderness of Nepal

The glory of wilderness of Nepal is described in the following poem.

Northwards reared
The stainless ramps of huge Himala's wall,
Ranged in white ranks against the blue-untrod,
Infinite, wonderful-whose upland vast,
And lifted universe of crest and crag,
Shoulders and self, green slope and icy horn,
Rivern ravine and splintered precipice
Led climbing throughout higher and higher, until
It seemed to stand in Heaven and speak with gods.
Beneath the snow and dark forest spread, sharp-laced,
With leaping cataracts and veiled with clouds :
Lower grew rose-oaks, and the great fir groves,
Where echoed pheasant's calls and panther's cry,
Clatter of wild sheep on the stones, and scream
Of circling eagles: under these the plain
Gleaned like a praying carpet at the foot
Of those divinest altars..... From Light of Asia

Sikar and Phenomenal Bags of Big Games



The circle of elephant behind, pegged with cloth (Bhit), an innovative method to keep tiger inside ring. The method of ringing tiger with elephants by using Bhit cloth barrier is peculiar to Nepal. Elephant grass in tigerland grows up to 20 ft in height and is so thick as almost obscure elephants.

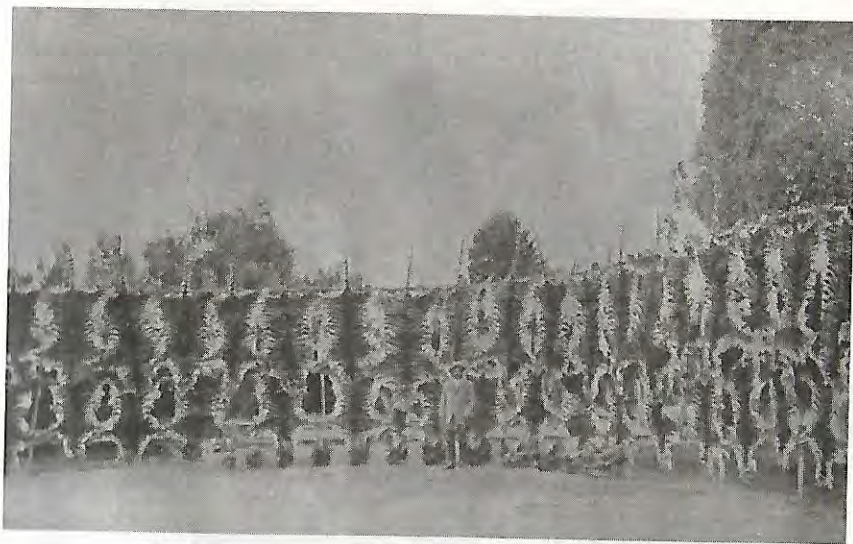


Field Marshall Kaiser Sumsher (in center) with hunting party.

A Sikhar Mural as Seen in Wall Painting at Kaiser Mahal



Rhino hunting in past was often aided by elephants as shown in wall painting of Kaiser Mahal, Kathmndu.



Massive tiger skin collected during hunting expedition of three weeks proudly displayed at the forest edge of Chitwan.

Marksman of Tiger and Wild Buffalo with Great Trophy



Maharaja Juddha Shumsher poses with his record 10 feet 9 inch tiger.



Maharaja Juddha Shumser and hunting party with collection of Wild buffalo.

Glare of Tiger in Grassland Forest Edge



Tigers in Nepal, From the painting by F. T. Daws, ESQ.
(Gallery Crystal Hall, Singha Durbar, Kathmandu)

Evocative Painting of Tiger in Wilderness of Grassland

The painting presented in the facing page gives an idea of a tiger's wonderful camouflage. A tiger's favourite haunts are in the Terai grasslands, or along the margins of streams, where for seven months of the year (December to June) the elephant grasses are red or ochre or brown with which the brown and black stripes blend naturally with perfection. In spite of this adaptation, however, the eyes of the other forest animals are incredibly quick to catch movement, often pierce their disguise, and a tiger's route through the forest is frequently marked by the alarm calls of his potential prey such as sambhar's melodious bell, a chital's or a porcupine's tremble call, a barking harsh bark, a grey ape's hurried violent leaping action from tree to trees. Why the langur (black faced entellus monkey) should get more excited over a tiger than a leopard in a jungle mystery, since the latter is the langur's real danger. Perhaps some prey animal has inherited instinct.

"In the upper most canopy of trees magpies and crows chatter and caw vociferously at the sight of tiger; these little scavenger steal a meal from a tiger's kill when they can, have been too often disturbed by the tiger's approach not to feel disturbed at the sight of one. A tiger, on the other hand, feels (and roars) disturbed at the sight of vultures, these mega thieves spoil his game or kill altogether, unless it is carefully concealed and carefully guarded. He must guard his kill and manage to make swift return to his kill otherwise his meal will be stolen and devoured by scavengers."

Ellision (1922), Big Game Hunting in Nepal

Once returning from hunting tired and exhausted Maharaja Juddha Shumsher encamped in a hut in the middle of the Jungle for brief resting, he sang following poem composed by Nepalese poet.

Song of-Wilderness

Sometimes, a drop of water nectar turns,
Sometimes, the cloud of golden heaven burns,
Sometimes, the worm a silken fabric weaves,
Sometimes, a hut mighty one receives

-A Nepali Poet

Tiger Shooting from a Perch

A most popular method of hunting a tiger is from a perch traditionally known as machhan shooting. The machhan is created at an elevated position rigged up high over a tree or an elevated spot. Sometimes, these machhans are erected permanently. Machhan so made is a very rigid with the wooden platform fixed on a tree. It is very well tied and well hidden with twigs and leaves. In machhans, some holes are kept open on various sides so that the hunter can peep or stick out his rifle. Usually, fresh leaves are widely used, the dried leaves are never used to camouflage in machhans because they make a noise. Only 2 hunters loaded with rifles sit in the machhan and wait for the animal. At the ground level of the machhan a live bait of buffalo is usually kept tied up to a pole. A bold man from the perch turns by torching light on animal while the other shoots. The light is preferably fitted on the gun, and the hunter takes great care not to produce any sound that will make the unwary animal apprehensive of the danger.

Still Hunting

The still hunting method of a tiger is no longer practised in the Terai of Nepal as the forest is too dense and the grass is too tall. But still hunting of deer can be conducted before sunset.

Rhino Hunting

The ring methods are not feasible for rhinoceros. Habitually, elephants are very much afraid of rhino. A wild rhino when cornered and trapped inside the ring charges right and left with blundering gait in confusion and to escape. Although rhinos have been shot in rings, the usual healthy practice is to stalk them or track them down with the help of three or four stout elephants. Generally, rhino hunting, the gun is mounted on a stout elephant, and fresh rhino tracks are observed. Soon after this the tracker mounts on a small elephant and follows the track. When a rhino is overtaken then a hunter starts testing his skill on the gun. The rhino is then shot right on the head or neck as it is of little use to shoot it on hinder part and bronzy skin parts. When a rhino gets shot on the hinder part and becomes mortally wounded it becomes more furious and charges even a run-away elephant thus adding to the thrill and excitement of the sport.

Elephant Capturing

In Nepal, an elephant is a holy animal so it is not hunted but captured and often used in procession, inspection, traveling, etc. It is a very sacred animal to the Nepalese as it is a symbolic representation of Lord Ganesh, the lord of wisdom, and son of Lord Shiva. Therefore, in Nepal, elephant killing is forbidden unless human life is in danger. So

the main objective is not to shoot or kill the wild elephant but to capture it alive for domestication. The traditional elephant catching methods are very interesting. The following three methods are used in elephants catching:

- (a) The first method is Kheddah drives or draws a herd of elephants into a strongly built stockade where once they enter they are entrapped in *chamber-de-capture*.
- (b) The second method of catching elephant is by trapping it and forcing into deep dug-outs pit or excavation.
- (c) The third method is popularly known as big Jangi or War Kheddah method. In this method, mighty domesticated elephants fight with a wild elephant until the latter gets utterly exhausted and after recovering its strength is again charged while it is brought to hook. Finally tricky loop or nooses of strong rope is slipped around its legs and neck, and it is taken forcibly off into captivity and tied to a tree or a strong post. This is a very energetic and thrilling method.

Trapping of Leopard

Sometimes leopards are lured into the trap. The traditional leopard trap consists of two chambers with trap door. At the interior of the trap, a goat or a sheep is tied to serve as bait. A wooden stick is tied on the trap doors and when the leopard touches the wooden stick, both the doors make the trap automatically closed.



Captured leopard which entered the human habitation.

From Big Game Hunting to Present Day of Conservation

Early explorers and hunters of Nepal told stories of animal abundance that gave them a reputation as spinners of tall tales. The tales of those days appear to be true, to some extent even today. History of hunting records shows that games in those days were prodigiously large; the balance of animal diversity was maintained by formal hunting of royalties and conservation by religious sentiment. After fall of Rana regime in 1950 big hunts ended. The continued migration of population from hills and multiplication led to destruction of forests.

As time progressed, the landless farmers began to make hue and cry and began to rush down into the plains, the new liberal government felt obliged to open Chitwan again for settlement. After this, a sound agricultural development programme started, and further thousands of hill people poured into the valley in search of land. A malaria-eradication program jointly started by the government and the United States Agency for International Development (USAID) in 1954 proved so successful that the whole district was declared malaria-free in 1960.

Soon after democracy in 1950 human intervention to forest increased rapidly, and inevitably, it had a disastrous effect on the wildlife habitat. According to estimates made by the United States Agency for International Development, the population rose from 36,000 in 1950 to 100,000 only ten years later, and by the early 1960s nearly two-thirds of primal forests had been lost forever due to the encroachment.



Dr. Tej Kumar Shrestha with Prem Bahadur Rai demonstrating Tribhuvan University students radio telemetry equipments used in tiger study.

Historical Beginning of Chitwan National Park Establishment

During the regime of royalties in past each ruling family possessed *carte blanche* to shoot game animals. Many good collections of photographs and trophies made in Rana regime by Maharaja Jung Bahadur and others are still well preserved in Singha Durbar (Lion palace) and Kaiser Mahal of Nepal. Some trophies from Nepal still exist today in British Museum and Finland Museum. Historical collections of the King Mahendra and King Birendra are still present in Narayanhiti Royal Palace of Kathmandu. The King Mahendra was a keen hunter, naturalist and philosopher. He has described his first hand experience of hunting experience of big game diversity in his book "A Hand Book of Big Game Hunting."

Towards the end of 1950s drastic decline of wildlife continued due to human interference in forest area, as a result the rhino and other principal wildlife faced extinction. The swamp deer and the water buffalo were disappearing from Chitwan. Therefore, in 1959, the Fauna Preservation Society appointed British naturalist E.P. Gee to a survey. To undertake a survey, Gee spent most of his prime life in India and Nepal as an expert on its wildlife, he recommended the creation of a national park north of the Rapti river, and this was later established in 1961-1962. Further, he also proposed a wildlife sanctuary to the south of the river for a trial period of ten years. He visited Chitwan again in 1963, his purpose was to survey this time for both the Fauna Preservation Society and the International Union for the Conservation of Nature (IUCN); he recommended an extension of the national park to include the areas of the rhino country still extant in the south.

The hunting records of the early past days, when game was abundant and when wild creatures were almost tamed show there was no need of conservation and management but in the past four decades due to shrinking of forest habitat much spectacular wildlife is threatened. The establishment of Chitwan National Park in 1973 was the beginning of a new era of protection of wildlife.

For stopping wildlife poaching actively strong battalion composed of 130 soldiers, called of Rhino Surveillance 'Gaida Gasti', or the 'Rhino Patrol', was recruited and mounted the patrols from a chain of outposts. Soon after this event encounters and clashes took place between the guards, and the intruders, and casualties were suffered on both sides, but the raids continued. Most of the poachers were gun men, some other dug pitfalls to trap animals, sometimes cutting off the horn of the animal while it was still alive, and leaving it to die of starvation. Taking the advantage of such delicate situation some bands of marauders arrived here from India also.

During past five decades, haphazard settlements started within the park. It was clear that if the animals were to revive themselves, the humans would have to migrate elsewhere. In 1963, a commission of the government investigated the legal status of immigrants in Chitwan; the Land Settlement Commission of 1964 resettled 22,000 people, including 4,000 from inside the rhino habitat, and resettled them elsewhere in the valley but a huge turmoil caused a great deal of resentment from the local people.

Drastic changes of the park management program brought little improvement, in the life of the people who had been evicted, then again, invaded the area to collect firewood and fodder. To manage the park, a systematic survey of wildlife was carried out in June 1968 by C. J. Caughley. He estimated rhino to be a total of between 81 and 108. Their report, published in 1969, declared that unless total protections are provided, the rhino would disappear by 1980.

In December 1970, King Mahendra approved the establishment of the National Park in southern part the Rapti river. Soon after boundaries were demarcated in March and April of 1971, and rapid development started in October that year. Royal Chitwan National Park was officially gazetted in 1973 by the declaration of King Birendra, since then it became the first national park in Nepal. This park has now become the magnet of tourist attraction. The visitor center and museum are placed highlighting major activities of the park.

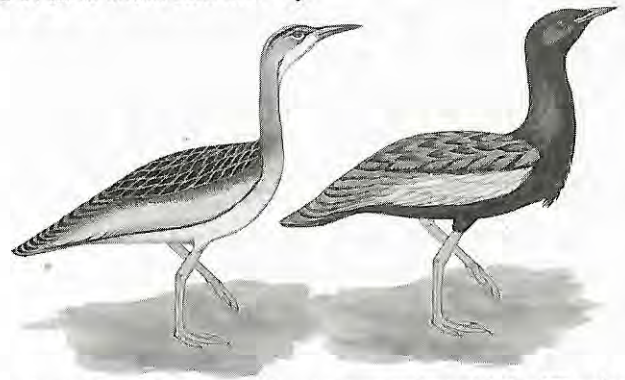
During the establishment of the park in 1959, it covered 210 square miles. It was known as King Mahendra Deer Park (Mahendra Mriga Kunj). The park was Gazetted as Nepal's first national park in 1973. After an extension and addition of the buffer zone in 1996, the park now covers an area of 932 km². More important than the park's shape, is the fact that it embodies a wide variety of habitats, from the grassland and riverine forests of the valleys to the Sal forest on the hills and the chir pine that grows along the ridges of hill slopes. Recognizing its unique ecosystems of international importance UNESCO declared Chitwan National Park a World Heritage Site.

The Nepalese wilderness is unique of its kind. It is not on-off kind of concept. It is rather a continuum of past wilderness of hunting days of royalties described in this book. The main characteristics enhancing wilderness character of the forest stand are number of dead trees, the amount of epiphytic lichens orchids adding the volumes of stock. The modern concept of wild lands and wilds scape includes wilderness areas, commercial forests recreational areas and rangelands.

Glimpse of Park Administrative Management

The park headquarter lies in Kasara Durbar, 12 miles east of Tiger Tops, where a former hunting lodge once used by the Rana royalties but at present contains a small museum. At the beginning, the park was patrolled by a force of eighty guards of the Forest Service, but these guards have since been replaced by armed forces of the Nepal Army. Now more than one thousand armed infantry troops were deputed to safeguard the park from forty seven outposts. For scientific management, the park is divided into three administrative districts, with sub-headquarters at Lamichaur in the west, Kasara Durbar of the centre, and Amuwa towards the east. Each district is under a commandment of Major rank who is responsible to lieutenant-colonel of the army battalion stationed at Bharatpur.

At present, the park is administered by the Department of National Parks and Wildlife Conservation, a wing of the Ministry of Forests and Soil Conservation. Which was popularly known until 1980 as the National Parks and Wildlife Conservation Office (NPWCO), this wing was elevated to the status of a full-fledged department, Department of National Park and Wildlife (DNPNC). While the Local Military Officer is responsible to take action against illegal human activities within the park, the Senior Warden is the national park's chief officer. Rapid progress has been made in stopping encroachment. Actually, the campaign against poaching has been so successful, only few cases have been reported within the park since 1976, and no doubt the army constitutes an effective element for halting destruction and poaching activity. The poachers keep away from vigilant soldiers and Rhino Patrol group and with good reason, the military patrol the border with loaded rifles, on foot and on elephant, and if they discover a poacher, they are empowered even to shoot him directly.



Bengal Florican *Eupodotis bengalensis* is an unique bird of Terai grassland.

Plate no:10
Rhino: A Living Legend of Chitwan



One horned rhinoceros *Rhinoceros unicornis* appears like a living relic with massive armour plating. Both male and female have horns which is nothing but tasseled hair that grows with age.

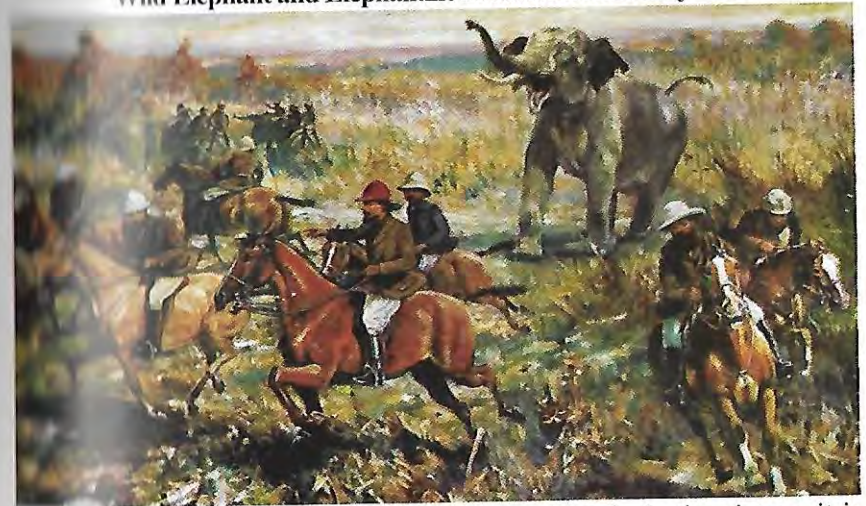


Mating process of Rhino, lasts for about an hour. During the climax of mating the interlocked female is capable of dragging up mighty male forward and backward.

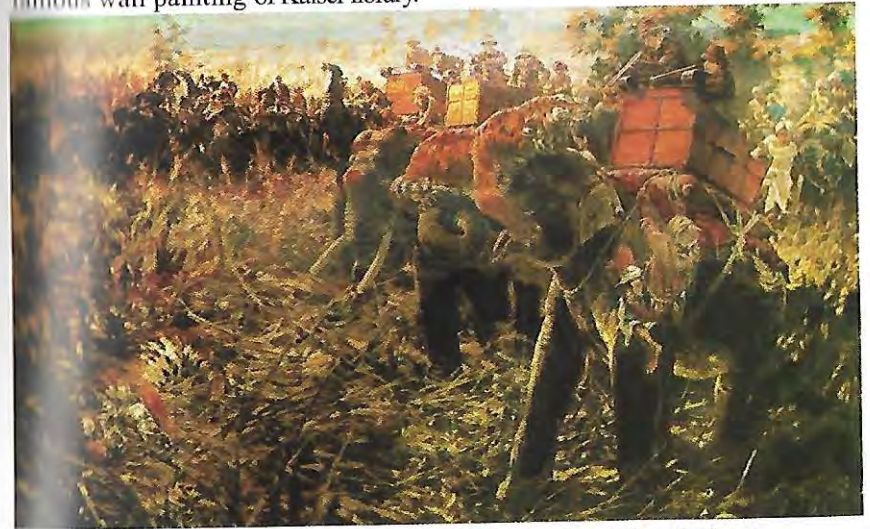


Remaining submerged in the wallow. Rhino escapes the scorching heat and myriads of flies at noon.

Plate no:11
Wild Elephant and Elephantine Problem from Hoary Past



A wild sexually excited elephant is known as Musth. In the picture, it is seen chasing hunters and spoiling big game hunting opportunity as seen in famous wall painting of Kaiser library.



Tiger making high jump to attack the hunter riding elephant

During Ring shooting when, a tiger is hurt and chivvied and chased, it becomes annoyed. If it can find no way of escape, it becomes really angry. As in painting of Kaiser library, tiger when cornered and wounded, his armament of claws as teeth, his tremendous energy and power, his superb pluck and fearlessness, combine to make tiger the most terrifying attack on elephant in ring and hunter riding the elephant.

GIANT HERBIVORE ANIMALS

Chitwan's has two largest herbivores, the rhinoceros and elephant. They are exceptionally large in build and play the dominant role in the forest and grassland ecosystem stand. Several legend and beliefs are attached to these animals.



ASIATIC ONE HORNED RHINO *Rhinoceros unicornis* (Gaida)

Asiatic Rhino is one of the peculiar animals of Asia, and it is regarded as an apothecary of Asia. Several legends and beliefs are attached to this animal. The Rhino is mentioned in most of the great Hindu epics, e.g., Vedas and Puranas. It is regarded as a holy animal. In Nepal, the flesh and blood of the rhinoceros is considered highly acceptable to manes. Brahmins and people of high caste offer libation of animal's blood. In Sharaddha, the libation of water and milk is poured from a cup carved from its horn. The urine is considered antiseptic and is hung in a vessel at the principal door as a charm against ghosts, evil spirits and diseases. These beliefs connected with the rhinoceros are prevalent in varying forms in Burma, Siam and China. They set a great value upon the animal and provide the main reason for persecution." - S.H. Prater (1965).

The rhino has its obscure genealogical history. Three species of rhino are known in Asia, i.e., the Great one-horned rhino (*Rhinoceros unicornis*). The smaller one-horned rhino or Javan rhino (*R. sondaicus*) and Asiatic two horned rhino (*Dicerorhinus sumatrensis*).

All surviving populations of rhino are included in a single family Rhinocerotidae. Rhinos are characterized by massive build and stumpy legs with three toes. The bones of rhino are noted for its thickness and solidity. The skin is sparsely clad with hair or is naked. The Indian and Nepalese species have been heavy hides which in some places have deep folds. The nasal bones are enlarged to serve as support for a single horn or double horns. In case of two-horned species, the horns are placed one behind the other. The horn has no connection with its bony skull because it is made up of closely matted mass of horny fibre. The horns of the rhino grow throughout its life span, and lost horns regenerate.

The Indian rhino is one of the largest species of rhinoceros. It once had a wide range of distribution but now its range is confined to isolated jungles.

A male rhino may stand over 6 ft (180 cm) at the shoulder with an average height of about 5 ft. 8 in. Behind wither its girth is near about 11 ft. and the rhino horn measures 24 in. The skin of a rhino is divided into shields by heavy folds at fore and hind quarter of the body in front of the thighs. The skin folds of the shoulder, however, do not reach across the back. Folds of the flanks, shoulders, and hind quarters have skin studded with masses of rounded tubercles. Sexes are alike, but the males are slightly larger and more robust than the females.

The rhino has, leathery hide; the entire body appears hairless and studded with armour-plated around warty tubercles. The single horn, is nothing but a mass of cemented, fibrous hair, is not attached to the skull but is supported by enlarged nasal bones. There are many deep folds on the body giving primitive armour-plated appearance. Growth of the horn continues throughout the rhino's life and if broken off, it can re-grow. Although the largest recorded length for a horn is 60 cm, most average around 20 cm. An elongated and pointed upper lip overhangs a pair of tusk-like teeth, which protrude from the lower jaw. These teeth can inflict deep wounds while fighting between males. The aggressive fighting is frequent, and injured rhino generally die off from infected wounds.

Ecology and Behaviour

Rhinos prefer to live in swamps and grassy plains. They also love to live in the wooded jungle near ravines and low hills. Rhinos feed mainly on grass, *Imperata* (Khar), *Cyperus* spp. (in wet areas), Dub grass (*Cynodon dactylon*) in dry areas. They take avidly Napier grass (*Pennisetum purpureum*). Besides this 29 common species of grass and rushes common in wallows, and river beds are eaten by the Rhinoceros. The rhinos are known to congregate in the Chitwan meadows from January to May when there is a luxuriant growth of new shoots after burning takes place. At this time, they like to take tall grass species and sprouts. From May onward they move away to the edge of shallow ravines and edge of fields where aquatic plant growth in great profusion.

The rhinos spend the hottest part of the day wallowing in marshy mud pools. At wallowing spots several animals may congregate together. They may be seen grooming each other. They feed from late afternoon and throughout the night. They seek resort in the hills during the rainy season. The Indian rhino (*Rhinoceros unicornis*) is a true grazer but its other kin, for example; Javan rhino (*R. sondaicus*), and Sumatran rhinos (*Dicerorhinus sumatrensis*) are true browsers.

The rhino is known for its blundering gait, which gives an impression of clumsy behaviour. Behaviourally, the rhino is quite agile and can manage short bursts of high speed. The rhino charge is generally recognized as an exploratory gesture. The mother rhino with calf shows an instinctive charging behaviour. Unless seriously provoked, however, the rhino has one peculiar habit, which often expels their dung. They always drop their dung at one and the same place. Any rhino passing the dung heap gets an urge to relieve backwards. This is one of the vulnerable occasions when a poacher can strike. The rhino exhibits unique urinating posture. Male rhino urinates backwards, often spraying urine a considerable distance. They usually deposit stool in the one and same place, making huge dung piles at favourable places. Freshly deposited dung provides unique stimulus to defecate, and calves are also induced to defecate soon after their mothers. Firstly, rhino examines a safe latrine site and tries to back up to it and add fresh dung to the pile. This act appears to be an important means of communication between individuals. The rhinos have poor vision, and they can hardly see further than 100 m. Poor sight is compensated for attacking enemy by good smelling and hearing powers.

Urinating and Defecating Behaviour

The rhino dung piles become an important factor of social communication. According to Laurie (1982), a scent marking is less effective for the Indian rhino, although it is highly effective in its African kin. In the Chitwan National Park, Laurie observed a unique defecating behavioural pattern. All rhinos defecate at scheduled place and fresh dung as it is a stimulus to defecate. Usually, calves defecate after their mothers. A rhino ready to defecate first approaches a dung pile, sniffs at it, swivels around its hind quarters, lift their tail and defecate. Rhino urination occurs generally when one rhino encounters either man or elephant. A rhino also urinates when it leaves the wallow or when it travels from one boundary to another in the forest. It also takes place while walking and feeding. Further urination takes place when one rhino sees another male rhino urinating.

Rhino display varieties of behavioural patterns also may be observed. A greeting behaviour in the rhino is common. It generally occurs between calves and approaching strange rhinos and between sub-adults. In all rhino populations, a slow approach with nose stretched upward is common. Mostly, the noses are touched and a sparring of horns takes place. Opponents clash audibly while muzzling face to face. During the process of muzzling, biting may occur and the mouth is often kept wide open.

A large number of other behavioural patterns are also known among the rhino in the wild. These patterns include bobbing its head up and down or grazing and sweeping the head rapidly from side to side. Mostly, bulls and cows display aggressive behaviour. When the pair comes into contact with other rhinos, they adopt a head up posture and snorts repeatedly. In the rhino sparring of horns are common. While doing so the rhinos approach nearer the head, and a low mouth posture is taken. The corners of the mouth are pulled back, and the teeth are displayed. A high-pitched bleating vocalization is repeated alternately with the honk. Further, head up position is maintained at the risk of turning the rump which is vulnerable to slash from tusks. Thus, attacks and fights are the main methods of defence (Laurie, 1982).

Operation Unicorn Population

Before 1950, the population of rhino in Chitwan was estimated over 1,000. Andrew Laurie has carried out detailed study of the rhinos in Chitwan National Park. He identified 168 animals. Dinerstein and Price (1991) estimated a population of around 270-310 individuals. About 67 rhino known to exist in the Royal Bardia National Park. The rhino population in 1999 exceeded figure of 500. More than 610

individuals estimated in 2,000. The surplus rhino has been translocated to Bardia National Park. Usually, young calves become easy prey to tiger, and some deaths occurred as a result of injuries inflicted during fights. Laurie estimates a population increase of rhino by 2.7 percent per year. He has shown that the rhino calving interval is known to be of 3.8 years. In the Chitwan National Park, the birth of rhinos takes place in monsoon between July and September. There is little information about the mother to young relationship in the wild. Estimation made in 2014 there were 534 rhino in Nepal among them 503 in Chitwan. Now, in 2017 there are 605 rhino in Nepal.

Reproductive Potential

The rhinoceros, reproduce all the year round. In Nepal, mating takes place from February to April. Adult male rhino is a slow breeder. Their breeding rate is slow. Besides, both the male and female have to be in heat for mating to take place, and it seems there is no specific mating season. The young are born after the gestation period extending over 16 to 19 months. One calf is born at a time and juvenile remain with its mother for about three years. A fully developed calf from the mother's uterus measures up to 4 ft. (124 cm) and 120 lb.

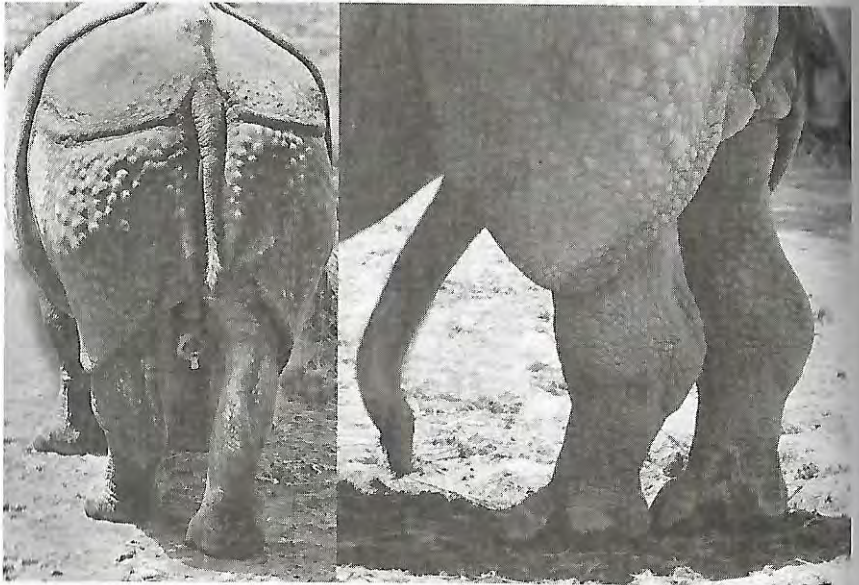


Mating posture of Rhino in the wild.

Posture and Gesture of Rhino in Mating Mood



Rhino defending territory by driving rival male can calf.



Showing the unique anatomy of male organ of Rhino.

Courtship and Mating

Generally adult rhino known to live up to age of 70 years and sexual maturity are reached around 10 years of age. Breeding takes place throughout the year, and mating takes place when both male and female come on heat. The male rhino has long drawn unique male reproductive organ. In shape size and uniqueness of the morphology, it remains unparallel in the whole animal world. Mating usually takes place after a courtship extends for 3 or 4 days. Mating process takes about an hour, perhaps longest mating period in animal kingdom. Adult males are solitary in habit, but the cow and calf remain in social communication for about three years. Mating commences when the calf attains three years of age. During the act of courtship, the male drive away the sub-adult calf. Mature male associates with estrus female for about three days. The driven calf rejoins its mother when the nuptial act is over. An adult male generally avoids a cow with calf.

Only one calf is born after a gestation period of 18-19 months. At birth, the calf is pink, and it is able to follow its mother immediately. Mother and calf usually live together for at least 3 years before weaning, after which the cow enters into an oestrus period and becomes receptive to male.



Head up display of rhino with mouth open and nose stretched upwards. It detects oestrus female in heat by nasal sniffing.

Translocation of Rhino

Under operation unicorn program, wild rhino translocated from Chitwan National Park to the Bardia National Park. The translocation of rhino started in Nepal in 1986. For this purpose, wild rhino roaming freely in the forest are sedated by shooting them with a drug filled projectile syringe. The dart is fired or shot from elephant back or from a tree, using a special rifle called "Capture Gun." The drug used inside syringe is extremely potent morphine derivative known by trade mark M99. The drug has also an antidote M50:50, which neutralizes the effects of M99 within a few minutes. The unconscious rhino weighing about two tons is put into wooden cages, rocking with the movement of the truck. Sixty seven rhino have been successfully translocated from Chitwan to Bardia and four in Suklaphanta.

Ethnobiology

In Nepal, the rhino's meats are thought to have many medicinal properties. Fresh powdered horn is considered to add invigorating on the human body. It is not generally used as an aphrodisiac except in a few parts of India. The fresh or dried meat is supposed to induce vigour and vitality, and the urine is used as a remedy against asthma, stomach trouble and tuberculosis. The flesh and blood of rhino is considered sacred highly acceptable to manes. While performing holy rites of departed spirit such as Sharaddha the libations of water and milk is poured from a cup covered from the rhino horn. The urine of rhino is considered antiseptic and hung in a vessel at front door as a charm against ghosts.

The rhino horn commands highest price. Redeemed to pounds, it becomes, especially in Chinese minds, a powerful aphrodisiac rhino, horn cups, believed to render poison harmless, were continuously used by rulers. Such cups still figure in some oriental religious ceremonies. Products of splintered or whole the horn supposed to have special powers for solving almost any problem, mental, physically- all this with no known scientific basis, but with the unshakable faith of those concerned. So these unfounded beliefs are to dispelled for the survival of rhino.

Rhino helps in the dispersal of seeds of Gurel *Trewia nudiflora* avidly eaten by rhino and passes undigested through the intestine, thus helping for the dispersal of seeds and rapid germination. Rhinos also urinate and defecate at fixed spots and enrich forest floor by its manure.

The rhino is also known as the Apothecary of Asia. Its urine mixed with herbs finds many uses in Ayurvedic medicine. Rhino blood is essential in a holy rite called "the Blood Tarpan" which every Nepalese king is required to

perform the rite by the name of deceased father and mother. The fresh warm rhino-blood libation is offered to Hindu gods, deities and to appease departed relatives. One of the Tarpan rites performed by General Kiran Shumshere, the relatives of royalties of Nepal run as follows:

General Kiran said “a team of helpers dragged rhino nearby river bank, where, they disembowelled body inner parts of rhino by using special knife-Khukuri then I climbed into abdominal cavity they had made in the rhino and sat in blood pool up to my waist for few minutes then the Hindu priest offered me the rituals with prayers, when I was directed to do offer holy water, I stood up, my hands cupped with rhino blood and held them outward to the Gods in the memory of my dead mother. Later, I ate the meat from the hoof and ankle of rhino thigh (Sanpara), the rest of the meat I gave to villagers.”

Rhino Conservation

The Chitwan National Park is the last strong-hold of the rhinos in Nepal. The rhino population has declined steeply during the past two decades due to poaching and habitat loss but they are doing well now. At present the rhino habitats have greatly regenerated as a result of meticulous management operating over the last five years the rhino population has shown significant increase. Current conservation efforts are being directed towards the protection of its habitat and preservation from poaching. Anybody that kill rhino may imprisoned for 5 to 15 years.



Natural habitat of rhino as seen near perennial stream of Dhungree Khola.



Photograph of an unborn rhino calf about 8 months. This fully developed calf in utero was taken from female rhino died accidentally is preserved in NTNC museum.



Rhino skull proudly displayed at Chitwan museum shows unique makeshift of jaw and tooth structure.

Suklaphanta National Park with the Largest Herd of Swamp Deer

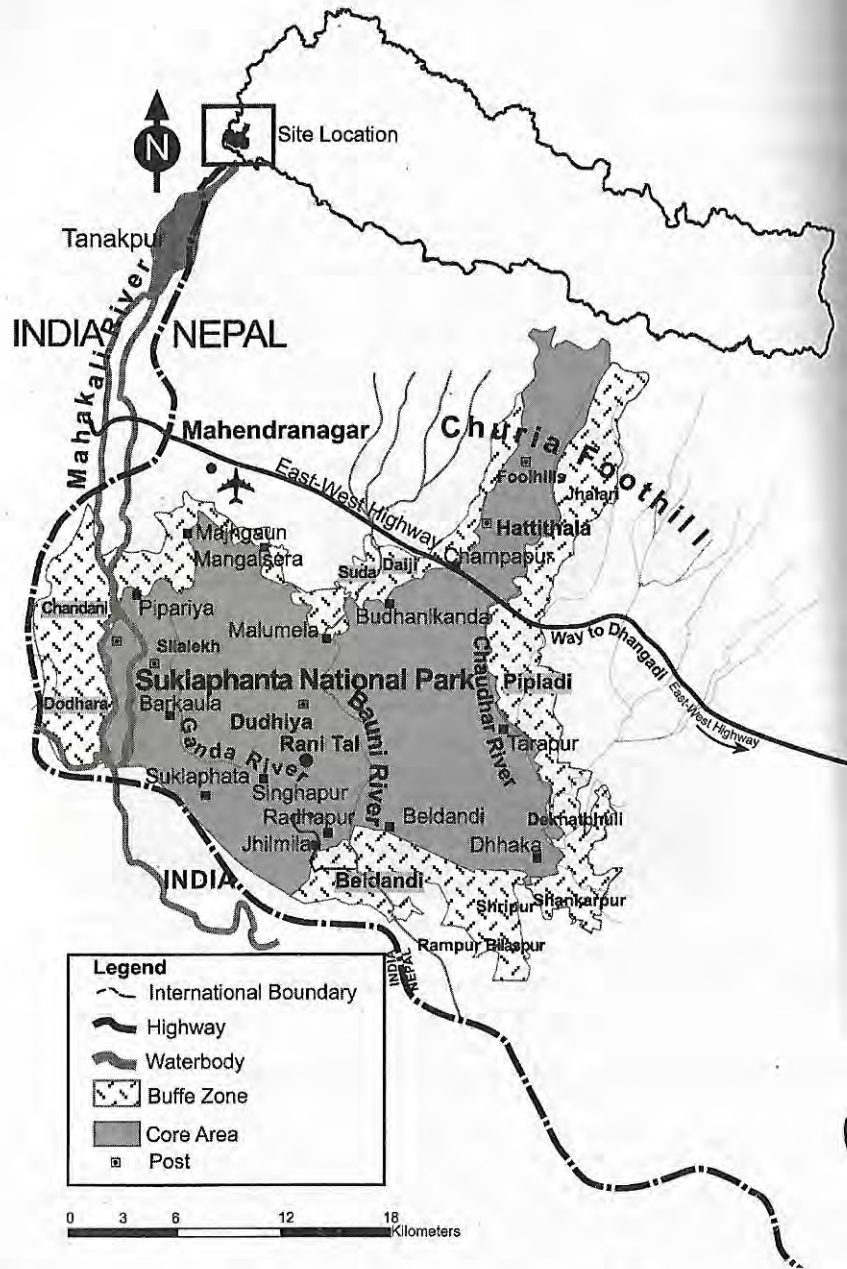
The Suklaphanta National Park covers an extensive area of 305 sq. km. Situated on the east edge of Mahakali river (Sarada river) in western Nepal, and was gazetted 1976. This park is the last strong-hold of Swamp deer (*Rucervus chivauceli*). Topographically, the whole park is flat with gently rolling hills having an elevation of 3,000 to 4,000 ft. The forest of Bhaber and Churia hills is dominated by Sal forest. Formerly, it was Royal Hunting (Shikar) Reserve, now it has been given the rank of national park. Bhatta and Shrestha 1973 surveyed environment of Suklaphanta Wildlife Reserve for the first time and drew a thematic conservation and management plan. The Bengal florican, Swamp partridge, and Sarus crane and Grass owls are main indicator rare species of the park. The Ranital and Salgoudital are rich in bird life comprising over 350 species.

General Background

Suklaphanta National Park (SNP) is located in the Far-Western Terai region of Nepal. The park was established in 1969 as a hunting ground of royalties of Nepal. The evergreen forests, grasslands, swamplands streams and rivers, lakes support teeming abundance of wildlife. As this park has large patches of grasslands in an unbroken series, known as phantas (grasslands), for which the park is named so comprises major habitat of the park. Sal trees (*Shorea robusta*) dominate the entire forest. Other vegetation such as Khair (*Acacia catechu*) and Sisso (*Dalbergia sissoo*) occur in subdominant level and is found in the riverside areas. Along the wetland areas, marsh vegetation dominates other plant species. The main grass species of the plants include *Imperata cylindrica* and *Heteropogon contortus*, which are used for thatching huts by the tribal people.

Ecological Feature

The pristine habitat of the park has allowed to flourish its ecosystem. The protection of the Swamp deer, and another endangered species, has been some success. The herd mostly swings back and forth between 2,000 to 3,000 individuals. This is slightly larger than the only other large herd in the world at Dudwa National Park of India. The park also supports about 20-25 wild elephants (*Elephas maximus*) 8 introduced rhino. Well, over 17 Royal Bengal tigers (*Panthera tigris*) still exist here as an endangered species and seen preying on deer species. This park supports more than 53 mammals and 424 species of birds. People living near the park dig a number of water hole for the wildlife benefit of wading birds and other wildlife during the dry period of



Sketch map of Suklaphanta National Park