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Ecological development of biodiversity in the Thar Desert arid regions of India

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Abstract

Biodiversity, short for biological diversity, refers to the variety of life on Earth, including the variety of species, ecosystems, and genetic diversity within species. The ecological development of biodiversity is influenced by several key factors: Habitat Diversity, Climate and Geographic Factors, Evolutionary Processes, Interactions between Species, Disturbance and Succession, Human Influence, Ecosystem Resilience, Global Pattern etc. The Thar Desert, located in the northwestern part of India and extending into Pakistan, is a challenging environment characterized by arid conditions, high temperatures, and low rainfall. Despite these harsh conditions, the Thar Desert supports a unique and diverse array of flora and fauna. The ecological development of biodiversity in the Thar Desert is shaped by various factors. Efforts to sustain and enhance biodiversity in the Thar Desert involve a combination of conservation policies, community engagement, sustainable land management, and research initiatives. Recognizing the ecological value of this unique desert ecosystem is crucial for its long-term conservation and the well-being of both wildlife and human communities in the region.

Keywords: Ecology, biodiversity, Thar desert, arid region, climate

Introduction

"Touch wood", the very expression denotes India's ancient cult, of tree-worship. Through unwritten but well-practiced as it was, of tree-worship. Tree has been a symbol of eternal life; its roots reaching down into earth touching deep sources of sustenance, its branches spreading up to the sky and look out over the horizons of possibility. As the tree undergoes its annual cycle of reproduction, it comes to represent a process of change within that continuity; regenerative energies pass through seasons of quiescence and fruitfulness, weathering every adversity in order to renew themselves in fresh leaf and ripe fruit.

The tradition continues in India despite the fact that the nation has received trampling blows from several alien invaders and was compelled, for several centuries at a stretch, to lose its intrinsic values. Ladies observe fast on certain days which are associated with plants; they offer prayers to certain species of trees on a particular day in the year; they offer clothes to plants and pray for well-being of community; the collective wisdom of people attach respect to ants, monkeys, deer, and even tiger, and lion. Similar predators are given an innate and intimate treatment in the Indian cultural ethos. Most species have been attributed to serve one or the other god, as his mount, thereby receiving respect, albeit, and conservation: and it is believed that there were 33-crore gods and goddesses here. Though this may be treated as a bit of extreme-viewpoint among the Hindu 'pantheons' but the fact remains that the Indian philosophy practiced the dictum: live and let live, and; *jeevo jeevasya bhojanam* (one survives by feeding upon the other species).

India presents a baffling diversity of geographical habitats - from Lakhpat (western tip of the Great Rann of Kutch) to Lushai hills in Nagaland bordering Myanmar, and from the cold desert terrain of Chushul and Hanley in Ladakh to the rain-forest regime in Periyar-Thekkadi. Like people belonging to different communities, having differing religious background, yet constituting a great nation, the species found in vastly contrasting habitats are inter-related into the continuing biological cycle; all of them constitute the Indian ecology, which, by far, is unique for survival of myriad organisms. In this stretch, India's desert terrains play their own dominant role.

A glance at the water resource map of India reveals that there are two widely separated areas in different climatic regions where surface run off is not existent.

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These are the arid regions where precipitation is the minimum for the climatic region to have any surface flow of water at all.

One of them lies in the north of the Himalayas - The Ladakh plateau. It covers an area of about 84,000 sq km and receives less than 10 cm annual rainfall. Flora is scarce as geography does not support growth. Yet life along with wild forms continues to brave the adversity. The elusive snow leopard among the predators, blue sheep among the prey, a wide number of avian species breed in this vast chunk of habitat. The brahminy ducks, which are common winter visitors to the Indian plains; and the strictly endemic (to a few secluded aquatic pockets of the Himalayas), black-necked crane, breed there. Due to inaccessibility, status surveys of most wild species in this terrain are still to be fully completed.

The arid region, which is the largest and the driest, is the continuation of the tropical desert of Asia in India. It lies in the west of the Aravali range in Rajasthan and is spread over two-thirds of the total geographical area of this state which is about 3.5 lakh sq km. This is the Indian desert having no surface run off except in the Luni and a few other strictly seasonal rivers. Unlike many other deserts of the world, this desert does not look very desolate and can support man and animal even though it is largely shorn of perennial irrigation inputs.

Study Area

This desert is known as the Thar or Marusthal and has an expanse across the international border into Pakistan as well. Therefore, its western boundary, being undulating sand dunes, is a difficult proposition for researchers who are generally not allowed beyond a certain belt. However, its eastern boundary is characteristically marked by the north-east-south-west trending Aravali range. On the north, this desert merges imperceptibly into the dry plain of Punjab which has been harnessed through the canal irrigation system. Towards south, it extends its limit beyond the boundary of Rajasthan into Gujarat where similar dry conditions prevail.

Excavation carried out at sites of Mesolithic culture in the Luni basin, particularly near Talwara in Barmer district, have revealed charred bones of, besides a host of other species, the spotted through-out this desert today. These finds also point at prevalence of a combination of hunting and stock raising economy in this region in the Mesolithic period.

The first Mughal Emperor, Babar has left behind vivid narratives of his hunting expeditions in this desert tract and in the adjacent Sind where the Asiatic lion was not scarce at all. In all probability, the lion had its sway over much of the Rajasthan desert until comparatively recent times. Besides the lion, the region could easily boast of a surprising variety of wild life. Emperor Humayun, son of Emperor Babar, witnessed interesting scenes of wild life in his days. While in distress, withdrawing from the Indian scene in a huff due to an inner revolt in his army, Humayun camped south of Jaisalmer. One morning he observed a bird having flown into the royal tent. Unmindful of his haste to quit the desert scene, he immediately put the curtains down, caught the bird, clipped its wings, and started observing it intensely. The incident was reported by the court writer and became part of history. The Indian house sparrow, observed by

Humayun, bears the name of this emperor in its zoological name to this day.

Presence of species like chital and hog deer, several centuries ago, in the desert, indicates the type of flora that would have been common then: dry deciduous for chital and moist deciduous for hog deer. Some regions of the desert should have been aquatic too, to host the one horned rhinoceros in olden times. This animal was reported in the Mohanjodaro terrain about 5,000 years ago. Moisture laden regime would have been possible because the Saraswati River had been flowing in this desert. However, the region underwent a long period of natural stress and developed arid conditions, which resulted in most large mammals getting extinct. This would have lasted for nearly a thousand years in which duration animals thrived in pockets only. Xerophytic flora took over from the one which survived here in the past to provide cover to animals and birds which could adjust to the gradual changes that occurred here.

A conservation renaissance took place in this desert during the fifteenth century when Lord Jambheswar (born in 1452 A.D. at Pipasar near Nagpur) preached the 29 new principles of modest living. Conservation of flora and fauna formed prominent part of this philosophy. The people who followed them were popularly called Bishnoi (bees+ noie 20+9 = 29 principles). The new sect flourished throughout the desert as Lord Jambheswar toured places. His sojourn was marked by construction of tiny rest-house type of facilities which were later on accepted as Bishnoi temples. The attention in favour of green flora and wild animal was drawn in a religious manner and the desert received a conservation support, after a long gap.

Yet spells of draughts and even famines were recurring features in this belt which caused widespread loss to wild life, both flora and fauna. This continued after independence of the country also, almost until the seventies when benefits from the canal irrigation were received. Tube wells came handy for other who could not avail of the canal irrigation facilities. This development caused detrimental effect on wild animals as their habitats were takeover to an extent for agricultural purposes. However the new greenery came out to be of some benefit to certain such species as were earlier missing from the scene.

The long stretch of canal today has earned the reputation of hosting birds in the desert belt which were never reported there like the black partridge on ground near Bajju, and mallard, a winter migrant from Europe, in the canal water. Bee-eaters, coucal, golden-backed woodpecker are similar examples in the desert belt which is getting greener through the advent of Himalayan waters.

The canal presents an interesting study of birds which seek shelter in its water which has given rise to aquatic vegetation as well. The wild animals are invariably observed on both flanks of its edges due to greenery having replaced arid surface. Blue bull and mongoose have marked there (Bikaner region).

Fauna Biodiversity

The Indian gazelle is invariably present in this desert and can be observed at a short distance, often within close proximity of villages and agriculture fields. This animal is very innocent looking, has beautiful large eyes, short stature, thin legs, spiraled horns, the one pointing towards opposite direction to the other, a short tail which is moving in quick succession in its vertical slant. It can be often

approached at close quarters by villagers indicative of symbiotic relationship developing between the wild life and human beings. The Bishnoi people adorn it as their pride. The animal is easily found even inside rooms of their temples.

The black buck is another common wild animal in the desert which is also preserved by the Bishnoi community. It is the larger than the gazelle and prefers open arid country only, while the gazelle may frequent some gravel terrain also. Both the animals are diminishing in their numbers due to loss of habitat and poaching.

The desert fox, the desert can and the wolf are the only predators left in the desert today. The fox is more common than the cat. While fox occurs even in arid areas, the cat prefers to be in localities which have human settlements. Both are being persecuted for the pelt and have been driven to their last legs. Wolves are occasionally seen.

The Indian hare is getting rarer in the desert. Its occurrence is reported in a section of the desert National Park in Jaisalmer district. It is breeding in that grass-affluent habitat, seeking good cover, but losing its numbers, obviously, due to poaching. Such a loss in a well-protected zone like this Park is a sad commentary on the consumers of the present day.

Rats, gerbils, skinks, snakes, etc. proliferate extremely well in this desert. The spiny-tailed lizard is common to be observed, often in open country shortly to run fast to slip into its nearby burrow at one's sudden approach. A variety of birds of prey are found in this region. In fact, avifaunal diversity is the hallmark of this desert.

Eagles (Short-toed, snake eagle, tawny eagle, steppe eagle, Imperial eagle), Harriers (pale harriers, pied harrier and Montabu's harriers), Buzzards (long-legged buzzard, white-eyed buzzard, common buzzard), Eurasian kestrel, laggar falcon besides several species of vultures are observed here. They are spotted, squatting over telephone/electric poles or hovering in the clear blue sky-taking thermals-during the day. They are often seen with a quarry in their talons, feeding vigorously and keeping a watch over any intruder by raising the head intermittently.

Larks, sand grouses and a vast variety of other terrestrial and arboreal birds are frequent to be encountered throughout this region. *Acacia*, *Prosopis*, *Zizyphus*, *Salvadora*, *Capparis*, *Calotropis* and other species are dominant with a vast variety of shrubs and grasses. They constitute conditions perfect for the resident species to breed and migratory species to winter here.

The great Indian Bustard finds it home in the desert, preferring scrub and bushy terrain; it is the State Bird of Rajasthan. The migratory bustard, Houbara is becoming uncommon as it is still being bagged through falconry across the desert in Pakistan, through India succeeded in having a ban imposed on the sport of falconry by the Arab Sheikhs-in 1978-79, through a public demonstration organized in Jaipur, which was led by this author.

The wild animal in India, as also in other countries, have been bagged for sport and other commercial purposes for long. This had continued in India even after independence achieved in 1947. It took the Government a few decades to realize what wrong had already been done to different species which had become 'rare' 'threatened' and 'endangered'. The Government established Sanctuaries during the fifties and also set up an apex advisory panel - Indian Board for Wildlife. However, the situation was,

perhaps, not to improve as pressure of hunting, by receiving permits from the Government, was getting intensified. The IUCN conference in 1969 in New Delhi brought to the fore bare facts about the conservation needs. Indian Tiger was going to be lost forever if urgent steps were not adopted for its protection. The Government of India imposed a ban on hunting of tigers in the country in 1970 and started taking a series of measures to batter control the scenario. This set a watermark in Indian conservation history.

The first comprehensive legislation was enacted by the Indian Parliament in 1972- The Wildlife (Protection) Act, 1972, which laid clear guidelines as how to nab poachers, regulate wildlife and undertake other measures. This marked a turning point and governance received a new fillip. Different states revitalized their own advisory panels - Wildlife Advisory Board to keep an over view on the situation and recommend to the authorities the steps to be taken from time to time.

Causes of Wildlife Depletion

The abundance and variety of wildlife has been dwindling rather, too, fast particularly after the independence in India. The factors mainly responsible for this sad plight of decline of wildlife are (i) changes in habitat, (ii) indiscriminate use of pesticides, (iii) commercial exploitation, (iv) poaching, (v) crop protection guns, (vi) excessive and continues grazing, (vii) allotment of wildlife habitats and forests to agriculture and other industrial activities, (viii) disturbance of the delicate balance of nature and above all the guide lines for the management of wildlife refuges.

Some Wildlife Terms

The International Union for Conservation of Nature and Natural Resources (I.U.C.N.) has recognized the following categories and definition of rare wildlife.

Endangered: The taxa in danger of extinction and whose survival is unlikely if the casual factors continue operation.

Vulnerable: The taxa likely to move into the endangered category in near future if the casual factors continue operating.

Rare: The taxa with small populations in the world that are not at present endangered or vulnerable but are at risk.

Threatened: These species are in one of the three categories i.e. endangered, vulnerable and rare.

Out of Danger: The taxa which were formerly include in one of the above categories but which are now considered relatively secure owing to the effective conservation measures.

Indeterminate: The taxa which are doubtful to be placed in any one of the above categories and about whom information available is insufficient.

Wildlife Protection Act, 1972

The Wildlife Protection Act, 1972 is the umbrella act which takes care of all the factors responsible for decimation of wildlife. This act applies to all the States of India barring Jammu & Kashmir. A list of protected animals is given in the Appendix.

It is interesting to observe that the Government of India vide its notification dated 24th November, 1986, has banned the shooting of all the animals included in Schedule I: II: III and IV of the Wildlife (Protection) Act. Schedule V of this Act includes vermins namely crow, fruit bats, mice and rats which do not fall in the category of animals for which permission is required for shooting.

It is therefore, necessary that the species which we are not able to promote, we must preserve as gene bank, to be of service and cooperation to man himself. Wildlife cannot survive without green leaf - the forests. We must, therefore, ensure that we save leaf to save our life and maintain the natural balance for our own existence.

Wildlife Refuges

The Indian desert received attention in the wake of this organized trust initiated during the seventies. An assessment was made by experts about the species that had been receiving threats to their survival due to poaching and/or loss of desert habitat. Creation of a separate zone for wilderness/nature was proposed so as to conserve the peculiar eco-system wherein the rare and threatened species of flora and fauna could receive better cover and longer mileage. The present shape of Desert National Park (DNP), located south of Jaisalmer, is the outcome of the same exercise in which non-government experts also contributed.

It is called a National Park, but, in effect, it is merely a Sanctuaries. For reasons beyond the administrative control of the Government of Rajasthan, this habitat, vast as it is and riddled with human and cattle interference, could not be protected as per exact definition of a National Park through it enjoys that nomenclature.

The DNP represents all the natural features of the Thar Desert. It is the largest zone in the entire Indian desert which hosts unique features of the desert as also some rare species of flora and fauna. People in this belt have lesser density due to adversity of resources. Therefore, some of the peculiar features of the desert are well represented in this open country, dotted by xerophetic trees and shrubs. Natural landscapes are observed in their characteristic forms, largely unspoilt. Traditional land use patterns easily come across like single-crop system, that, too, if the rain-god would be kind, and water harvesting. The park covers 3,162 sq km area and is situated between 250 47' and 260 46' N between 700 15' and 700 45' E. It is generally sandy terrain through pure sand, devoid of any vegetation, is not to be observed anywhere. The sand dunes are popularly called 'shifting dunes' due to shifting of sand from one spot to another spot. Such undulating dunal regions too, have cover of green shrubs and grasses coming up soon after first showers of rain. Flat areas and gravel country are also found here.

The rain water is stored in dunal depressions by raising an earthen mound (embankment) towards the natural slope. This is a characteristic features of water harvesting. Both people and Cattle use this source until it is exhausted. Such village ponds are calle 'naadis'. They are used by the entire community while the village Panchayat (elected body) is supposed to maintain them. These water sources are crucial links in the life chain of wild life as also people in this desert. Almost each village maintains such a 'naadi' by the side of its settlement. Choice of site, situation and direction in which a 'naadi' is to be located is scientifically decided by local people who develop such water bodies in a manner

that they are not largely damaged by the sand deposits during the summer storms.

People carry water from the pond on came-carts to their huts and empty those into tiny 'tanka' (personal tanks) built underground by the side of each hut. Each 'tanka' may differ in its size and capacity to store water. However, their design remains the same. The 'tanka' is operated through an opening over the top with a lock and key system. People draw water out of such personal deposits through a pail and a rope for daily use. As the 'naadi' is crucial for communities (of people as well as wild animals and cattle), the 'tanka' is even more crucial for survival of a family. Water is stored by people in tankas to last for more than a year. If the quantity is exhausted, they trek tens of miles to replenish it through a tube-well or traditional dug well. It is one unique feature of sustainable living to be observed only in the Thar desert and the Rann of Kuchch in Gujarat. People have uncommon sense of toleration any they appear to be, too, eager to offer their scarce resource (water) to any guest, including an unannounced thirsty gazelle or black buck that generally roam about their village settlements.

The Park has sparse vegetation. Tree species are rather limited. Grassland is a peculiar feature here. If not grazed or cut, the grasses assume the shape of a thick jungle as has been happening in some of the closures of DNP, which have been fenced with barbed wires where grazing and manual operations are prohibited. Xeric genera is widely found here. Sam, Sudasari, Phulia, Maijlar and Bandera constitute the main core areas covering about 140 sq km of the total area of the DNP. However, it is rather difficult to decipher which is the core and where the buffer slips away. Visits to this zone are advised in 4 x 4 gear vehicles only so as to maintain unhindered passage throughout as there are no metal roads here.

Protection of DNP as a crucial biological zone is necessary to maintain the desert characteristic as changes in the habitat and land use forms are rapid. It is the only sizable area to represent the desert flora and fauna in India and other Sanctuaries in the desert rather small in size to withstand greater degree of threats to the species thriving therein.

Gajner is another former Sanctuaries near Bikaner. It has also unique features - plain grassland with a few water bodies on the periphery and the main like by the side of the village where a palace is built by the former ruler of this princely State (Bikaner) who are adept in the art of marksmanship reflected in game shooting too. Black buck, gazelle are now not as frequent to come across in and around Gajner as they were during previous decades. Yet the animals, including an occasional fox, present a wonderful sight in this stretch. The lake receives a number of migratory ducks during winter. Resident birds are present round the year as a patch of dense vegetation is in good health by the side of its main bank. Raptors are a good sight in Gajner which are present to prey upon the monitor lizard, rats etc. Grazing and human interference have marred the one time great glory of this habitat. The official neglect is also causing its gradual decay. Yet nature replenishes each season what the hands of man are trying to take way from this region.

Total chapter is another major attraction for wilderness in the desert. It is located in Churu district, about twelve kilometers north of Sujangarh. It is a tiny grassland habitat, totally plain, surrounded by villages from three sides and salt manufacturing complex on the fourth side - critically

located under several threat. Within its 4-6 sq km area, there is concentration of nearly 1,500 black buck. The breed annually to raise the wild stock. There is no predation for them here. A few 'naadi' (water bodies) around the Sanctuaries, and two within, are the main sources of the drinking water for both the animals and people alike. People have developed liking for the black buck and allow them to share part of their agriculture produce. They drive them away from their farm fields instead of killing or poaching them. Such is the unique tolerance and understanding between man and wild animals in this desert. A few pairs of desert fox are often observed here. Larks are in thousands. Raptors are invariably present, observed squatting over khejri trees, as soaring in the air. Several migratory species of birds are a common sight during winter months, prominently ducks (shoveller, teal, pintail, etc.), and demoiselle cranes. The Sanctuary is across the Europe-Indian fly over for the winter migrants and presents a delectable spectacle of birds in air as well as ground when the immigrant species flock in (late September and October).

Dhawa, Doli, Guda Bishnoi, Khejreli, Lohawat, Jamba, Mukam and some others (seemingly) are popular names significant for wildlife in this desert. These are the regions dominated by the Bishnois. Hence, there is natural occurrence of gazelle, black buck and flora in comparatively better shape. The desert is replete with this sect of people, so also animals around them.

Dhawa and Doli are village settlements towards west of Jodhpur, along the road to Barmer (a few kilometers off the main road). Feench is another locality for wild animals in the same vicinity. Guda Bishnoi and Khejreli south of Jodhpur, is about 30 km. away. Kejreli is the place where a mass human sacrifice was committed by 363 men and women in 1730 to defend the Khejri trees being felled through an order of the then state. The Bishnoi people set a rare example through this act. Lohawat is along the Jodhpur-Phalodi road. However, the Bishnoi temple is off the road where gazelle present a rewarding spectacle. Jamba is north of Phalodi, approached through a diversion from the Phalodi-Bikaner road. Mukam is south of Bikaner and is a prominent destination for Bishnoi people as Lord Jambheshwar breathed his last here in 1537. Annual fairs attract thousands of people, mostly, Bishnois, at Khejreli, Lowat, Jamba and Mukam. Despite such pressures, the desert animals and birds, so also vegetation is thriving around these places in a most remarkable manner.

The Luni River is generally a dry bed barring the monsoon season when it suddenly swells up. The river has a peculiar eco-system that supports vegetation and sub-soil water. Hence, the presence of blue bulls, gazelle and black buck along its banks. The wolf is invariably present in this belt.

Blue bull (Nilgai) is proliferating in several pockets of the desert. It is mainly because the animal has no threat from any predator, also due to its pseudonym 'gai' (cow). It is an antelope. But its local name sounds as if it belongs to the family of cows, which it is not as cow is given total protection in parts of India. The bluebull enjoys a parallel benefit to thrive beyond tolerance of agriculturists. Sikar, Nagpur Jodhpur, Pali and Sirohi districts are witnessing a sustained rise in numbers of this large damaging crop. People resist it. Yet they seldom open fire at it. Road accidents cause loss to their number but rate of growth of this animal is higher than such incidents.

There are numerous other pockets in the desert which have unique features to host wildlife. The desert is a great romance in wilderness despite the increasing pressures, biotic and abiotic. The author has had first hand experiences in this vast terrain over past twenty five years to observe animals, birds and habitats. Ironically, this desert is accepted as 'no man's land' and is also described as 'inhospitable' which it is not. But it is better recognized only when one tries to realize the ground realities of this eco-system where trees are in full bloom even during the peak of summer when the temperature is 45°C. Kair is in bloom during pre-summer season to yield its fruits which are very nutritious. And Khejri blooms almost at a time when the desert expects its annual rainfall. Exuberant growth is the character of this desert which has its own tale of scarcity to tell. This arid region is an excellent and glaring example of a sustainable eco-system.

Conclusion

Understanding and preserving the biodiversity of the Thar Desert are crucial for maintaining the ecological balance of this unique and fragile ecosystem. Conservation efforts need to consider both the natural adaptations of the species and the sustainable use of resources by the human communities living in the region. There are two type main problems like as Conservation Efforts and secondly Climate Change Impact. Conservation initiatives focus on preserving the unique biodiversity of the Thar Desert. This includes habitat protection, community-based conservation, and efforts to mitigate threats such as habitat degradation. Climate change poses challenges, including altered precipitation patterns and increased temperatures, which can impact the distribution and behavior of species in the Thar Desert.

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Appendix *
Protected Animals of Rajasthan
Schedule I Wildlife (Protection) Act, 1972
(Complete Protection; No Shooting at all)

A. MAMMALS		
Cat	Family	
S.No.	Common Name	Latin Name
1.	Tiger	<i>Panthera tigris</i> (Linn)
2.	Leopard or Panther	<i>P. pardus</i> (Linn)
3.	Leopard Cat	<i>Felis Bengalensis</i> Kerr
4.	Fishing Cat	<i>F. viverrina</i> Bannet
5.	Desert Cat	<i>F. libyca</i> Forster
6.	Caracal	<i>F. caracal</i> Schreber
Dog	Family	
7.	Indian Wolf	<i>Canis lupus</i> Linn
8.	Desert Fox	<i>Vulpes bucopus</i>
Bear	Family	
9.	Sloth Bear	<i>Melursus ursinus</i> (Shaw)
Hog	Badger Family	
10.	Ratel or Honey Badger	<i>Mellivora Capensis</i> (Schreber)
Rodents		
11.	Large Brown Flying Squirrel	<i>Petaurista petaurista Philippensis</i> (Elliot)
Antelopes	Gazelle	
12.	Chinkara or Indian Gazelle	<i>Gazella gazelle bennetti</i> (Sykes)
13.	Black-buck or Indian Antelop	<i>Antilope cervicapra</i> (Linn)
14.	Fourhorned Antelope or Chowsingha	<i>Tetracerus quadricornis</i> (Blainville)
Dear	Family	
15.	Mouse Deer or Chevrotain	<i>Tragulus memmina</i> (Erxleben)
Pangolins		
16.	Indian Pangolin or Scaly Anti-eater	<i>Manis crassicaudata</i> Gray
Dolphins		
17.	Gangtic Dolphin	<i>Platanista gangetica</i> (Leback)
B. BIRDS		
Storks		
18.	Eastern White Stork	<i>Ciconia ciconia</i> (Linn)
Spoon Bill		
19.	White Spoon Bill	<i>Platalea leucorodia</i> Linn
Hawks, Eagles, Osprey		
20.	Gos-Hawks	<i>Accipiter gentiles</i> (Linn)
21.	Sparrow Hawk, Asiatic	<i>A. nisus</i> (Linn)
22.	Besra Sparrow Hawk	<i>A. virgatus</i> (Temminck)
23.	Shikra	<i>A. badius</i> (Gmelin)
24.	Fish-eating Eagle or Osprey or Fish Hawk	<i>Pandion haliaetus</i>
Falcons		
25.	Peregrine Falcon	<i>Falco peregrinus</i> Tunstall
26.	Laggar Falcon	<i>F. bairmicus jugger</i> (Gray)
27.	Red headed merlin	<i>F. chicquera</i> Daudin
Cranes		
28.	Great or Siberian White Crane	<i>Grus leucogeranus</i> Pallas
Busturds, Floricans		
29.	Great Indian Busturd	<i>Choriotis nigriceps</i> (Vigors)
30.	Houbara or Macqueen's Busturd	<i>Chlamydotis undulata mcqueen</i> (Gray)
31.	Lesser Florican or Kharmor	<i>Syphaetides indica</i> (J.E. Muller)
C. REPTILES		
Turtles		
32.	Ganges Softshelled Turtle	<i>Trionyx gangeticus</i> Cuvier
33.	Indian Softshelled Turtle	<i>Lissemys punctata punctata</i> (Schoeff)
Crocodiles		
34.	Marsh Crocodile	<i>Crocodylus palustris</i> Lesson
35.	Gharial or Gaviale	<i>Gavialis gangeticus</i> (Gmelin)
Lizards		
36.	Agra Monitor Lizard	<i>Varanus grisius</i> Daudin
37.	Barred, Oval or Yellow Monitor Lizard	<i>V. flavescens</i> Gray

38.	Large Bengal Monitor Lizard	<i>V. bengalensis</i> Schneider
39.	Water Lizard	<i>V. salvator</i> Laurenti
Snakes, Pythons		
40.	Indian or Rock python	<i>Python melurus melurus</i> Linn

Schedule II Part II**Wildlife (Protection) Act, 1972****(Very stringent measures for protection: Shooting allowed rarely)**

Mammals		
Cat Family		
1.	Jungle Cat	<i>Felis chaus</i> Gueldenstaedtii
Civet Family		
2.	Small Indian Civet	<i>Veverricula Indica</i> (Desmarest)
Dog Family		
3.	Common or Indian Fox	<i>Vulpes bengalensis</i> (Shaw)
4.	Whitefooted Red Fox (Western Desert)	<i>V. pusilla</i> Blyth
5.	Jackal	<i>Canis aureus</i> Linn
Reptiles		
Snakes		
6.	Checkered Keelback	<i>Xenochrophis piscator</i> (Schneider)
7.	Rat Snake or <i>Dhaman</i>	<i>Ptyas mucosa</i> Linn
8.	Indian Cobra	<i>Naja naja naja</i> (Linn)
9.	Black Cobra or <i>Nag</i>	<i>N. naja oxiana</i> (Eichwald)
10.	Russel's Viper	<i>Vipera russelli</i> (shaw)