MASTER PLAN
OF
SANJAY GANDHI BIOLOGICAL PARK
PATNA

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Symbolizing Ahimsa (non-violence), tolerance and compassion

Chapter 1.
Introduction

1.1. History

The Sanjay Gandhi Biological Park, Patna was established as a Botanical Garden vide Government of Bihar, Forest Department's letter no. 1781V dated 13.4.1970 on a chunk of 34.00 acres land being part of the Governor's campus. His Excellency the then Governor of Bihar, Shri Nityanand Kanoongo bestowed the land to the forest department to establish the garden. The Divisional Forest Officer, Gaya Forest Division was deputed as officer-in-charge of the Garden.

Later on, in 1972 the name was changed to Biological Park by the Department of Forests, Govt. of Bihar, vide letter no. 13/72-2967-F dated 03.06.1972 (**Annexure-I**). And, it was brought under the administrative control of the Working Plan Officer, Magadh Circle, Patna. Later on the adjoining 58.20 acres land of Revenue Department and 60.75 acres land of Public Works Department transferred to Forest Department was added to the existing Biological Park. Thus, present area of the Biological Park is approximately 153 acres. The land acquired from Public Works Department and Revenue Department is notified as Protected Forest by the State Government vide S.O. No.

Basic Facts

Year of Establishment: 1972

Area: 153 Acres

280 dated 08.3.1983 (**Annexure-II**). The State Government has declared the park/zoo service as 'Essential Sevice' under the Bihar Essential Services Maintenance Act [**Annexure-III (a) & III (b)]**

1.2. Objectives

Main objective of the park is *ex-situ* conservation of flora and fauna. Further, it also aims at *ex-situ* breeding of endangered species of wild fauna and their rehabilitation in the wild as per the IUCN guidelines for reintroduction. Apart from this, the park endeavors to act as a tool for mass awareness on nature conservation in general and wildlife in particular, besides serving as an eco-friendly recreation space.

1.3. Physical features

The park is situated in the confluent floodplain of river Ganga and Sone. The land consists of mainly Gangetic alluvial soil. A part of the park used to suffer from waterlogging which was reclaimed by planting *Terminalia Arjuna* and *Teak*.

1.4. Flora and fauna

In the last 40 years, sustained plantation activities have been carried out. This has resulted into presence of more than 150 tree species here. List of tree species in the park is given in **Annexure-IV**.

The lush vegetation in the park provides habitat to many faunal life forms. The striking free-ranging groups of animals in the park include insects, amphibians, reptiles and birds. List of free-ranging birds in the park is given in **Annexure-V**. Common palm civet, mongoose, jackal, bats and squirrels are few among small mammals inhabiting the park.

1.5. Climate, rainfall and seasons

In Patna, the summer temperature rises very high coupled with heat wave. The city, being near four large rivers, experiences high humidity throughout the year. The summer begins in April and peaks in June/July with the temperature soaring up to 46° C till the moisture laden monsoon wind bring rain-showers. The rains last through August and September and continue till early October. Following this, winters bring bitter cold nights and occasional foggy days to Patna from November to February till the arrival of the spring. The local almanac divides the year into six seasons of roughly two months each. Apart from the usual four seasons: summer, monsoon, winter and spring, mild winter between monsoon and winter and mild summer just before severe north-Indian summer.

Relative humidity in summer afternoons is between 30 to 40 percent while in monsoon period it ranges between 75 and 85 percent. Average rainfall in the city is 990 mm and

Climatological information for Patna (Based on the data of 1951-2000)

Month	Mean Temperature (^{0}C)		Mean Total Rainfall (mm)
	Daily Minimum	Daily Maximum	
January	9.3	23.0	20.4
February	11.6	26.1	11.1
March	16.4	32.4	11.4
April	22.1	37.4	9.0
May	25.1	38.4	35.6
June	26.7	36.7	141.0
July	26.1	32.9	319.2
August	26.1	32.5	279.3
September	25.3	32.2	212.6
October	21.6	31.7	72.3
November	14.8	28.9	8.2
December	10.1	24.6	7.4

Source: http://www.worldweather.org/066/c00534.htm

average number of rainy days in a year is about 47.

1.6. Approach

The Park situated at Patna, the capital city of Bihar, lies at 25^{o} 35.966'N and 85^{0} 5.970' E and spreads over an area of 153 acres. The zoo is bounded by Bailey road on its north, Governor House on its east, Wheeler road on its south and Riding road on its west and is located in the posh area of the capital called the new capital area. Google Earth perspective of the Park and its surroundings is given in the figure below;

The park has two entrances. One can enter either from Bailey Road (Gate No. 1) or

Taylor Road (Gate No. 2) into the park. The park is 5km from the Patna Railway station and 1km from the Patna Airport.

1.7. Demography of the surrounding area

Population of Patna is over 5,838,465 (2011 census), which has grown from 4,718,592 in the 2001 census. Population density in the city is high with 1823 persons living per square kilometer. There are 897 females to every 1,000 males. Overall Literacy rate is 70.68%, while female Literacy rate is 61.96%. (Source: 2011 Census Data)

1.8. Legal status and classification

A total of 118.95 acres out of the total 153 acres of the land of the park is notified as Protected Forests in March, 1983 (**Annexure-II**). The zoo comes in the category of "Large Zoo".

1.9. Sources of pollution

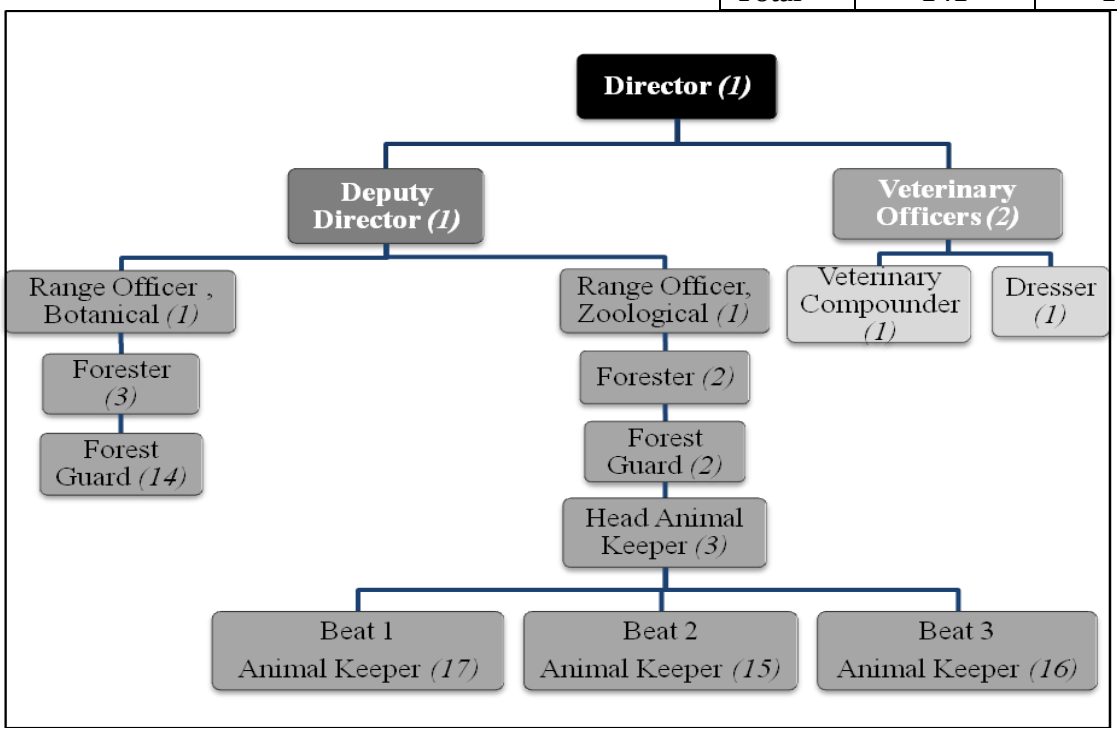
Being in the city and surrounded by heavy traffic roads, automobile emission is the only point source of air and noise pollution. Noise pollution is also caused during landing and taking-off of aircrafts from the Patna airport in the vicinity.

1.10. Present Ground Situation

The park houses almost 1200 animals of more than 100 species. Apart from animals, it is a rich repository of plant species, and accordingly the park has been divided into Botanical and Zoological Sections. The park is annually visited by more than 18 lakh people. The zoo is growing day by day. Accordingly, workforce to manage the park and take care of welfare measures of the animals is being reviewed and created. The present grade wise staff strength of the park is given in the table *Staff Strength*.

Staff Strength		
Class of staff	**Sanctioned Strength**	**In Position**
I	1	1
II	5	5
III	15	13
IV	120	96
Total	141	115

Organogram of the park is given below;



Support and ministerial Staff:

The human resources available to support the management and park directorate have been given in the table *Support Staff Strength*. In addition to this, almost 200 casual laborers render their services for the maintenance of the park.

Support Staff Strength					
Staff	**Sanctioned strength**	**Posted strength**	**Staff**	**Sanctioned strength**	**Posted strength**
Frontline Support staff					
Driver	4	2	Mali	15	11
Chowkidar	3	2	Thela Puller	1	1
Electrician	1	0	Khansama	3	2
Sweeper	7	6	Mahawat	3	2
Pump operator	2	2	Sapera	1	1
Plumber	1	1	Dresser	1	1
Baira	2	2	Carpenter-cum-welder	1	0
Aquarium attendant	3	2	Museum Keeper	1	0
Office staff					
Head Clerk	1	1	Steno	1	0
Clerk	7	7	Orderly Peon	4	2

The park has achieved many distinctions in captive breeding of the animals. Successful breeding of Greater One-horned rhinoceros has earned it countrywide laurels. Successful breeding of big and small cats, herbivores, birds and reptiles in the park has added success stories in the park's history. The park has a veterinary hospital with facilities of operation theatre, hall for radio-diagnosis, medicine store, intensive care room, laboratory and veterinarian & staff room.

The botanical section of the park houses herbal garden, waterpark, rock-garden, climber-garden, green-house, cactus-house and rose garden, while zoological section encompasses about 45 enclosures for different groups of animals. An aquarium housing 35 species of colourful fishes is another attraction of the park. Major facilities for public recreation include toy train, battery operated vehicles, boating, cycling, children-park and foodplaza.

Chapter 2.
Present arrangements and constraints

2.1. Land resources

The area has been divided into two sections, namely botany and zoo. At present the animal enclosures occupy approximately 50 acres of area. Rest is in other land-use forms. The legal status of more than 118 acres of land is protected forest.

The park has been divided into Botanical and Zoological Sections. The Botanical Section houses plant gardens, residential and official buildings, and lakes. About 45 animal enclosures and veterinary hospital are part of the Zoological Section of the park.

2.2. Botanical section

Botanical section occupies mainly the north-eastern portion of the park, adjacent to the premises of the Governors' House. The two lakes in south-eastern and south-western parts are also in the Botanical Section. The section houses not only the exclusive plant gardens and lakes but also the residential and official complexes, jungle trails, Children Park, toy train and a temple.

2.2.1. Plant gardens

A. Orchid House:

An Orchid house was constructed in the year 1992 to propagate the epiphytes. More than 30 species of orchids were planted in the house with modified moisture and temperature regime suitable to the orchids inside. However, sparing initial success, the initiative could not bear the fruits and the purpose of establishing the house has not been achieved. **It is proposed to convert the structure as part of interpretation centre.**

B. Herbal Garden:

Christened as 'Dhanvantari Udyan', the herbal garden harbouring more than thirty species of medicinal plants is situated in the eastern part of the Park by the side of the Raj Bhawan's boundary wall. Exclusive to this garden is depiction of curative values of different plants in ailments of various human body organs and parts by planting the herbs and shrubs on corresponding body parts of a large cemented replica of a lying human body. The garden serves as an important repository of many important herbal plants in Patna. Large numbers of school and college students visit this garden for educational purpose.

C. Green House:

Green House is a storehouse of more than fifty varieties of shade loving plants, ferns, etc. This attracts visitors especially the school & college students.

D. Rose Garden:

A rose garden is being maintained by the side of the main road passing through the Park. It is a good attraction for the park visitors. Divided into four sections, the garden has got roses of different colors in different sections also decorated with beautiful pathways. This is to be relocated in the jungle trail-1 area. The present area will be a part of the swamp deer enclosure.

E. Jal Udyan:

Established in the year 1994-95 the Water Garden attracts a lot of visitors. Water falls from a small hillock like structure and it gives a picture of a natural fall. Various types of submerged and floating hydrophytes are grown in the pond constructed in the garden. Flowers of lotus and water lilies add to the garden beauty. The Jal Udyan needs to be given more robust and natural look by extending it further.

2.2.2 Lake

A. Old Lake:

A lake, covering approximately 8 acres, was excavated in the year 1974, which is currently used for boating for the park visitors. A 6 feet wide and 1048 long footpath has been constructed along the periphery of the lake. Sitting chairs have been constructed at different places. The place is an ideal recreational place for the visitors. It is in use for fish rearing and exploitation of the same. It houses more than 500 turtles and other aquatic animals. The lake has three high rise floating fountains which add to the beauty of the lake and aerate the water as well. Pedal boating is permitted here. A floating jetty has been put in place to facilitate the boaters.

The lake surroundings need an upliftment and proper landscaping. A wastewater treatment plant is necessary to treat the water being discharged into the lake. The footpath around the lake needs replacement. Angling can be introduced in the lake on payment of a fee. Facilities of water sports can be added using this lake in future.

B. New Lake:

There was large water logged area in the south western portion of the park through which muddy water used to flow in rainy season and stagnate during summers creating extremely unhygienic conditions in the park. In 2001 this area was filled up to reclaim, followed by plantation. A new lake came into being due to the removal of soil used for reclamation. The water which used to spread over a large area now gets accumulated in the new lake. Water stay in the lake for 3-4 months only. A motor pump has been put into place to augment the flow of water to maintain atleast as marshy land. Major part of the depression together with adjoining jungle trail will be developed into rhinoceros conservation area.

2.2.3. Toy train

The Toy Train facility was started in August 1977, when the Indian Railways gifted one engine of 17 HP and two coaches to the park. Tata Iron and Steel Company, Jamshedpur donated 60 M.T. of 30 Lbs. rails to lay down the 1590 m long track. Later on in 2004, length of the track extended to 4368 m. This length covers almost every animal enclosure / area of the park.

Further, the Railways gifted a new train having four bogies (named as Sarus) of capacity of 20 persons each. Along with this a steam engine No. 73 ZB was donated by the Ministry of Railways, which is kept near the railway platform. There are three mini stations enroute of the toy train.

Currently the railway track passes through the back of animal enclosures. This is against the norms of the zoo management. Hence, realignment of the track is desired in such

a way that it passes in front of all enclosures. Deisel engine of the train shall be replaced by battery powered engine.

2.2.4. Jungle trail:

Two walking trails of length 700m and 595m passing through the thick man-made jungle of the park are very popular among the visitors. The trails give a feeling of natural forest to the visitors walking on the tracks. There is proposal to develop new animal enclosures and other zoo facilities in these areas.

2.2.5. Eateries:

Mayur Restaurant, a vegetarian outlet, is located at the central place of the park. There are one sudha outlet and one snacks counter on the main road.

2.2.6. Residential and official complexes

A. Administrative Building:

The administrative building of the park is situated on the southern side of the Park about 50m away from southern entrance gate. The office has 6 rooms of different sizes and two medium sized halls. The building also houses one room functioning as a temporary library of the zoo. The Director, Dy. Director, two Range Officers and the office staff of the Director office function from this building.

By the side of the Director's office, there is a big hall used to organize different functions/cultural shows and other activities of the zoo. The building needs renovation and needs to be put for some better use.

B. Director's residence:

The Director's residence is situated in the north-eastern part of the park.

C. Rest House:

A rest house has been developed near the Director's Residence. The building constructed as godown for construction material in the initial days of establishment of the park was later converted into the rest house.

The rest house is not only a potent nuisance but a security threat to the park, due to visit of people even during evening hours. This shall be done away with as early as possible.

D. Staff quarters:

There are two quarters inside the park, one for the caretaker of the rest house and the other for veterinary officer of the park.

2.2.7. Tree House:

The Tree House is a beautiful cottage built on a white Siris tree beside the main road near the Administrative Building. It is a well-furnished double bed cabin with amenities for night stay. The structure has deteriorated over a period of time and needs to be replaced.

2.2.8. Children Park:

A park has been exclusively maintained for the recreation of children. The 116400 sq ft. park is provided with a small pond in the centre with sitting facilities around it, five pairs of swings, a pair of see-saw, two roundabouts, and other recreational facilities for different ages of children. Small enclosures of parrots, Himalayan Gian Squirrel and turtles in the park add to the amusement aspect of the children park. The childrens'park is fenced with wiremesh for the safety of the children and for security of the park per-se.

2.2.9. Temple:

There is a temple by the side of the rose garden. Although existence of a temple inside a zoo is not in conformity with the objectives of the zoo management but keeping in view the sentiments of the people prayers are allowed during zoo hours.

2.3. Zoological section

This section houses 44 animal enclosures along with the hospital and feed distribution centre. It is divided into three sectors for administrative purposes. The number of enclosures in each section is as given below.

Sector No.	No. of Enclosures	Enclosure of animals
1	10	Hyena enclosure; Duck enclosure.; Dumbell shaped enclosures 1,2, and 3; Monkey enclosure; Leopard enclosure; Langur enclosure; Lion enclosure; Emu enclosure
2	21	Tiger enclosure 1 and 2; Jackal enclosure; small Gharial enclosure; Snake house; Cassowary enclosure; Bear enclosure 1 and 2; Pelican enclosure; Hog deer enclosure; Barking deer enclosure; Sarus enclosures 1, 2 and 3; Parrot enclosure; Himalayan Giant Squirrel enclosure; Hen enclosure; small bird enclosure; Phesants enclosure; Turtle enclosure; Otter enclosure
3	18	Cheetal enclosure; Swamp deer enclosure; Zebra enclosure; small mammals enclosures; Hippo enclosure; Lion-tail macaque enclosure; Black buck enclosure; Giraffe enclosure; Sambar enclosure; Rhino enclosure 1, 2, 3, 4 and 5; Sanghai deer enclosure; Elephant enclosure; Muggar enclosure; Gharial enclosure

Details of various enclosures in different sectors are given in the table *Enclosure Details*.

Enclosure Details				
Sl. No.	**Name of the enclosure**	**Size of enclosure (in ft.)**	**Number and app. size (ft.) of cubicles / night houses**	**Remarks, if any**
1	Leopard En.	129 x 121.6	5 (7x3x 4 each)	Cubicles are not as per the specification of CZA
2	Lion En.	100 x 82	7 (7x5x7 each)	Railway track passes through backside of the night-house
3	Tiger En. No.1	100 x 90	4 (10x8x9 each)	Provided with an open moat in the front
4	Tiger En. No.2	180 x 192	4 (10x7x9 each)	Provided with open moat in the front and two nurseries
5	Emu En.	59 x 122	2 (8x7x8 each)	
6	Water birds En.	46 x 41 x 15		
7	Mugger En.	90 x 50		Provided with moat
8	Elephant En.	215 x 117	1 night shed with 3 compartments (51 x 21.5)	The facility would be utilized for other animals, once the existing lone elephant is either sent to rehabilitation centre or its death, in case it is allowed to stay in the park in the light of its illness, with permission from CZA.
9	Hyena En.	150 x 42	8 (12x8 each)	
10	Jackal En.	100 x 100 x 14	2 (10x10x10 each)	
11	Gharial Nursery	50 ft Dia.	Small pond of 25 ft Dia. For juveniles	
12	Snake House		10 framed glass compartments of size 7 x 7	
13	Cassowary En.	25 x 60 x 15		
14	Himalayan Black Bear En.	50 x 90	5 (8 x 7 each)	
15	Sloth Bear En.	50 x 90	5 (8 x 7 each)	
16	Pelican En.	162 x 196		Also includes a pond of app. 2400 sq ft
17	Hog Deer En.	114 x 75		With a dry moat
18	Barking Deer En.	117 x 85		
19	Sarus En.	3	3 (31x21x18 each)	It is a dumbbell shape enclosure, which serves the purpose of cubicle as well.
20	Peafowl En.	20 x 15 x 15		
21	Bird En.	Three	16 compartments (12	

		sections	x 36 each)	
22	Zebra En.	115 x 39	2 (45 x 3.63 x 3.63 m each)	
23	Small mammal En.	95 x 44 x 7	8 (8x6'6"x6'10") 2 (10'10"x6'6"x 6'10") 1(25'4"x6'6"x6'10")	It is too small and cramped
24	Giraffe En.	1		
25	Aquarium	1		

2.4. Veterinary Section

The veterinary wing of the park mandates to take care of health of the captive animals in the park. The hospital is manned by veterinary doctors and para-vet staff. Experts from Bihar Veterinary College, Patna are also invited to the park to deal with problems related to animal health. The Government of Bihar has constituted a Technical Committee of expert veterinarians and zoo officials in 2004 to oversee and advise on technical and other matters of the zoo. The Committee meets monthly or periodically as and when required. The Bihar Veterinary College has been using the facilities in the park for training their Post Graduate students in management and health care of captive animals.

The hospital is equipped with necessary basic infrastructure to restrain the animals and perform disease diagnosis, surgery and other veterinary interventions. The hospital has an

operation theatre, a hall for radio-diagnosis, a medicine store room, an intensive care room, indoor ward with four cubicles for small animals, and two rooms for hospital staff and veterinarian. However, there is no library facility in the hospital, so that the veterinarians could update their knowledge in this specialized aspect of animal care.

As a part of veterinary care to the animals, de-worming and vaccination of animals and disinfection of their enclosures is done on regular basis. Schedule of the activities are given in the table *Veterinary Care Schedule*.

Veterinary Care Schedule

Activity	Frequency	Schedule
De-worming	Quarterly	3rd weeks of March, June, September and December. Samples are collected in 2nd weeks of March, June, September and December
Vaccination *In Felines:* Feline panleucopnea, Feline rhinotrichitis, and Feline calcivirus	Annual	2nd week of October
Vaccination *In Felines and Canines*: Rabies	Annual	2nd week of November
Blood screening	Annual	2nd week of June
Antitryps medication	Annual	2nd week of December
Homeopathic prophylaxis for TB	Monthly	15th of every month
Homeopathic prophylaxis for Fowl Pox	Weekly (in 4 months only)	Every Monday of May, June, July and August
Chemical disinfection of birds cages	Fortnightly	
Moat cleaning and cage disinfections by blow gun	Weekly	Every Monday
Ecto-parasite control	Quarterly	2nd Monday of May, August, November and February
Field disinfection by turning of soil and lime treatment	Quarterly	
Vitamin, Liver tonics and calcium supplementation	Regularly	

At present the dead bodies are disposed off in the carcass disposal unit through burning in firewood. There is a diagnostic laboratory in the zoo to examine feacal samples, blood smears, urine etc.

2.5. Stores & Feed supply section

The store section has mainly two activities; procurement and supply of feed for animals, and procurement of construction material, equipment and machinery. The existing store building consists of 3 rooms, 2 halls and a verandah which serve as storehouse of food items of the animals and works as the distribution centre to different cages/enclosures of the Park. The other newly constructed concrete structure is used to store the materials meant for construction and maintenance work. Tricycles are used for distribution of feed to different cages.

Currently, feed and fodder for all animals are procured from outside sources through tendering process annually.

2.6. Security system

The park being situated in a VIP area of the city gets the advantage of high security by police. Boundary wall exists all along the periphery. During daytime forest guards keep on patrolling in different portions of the park. Mobile phones have been provided to Foresters for quick communication. On special occasions like New Year Day and other holidays, local police forces are deployed. Park officials maintain proper co-ordination with the concerned local Police Stations for their active support in maintaining law and order inside the zoo.

It has been proposed to fortify the boundary wall with a Razor wire fence and with solar electric fence at appropriate stretches.

2.7. Sanitation Section

Sanitation is one of the most important aspects in a zoo as lots of solid and liquid wastes are generated every day from the animal enclosures and other facilities of the park as well. In order to reduce generation of solid waste in the park due to visitors, use of polythene and tetra packs are completely prohibited in the park. Dust bins have been provided at different places within the park. Currently, the wastewater from the cages is discharged into the old lake. The under construction Bio-Filter, with the help of National Environmental Engineering Research Institute, Nagpur, will be used for the treatment of waste water.

Sanjay Gandhi Biological Park is a 'No-Polythene' Zone

2.8. Workshop Section

This is housed in a new house on the western side of the park. The workshop accomplishes welding, fabrication, carpentry works and vehicle maintenance works. There is need to equip the workshop in better way.

2.9. Water supply section

The park has grown in phases and so has the water supply system. At present there are two boring pumps of 50 and 25 HP in operation in the park, which is neither sufficient nor reliable. It needs to have smaller pumps in different sections of the park to have judicious use of water.

2.10. Power Supply Section

Though power is supplied to the park by the Patna Electricity Supply Undertaking (PESU), there are instances of power breakdown as well as low voltage, thereby depriving the zoo of power supply time and again.

Most of the animal enclosures have power supply, but the power wires are over ground thus making the wires vulnerable to snapping due to falling trees or strong wind.

2.11. Roads, Landscaping and Gardening

Black top road network in the park extends for 5.3 kms. A road connects both gates of the park. The park has evolved over a period of time. In the absence of management plan things have been added as and when required. This has resulted into fragmented development of the park. At present the lawns are scattered across the park in an unplanned way. No conscious attempt has been made to landscape the park.

2.12. Nursery

Two nurseries for garden plants (seasonal and perennial) and another for trees and shrubs (for informal gardening) are being maintained in the park. This is done in the botanical section. Large nursery is an absolute necessity for a modern zoo, for maintaining its greenery and aesthetic appeal. New technology will be introduced for producing better quality of plants.

2.13. Amenities for convenience and recreation

It is a large park with a vast area to be covered which necessitates the visitors to spend a lot of time here. The amenities being provided by the Park to the visitors are given in the table *Amenities to Visitors*.

Amenities to Visitors		
Sl. No.	**Facilities**	**Details**
1	Boating	In the old lake
2	Toy train	Covers nearly all enclosures in about 35 minute trips.
3	Toilets	Four
4	Urinals	Eight
5	Benches	Throughout the park
6	Drinking water	At eight points
7	Children Park	For kids
8	Eateries	Restaurant – 1, Ice-cream parlors – 2
9	Battery operated vehicles	9 (45 minutes to go around the zoo)
10	Wheel-chairs	9 For differently-abled people (available for free at both the entrances)
11	Resting places	Many places throughout the park
12	Bicycles	15

The public amenities of the park need quantitative and qualitative improvement to meet with the aspirations of the visitors.

2.14.

Present fee structure

The present fee structure for various facilities being provided to the visitors is given as **Annexure-VI.**

2.15. Education and awareness

Education to and awareness of visitors are important from zoo management point of view. The visitors should go back with empathy for wild animals in captivity and also in wild, besides getting educated about behavioural aspects of wild animals.

Information about plants and animals has been provided at various locations, especially near the animal enclosures. Directive signages have also been placed at strategic locations.

Several activities are conducted in the park to meet the objective of zoo management. On the occasion of Wildlife Week, World Environment Day and such other days the zoo organizes painting, essay writing and photography competitions for children. However, activities for education and awareness need to be conducted round the year.

2.16. Research

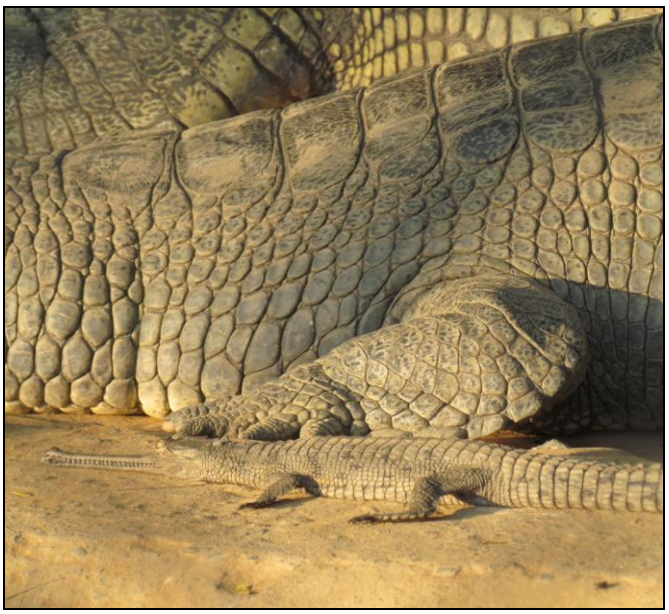
The park provides a platform to wildlife researchers and students of veterinary sciences of Bihar Veterinary College, Patna to work in their respective fields. Researchers from local universities and colleges viz. Patna University, A.N. College and Patna Women's College have conducted several studies on animal behavior and other aspects of zoo animals. Post-Graduate students of veterinary sciences have also conducted research to complete their Master's dissertation.

2.17. Conservation breeding

Captive breeding of Greater one-horned rhinoceros in Sanjay Gandhi Biological Park has helped it acquire global recognition. First pair of the pachyderm was brought to the park in 1979 and its breeding started in 1988. The park houses the highest number of individuals of the species in captivity after San Diego Zoo, California, U.S.A.

Breeding of endangered and rare animals is prime focus of the park. The park is one of the best breeding centers of the Greater One-horned Rhinoceros in the world. Breeding of the species started way back in 1988. The park witnessed the birth of two calves in 2011 and three calves in 2013. At present the zoo houses 14 rhinoceros (6 males and 8 females) of four different bloodlines. The following table *Breeding Successfully* enlists the species bred successfully in the park.

Breeding Successfully (Births in the last 10 years till 31.3.2012)		
Sl. No.	**Species**	**No. of births**
1	Leopard cat	4
2	Gharial	130
3	Zebra	4
4	Giraffe	2
5	Black buck	39
6	Shangahi Deer	7
7	Sambar	17
8	Cheetal	25
9	Swamp deer	9
10	Barking deer	12
11	Hog deer	8



2.18. Wildlife adoption program:

Recently, a Wild Animal Adoption Program has been initiated. The program aims at connecting people to wildlife and its conservation. Under the program an individual, group of individuals, organization or corporate body can adopt an animal or enclosure of its choice. The money so collected is utilized for betterment of the adopted animals.

2.19. Mobility

There is one Tata Indigo car, one old petrol Gypsy and one old confiscated Maruti Van for the use of the field level officers, besides a TATA 207 pickup van, an old diesel jeep, one modified Bolero Camper as Rescue van & a tractor for zoo service. For movements within the park/zoo bicycles are used by the officials and other staffs.

Constraints

- Morning & Evening walkers thronging up in the zoo daily hinders the day-to-day upkeep of the park/zoo besides posing a security threat.
- A large number of trees of the park fall within the flight path funnel of aircrafts, which requires frequent pruning and felling to eliminate the threat.
- There is no scope of expansion due to human settlement and unavailability of land, except the adjoining Patna Golf Course land adjoining the zoo.

2.20. Constraints

i. Being located in the VIP area in the heart of the city, the Park has been a place where people have been coming for morning walk from the beginning. The efforts on part of the Park manager to stop or regulate it have not yielded much favorable results. However, the

movement of the morning walkers has been restricted to the Botanical section of the Park. Heavy rush of people, who throng up in the park as early as 5:00 AM is neither in conformity with the objectives of the zoo nor conducive for the welfare of animals and park management as well. There is an attempt under consideration to regulate the morning walk in restricted area (botany section) which is to be implemented phasewise.

ii. The Park is adjacent to Patna airport, which is in itself a constant threat to the animals in the Park due to heavy noise created by the aircrafts during landing and taking-off. The southern side of the Park has long standing trees in the approach funnel of runway which pose security threat to the aircrafts coming to or going from Patna airport. As per a survey conducted by the airport authority, about 3500 trees of Sanjay Gandhi Biological Park fall in the approach funnel. There is regular pruning of more than 1000 trees to keep their height at permissible level.

iii. The zoo faces a constraint due to its location, which does not leave any space for further expansion. The park being situated in the VIP area of the capital, apart from the area under Golf Club there is no other land which can be added to the zoo for its expansion in future. It will be done in the future in conformity with the policy of the state government.

The expansion of the Zoo is very essential to enrich the biodiversity, to improve the education/awareness of the public in general, to improve the population of endangered wild animals in particular and to improve the general attraction. The adjoining Golf Course is a hope and that shall be availed to fulfill this demand in the larger public interest.

Part II

Sanjay Gandhi Biological Park: Symbolizing *Ahimsa (*non-violence), tolerance and compassion

The city of Patna known as Patliputra in the ancient time has got the privilege of being the capital of the great Mauryan Empire. King Ashoka, the Great, took the reins of the Empire in 269 B.C. Later on Ashoka conquered and annexed Kalinga. He subsequently recorded his feelings of profound sorrow and remorse caused by the miseries of the people during his Kalinga campaign in one of the rock edicts. This event was a turning point in the life of Ashoka and he introduced a change in the Muaryan policy by substituting Dharmvijaya for Digvijaya. The city of Patliputra became a unique example in the history of the world that a conqueror after a resounding victory decided not to go for further conquests at a time when the Magadh Emperor could have easily taken over the entire peninsular India and tribal area on the frontiers. The city of Patliputra became the centre where the Emperor directed for developing cordial and social relations and religious tolerance among various groups of people.

From his seat at Patliputra, Ashoka sent out the first royal missionary of international peace and cooperation to different parts of the world. This transition brought a drastic change in life of the emperor and he became an ardent protector of animal life. Ashoka was the first king in the history who founded a **hospital for animals at Patliputra**, which became perhaps the origin of the **pinjrapol**, which is commonly found in India. Ashoka died at a holy hill near Rajgir, which is 60 kms from Patliputra (Present Patna) was known for a very rich habitat for wildlife in the past.

This Park situated in the city of old, has drawn inspiration from its lead Emperor and strives to take forward the message of **Ahimsa**, **tolerance and protection of wild animals and various activities, which was symbolized by the great Emperor Ashoka's love for animal life.** The Park strives to become a centre where people coming to see wildlife goes back as a messenger of peace, love and compassion for the welfare of wildlife in particular and environment in general.

Chapter 3. Future plans

The journey of 'keeping animals in captivity' started with individual collections and menageries for recreation and reached to the present form - *a tool for conservation*. Growing awareness on nature and wildlife conservation has made zoos popular institution. As per estimates, in India, nearly 50 million people visit zoos annually. To use zoos as a means of *ex-situ* conservation of wild animals in the country was realized soon after independence, later on in 1972 the role of modern zoos in the conservation were outlined in the

recommendations of the Expert Committee set up on Management of Zoos in November 1972. Further, role of zoos has been amply made clear in the National Zoo Policy 1998.

And now, the role of zoos as a picnic spot for entertainment and amusement has changed to centers for conservation breeding of endangered species, and awareness and scientific research on wildlife. The zoos are now mandated to complement and strengthen the national efforts in conservation of the rich biodiversity of the country, particularly the fauna. Zoos in modern avatar are crucial for re-introduction programme and biological research on several species under one roof benefitting not only the captive stock of animals but also their wild counterparts. With increasing pressure on natural habitat of wild species, role of zoos would be crucial for strengthening the natural population through re-stocking and re-introduction measures. With increased importance of zoos in the present context, welfare and husbandry techniques of the captive animals require topmost attention.

The Sanjay Gandhi Biological Park strives to excel in the field of conservation and breeding wildlife.

3.1. Mission, vision and theme

Mission

"*To ensure welfare of captive animals and contribute towards nature conservation through research and captive breeding of endangered species and education and awareness of common mass*".

Vision

"*A world in which humankind acknowledges the value of living entities by conserving and protecting them*".

Theme of display

- Broad taxonomical display of wild animal species of national importance with special emphasis on fauna of the Gangetic Plains
- Off-display Conservation breeding centre for one-horned rhinoceros
- Off-display Rescue and rehabilitation for leopards and sloth bears.

3.2. Objectives

Keeping in view the guidelines of the National Zoo Policy (1998), the objectives of Sanjay Gandhi Biological Park, Patna have been framed as follows:

i. Conservation and captive breeding of different species particularly the endangered and endemic species of the Gangetic Plains region for preservation of bio-diversity, exchange with other zoological parks and rehabilitation of suitable species in the wild.

Objectives

- Captive Breeding
- Research
- Education and awareness
- Training
- Recreation
- Rescue and rehabilitation

ii. Research and scientific study on animal behavior, diseases and their control, feed and nutrition and reproductive biology.

iii. Promotion of nature education and creating awareness about wildlife conservation

iv. To develop it as a training centre on management of wild animals including zoo designing for veterinarians, keepers, wildlife people taking advantage of the knowledge and experience gathered in captive management of wildlife here.

v. Providing healthy wholesome recreation to the visitors utilizing ambiance of the setting of the zoological park keeping in view the safety and upkeep of the zoo animals. Recreation shall only be incidental and shall not be the main objective at any time.

vi. To develop the facilities in the zoo so that it can act as rescue-cum- rehabilitation centre for wild animals in suffering.

3.3. Strategy for achieving the stated objectives

The park would strive to display the species of local, regional and national importance, and species from other parts of the world as well for the sake of education and incidental breeding for exchange. It would be imperative to utilize the space of the park in most efficient way by providing optimum space to each individual and social group of animals and maintaining fewer species of large social and breeding groups. The park would not be able to stick to its mandate unless it ensures a high standard of animal health and hygiene and expert veterinary care. Outlined below are the specific strategies to meet each of the objectives;

i. Captive breeding

- Undertake *ex-situ* conservation breeding of endangered species to strengthen *in-situ* conservation measures, and also to take up the species those received in exchange.
- Maintaining collection and develop breeding plan of endangered species of local, regional, national and other areas (in order of priority).
- Maintaining a viable sex-ratio of the species targeted for breeding program.
- Coordinating with other zoos in pooling such animals into genetically, demographically and socially viable groups.
- Providing and maintaining healthy and natural environments to animals to facilitate breeding.
- Regulating the number of animals of various species in the collection in such a way that every animal serves the objectives of the zoo.
- Adopting population control measures of prolifically breeding species to avoid keeping surplus animals.

ii. Research

- Enlisting and prioritizing the themes in a manner that the research is beneficial for management / conservation of the species in captive and wild as well.
- Establishing collaboration with individual experts, universities, colleges, Research and Development organization, non-government organizations and other zoos in India and abroad and facilitating them for specific research.
- Capacity building of the zoo staff to facilitate in-house research.
- Publish the findings of the research for the benefits of zoos and other stakeholders.

iii. Education and awareness

- Providing formal and informal education for conservation by using the unique resource of live animals, natural environment and links to field conservation.
- Using education for conservation activity by influencing people's behaviour and values and inspiring amongst zoo visitors empathy for wild animals, an understanding and awareness about the need for conservation of natural resources for maintaining the ecological balance.

- Establishing linkages with schools, college, government departments, conservation and scientific organizations, non-government organizations, media, and people's representatives for designing, supporting and facilitating conservation education.
- Orienting the visitors towards wildlife and nature conservation right from their entry into the park.
- Building capacity of zoo staff, guides, volunteers to respond to the queries of visitors.
- Communicating the educational messages effectively by using properly designed exhibits, signage, interpretation centre, conducted tours, film and slide shows etc.
- Inviting feedback of the visitors and incorporating their suggestions in improvement processof the facilities / methods / strategies.

iv. Training

- Training of zoo staff, foresters, veterinarians and others involved in wildlife management in the state and elsewhere in the country to be encouraged for creating trained man power for better management of wild animals in captivity and in the wild.
- Developing a network of experts in the field of captive management of wild animals.
- Organizing workshops for different target groups to have hands-on learning experiences.

v. Recreation

- Displaying the animals in a pleasant, aesthetic, natural setting in conformity with their near natural habitat, behavior and biological needs in state-of-the-art enclosures.
- Providing high quality services and facilities to the park visitors in general, and differently abled and family groups in particular.
- Using volunteer services to help the visitors and enriching their experiences in the park.

vi. Rescue and rehabilitation

- Providing proper life-time care facilities to abandoned, orphaned and sick animals and ensuring welfare measures of high standards.
- Creating a trained, skilled and equipped workforce to rescue the animals suffering from disability / physical trauma in the wild and those in conflict with human being outside natural habitats as well.

Chapter-4

Proposed Action Plan

The future action plan is aimed to provide direction for development of the zoo in coming 10 years i.e. 2013 to 2022. The proposal is based on the topography of the site, water availability, vegetation, climate, visitors profile, conservation, education and research needs and convenience of management. For convenience, the proposal has been prepared section-wise. The recommendations of the Central Zoo Authority during the evaluation of the zoos from time to time has also been kept in view while formulating the proposal for new structures or modification of existing structures.

4.1. Administrative section

A personal assistant/steno, one driver and two peons will be under the control of the Director to assist the personnel section. The job of the section will be to control and coordinate among different wings of the park. The section will be equipped with a complete computer set with Internet, fax machine, photocopier, laptop, telephone with STD and ISD facility. A conference room shall be made by converting the current dilapidated structure near director's residence. It shall be fully equipped with projection system like LCD projector, screen, multimedia speakers, laptop, white board, TV set and DVD/ Blue Ray player, public address system etc. to hold meetings and for adequate monitoring from a central place. The list of proposed staffing pattern is annexed as **Annexure-VII**.

The administrative section will continue to function from the present building. However, separate rooms will be added to the present building to accommodate two range officers, four foresters and other frontline staff. The new buildings will have a library section too. Sufficient space for this is available by the side of the present administrative building. A group of veterinary experts have been notified as advisors to advice the Zoo admininstration regarding the welfare of the animals (**Annexure-VIII**).

4.2. Botanical Section

Botanical section is a very special section of the park. This is one of the few parks in the country, which has got such a high density of tree cover, many being very old and rare. Thus, development of the botanical features of the park is imperative to realize its true potential. The proposed activities to be taken up in this area are as follows:

i. Children Park will be relocated behind rock garden as has been approved in the master layout plan. It will be a fenced up (wiremesh) modern children park with latest gadgets and interactive play-equipments to provide more attraction to children and will impart knowledge on conservation of wild animals. This will be run on public-private partnership under the control of the zoo administration.

ii. The building near the main Office building would be converted into the new veterinary hospital, with necessary alterations.

iii. The area infront of rock garden will be developed as zoo/nature interpretation centre. This will have facility of showing nature related movies and documentaries in 3-D or upgraded version. It will have facility to educate visitors using latest & interactive audio-visual means. The present resthouse will be part of zoo interpretation/education centre only.

iv. The tree house is a major attraction and has uniqueness value. The tree has dried up. The climbers may be used to cover it and give it green look. The tree house will be replaced by fresh structure. However, as the tree house is located within the zoo premises the same will not be used for staying (including officials, dignitaries, visitors, etc), but the same shall be used a nesting shelter for the free ranging birds with conducive alterations.

v. As the Veterinary Doctor's residence inside the Park is without any boundary wall hence a 8' (eight feet) high fence will be constructed/ made around the residence as per the prescribed provisions of the CZA.

vi. If possible and feasible, the toy train track may be realigned in a way that it passes in front of the enclosures. This will enable the visitors to see the animals from front. A battery operated noiseless engine will replace the diesel engine of the toy train.

vii. The aquarium would be extended and redesigned with latest gadgets to make it more attractive and accommodate more aquatic fauna, including the local fish varieties.

viii. Facility for cloak-room with locker systems will be created at both the entrance gates for the benefit of the visitors.

ix. Construction of underground nala from Gate No. 2 to Rose Garden will be completed to reduce the problem of water logging. The rain water is harvested in the old & new lakes

to recharge the ground water table. Subsequently the water is pumped through borings from the recharged ground water. It is also fact that the ground water is too high in this zoo as the location of this zoo is in close proximity to the river Ganges.

x. The entrance gate of the zoo is not impressive enough. New gate of proper design keeping in mind the theme of the Park (i.e. Ahimsa) will be constructed. The Nalanda architecture will be given due emphasis while re-designing it.

xi. A detailed Action Plan for landscaping of the zoo would be prepared in consultation with landscaping experts. The botanical section would be developed as per the plan for better use of space and adding attraction for the park visitors.

xii. The new lake will be developed in a way to attract avian fauna. The two hillocks in the lake will be planted with bird loving trees and shrubs. The possibilities of enriching the aquatic life (mammals, reptiles etc.) in the new lake will be explored and facilities would be developed accordingly. The major part of the lake in addition to adjoining vegetated area will be used as rhinoceros conservation breeding area. The swampiness of the lake will be maintained round the year using artificial water supply.

xiii. The electricity cables (above ground bare conducters) would be made underground to avoid the instances of power failure due to snapping of electricity lines by fall of trees/branches, especially during rainy season. This will take care of any abrupt power failure as well as any danger to the animals (birds especially) and the safety of the visitors.

xiv. The park provides boating facility for visitors in the old lake area. There is provision of floating fountains. Both these facilities will aerate the water to maintain the quality of the rain and waste water stored in the lake. There will be provision for bio-filter (phytorid technology of NEERI, Nagpur) plant to allow only clean water into the lake.

xv. Possibility of connecting of two lakes by an underground pipe will be explored and executed so that water level in both the lakes is maintained up to a desired level.

xvi. The height of boundary wall of the zoo along the airport road has been reduced effectively by almost three feet due to raising of the road level and construction of new pavements. The height of the wall is insufficient to prevent unsocial elements from scaling the wall. There shall be provision of the spiral wire fence on the top of boundary wall all around the zoo.

xvii. The entry of private vehicles is not allowed inside the zoo. There is parking space for vehicles at both entrances. At times the space becomes small to cater to the demand of the parking space. There is space available by the side of the outer boundary wall on both the gates. Currently that space is being used by the vehicles for parking during peak load. The parking area outside gate no. 1can be made multi-layered and the inside area can also be used as parking space once the traffic pressure increases.

4.3 Animal Section

4.3.1. Animal enclosures: General Plan

i. The animal section is the most important section of any zoological park and various aspects of topography and vegetation has to be kept in mind to establish enclosures for different species depending upon their habits. The display will also depend on management convenience.

ii. Presently many of the enclosures are very old and dilapiated. These neither conform to specification of the modern concept of zoo design nor meets the biological need of the species housed there. Some of them shall be completely demolished and few others shall be modified to meet the specified size for feeding or retiring cubicles as recommended in the Recognition of Zoo Rules, 1992 and by the CZA. These rules shall be followed while designing new enclosures or modifying the existing one or while constructing new enclosures.

iii. All enclosures shall be provided with adequate protection to the animals against climatic variation, commensurate with the individual need of the species such as boulder, caves, trees, platform, shrubs, logs etc. as enrichments to fulfill their biological needs. Adequate attention would be paid for provision of kraals or isolation arrangements for free movement (including special care) of individuals or groups from aggressive behavior of individuals in the group, protection of expectant mothers, injured animals and young ones. Such separation will help in elimination of any problem of infighting, cannibalism or rejection and give enough space for exercise/relaxation of animals.

iv. The maximum number of individuals of any species to be displayed depending on their social behavior would be taken into account to provide adequate space to animals. The

enclosure would be designed to take care of the biological need of the species, its safety and ease of viewing by the visiting public.

v. While attempts would be made to provide open air enclosures for most of the species with dry or wet moat barrier, other types of barriers like chain link mesh fence, glass or wall shall be used wherever necessary.

vi. Wherever feasible, in-built squeeze cages would be attached with animal houses or sets of animal houses for restraining the animal for treatment and other purpose. It will reduce the chance of animal undergoing stress while being captured or transported to zoo hospital.

vii. Each animal house will be equipped with adequate drainage facility. There will be arrangement for disposal of solid waste without any risk to the animals or staff.

viii. Potable water supply to be ensured to all animal enclosures and feeding cubicles preferably from deep tube well.

4.3.2. Safety of animal section

The chain-link fencing along the common boundary of the Park and the golf club needs renovation to provide adequate security to the animals. An 8' high fence will serve the purpose. The fence will be put on a solid low toe wall so that the visitors may continue to enjoy the scenic beauty of the golf course, apart from maintaining the ecological interactions of the free ranging animals/reptiles.

4.3.3. Enclosure Plan

The proposed modification in existing or addition of new enclosures is as follows:

4.3.3.1. Carnivore Mammal enclosures

A. Renovation / extension of existing enclosures

i. *Leopard enclosure:* Old ‘closed cage type’ leopard enclosure will be demolished and an aesthetically designed open leopard enclosure with good vegetation will be constructed as per the approved design and specification of the CZA. Location: serial no. 42 in the approved master layout plan.

ii. *Lion Enclosure:* The existing lion enclosure will remain in the same place located as of now, but with necessary modifications in conformity with the specifications of the CZA. Location: serial no. 5 in the approved master layout plan.

iii. *Tiger enclosure:* The squeeze cage in the tiger enclosure will be positioned inside the night house from its current position, which is outside the night house. The location of the existing two enclosures will remain in the same place as of now. Location: serial no. 6 & 7 in the approved master layout plan.

iv. *Bear enclosure:* The present bear enclosure will be extended towards front. The night house cubicles of bear cages are not as per the CZA guidelines. The existing five cubicle's cluster will be converted into two cubicles cluster and a new night house of approved size for remaining bears will be constructed. The location of the existing two enclosures will remain in the same place as of now. Location: serial no. 8 in the approved master layout plan.

v. *Otter enclosure:* The existing otter enclosure is a temporary facility and it is not suitable for a proper display of the animal. The enclosure would be suitably redesigned and provided with latest water purification and cleaning system. The location of the existing otter enclosure will remain in the same place as of now. Location: serial no. 14 in the approved master layout plan.

B. New enclosures

i. *Small mammal enclosure:* The new small cats enclosure will come up in existing jungle trail-2 as indicated in the approved master layout plan, with enclosure as per the design and specification of the CZA. Location: serial no. 23 in the approved master layout plan.

ii. *Lion enclosure:* A new Lion enclosure (off-display) has been constructed in the space available between feed store and existing lion enclosure. This facility will be used for breeding of lions. Location: serial no. 4 in the approved master layout plan.

iii. *Anteroom:* An anteroom to be used as store will be constructed by the side of each tiger, lion, leopard, hyena, bear, giraffe, hippo, small cats, rhino, aviary and elephant enclosures taking due care that the construction merges with the overall surroundings.

iv. *Cage paddock:* A small area outside the cubicle will be created, called as cage paddock, for allowing movement/exercise of the caged animals. The only present cage paddock area is very small. Its enclosure will be extended in the area available between Ahar godown and Lion enclosure. Its night cubicles being very small will be extended up to the size as per the CZA guidelines.

v. *Night shelters:* Sufficient number of night shelters and in-built squeeze cages in conformity with the specification of CZA will be provided in all large cat enclosures for providing individual feeding cells to each animal.

C. Facilities to be added in all enclosures

i. Each animal house to have facility of round the clock water supply and power. However, in normal conditions, artificial lighting of animal enclosures would not to be done.

ii. All the enclosures will be provided with pressure water cleaning system, proper ventilation, separate drinking water supply system to maintain sanitation and hygienic condition in the enclosures.

iii. The enclosures will also be provided with firefighting equipments.

4.3.3.2. Herbivores Mammal enclosures

A. Renovation / extension of existing enclosures

i. *Rhino enclosure:* The present rhino enclosure in the Park is divided in five inter-connected enclosures housing 11 rhinos at present. There is an urgent need to modify/enlarge the existing night houses of two rhino enclosures. A suitably designed shade over the feeding stalls of all the rhinos will be provided. Location: serial no. 25 & 26 in the approved master layout plan.

ii. *Barking deer enclosure:* The barking dear enclosure, which is covered from above, would be opened up. Location: serial no. 37 in the approved master layout plan.

iii. *Giraffe enclosure:* The Giraffe enclosure needs extension, as its area is not even sufficient for the present stock. Breeding of the species would add more individual to the existing stock. Hence, enclosure would be extended in the space available in the jungle trail area by the side of the existing enclosure. These modifications would help meeting biological needs of the animals and complying the CZA guidelines on enclosure sizes as well. Location: serial no. 28 in the approved master layout plan.

iv. *Hippo enclosure:* The Park houses 4 hippos but the enclosure faces a big challenge in terms of ensuring clean water in the moat. Equipment suitably designed to clean the water of hippo's moat would be installed to ensure the animals a more hygienic environment. The arrangements of underwater glass viewing can be made in te future to give complete viewing of the animal, apart from exhibiting the natural environ of the animal. Location: serial no. 19 in the approved master layout plan.

v. *Nocturnal house:* The nocturnal house, which is only partly constructed, will be completed and made operational on a priority basis. Location: serial no. 40 in the approved master layout plan.

B. New enclosures / structures

i. *Rhino conservation area:* An off-display rhino conservation area will be developed in the Western-end of the jungle trail-2, near the Riding road, encompassing the new lake. This facility will support the conservation breeding programme for Greater One Horned Rhinoceros and its release in the wild as per the standart & prescribed protocol in the near future. This has been denoted using violet colour in the approved master layout plan.

ii. *Indian Bison enclosure:* The existing elephant enclosure will be converted into Bison enclosure or one of the Rhino enclosure will be converted into Bison enclsure, after due permission from CZA for acquisition and design approval.

iii. *Chimpanzee enclosure:* A well designed new enclosure will be constructed in the jungle trail-1in the future in tune with the specifications of the CZA. Location: serial no. 31 in the approved master layout plan.

iv. *Enclosures for kangaroo, orangutan will be developed in the jungle trail-1, towards South of the old lake, as the zoo acquires these animals in due course of collection.* Location: serial no. 29 & 30 respectively in the approved master layout plan. The Chimpanzee, Oragutan and Kangaro enclosures are ideally located near the already existing Giraffe enclosure, with the intention to house all the exotic big mammals in one cluster to facilitate better understanding for the visitors.

v. *Enclosure for rescued animals:* Rescue centre (along with quarantine facility) will be set up in the jungle trail-1 as indicated in the approved master layout plan, judiciously away from the Veterinary Hospital.

4.3.3.3. Birds enclosures

i. Water birds enclosure will be renovated to make it more natural and animal friendly.

ii. Cassowary and Emu enclosures will be relocated. Location: serial no. 9 & 10 respectively in the approved master layout plan.

iii. The existing aviary will be remodelled, renovated and expanded to accommodate birds in naturally & better enriched enclosure. New enclosures will also be added in this section. Location: serial no. 39 in the approved master layout plan. The present view of the water birds enclosure is given in the following picture.

4.3.3.4. Canine enclosures

i. Enclosure for jackal will be relocated in the jungle trail-2 area, in a new enclosure. Location: serial no. 22 in the approved master layout plan.

ii. Enclosure for Hyena will be relocated in the jungle trail-2 area. Location: serial no. 21 in the approved master layout plan.

iii. Wolf enclosure will be constructed in the jungle trail-2 area, as per the approved master layout plan. Location: serial no. 20 in the approved master layout plan.

4.3.3.5 Reptile enclosures

i. *Gharial & Muggar enclosure:* The existing Gharial enclosures are very small and are not fit to house the existing stock of 107 individuals. The part of the lake near Aquarium Island in the old lake will be developed as gharial and mugger enclosure. Location: serial no. 34 & 32 respectively in the approved master layout plan.

ii. *Turtle enclosure:* The Park is having quite a large number of turtles kept in the old lake, which are not available to the visitors for viewing. Hence, it would be imperative to develop a turtle enclosure, with similar see through glass viewing, near otter enclosure to display the animals. Location: serial no. 40 in the approved master layout plan.

iii. *Snake house:* The existing snake house would be demolished and a new enclosure would be developed with latest gadgets to regulate the temperature in conformity with the needs of the animal group. Location: serial no. 41 as reptile house in the approved master layout plan.

4.4 Veterinary Section

The theme of the park is '**Ahimsa**' and park strives to become one of the pioneer zoos in the field of health care and welfare of the animals. The following activities are proposed during the plan period in this section.

i. Hospital will be relocated as per the approved master layout plan adjoining the existing admininstrative building. It will be well equipped to deal with health problems of the animals. The same will be relocated in the South East part of the Zoo near the admininstrative building. The location has been mentioned in the master layout map.

ii. Park does not have any post-mortem room. The new Post-mortem room and an electric operated incinerator will be constructed near north-west portion or at some other suitable place, away from the hospital in jungle trail-1.

iii. There is no quarantine facility available in the Park at present. It will be developed in the jungle trail-1away from the hospital.

iv. The old hospital will be suitably redesigned to be developed as library or zoo interpretation facility.

v. A pathological laboratory is a must in the park to take up the routine feacal sample examination, blood smears, urine, skin scraping etc. for which necessary up-gradation and creation of infrastructure will be taken up. Efforts will be done to create facilities of diagnosis of all parasitic diseases in the zoo with provision for ultra modern instruments.

4.5. Food supply section

i. Feed store will be relocated at a new place as mention in the approved master layout plan. The same will be relocated in the South Eastern part of the Zoo, close to the proposed new veterinary hospital.

ii. This section requires the services of a motorized food carrier, which can be used for carrying the food material to the various cages/enclosures of the park. This carrier (battery operated cargo carrier) is urgently required as it can also be used to bring food materials from outside the zoo in case of non-supply of materials by the contractors.

iii. There will be provision of deep freezer system to store food. There should be weighing system (like computerized weighing bridge) so that voluminous items like fodder can be weighed on the trailor itself.

iv. Modern equipment for boiling (steaming) food for disinfection needs to be installed. The gas chulhas need to be unified to increase fuel efficiency. The feed house is the mainstay of good management of the zoo. Hence modern equipments shall be provided

to ensure healthy food. Gobar gas system with animal waste as raw material may be attempted to supplement the LPG gas use.

4.6. Workshop section

A suitable ramp with water supply would be constructed for cleaning and taking care of the vehicles. All modern carpentry tools, gas welding tools, gas cutters, besides basic minimum vehicle maintenance tools and equipments would be procured for making the section self-reliant to meet the day-today need of the park and to keep the vehicles & cages fit even during any harthal or any other emergencies.

4.7. Water supply section

i. A detailed survey for supply of potable water in all the enclosures and other infrastructure will be taken up on a priority basis as the previous water supply system has become quite old and outdated and unreliable at times. The normal supply of water for cleaning etc. shall be separated from drinking water supply. The drinking water supply system shall incorporate water purification system too.

ii. The presently defunct over head water storage tank near Hog deer enclosure may be revived. The over head tank can be redesigned/repaired for the renewed use instead of demolishing the structure. The continuous supply of water needs provision of alternate source of power supply like generator sets in adequate numbers or capacity to meet the contingencies in case of power failure.

iii. Provision of bore-wells would be made in different sections of the zoo so that desired level of pressure is maintained at each enclosure.

iv. It would be needed to have four additional borings of 10 HP, one near tiger enclosure, one near giraffe enclosure, one near new lake and one in the botanical section to ensure sufficient water supply with adequate pressure round the clock.

v. The water supply lines would be integrated with the over head tank to meet cany contingency.

4.8. Power supply section

i. One 60 KVA diesel silent generating set to ensure uninterrupted power supply.

ii. The power line will be spread along the roads of the park through underground cable to avoid contact with the trees and also to prevent their damages by any other means.

iii. Concealed power points to each of the retiring cubicles will be made available to provide lighting for emergent handlings including relief measures against heat or cold stress.

iv. Modern lighting arrangement conducive to zoo environment would be done. To make the park energy efficient, LED lighting technology and use of solar energy will be applied as soon as possible. The possibility of increasing the use of solar power shall be explored to make it a green zoo.

4.9. Sanitation section

i. The enclosures shall be provided with the best sanitation facilities using modern equipments and latest technique.

ii. There shall be provision of underground sewage tanks at least for tiger, lion, monkey, langur and bear enclosure. The existing sanitation facilities will be upgraded. A sewage treatment plant would be installed to treat the effluents for safe discharge into the lake.

iii. To improve solid waste management in the park, provision of separate collection bins for biodegradable and non-biodegradable wastes, and other equipments to handle and dispose the solid waste materials generated by visitors will be strengthened. Plastics will be disposed through Patna Municipality Corporation for re-cycling or directly auctioned to private party and the biodegradable wastes will be used for composting and vermicomposting, the resultant organic manures will be used for raising plants in different nurseries and gardens. Compost and vermicompost pits will be constructed at all the nurseries and gardens to consume the biodegradable wastes generated.

iv. For cleaning of the zoo premises excluding animal enclosures, possibilities of contractual arrangements shall be put into place for minimizing establishment cost.

v. The plants including the lawn will be maintained with modern machines & tools. Battery operated machines will be used in the zoology section to to minimize the disturbance to the anbimals housed.

4.10. Road

The road network inside the park would be renovated in view of increasing number of visitors and enriching the enclosures' surroundings. It is proposed to realign the road passing through the zoo section. This will make extra space available for enlargement of the enclosures as per the specification of the Central Zoo Authority and also for making them as close to the natural habitat of the animals as possible. It is proposed to widen the roads of zoological section of the park to 28 feet, which will consists of a 16' (16 feet) wide road flanked by 6' (six feet) wide pavements on either side. The zoo will be provided with adequate lighting facilities to support night patrolling but at the same time to avoid any disturbance to the animals.

4.11. Amenities for visitors

The existing amenities and facilities provided to the visitors would be further strengthened for convenience and better experience to them. The facilities to be given are as below;

i. Wheel chairs are provided for differently able people at the entrance gate free of cost. This system would be improved upon with more number of wheel chairs at nominal charges with park providing manpower to take them around.

ii. Perambulators would be put into service at nominal charge for visitors coming to the park with babies.

iii. The temporary resting places would be improved for protection against sun and rain using environment friendly materials merging with the surrounding.

iv. More drinking water points at suitable places with provision of pure & potable water to the visitors would be created.

v. The existing toilets would be improved upon with proper cleaning facilities. While improving toilets, toilets will be modified for access to differently abled persons.

vi. More pucca & eco-friendly benches may be provided at suitable intervals along visitors' paths and along the lake side for resting purpose of the visitors.

vii. The park raises thousands of seedlings of tree species, show-plants, medicinal plants and flower plants. The botanical section would be entrusted with the task of selling those at the price fixed by the park management. This will add on the efforts of

spreading greenery outside, apart from creating awareness about the nature conservation.

viii. There shall be provision of zoo guides for the visitors at nominal charges. They will educate the visitors about the zoo in a better way. The zoo guides will be properly trained and licensed before their deployment. Volunteers may also be used as zoo guides, apart from deploying a dedicated zoo education officer (forester-level officer).

ix. There will be an zoo interpretation centre with arrangement of screening of wildlife movie to educate more visitors in less time. This will leave long lasting memories in the mind of the visitors, especially school children.

x. A souvenir shop for selling curios of the park, photos, slides guidebooks, stickers and other nature related artifacts like mugs, paper weights, caps, ties, t-shirts and vests, etc. is running in the zoo. This not only helps people take back certain durable wild animal related materials back home but help them retain memories of zoo visit. The zoo logo will be developed and will be embossed in the zoo souvenirs.

xi. There will be addition of recreation facilities in the old lake area to make it more entertaining to the visitors. At present it is mainly used for boating (to aerate the water). Regulated angling can also be allowed at a suitable fee.

4.12. Future Animal collection plan

4.12.1. Choice of animals

i. This open air zoo is ideally situated to breed and exhibit Indian fauna of tropics. Recognizing the importance of large zoos in providing nature education as well as their role in scientific research on different aspects of wild animals, emphasis would be given to display Indian fauna with special reference to those belonging to the region. Some little known smaller animal species like Golden cat, Fishing cat, Jungle cat, civets, Indian giant squirrel, porcupine, mouse deer, malabar giant squirrel, clouded leopard, different species of snakes etc. need to be exhibited. The zoo has the past experience in handling these species. The zoo at present has many exotics. Exotic species like giraffe, zebra, hippo, flightless birds like Emus, Cassowary, and Psittacoses like macaw, cockatoo etc. may be exhibited for their peculiar & attractive morphological character.

ii. Priority would be given to pair the single animals or animals of the one sex available in the zoo either by arranging mates for them or by transferring to other zoos on breeding

loan or transfer in the interest of conservation of the species. This is very crucial in case of endangered species of Indian sub continent.

iii. For long term commitment to conservation and captive breeding, Sanjay Gandhi Biological Park, Patna has identified a few core or mission species / race of animals.

Core species identified for breeding program are as below;

Mammals: One horned rhinoceros, lion, tiger, thamin deer, swamp deer, leopard cat, blackbuck and golden langur

Reptiles: Gharial and python

Birds: Hornbills, brahminy kite, mallard, red jungle fowl, white rumped vulture and peafowl

iv. Exotics breeding successfully at Sanjay Gandhi Biological Park, Patna include giraffe, zebra, hippopotamus, cockatoos and emu. These species would also be in the focus of captive breeding program.

v. Sambar, Barking deer, leopard, bears, mugger, and vultures shall form the limited breeding species. Species like chital, hybrid lions shall not be bred by carrying out vasectomy and separation of sexes.

vi. As Sanjay Gandhi Biological Park, Patna is a specialized zoo, animal species of the Gangetic plains region will be its primary target. Apart from the animals presently

housed in the zoo, the list of major species forming part of Collection Plan along with the population size is given below, that also includes the largest number of all the individuals which can be housed, the present stock and the number of individual species which the zoo intends to keep for display and conservation.

Sl. No.	Species	Present stock	Proposed stock	To be acquired or removed
Mammals				
Primates				
1.	Lion Tailed Macaque	0:1	2:4	+2:+3
2.	Assamese Macaque	1:1	1:2	0:1
3.	Rhesus Macaque	12:9:1	2:5	-10:-4
4.	Stump tailed Macaque	1:0	2:4	+1:+4
5.	Pig tailed Macaque	0:0	2:4	+2:+4
6.	Langur common	5:2	2:2	-3:0
7.	Golden langur	0:0	2:4	+2:+4
Chiroptera				
8.	Bats	0:0	2:3	+2:+3
9.	Slow loris	0:1	1:2	+1:+1
Felidae: Big cats				
10.	Lion (Asiatic)	2:1	2:4	0:+3
11.	Lion (Hybrid)	0:2	0:0	0:-2
12.	Tiger (normal)	1:1	1:2	0:+1
13.	Tiger (white)	1:1	1:2	0:+1
14.	Leopard	1:2	2:4	+1:+2
Felidae: Small cats				
15.	Leopard Cat	2:2	2:5	0:+3
16.	Jungle Cat	2:2	2:3	0:+1
17.	Golden Cat	1:0	2:3	+1:+3
18.	Fishing Cat	0:0	2:3	+2:+3
Ursidae				
19.	Sloth Bear	4:1	2:3	-2:+2
20.	Himalayan Bear	3:1	1:2	-2:+1
Canidae				
21.	Wolf	0:0	2:3	+2:+3
22.	Hyena	2:0	2:3	0:+3
23.	Jackal	3:3:2	2:4	-1:-1
Ungulates (Cervidae, Bovidae, Rhinocerotidae)				
24.	Nilgai	3:4	3:3	0:-1
25.	Spotted deer	26:33:7	5:20	-21:-13
26.	Sambhar	10:15:13	2:8	-8:-7
27.	Black Buck	14:26:15	4:9	-10:-17
28.	Swamp Deer	1:6:2	3:7	+2:+1
29.	Sanghai Deer	3:0	3:7	0:+7
30.	Barking Deer	6:5:7	3:7	0:0
31.	Hog Deer	1:4:5	3:7	0:0
32.	Indian Bison	0:0	1:2	+1:+2
33.	Rhinoceros	5:6	5:10	0:+4
Rodents				
34.	Indian Giant squirrel	1:2	2:2	+1:0
35.	Indian Porcupine	4:1	2:3	-2:+2
Mustelidae and Viverridae				

36.	Otter (Smooth coated)	1:1	2:3	+1:+2
37.	Civet common palm	4:6	2:4	-2:-2
Reptiles				
Testudines				
38.	Turtle Indian soft-shelled	35:25:250	25:25	-10:00
39.	Turtle Gangetic soft-shelled	5:8:8	5:8	0:0
40.	Turtle three striped roof	1:3	2:2	+1:0
Crocodylidae				
41.	Mugger	1:1	2:3	+1:+2
42.	Gharial	2:10:95	4:8	+2:-2
Serpentes				
43.	Cobra Indian	6:8	6:8	0:0
44.	Python Indian Rock	3:2:18	6:10	+3:+8
45.	Snake Rat- Dhaman	2:4	2:4	0:0
46.	Karait-common Indian	1:1	1:1	0:0
47.	Sand Boa	5:10	5:10	0:0
48.	Snake water	2:3	2:3	0:0
49.	Viper Russels	1:2	1:2	0:0
50.	King cobra	0:0	1:2	+1:+2
Varanidae				
51.	Monitor Lizard	2:3	2:3	0:0
52.	Monitor lizard yellow	0:0	1:2	+1:+2
Aves				
53.	Eagle crested serpent	0:1	1:1	+1:0
54.	Hornbill Common Grey	1:2	2:2	+1:0
55.	Hornbill Great Indian	0:1	2;2	+2:+1
56.	Hornbill Indian Pied	1:1	2:2	+1:+1
57.	Kite common pariah	4:6	6:6	+2:0
58.	Kite- Black winged	2:2	2:2	0:0
59.	Peafowl	2:4:7	2:4:7	0:0
60.	Peafowl white	1:1	2:2	+1:+1
61.	Red jungle fowl	3:4	4:4	+1:0
62.	Spoonbill	1:0	2:2	+1:+2
63.	Crane common	0:2	2:4	+2:+2
64.	Crane Sarus	1:2	2:2	+1:0
65.	Heron night	1:1	4:4	+3:+3
66.	Ibis black	0:1	6:6	+6:+5
67.	Lesser adjutant	1:1	2:2	+1:+1
68.	Duck Brahminy (Ruddy shelduck)	4:6	4:6	0:0
69.	Duck Muscovy	1:1:2	2:4	+1:+3
70.	Duck falcated	0:2	6:6	+6:+4
71.	Goose bar headed	5:7	5:7	0:0
72.	Duck Mallard	2:5:3	4:6	+2:+1
73.	Gadwall	1:1	2:3	+1:+2
74.	Pintail northern	1:1	6:6	+5:+5
75.	Pelican rosy	2:3	6:6	+4:+3

76.	Pochard common	3:5	3:5	0:0
77.	Pochard red crested	1:1	1:2	0:+1
78.	Stork black necked	1:1	1:2	0:+1
79.	Stork white necked	0:0	1:2	+1:+2
80.	Pigeon common green	2:4	2:4	0:0
81.	Mandrin	0:0	2:2	+2:+2
82.	Indian cormorant	2:4	4:4	+2:0
83.	Indian pond heron	2:2	2:2	0:0
84.	Black swan	0:0	2:2	+2:+2
85.	Tufted Duck	0:0	6:6	+6:+6
86.	Peregrine Falcon	0:0	1:1	+1:+1
87.	Demoiselle Crane	0:0	2:2	+2:+2
88.	Common Moorhen	2:3	2:3	0:0
89.	Goose (Not identified)	10:24:6	10:10	0:-14
90.	Buzzard	0:3	5:5	+5:+2
91.	Myna hill	3:3	5:5	+2:+2
92.	Budgerigar	7:26:5	20:20	+13:-6
93.	Vultures (*Gyps* sps.)	0:0	(10:10)	+10:+10
94.	Common Coot	0:2	4:4	+4:+2
95.	Dove Common	5:10:11	10:10	+5:0
96.	Emerald Dove	0:0:3	5:5	+5:+5
97.	Parakeet blossom headed	4:9	10:10	+6:+1
98.	Rose ringed parakeet	0:0	6:6	+6:+6
99.	Alexandrine parakeet	0:0	6:6	+6:+6
100.	Pheasant kalij	0:2	2:2	+2:0
101.	Golden pheasant	7:7	10:10	+3:+3
102.	Lady Amherst pheasant	5:4	5:5	0:+1
103.	Silver pheasant	10:12:5	10:10	0:-2
104.	Owl Indian great horned	0:3	2:3	+2:0
105.	Owl screech	3:7	3:7	0:0
Exotic Species				
Mammals				
106.	Hippopotamus	2:1	2:3	0:+2
107.	Zebra	1:0	2:3	+1:+3
108.	Giraffe	0:2	2:3	+2:+1
109.	Kangaroo	0:0	2:3	+2:+3
110.	Orangutan	0:0	1:2	+1:+2
111.	Chimpanzee	1:1	2:3	+1:+2
Aves				
112.	Cockatiel	1:4:20	10:10	+9:+6
113.	Cockatoo	1:0	2:2	+1:-2
114.	Cassowary	1:0	1:2	0:+2
115.	Emu	2:2	3:3	+1:+1
116.	Ostrich	0:0	2:2	+2:+2
117.	Love birds	2:5:7	20:20	+18:+15

The list of surplus animals/Bids/Reptiles is listed in **Annexure-IX** and the list of required animals/Birds/Reptiles is listed in **Annexure-X**.

4.12.2. Capacity, space and limitations

Captive breeding and conservation efforts by zoos have its limits. Zoos, even the best of them, are limited by financial, physical and human resources. Practical limits to the number of individuals that can be supported within captive facilities are increasingly forcing Zoos to make difficult decisions about their collections. Space within Zoos that may be occupied by popular display animals may be needed for endangered species.

Sanjay Gandhi Biological Park has limitations of space. Being the only established Biological Park in the State, availability of animals as well as exchange of animals with other zoos is limited. Species which are comfortable at this altitude, rainfall and humidity level can only be housed in the Park apart from the existing animal species.

Constraint of space also poses difficulty in growing fodder, and fodder is supplied by outside agencies.

4.12.3. Acquisition from wild

As there are very remote chances of exchange as well as acquisition of desired animals from the zoos of the region the only possibility of acquiring animals for planned conservation breeding of these critically endangered animal species is acquisition from the wild. There is provision for such acquisitions from the wild for recognized zoos under Section 12 of the Wildlife (Protection) Act 1972. However, scope for collection from wild is quite remote, except those admitted to the park after rescuing from human settlements around wild habitats.

4.13. Variability, fitness and adaptability

The Biological Park maintains very small captive populations hence there are always chances of in-breeding. To avoid such eventualities, it is proposed to continue to add new blood in the form of animals from different stocks to maintain variability and genetic hetro-zygocity.

The park strives to support in-situ conservation of captive species through restocking and rehabilitation, all efforts would be taken to keep these animals fit and adaptable to the wild conditions for which keeping the animal enclosures more naturalistic, large and

appropriately furnished where all the biological, physiological and psychological needs can be fulfilled is a must. The animals to be released in the wild would be bred and kept in the off display areas to keep them away from the human imprint.

4.14. Studbook & pedigree

The park maintains animal history charts and pedigree cards for all the animals. The documents would be maintained and updated on regular basis. Regional/ National /International stud books for the members of the endangered animal species would be maintained and updated. Further, this zoo is having access to the ZIMS (Zoo Management Information System) and is updating the information about new births, acquisitions and disposals.

4.15. Artificial reproduction & cryopreservation

As availability and exchange of animals are very limited, and transportation of animals from far off places is financially prohibitive, it will be more worthwhile to try artificial reproduction with single sexed animals or where natural reproduction is scarce or could not have been achieved. Cryopeservation would also be tried in consultation with the expert agencies in future to develop this facility to create a frozen zoo in tune with the scientific advancement in this field.

4.16. Reintroduction & restocking

The primary objective of ex-situ conservation should be to assist national or global efforts in the conservation of these highly endangered species. There should be some objective of keeping each and every animal in the Park. The zoo bred animals of these identified targeted animal species can be released in the wild to augment the dwindling population of these animal species where they still exist or can be reintroduced in the areas where these were found in the recent past if the habitat is still found to be suitable for the purpose.

Sanjay Gandhi Biological Park can play a crucial role in augmenting wild populations of Greater one-horned rhinoceros and Gharials, since these two species have been bred very successfully in this zoo.

4.17. Display of animals

Though the zoo will have animals from different regions of the country and abroad, it is not proposed to display them as per their geographical distribution. It is proposed to adopt broad taxonomic display for convenience of management, research and education. The broad classifications, according to which the space will be allocated to the animals, will be as far as possible like this:

a. Large cats/large carnivores like tigers, leopards, lions etc.
b. Large mammalians elephants, hippopotamus, rhinoceros etc.
c. Small carnivores
d. Other small mammals like rodents, marsupials etc.
e. Nocturnal animals
f. Bears
g. Ungulates
h. Primates
i. Reptiles including crocodilians
j. Water birds
k. Terrestrial birds including birds of prey
l. Flightless birds
m. Fishes

(The present animal inventory is annexed as **Annexure-XI**.)

i. The area open to access by visitors would be clearly delineated and demarcated in such a manner that animals are not impacted by the presence of visitors and that animals are not in a position to injure the visitors.
ii. Visitors would be allowed to enter the walk through animal enclosure in controlled groups under proper supervision. Visitors would be adequately informed about the dos' and don'ts, while near the enclosure.
iii. The carrying capacity of the visitors in the walk through enclosure would be clearly defined and at no point of time the visitor number would exceed the same.

4.18. General guidelines to be followed

Since the zoo will almost undergo a complete modernization within the period of this master plan, it is necessary to give special attention to the following aspects of execution.

i. As far as possible, emphasis shall be given to providing large space to each exhibit, provide dry, wet or concealed moats as per the need of the species.

ii. Excessive exposure of concrete structures should be avoided and effort should be made to give special effects to barriers and night shelters and cubicles for merging them with the surrounding or to give a look of the animal habitat. Concealment of barriers by arranging creepers or vegetation should be attempted. Natural vegetation should be protected and nurtured as far as possible.

iii. Use of laterite blocks or sand stone etc. should be preferred to concrete.

iv. The enclosure should not be designed in isolation. All aspects of the surrounding area including other enclosures, topography and vegetation should be taken into consideration for design and lay out of the new enclosure. For this purpose it will be better to use the services of the landscape architect.

v. All structures should be painted with selected colour, which should merge with nature.

vi. No tall structure above the tree height should be erected within the park as that will spoil the landscape of the park.

vii. Built up area should in no case, be more than 20% of the area use for the zoo.

viii. Special attention has to be given for planting indigenous evergreen or semi-evergreen vegetation.

ix. All latest international developments in zoo architecture, design, landscaping and education should be kept in mind while modernizing the park.

x. All guidelines and rules and directions of Central Zoo Authority of India and other statutory bodies should also be kept in view while planning new developments/activities so that they are not violated.

xi. Education and interpretation should be given top priority in any future development of the zoo.

Chapter-5

Disaster Management

The park is a place where thousands of people visit every day and it hosts a large number of animals and sizable number of staff. In such a situation, the park must be well prepared for dealing with emergencies.

[The plan is based on the Model Disaster Management Plan published by Kanpur Zoo and CZA]

Some of the emergency situations that the park may face are;

- Escape of Zoo animals
- Natural disaster like flood, earthquake, fire etc.
- Outbreak of Epidemic diseases
- Civil unrest like curfew or curfew like situations
- Extreme visitor behavior

To deal with such emergencies it is very important to do meticulous planning to face such adverse situations. The park would develop a Disaster Management Plan for dealing with potential disasters. The plan would include components of; **Preparedness (**being ready to handle disasters and emergencies), **Mitigation (**preventing or minimizing the losses and damages that emergencies can cause), **Response (**actions taken to deal with a disaster or emergency), and **Recovery (**restoring services, facilities, programs, collections, and infrastructure). Broad outline of the mitigation plan would be as below;

i. Constituting a team for emergency situations and outlining chain of command in the team.
ii. Written instructions for all employees, available to each employee and known by each.
iii. Defining role of each employee during a disaster, with a clear-cut direction on reporting hierarchy.
iv. Provisions to alert the emergency team to come into operation in an orderly and planned manner and help evacuating the visitors or animals either prior to or after a disaster has occurred.
v. All the new construction and renovation in the Zoo would be sturdy and with ability to withstand effect of earthquakes or other major disaster.
vi. Provisions of alternative power and water supply for disaster mitigation.

vii. Provision of stocking nonperishable items of diet sufficient for at least 15 days for dealing with situations like curfew, other items of personal use and animal needs would also be kept in stock including equipments, medicines and emergency tools.

viii. The provisions and equipment needed during disaster emergencies would be procured and consumables required for the purpose shall always be in place. An indicative list of items necessary to be arranged and kep in stock is as below;

[**Personnel needs** – water, food, first aid, lantern, battery, torches, rain/ winter clothing, stoves. And **animal needs** – generator, chainsaws, plastic sheets, nets, nylons, strapping, sandbags, capturing equipments, tranquilizing drugs and veterinary supplies].

ix. Attempts to be made to develop voluntary teams to support during emergency and to work with the emergency team. Such volunteers to have an instruction handbook to function and report.

x. Close links to be established with district as well as state disaster management authorities.

xi. The disaster management team of the park shall be provided relevant thematic training on regular intervals from specialized agencies of the state government and outside expert agencies. Periodic mock drills shall be organized to assess the preparedness of the park for such emergencies.

5.1. Disaster Mitigation Team

The Zoo management would identify skills possessed by its employees that can be used during emergency situations. Once the employees are identified they would be skilled for dealing with emergency operations.

The information about the skills of employees would be stored in the form of a table as given below:

Skill	Employee name	Contact number
Animal handler (Carnivore)		
Animal handler (Herbivore)		
Animal handler (Birds)		
Animal handler (Crocodile)		
Animal handler (Monkeys)		
Snake catcher		
Good climber of trees		
Who can make good notches		
Good swimmer		
Good at public relations		

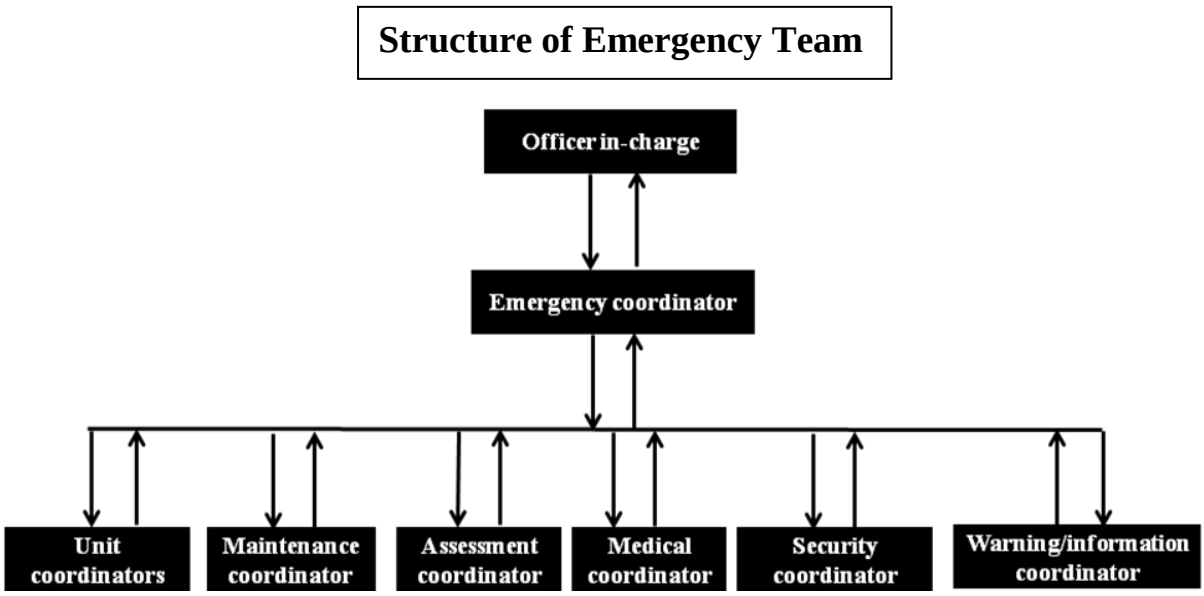
Good at communication		
Trained in first-aid		
Good fire fighter		

In order to tone up the skills of the employees the management would organize workshops/trainings etc. on continuous basis.

Members of the Disaster Management team and their responsibilities would be as below.

Member of the team	Official / staff designation	Role and responsibilities
In-charge Emergency Team	Director	Decision making for protective actions, operations and expenditures, and imparting training to people in the different protective actions before actual emergency occurs.
Emergency coordinator	Deputy Director	Ensuring the smooth implementation of the emergency preparedness plan; maintaining a current disaster management plan and testing it on regular basis; ensuring that all members of different teams are well-trained in dealing with exigencies; Coordinating the functioning of different teams that are involved in crisis management; Notifying local authorities of an emergency or disaster situation; Ensuring that vital records are identified and protected; Making arrangements for logistics, emergency housing and feeding for personnel involved in emergency operations; Making provisions for food and water requirements of Zoo animals; Organizing and maintaining control room with adequate communication facilities; Implementing decisions and directives from the In charge of the zoo/Director.
Warning/ Information Coordinator	Range Officer	Ensuring that protective actions are publicized for all employees; participating in emergency plan review meetings; training the people working under them; establishing a media centre and making arrangements for logging the messages; maintaining communication equipment like wireless sets, fax machines, telephone lines etc; receiving and disseminating information about the disaster; communicating with the local police/fire departments for assistance; requesting the district administration for vehicles/ personnel; preparing press notes after consulting assessment coordinator and submitting them to the officer in charge of the zoo for press release; conducting media tours whenever possible.
Assessment Coordinator	Range Officer	Participating in emergency plan review meetings; training the people working under him; collecting and compiling information on disaster situation; maintaining a written record of all events that occur including

		actions taken, decisions made and by whom, personnel involved, costs incurred etc.; reporting verified damage information to the officer in charge of the zoo; assisting with the preparation of reports like after-action report.
Maintenance Coordinator	Curator	Participating in emergency plan review meetings; proper maintenance of cages, squeeze cages, fire extinguishers, tube wells, electrical supply points, Tractor, Trolleys, welding machines, earth moving equipment, shovels, axes, cutters, blades, ropes, ladders and spare parts of different mechanical devices etc.; training the people working under them; putting up of barricades for the control of traffic; getting the fallen trees, poles, debris of the buildings etc cleared off; inspecting the damaged areas with his team and giving recommendations for entry/ reuse etc.
Unit coordinators	Beat officers	Giving their inputs in planning process; training the people working under them; conducting mock drills; taking in protective actions within their jurisdiction before an actual emergency occurs; identifying and ensuring protection of vital things under their jurisdiction; mobilizing resources and personnel; ensuring that stranded zoo visitors are taken safely to the designated shelter/ evacuation areas; ensuring that the electricity points are shut down during emergencies; helping in the proper movement of people and vehicles.
Medical coordinator	Veterinary Officer	Participating in site emergency plan review meetings; ensuring that emergency medical care/ first aid is provided to injured persons and animals; maintaining adequate quantities of medicines; collecting and compiling health/medical disaster information for the Assessment Coordinator; coordinating ambulance calling and pick-up, medical assistance etc.
Security coordinator	Curator	Participating in emergency plan meetings; providing training and conducting of mock drills; ensuring that all wire meshes, chain link fences, walls, double doors, shutters etc are in good condition and getting them repaired immediately; ensuring that the trapping materials are in good working condition and are available as per requirement; periodic checking for breached boundary walls; lopping and cutting of trees that might pose danger; controlling the movement of people and vehicles; preventing unauthorized entry; assisting with the care and handling of injured persons; assisting with fire suppression, if necessary etc.



5.2. Natural disasters

The Park being situated at Patna which is situated in a 'saucer like depression' flanked by the River Ganga on north, Sone on the west and Punpun in the south. The city is in fact well protected against floods from river Ganga but the river Sone and Punpun combined pose a real threat in that regard. Sone and Punpun may not be able to discharge their flood waters in Ganges and thus it is possible to imagine Patna and consequently this park under deep water. Lack of proper drainage and heavy rains in monsoon causes water logging in town including the park.

i. It is proposed to create infrastructure to shift the affected animals to safe place in case of disaster. Adequate number of transport cages for the purpose will be kept.

ii. In case of flooding, large-scale contamination of drinking water is expected. Water-borne diseases usually associated with poor hygiene and sanitation, can affect a large portion of the Zoo population. Under such conditions the proper storage of water is of great importance, as poorly stored supplies may become contaminated and also act as breeding grounds for vectors. During floods there is probability of potable water getting contaminated from the sewage system. So providing safe drinking water to zoo animals in case of flood will be a challenge. This may be met in following ways;

- Identify alternative sources of water which can be tapped during emergencies

- Water must be tested as soon as possible after calamity
- Ensure sufficient vessels for water storage.
- Mobilization and deployment of water tankers
- Microbial contamination of potable water during floods is of great concern to the safety of animals. Chlorine disinfection can be done, which is relatively cheap, effective and usually readily available.

iii. The risk to food safety also results from direct or indirect contamination from floodwater from poor storage of food that can lead to the proliferation of microorganisms, some of which produce toxins. Improperly stored food can also serve as a habitat and source of food for vectors, e.g. flies and rodents. Thus proper measures would be taken to reduce chances of contamination of animal feed in case of flooding.

iv. For protecting the health of zoo inmates, good sanitary conditions would be maintained in the zoo after flooding. Proper water quality would be ensured to prevent the spread of diseases which can affect animal health. Raw sewage contains a large number of disease-causing pathogens which might include: Hepatitis viruses, Salmonella spp, pathogenic bacteria such as Leptospira spp, pathogenic protozoa such as Entamoeba, and other parasitic organisms such as Ascaris and hookworms. Improper waste disposal also aggravates the growth of vectors such as insects, rodents etc. Arrangements would be in place to collect and dispose of solid wastes of the animals, including the animal carcasses.

v. To deal with the situation, some highland areas would be developed in those enclosures which have a history of inundation. Water outlets would be cleared before and during rainy season so that gushing water will do no harm to the zoo infrastructure or deluge the zoo premises.

In addition to the flood, threat of earthquake to the park is equally important to deal with, since Patna falls under zone IV of earthquake prone area classification. The buildings of the park would be built as per the earthquake resistant building technologies developed by the premium institutions like HUDCO and Building Materials and Technology Promotion Council (BMTPC).

5.3. Fire

Fire causes devastation if it occurs in zoos since there is large concentration of people and animals. Heat, smoke, flying or falling debris may cause injury or loss of life to persons and animals. The park houses more than 10000 trees, which shed their leaves in autumn. The deposited leaf litter becomes a fire hazard during summer.

i. Fire lines would be cut near the animal enclosures and adequate supply of water for sprinkling on the animals and for dousing the fire would be made available.
ii. The park is full of vegetation near the animal enclosures; hence measures would be taken so that the crowns of the trees of the animal enclosures do not catch fire. As a precautionary measure lopping of trees would be done at regular intervals.
iii. Fire-fighting equipment and outfits would be arranged for the human resource involved in the activity.
iv. Fire-extinguishers and heap of sand would be kept in all buildings (enclosures) / premises throughout the park.
v. A small *Damkal* (Fire tender vehicle) will also be procured and kept in readiness in the park for any such eventuality.

5.4. Civil disturbances

Civil disturbances like demonstrations, riots, looting, curfew etc. can threaten the supply of food to the zoo animals and at times for the safe evacuation of zoo visitors and staff. Evacuation or other protective measures would be imperative to deal with the extreme situations when violence may result in injury or loss of life or loss of zoo property.

The zoo managers would be in constant touch with police and local administration and media to get information about a major civil disturbance that may affect the park.

5.5. Animal disease emergencies

The captive animals of the zoos are vulnerable to a number of contagious diseases. The diseases are dreadful and their occurrence may have disastrous consequence like loss of valuable genetic material; increased zoonotic diseases; and unnecessary pain and suffering to the captive animals.

Sanjay Gandhi Biological Park takes utmost care in reducing the spread of communicable diseases. This needs to be maintained in future too, with more sincere efforts. There will be a protocol in place which will help diagnosing diseases in nascent stage. Steps shall be taken to eliminate it, before it spreads. Early warning and early reaction to the disease would help achieving the desired results and reducing casualty of animals.

A. Early warning

- The park fulfills the food requirement of animals from outside sources which poses threats of transmitting diseases.
- Disease surveillance would be ensured through; routine gathering of information on disease and death incidents from different sources, reports from the press and from the laboratory reports of local veterinary college and research centre (*Passive Surveillance*), and comprehensive searching for evidence of disease in animal populations or for verification that such populations are free of specific diseases (*Active Surveillance*).
- Disease surveillance would be ensured through complete necropsies on every animal that dies within the Zoo. A record of all necropsy reports would be maintained and analyzed from time to time involving the team of expert veterinarians of the Veterinary College.
- Daily observation by animal care staff of each animal for clinical signs of disease and method of reporting abnormalities would be done to have an early veterinary investigation.
- Risk assessment would be done from time to time to assess the likelihood of occurrence of particular disease and its potential consequences would be identified and evaluated.
- Risk management would be done by identifying, documenting and implementing measures to reduce risks and their consequences. The aim of risk management would be to adopt procedures to reduce the level of risk to an acceptable level.
- To develop an efficient surveillance system, it would be necessary to strengthen the veterinary section of the park. A fully equipped laboratory with have a range of standardized diagnostic tools would be set-up. Staff would be given adequate training to run the facilities. Collaboration would be developed with Research and

Development organizations, Veterinary Colleges, and diagnostics laboratories for important examinations of animal samples.

B. Early Reaction

There are fair chances of disease-causing agents entering into the parks through infected animals (new acquisitions/ migratory birds/ feral animals etc), contaminated vehicles, and visitors to the zoo with zoonotic diseases; contaminated food (meat/milk products/fodder) and by natural factors spread by vectors or by wind currents. Improperly disposed carcasses and other zoo waste can spread from one part of the zoo to the other part by the feral animals of the zoo. This condition necessitates having plans for an early reaction.

i. Dealing with new acquisitions

- All newly acquired animals would be identified with permanent marking method at all times and detailed records kept.
- Treatment records of newly acquired animals would be procured to facilitate investigations into the disease and health history of the animal.
- The veterinarian / team of veterinarians would analyze the cause of death of any quarantined or imported animal (after detailed post-mortem and detailed histopathological tests) as soon as possible after the postmortem examination.
- During quarantine, access to animals would be limited to essential staff only (veterinary and designated animal care staff).
- Waste material from animals in quarantine would be treated in a manner that limits access by all other fauna (including free-ranging animals/birds).
- Biological specimens from animals in quarantine would be handled, transported, and stored under conditions that will minimize the potential transmission of pathogens while preserving the integrity of the sample for diagnostic testing.
- There may be a need to consider the spatial requirements (distance) between animals in quarantine and those that have been cleared.

ii. Denial of access of the disease agent to susceptible host animals

This would be achieved by;

- Applying good hygiene and sanitary practices

- Removing potentially contaminated materials (Feces, bedding, and used hay of the ailing animals) by disinfection, destruction and/or safe disposal.
- Reducing Vector numbers in the zoo by treatment and/or elimination of potential breeding sites like bushes, stagnant water etc.
- Care will be routinely taken to ensure all food (living or dead) brought into the zoo (to feed zoo animals) should originate only from the most reliable sources. It requires periodical checking of fodder cultivation areas, and being in touch with local veterinarians in the area, for ensuring that diseases should not enter the Zoo through feed. Similar care would be taken while procuring meat and poultry from different sources.

iii. Avoiding contact between infected and non-infected zoo animal collection

To reduce the risk of transmission of disease among the inmates of the Zoo, following measure would be taken;

- Exotic animals (including the free ranging animals) would not have any direct contact with the animal collection.
- An effective pest- management program would be implemented and maintained.
- Exhibit and holding facilities would be free from the contamination of adjacent areas by waste materials and/ or drainage.
- Isolation premises for small species would be indoors and bird, vermin, and insect-proof. Such premises would also have no wind currents, efficient waste collection and disposal, and dedicated utensils, instruments, and clothing. Isolation areas would meet all requirements for quarantine facilities as outlined in the CZA guidelines.
- Large animal isolation premises would be in a section of the zoo with a wide buffer zone from other stock or have solid walls that prevent aerosol transmission. The enclosures must have footbaths, dedicated utensils, instruments and clothing, and be tended by staff that will not have further contact with any other zoo animal that day.
- All movements of susceptible species within and into the zoo would cease.

iv. Maintaining hygiene of the zoo through proper waste disposal system

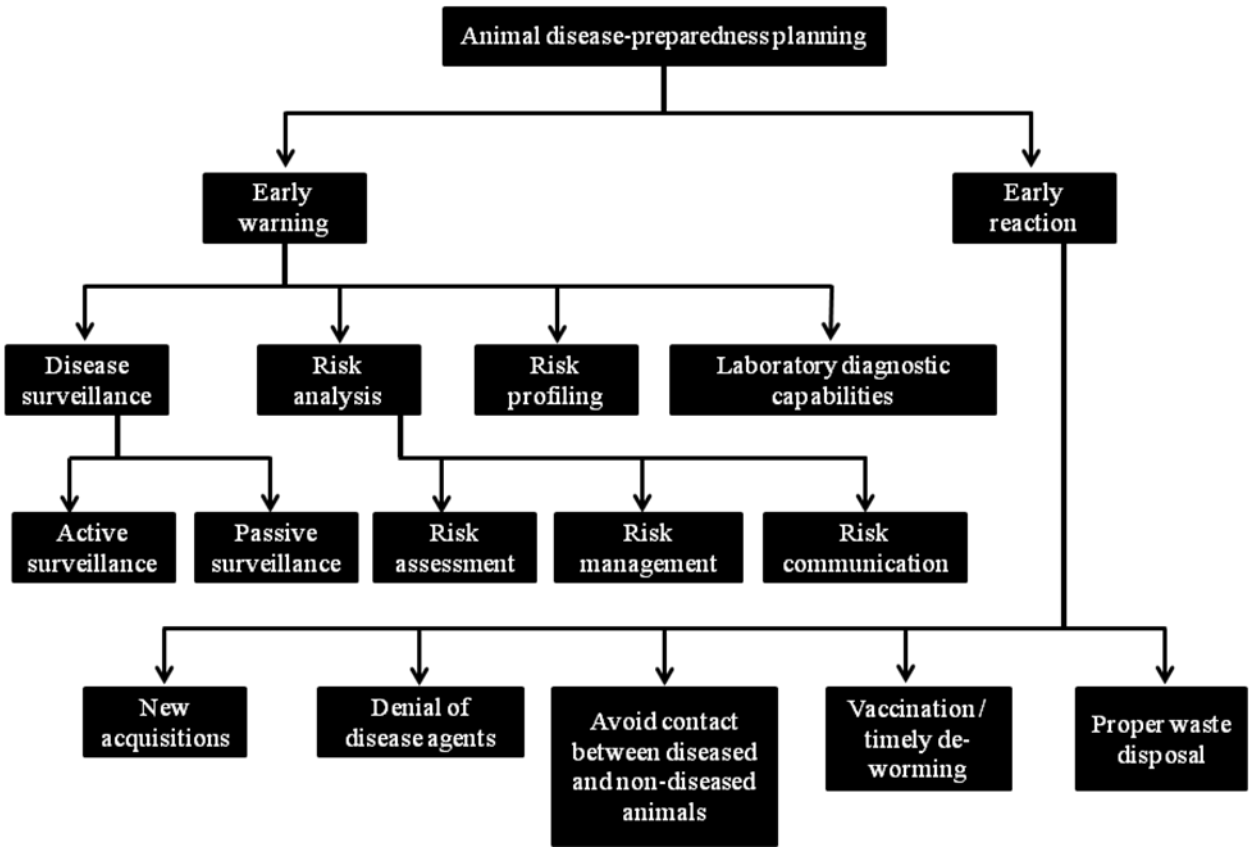
- Appropriate and speedy disposal of biological waste, carcass, animal products etc. will help in preventing the diffusion of infection within the zoo. Hence it would be given top priority by the animal and veterinary sections of the park.

- Disposal of waste would be completed as soon as possible after destruction to minimize opportunities for infectious material to disperse. Burial, cremation, incineration, composting (of stable manure, feeds, hay, litter and bedding material etc.) would be adopted appropriately for disposal of wastes.

v. Vaccination

The park has a well-planned vaccination programme to control diseases. Following points related to vaccination of zoo animals need to be kept in mind while implementation:

- Only the time- tested vaccines would be used.
- It is important to select the correct antigenic type and subtype vaccine in order to achieve good levels of immunity.
- Quality of the vaccines would be assured by procuring it from reputed firms only.
- Vaccines would be stored at the correct temperature by refrigeration at all times. Heat-stable, live vaccines, if available, would reduce cold storage problems.
- Depending upon the necessity the veterinarian would go for ring vaccination and/or blanket vaccination.



Schematic representation of Animal Disease Preparedness Planning

Chapter-6

Contingency plan

6.1. Animal rescues from wild

Sanjay Gandhi Biological Park also provides its expertise to the state in handling animals outside zoo creating problem for human population. Rescue cases of monkeys, leopard, elephant, tiger, nilgai, hyena, bear, snakes, different types of birds etc. near the human habitation are frequent. Such situations pose problem not only to human being but also to the animals and necessitates their capture or rescue. Park management comes under pressure to rescue these animals.

It is proposed that a team of six persons trained in restraining (physical and chemical) the animals, would be equipped with a rescue vehicle, trap cages, transportation cage, large nets, forks etc. will be raised in the Park. Crowd control becomes crucial during rescue operation; hence the team will also be equipped with public address system and other equipment to deal with crowds. A forester rank official stationed at the Director's office of the Park would lead the rescue team. For any eventuality in the City or State, this team will be equipped to take care of the situation. The animals so rescued from the outside of the zoo will be kept in the quarantine area of the zoo for at least 15 days and all possible medical help will be provided to the animals at the quarantine enclosure itself. After the medical treatment, these animals will be rehabilitated back to wild or the place they belong or kept in the zoo as per prevailing situation.

The team will also take care of any dog menace in the Park, which may arise inspite of all precautions.

6.2. Escape of animals from enclosures

Inspite of best management practices in the zoo, there may be cases of animals coming out of enclosure. In case of such occurrence, team so formed will be the agency to control the situation. In the entire situation, precaution or action for the safety of the animals and public will be the top priority. The isolation and tranquilization of the animals will be the first action to be adopted by the team.

Following equipment would be organized to combat the problem of different groups of animals.

Captive animal	Requirement
Large carnivore	Nets, pole syringes, snare, Projectile guns and darts, blow dart equipment, crates, squeeze cages etc.
Small carnivore	Nets, gloves, pole syringes, snare, crates, blow dart equipment, crates, squeeze cage etc.
Hoofed animals	Projectile guns and darts, blow dart equipment, crates etc.
Rhinos	Elephant hook, projectile guns and darts, chins.
Primates	Nets, gloves, pole syringe, snares, plastic tubes, blow dart equipment, crates, squeeze cage
Birds	Nets, gloves, towels, pole syringe
Reptiles	Nets, gloves, snares, plastic shield, bags, plastic tubs, snake tong, snake hook etc.

The park takes due care in designing the enclosures that prevent escaping of animals. In future too incidents of animals escaping from enclosures would be controlled by designing the enclosure properly, fixing the enclosure structure firmly, maintaining the enclosures in a way that it do not aid escapes, provisions of locking facilities of doors and gates etc.

Apart from these, public address system, alarm system and communication system (walkie-talkie) would be used to warn people during emergencies.

6.3. Monkey and dog menace

There have been frequent instances of monkey menace in the state and particularly in the city of Patna. The zoo administration has been called upon to capture the monkey and remove it from the area quite frequently. A team of zoo personnel be trained in handling of such emergency cases by providing them technical training. They will be provided required essential items to tackle the situation which will include providing capture nets, forks etc.

6.4. Arrangement of food in case of strike

The feed section will store 15 days buffer stock of all the items of non-perishable food at any point of the day. In case of any opportunity of non-supply of items, this buffer stock will be used. A team of persons will be trained so that their services can be utilized during the period of any strike by the regular staff or non-supply of essential items by the

contractors. The list of food items/feeds provided to the Zoo animals/reptiles/Birds are listed in **Annexure-XII**.

6.5. Snakebite

The Park with very thick vegetation in and around has the potential of varied range of snakebite. The veterinary section of the Park will always keep in readiness anti-venom medicines in its stock, which can be easily made available to anybody who happened to be bitten by snake. Local medical officer would be called for help in this regard. Constant patrolling of Botanical Section and Zoological Section of the Park will be maintained so that any type of emergency regarding injury to visitors or anybody crossing over enclosure can be detected.

6.6. Visitors getting injured falling inside enclosure

As the park is spread over a vast area there is always a possibility a visitor getting injured during the visit. A first hand medical aid box will be kept at the two entrance gates, in the hospital, Director Office to meet any eventuality. There have been some instances in which visitors have deliberately jumped inside the enclosures. Strict vigil will be maintained to avoid any such occurrence. Small ladder will be kept in the night house of lion, tiger and rhino cages so that they can be used to pull out anybody who happen to fall or jump in the moated enclosures of these animals. One tranquilizer gun will also be kept in readiness, which may be necessitated due to any human being falling in the enclosure in order to save the life of the visitor. A vehicle of the rescue team will be in readiness to take the visitors or anybody so injured to the nearby hospital if the situation so demands.

Chapter-7
Human Resources & Capacity Building

Due to diversity in works, the park requires adequate number of trained people in various skill sets. The park would strive to deploy an efficient workforce. To meet the objectives of the park, new posts would be created, while some would be either abolished or reduced in the strength. Post of Curator, Zoo Education Officer, Biologist, Welder, Mason and Laboratory Assistant would be created while positions of Deputy Director and Museum Keeper would be abolished. Strengths of many posts would be also changed to optimize the need of human resources. A detailed account of the present human resources and the proposed human resources is given in **Annexure-VI**.

Further, the officers and staff working in the zoo need to constantly upgrade their knowledge regarding modern approach towards zoo management as well as health care practices and general welfare of the animals kept in the zoo.

Sanjay Gandhi Biological Park being situated in the eastern part of the country proposes to keep interaction with zoos of this region as well with the zoo of other regions which house animals similar to this zoo.

i. The middle level zoo officials will be sent to Kanpur, Lucknow, Assam, Kolkata, Darjeeling & Nandankanan zoo for firsthand knowledge of the methods and practices being followed in those zoos and their success stories.

ii. The veterinary officer will be sent for every possible training, seminars, and symposiums being held in the country to apprise him with the latest trend and methodology being adopted for treatment of animals.

iii. The Director and Dy. Director level officers will be exposed to all top national and international exposure in the field of modern zoo management.

iv. The Veterinary Officer and compounder will be exposed to all the facilities being made available by the local Veterinary College and Hospitals.

v. The veterinary and para veterinary staff of the zoo would be subjected to training programme in Indian Veterinary Research Institute (IVRI) or other Veterinary institutions for upgrading their skills.

vi. Veterinary Officer and the Curator of the Park will be sent to WII, LaCONES for firsthand experience of the working of the institute in wildlife taxonomy.

vii. The office and staff in the hospitals will be trained in computer and other allied fields.

viii. As this zoo has been selected as participating zoo in Conservation Breeding Programme of Rhino by the Central Zoo Authority, a close association with all other participating zoos in the programme will be maintained.

ix. The gardeners working in the zoo will be exposed to training schedule in horticulture and gardening including landscaping so that garden section of the park may be improved.

Chimps – Subhadra and Karthik

Chapter-8
E-governance

E-governance shall be implemented in the park in phasewise manner to improve efficiency, consistency and effectiveness of governance; reduce processing delays; and provide for effective resource management to improve the quality of administration. The Director office and the zoo hospital are connected with computer network. Online systems shall be used to reduce the use of paper. Paper documents, photos, engineering plans and other paper based systems shall be converted to digital documents. E-books shall be preferred over the paper books in the zoo library. Communication through e-mails shall be encouraged to reduce consumption of paper for the purpose to the minimum possible level. A system for e-procurement of supplies and tendering shall be put in place. It is proposed to reduce the paper work of the zoo to a bare minimum and transact all the paperwork on-line by the middle of this plan period. This includes computerized e-ticketing system, use of computer based data base at feed godown & computerized weighing systems for feeds.

Animal history data sheet and related information are computerized, but a specialized software programs like ISIS (International Species Information System), ARKS (Animal Records Keeping System) and SPARKS (Single Population Analysis & Records Keeping System) shall be used to keep the animal records. The old records of the park shall also be digitized in phased manner. Advanced record keeping systems like ISIS wiil be implemented. The zoo is having the internet facility. Action has been taken to join the Zoo Information Management System (ZIMS) after which the zoo is in a position to have access to vast information regarding various zoos and their animals around the globe.

A website of the park shall be developed and hosted to facilitate exchange of ideas with other zoological parks. IP camers will be installed in all the animal enclosures and at important places of the zoo for effective communication and management of zoo human resource & visitors as well, apart from the improved security for the animals housed.

For an effective e-governance in the park, competent workforce needs to be improved through training.

Chapter-9

Research, Monitoring & Evaluation

Research would be an important aspect of Zoo Management. As the zoo management involves interaction and dealing with live animals, every bit of observation is a part of research and must be carefully noticed and recorded. At present although the zoo hospital staff and the veterinary officer do record all the data regarding behavioral changes, treatment, pathological data of the animals in permanent records, still a lot has to be done to formally link these activities with other institutions in order to arrive at some conclusions regarding any particular event or occurrence.

i. It is proposed to facilitate basic and applied research and short-term studies on various aspects of *ex-situ* wildlife management like improvement in zoo, scientific management practices, *ex-situ* conservation of species, welfare of captive animal, zoo design etc. The independent researchers would be motivated to undertake studies which are beneficial for the zoo management.

ii. Probable broad topic for the research would be; behavior of different groups of animals; effects of visitors / disturbances on behavioral patterns; behavioral response to enclosure design and enrichment; genetics of different animal species, reproductive studies of endangered species; animal nutrition; animal health; visitor's attitude and behavior towards animals; impact of zoo on knowledge and understanding of zoo visitors; zoo as a nature education tool etc.

iii. Studies by in-house manpower would also be promoted by motivating and training the staff in thorough data collection. Helps of independent researchers, experts and organizations would be taken to design in-house studies, as and when required.

iv. The park will collaborate with Patna and Magadh Universities and Bihar Veterinary College to undertake research work. Students of botany, zoology, environmental sciences, veterinary science, tourism and architecture can also undertake Graduate and Post-graduate dissertation.

v. The park would provide opportunities to students as volunteers and interns to work in their area of interest.

vi. The park would develop good library and laboratory which would help the volunteers, interns and researchers in conducting studies and researches.

vii. A full time biologist will be engaged by the park to conduct research on various aspects. The person would be responsible for co-ordinating research in the zoo and facilitate publishing the research outcomes.

viii. The park would endeavor to publish the important research thesis in the form of a monograph or a book.

ix. The park would organize seminars at regular intervals (at least once every two years) to discuss various issues in wildlife management.

Data Collection

Basic data regarding any activity of the animal, normal or otherwise, is recorded in the cage register kept in every enclosure by the zookeeper. The system would continue, however, format of data collection would be changed from time to time to suit the thrust of the study. The Veterinary Doctor also maintains a treatment card for every animals being treated for any ailment. Desired improvements would be made to make the system more effective for any further diagnosis or line of treatment to be adopted in future, and improve understanding on the disease.

In addition to the animal inventory register, diet chart, treatment register, postmortem reports, death & birth record, prophylaxis records and studbook are maintained in the zoo. This would continue.

Data Storage

All the data regarding animal's inventory, treatment chart, studbook, diet chart and any important observations have been stored in the computer, but still a lot is to be done. Use of specialized software would be used for data storage. The park has procured the software ARKS'. Similarly, software SPARKS will also be procured for the park. Efforts are on to obtain advanced softwares for recording of data on international lines. The park has agreed to accept the membership of ISIS.

Monitoring & Evaluation

The Central Zoo Authority keeps a watch on the activities and operation of zoo keeping in view the general objectives of zoo management and welfare of the animals kept in the zoo. The authority does inspection of zoo for granting recognition to the zoo from time to time and receives inventory reports every three months.

At the department level, Chief Wildlife Warden of the State and the Director, Ecology and Environment monitor the functioning of zoo.

The State Government vides its order no. Vanya-Prani-18/2002-21(E) EV dated 07.01.2005 has constituted a team of experienced veterinary doctors to advise/assist the zoo authorities in managing and taking care of the general health and welfare of the zoo inmates.

Chapter-10
Education and Awareness

Education and building awareness of visitors is one of the key objectives of Sanjay Gandhi Biological Park. It has been felt that if conservation is to succeed, people need to be inspired to care about and understand nature and animals and the threats they face in the wild and, building support for conservation. Education plays an important role in this regard. Zoo education program of the park would be designed in a manner to provide educational experiences for the visitors. The education programme would be targeted for visitors of all groups.

The education and awareness program will be aimed at;

- Getting connected with visitors
- Providing intimate experiences that create emotional connections with animals
- Communicating more about wildlife and natural world
- Creating awareness, and talk about an issue
- Creating a memorable experience
- Rousing the curiosity and sensibility of the visitor through dialogue, hands-on activities, contact with living animals or other practical events.

i. Celebration of exclusive events (like World Environment Day, Wildlife Week, Biodiversity Day, Animal Action Week etc) with various activities would continue to spread awareness about importance of these days and their purpose.

ii. Some other programmes that can be initiated in the park are as follows;

Sl. No.	Program	Age Group (Yrs.) / Target Group	Details
1.	Inspiring the young poets	8-13	Annual poetry contest on wildlife and nature
2.	Working for wildlife	10-16	Exposure on how a zoo is managed, involving in different sections of the park
3.	Puppet shows	All age-groups	Puppet shows on wildlife behavior / social structure / threats etc on weekends by expert artists

4.	Animal birthday celebration	All age-groups	A monthly event to celebrate birthday of a particular species, by serving food of the choice of the animal before the visitors.
5.	A day in a cage	10-20	To put 8-10 volunteers in a separate enclosure for a day and they would what other exhibits do in a cage (like feeding, interacting with each other, enriching activities etc). It would help in understanding how we perceive animals.
6.	Keeper talk	All age-group	Keepers talk about their experiences with the visitors. This could be weekly activity in different animal enclosures
7.	Linking with formal education	All classes (High School – College students)	A whole day program on theory of wildlife conservation followed by park visit.
8.	Guided tour	For School / college group	Visitor groups to be accompanied by guides who would explain not only the natural history of the animals but also the other conservation issues in the country.

iii. Apart from these specific activities, brochure, stickers, activity books, picture post cards of the park would be developed besides other literature and resource materials to enrich the knowledge of visitors.

iv. Impressive signage would be developed and erected in different parts of the park. The signage would be informative, directive (at visitor behavior) and interpretive to enrich the visitors understanding on the subject.

v. A Nature Interpretation Centre would be developed with an auditorium, museum, library and multi-media 3D projection systems to screen wildlife movies. The facility would also be used to organize talks, exhibitions, slide-shows and other such activities to visiting student groups, special interest groups, and zoo visitors on special occasions.

vi. The library would have collection of books, journals and periodicals on nature conservation, wildlife management, animal welfare, ecology etc.

vii. A guide teacher of the Life Science background would be appointed for educating the conducted groups on different aspects of conservation and captive management. This shall also facilitate zoo's outreach activities to peripheral villages, schools and

educational programmes for various sections of society like teachers, students, village organizations, media and others.

viii. An arrangement may be made with schools of the nearby districts to arrange visit of the students to zoo by prior arrangement. They can be exposed to various aspects of bioscience taking advantage of live animals, documents and library facility of the park.

Chapter-11
Budgets and Operation Schedule

11.1. Non-Plan Budget

Availability of adequate budget and essential activities being taken on schedule time as per budget provisions is essential components of management of a zoo. The objective of zoo management cannot be achieved unless an infrastructure to support the activities is created and budget to support such infrastructure is made available in time.

The park presently receives almost entire budget for daily maintenance from the State Government. Government of India or any other agency does not provide any money for maintenance of the park. Development activities are funded by Central Zoo Authority, but for the last 10 years no money from that source could be utilized in the park. There is no money from CZA pending with the zoo for last two years. The revenue generated to the tune of Rs. 3.5 crore per annum goes to the Government exchequer and can not be ploughed back for zoo management unlike various other zoos of the country.

Maintenance budget for 2012-13 for different works include staff salaries, material supply (food supply), etc. have been tabulated in the format below. It is expected that there will be at least 15% increase in maintenance cost annually for each item, so provision should be made accordingly.

Lion - Vishal

STATEMENT OF MAINTENANCE BUDGET (Non-Plan)

YEAR: 2012-13

Sl.No.	Head of Service	Requirement during the year (Rs. in lakh)	Remarks
1	Pay, D.A. Salary of officers and staff.	334.30	Pay, Dearness allowance, House Rent allowance, washing allowance, city allowance, medical allowance etc. of the officials and staff working in the Park.
2	Traveling Allowance of Officers and staff.	0.80	Traveling expenses on traveling of officials and staffs working in the Park.
3	Conservation	90.00	Payment of wages to the labourers working in the park.
4	Office Expense	1.80	Office expenditure, purchase of stationary articles, office equipments.
5	Rent, Rate & Taxes	0.44	Payment of holding tax of Park.
6	Publicity & Extension	4.00	Expenditure on publicity, wildlife week etc.
7	Minor Construction Works	15.00	Minor construction works to be done in the Park.
8	Tools & implements	2.00	Purchase of necessary instruments.
9	Motor Vehicle	5.00	Purchase of fuel, maintenance & repair of vehicles.
10	Maintenance	20.00	Maintenance of different sections, train, animals cages, purchase of cleaning materials etc.
11	Material & supply	90.00	Payment of food material supply of animals and purchase of necessary equipments/medicines.
12	Telephone	0.70	Payment of telephone bills.
13	Uniform	3.48	Supply of uniforms to the subordinate staffs.
14	Electric	18.20	Payment of electric bill of the Park.
15	Medical reimbursement	0.25	
	Total:	**585.97**	

11.2. Plan Budget

It is the budget required to implement the management plan prescriptions and obligations for future development in accordance with the objectives of the zoo management. Zoo development is specialized job and should be taken after proper consultations with experts, zoo architects, taking into consideration local traditions. If proper care is not taken

then either scheme is not cleared by the competent authority or if cleared and implemented, fail to bring the desired results as required by the objectives of the zoo managements.

A detailed assessment of the year-wise requirement of fund for the activities to be taken up during the plan period has been detailed in a tabular form given below:

STATEMENT OF PLAN BUDGET AND SCHEDULE OF OPERATION (phasing)

2013-14			
Sl.No.	**Item of work**	**Approx. cost (Rs. in lakh)**	**Source of fund**
1	Construction of new lion enclosure with adequate landscaping as non display area	72.00	CZA 100% share (under implementation)
2	Renovation of Reptile house	28.00	State fund (under implementation)
3	3-D wildlife movie screening centre as part of interpretation centre (Part-1)	214.00	State fund
4	Aviary – renovation/replacement	140.00	State fund
5	Emu enclosure	20.00	State fund (under implementation)
6	Construct of deck at a corner of lake (part - 2)	7.00	State fund (under implementation)
7	Strengthening of rail track	40.00	State fund
8	Setting of bio-filter plant near old lake	12.00	State fund (under implementation)
9	Cassowary enclosure construction	20.00	State fund (under implementation)
10	Land scaping (part-1)	20.00	State fund (under implementation)
11	Rhino conservation area (part - 1)	200.00	CZA 100% share
	TOTAL	**773.00**	

2014-15			
1	Construction of Rhino conserevation area (Part-2)	100.00	CZA 100% share
2	Monkey enclosure	75.00	CZA 100% share
3	Gharial and Mugger enclosure in part of the lake	175.00	State fund
4	Renovation of Aquarium (part-1)	50.00	State fund
5	3-D Wildlife movie screening centre as part of interpretation centre (part-2)	120.00	State fund
6	Enclosure enrichment, renovation to give naturalistic look	100.00	State fund
7	Installation of incinerator	15.00	CZA 100%
8	Land Scaping	100.00	State fund
9	Construction of childrens' park	100.00	State fund
	Total:	**835.00**	

2015-16			
1	Langur enclosure	75.00	CZA 100%
2	Development of interpretation centre in and near current guest house (Part-2)	200.00	State fund
3	Enrichment of existing enclosures to make it more animal friendly and natural	200.00	CZA 100% share
4	Fencing between Golf Club and Zoo (part-1)	75.00	50:50 CZA:State fund
5	Replacement of old sewage system and water supply system (part-2)	60.00	50:50 CZA:State fund
6	Pheasants enclosure	20.00	CZA 100% share
7	Addition of public utility services	50.00	State fund
8	Cloak Room facility at Gate No. 1	10.00	State fund

9	Construction of vermicompost units	20.00	State fund
10	Landscaping	200.00	State fund
11	Renovation Aquarium units (Part-2)	50.00	State fund
	Total:	**960.00**	

2016-17			
1	Improvement of Otter Enclosure	25.00	CZA 100% share
2	Conversion of LTM enclosure and rose garden into Swamp Deer enclosure	50.00	CZA 100% share
3	Fencing between Golf Club and Zoo (part-2)	75.00	50:50 CZA: State fund
4	Construction of Veterinary New Hospital	75.00	State fund
5	Landscaping	100.00	State fund
6	Enclosure enrichment and giving them natural and animal friendly look	100.00	State fund
	Total:	**425.00**	

2017-18			
1	Jackal enclosure	50.00	CZA 100% share
2	Small Cats enclosure	100.00	CZA 100% share
3	Chimpanzee enclosure	100.00	State fund
4	Construction of new feed store	40.00	State fund
5	Construction of hospital	75.00	State fund
6	Landscaping	100.00	State fund
7	Enclosure enrichment and giving them naturalistic look	100.00	State fund
	Total:	**565.00**	

2018-19			
1	Sanghai deer enclosure	100.00	CZA 100% share
2	Nocturnal house	60.00	CZA 100% share
3	Leopard enclosure	100.00	CZA 100% share
4	Renovation of main entrance	200.00	State fund
5	Landscaping	100.00	State fund
6	Enclosure enrichment and giving them naturalistic view	100.00	State fund
	Total:	**660.00**	

2019-20			
1	Lion Tailed Macaque	75.00	CZA 100% share
2	Construction of Hi-tech plant nursery	20.00	State fund
3	Small Birds enclosure	30.00	CZA 100% share
4	Construction of aviary near Otter enclosure	50.00	CZA 100% share
5	Landscaping	100.00	State fund
6	Enclosure enrichment and giving them naturalistic view	100.00	State fund
	Total:	**375.00**	

2020-21			
1	Bison enclosure	75.00	CZA 100% share
2	Construction of feed store	40.00	State fund
3	Wolf enclosure	60.00	CZA 100% share
4	Hyena enclosure	60.00	CZA 100% share
5	Landscaping	100.00	State fund
6	Enclosure enrichment and giving them naturalistic	100.00	State fund

	view		
	Total:	**435.00**	

2021-22			
1	Kangaroo enclosure	100.00	State fund
2	Landscaping	100.00	State fund
3	Enclosure enrichment and giving them naturalistic view	100.00	State fund
	Total:	**300.00**	

2022-23			
1	Landscaping	100.00	State fund
2	Replacement of water supply systems	200.00	50:50
3	Orangutan enclosure	100.00	State fund
	Total:	**400.00**	

The budget projection is indicative and subject changes as per the prevailing schedule of rate.

ANNEXURES

Annexure-I

No. A/F-PBR-22/70-1781V.
Government of Bihar,
Forest Department.
...

From

Shri M. Singh,
Deputy Secretary to Government,

To,

The Accountant General, Bihar,
P.O. Hinoo, Ranchi.

*Consulted U/O (Through *Finance Department)

Patna 15, the 13th April 1970.

Subject:- Declaration of the Chief Conservator of Forests, Bihar as Controlling Officer and Divisional Forest Officer, Territorial Division, Gaya as Drawing & Disbursing Officer under the head"31-Agriculture-Agricultural Education-4th Five Year Plan- Establishment of a Botanical Garden in the campus of Raj Bhavan".

Sir,

I am directed to say that the State Government have been pleased to sanction the setting up of a Botanical Garden in the Campus of Raj Bhavan, Patna, at a total cost of Rs. 2,04,000/- as recurring and Rs. 2,50,000/- as non-recurring over a period of five years with effect from 1969-70 within the Fourth Plan period as per details gien in the enclosed statement I. The scheme will be set up under over all control of the Forest Department.

2. The charges in respect of the scheme are debitable to the head "31-Agriculture-Agricultural Education 4th Five Year Plan-Establishment of Botanical garden in the campus of Raj Bhavan" during 1969-70 and 1970-71. Provision of fund is being made by means of a token schedule in the 2nd Supplementary Statement of Expenditure 1969-70. Meanwhile expenditure is being authorised to be incurred from an advance of Rs.1 lakh from Bihar Contingency Fund sanction in Finance Department memo no. BT-30/69 Pt-2468-SL. 167 ated 20th March, 1970.

3. From the year 197-71, the charges under the scheme will also be debitable to the head "31-Agriculture-Agricultural Education 4th Five Year Plan-Establishment of Botanical garden in the campus of Raj Bhavan".

4. The Divisional Forest Officer (Territorial Division) Gaya will be the drawing and disbursing Officer in respect of the above mentioned budget head and Chief

Conservator of Forests will be the Controlling Officer as detailed in schedule A(enclosed) under Appendix 7 of the Bihar Treasury Code Vol. II.

5. The Agriculture Department have concurred in the scheme for execution from Agricultural Sector during 196-70 and 1970-71.

Yours faithfully,
Sd/- M. Singh
(M. Singh)
Deputy Secretary to Government.

Memo No. A/F-PBR-22/70-1781V, Patna 15, the 13th April, 1970.

Copy with a copy of enclosure forwarded to the Chief Conservator of Forests, Bihar, Ranchi/ Conservator of Forests, Magadh Circle, Patna/ Divisional Forest Officer, Territorial Division, Gaya for information and necessary action.

Sd/- M. Singh
(M. Singh)
Deputy Secretary to Government.

Memo No. A/F-PBR-22/70-1781V, Patna 15, the 13th April, 1970.

Copy forwarded to Finance Department (Budget Branch)/ Section VII/Agriculture Department/Planning Department for information.

Sd/- M. Singh
(M. Singh)
Deputy Secretary to Government.

Annexure-II

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Annexure-III(a)

Government of Bihar,
Forest Department.
...
NOTIFICATION

Patna-15, the 1981

S.O._____/ In exercise of the powers conferred by sub-section (5) of Section 6 of the Bihar Essential Services Maintenance Act, 1947 (Bihar Act I of 1948) as amended by the Bihar Essential Services Maintenance (Amendment) Ordinance 1979, the Governor of Bihar is pleased to declare the Officers specified in Col. 1 below to be the officers authorised to file complaints for offences punishable under in so far as it applies to the class of employment specified in column 2 below.

1	2
Director, Sanjay Gandhi Biological Park, Patna.	All members of Bihar State Forest Service posted in the Sanjay Gandhi Biological Park, Patna.
,, ,, ,,	All Range Officers of Forests posted in the Sanjay Gandhi Biological Park, Patna.
,, ,, ,,	All Class III & Class IV employees posted in the Sanjay Gandhi Biological Park, Patna.
,, ,, ,,	All casual labourers employed in the Sanjay Gandhi Biological Park, Patna.

(File No. Van-Ara-Stha-104/81)

By order of the Governor of Bihar,

(N. Kujur)
Joint Secretary to Govetrnment.

Memo No. Van-Ara-Stha-104/81-4147V, Patna 15, the 19th/20th November'81.

Copy with Hindi rendering copy of notification forwarded to the Superintendent, Govt. Press, Gulzarbagh, Patna for publication in the Bihar Extraordinary Gazette and supply three hundred copies to the Forest Department.

(N. Kujur)
Joint Secretary to Govetrnment.

Memo No. Van-Ara-Stha-104/81-4148V, Patna 15, the 19th/20th November'81.

Copy forwarded to 1) The Chief Conservator of Forests, Bihar, Ranchi/ 2) The Inspector General of Police, Bihar, Patna/ 3) The Commissioner, Patna Division/ 4) The District Magistrate, Patna/ 5) The Director, Sanjay Gandhi Biological Park, Patna/ 6) The Addl. C.C.F. (Dev.)/(MFP), Bihar, Ranchi/ All C.Fs/ All D.F.Os for information and necessary action.

Sd/-

N. Kujur
20.11.81
(N.Kujur)
Joint Secretary to Government.

Annexure-III(b)

Government of Bihar,
Forest Department.
...

NOTIFICATION

Patna-15, the 1981

S.O._____/ In exercise of the powers conferred by section 3 of the Bihar Essential Services Maintenance Act, 1947 (Bihar Act I of 1948) as amended by the Bihar Essential Services Maintenance (Amendment) Ordinance 1979, the Governor of Bihar, being of opinion that the class of employment mentioned below is essential for maintaining services necessary to the life of the community, is hereby pleased to declare the said class of employment to be the class of employment to which the said Act applies.

(1) Bihar State Forest Service posted in the Sanjay Gandhi Biological Park, Patna.

(2) Range Officers of Forests posted in the Sanjay Gandhi Biological Park, Patna.

(3) All Class III & IV employees belonging to the establishment of the Sanjay Gandhi Biological Park, Patna.

(4) All casual labourers employed in the Sanjay Gandhi Biological Park, Patna.

(File No. Van-Ara-Stha-104/81)

By order of the Governor of Bihar,
Sd/-
N. Kujur
20.11.81
Joint Secretary to Govetrnment.

Memo No. Van-Ara-Stha-104/81-4148V, Patna 15, the 19th/20th November'81.

Copy with Hindi rendering copy of notification forwarded to the Superintendent, Govt. Press, Gulzarbagh for publication in the Bihar Extraordinary Gazette and supply three hundred copies to the Forest Department.

Sd/-
N. Kujur
20.11.81
Joint Secretary to Govetrnment.

Memo No. Van-Ara-Stha-104/81-4148V, Patna 15, the 19th/20th November'81.

Copy forwarded to 1) The Chief Conservator of Forests, Bihar, Ranchi/ 2) The Inspector General of Police, Bihar, Patna/ 3) The Commissioner, Patna Division/ 4) The Director, Sanjay Gandhi Biological Park, Patna/ 5) The District Magistrate, Patna/ 6) The Addl. C.C.F. (Dev.)/(MFP) Bihar, Ranchi/ All C.Fs/ All D.F.Os for information and necessary action.

Sd/-
N. Kujur
20.11.81
Joint Secretary to Government.

Annexure-IV

List of tree species in the park

Sl. No.	Botanical name	Vernacular / Common name
1	*Mangifera indica*	Aam
2	*Polyalthia longifolia*	Ashok Druping
3	*Asoka indica*	Ashok chhota patta
4	*Millingtonia hortensis*	Akash Neem
5	*Melia azadarach*	Bakain
6	*Dendrocalamus strictus*	Bans
7	*Ficus bengalensis*	Bargad
8	*Artocarpus lakoocha*	Barhar
9	*Casurina equisetifolia*	Casurina
10	*Michelia Champaca*	Champa
11	*Alstonia scholaris*	Chhatwan
12	*Cassia siamea*	Chakundi
13	*Dilenia indica*	Chalta
14	*Ficus benjamina*	
15	*Ficus retusa*	
16	*Ficus glumerata*	Gular
17	*Nycanthus arbortistis*	Harsingar
18	*Tamarindus indica*	Imli
19	*Heloptelia integrifolia*	Jilebi
20	*Bauhinia variegata*	Kachnar Bara patta
21	*Anthocephalus kadamba*	Kadamb
22	*Pongamia pinnata*	Karanj
23	*Artocarpus integrifolia*	Kathal
24	*Litchee chinensis*	Litchi
25	*Swetenia mahognii*	Mahogni Bara patta
26	*Swetenia mahognii*	Mahogni chhota patta
27	*Bassia latifolia*	Mahua
28	*Ficus religiosa*	Pipal
29	*Shorea robusta*	Sakhua
30	*Achras sapota*	Sapatu
31	*Leuceana leucocephala*	Subabul
32		Sita Ashok
33	*Terminalia myriocarpa*	
34	*Schleichera oleosa*	Kusum
35	*Acacia auricoliformis*	Acacia
36	*Cassia fistula*	Amaltas
37	*Spondias mangifera*	Amara
38	*Psidium guava*	Amrud
39	*Terminalia arjuna*	Arjun
40	*Emblica officinalis*	Amala
41	*Alangium hexapetalum*	Ankol
42	*Terminalia bellerica*	Bahera
43	*Aegle marmelus*	Bel
44	*Ziziphus sp.*	Ber
45	*Citrus*	Bajra Nimbu
46	*Adinasonia digitata*	Bao-Bao
47		Bangla Badam
48		Bilaiti pakar
49	*Cassia grandis*	Cassia grandis
50	*Heloptelia integrifolia*	Chilbil
51	Dalbergia Speciosa	
52	*Swertia chirata*	Chiraita

53	Cycus cicinalis	
54	*Dalbergia peniculata*	Dhoban
55	*Caesalpinia coriaria*	Divi-divi
56	*Grewia asiatica*	Falsa
57		Farhad
58	Fern tree	
59	*Gmelina arborea*	Gamhar
60	*Cassia nodosa*	Gulabi Amaltas
61	*Delonix regia*	Gulmohar
62	Gulaichi	
63	*Terminelia chebula*	Harre
64	Hetrofragma	
65	*Barringtonia spp*	Hijal
66	*Legestromia speciosa*	Jarhul
67	*Cassia siamea*	Chakundi
68	*Alstonia scholaris*	Chatwan
69	*Tilaiya*	Jhunjhuna
70	*Kijalia pinnata*	Jharphanus
71		Julputti
72		Kabli Badam
73	*Terminalia arjuna*	Kahua
74	*Dalbergia latifolia*	Kala Shisham
75	*Adina cordifolia*	Karam
76	*Acacia catechu*	Khair
77	*Phoenix sps*	Khajur
78	*Mimusops hexandra*	Khirni
79	*Thevetia nerifolia*	Kanail
80		Kanak champa
81	*Diospyros melanoxylon*	Kend
82		Kanak champa chhoti
83	*Bauhinia veriegata*	Kachnar
84	*Murraya spp*	Kamni
85	*Careya arbotia*	Kumbhi
86	*Cordia myxa*	Lisorha
87		Leluna
88	*Mimusops elengi*	Maulshari
89	*Livistona chinensis*	Muchkun
90	Malecea amlifolia	
91	Milicea peguensis	
92	*Borassus flabellifer*	Tar
93	*Cocos nucifera*	Nariyal
94	*Azadirachta indica*	Neem
95	*Ficus retusa*	Pakar
96	*Butea monosperma*	Palas
97	*Trewia nudiflora*	Pani Gamhar
98	*Peltophorum pterocarpum*	Peltophorum
99	*Grewia asiatica*	Phalsa
100	*Buchnania lanzan*	Piyar
101	*Putranjiva roxburghii*	Putranjiva
102	*Pithecollobium saman*	Phal jamun
103	*Samanian saman*	Rain tree
104	*Pterocarpus santalinus*	Rakt Chandan
105	*Sapindus mukorossi*	Ritha
106	*Ficus elestica*	Rubber Lal
107		Rubber Ujla
108	*Elaeocatpus sphaericus*	Rudraksha
109	*Santalum album*	Safed Chandan
110	*Moringa ptcrygosperma*	Sahjan

111	*Bombax ceiba*	Semal
112	*Bombax ceiba*	Semal green
113	*Morus indica*	Shahtoot
114	*Dalbergia sissoo*	Shisham
115	*Lagerstroemina parviflora*	Sidha
116	*Gravelia robusta*	Silver oak
117	*Albizzia lebbeck*	Siris kala
118	*Spathodia campanulata*	Spathodia
119	*Areca catechu-Betel nut*	Supari
120		Saigre palm
121		Sidhubar
122		Sima Ashok
123	Bixa orelana	Sindhur
124	*Michelia champa*	Swarn champa
125	*Tectona grandis*	Teak Sagwan
126	*Thujasds orientalis*	Thuja
127		Traveller palm
128	*Albizzia procera*	Ujla Siris
129		Ulat Kamal
130	*Almond prunus amygdalus*	Badam
131	*Calistemon Viminalis*	Bottle Brush
132	*Calistemon viminalis*	Bottle Palm
133	*Livistona chinensis*	China palms
134	*Cinnamomus zeylanicum*	Dalchini
135	*Eucalyptus hybrid*	Eucalyptus
136		Ixora
137		Fistel palm
138	Gliricidia sepium	Glirisedia
139	*Jacaranda ovelifolia*	Jacaranda
140	*Cinnamomum camphora*	Kapur
141	*Dolichandrone spathaceae*	Patali
142		Rubber Tekoma
143	*Chrysalidocarpus lutescen*	Areca palm

Annexure-V

Free Range Birds of Sanjay Gandhi Biological Park, Patna.

Sl. No.	Common Name	Scientific name	Status	IUCN/WPA Status
1	Little Cormorant	*Phalacrocorax niger*	R*2	Sch-IV
2	Indian Pond Heron	*Ardeola grayi*	R*1	Sch-IV
3	Cattle Egret	*Bulbulcus ibis*	RA1	Sch-IV
4	Little Egret	*Egretta garzetta*	R*2	Sch-IV
5	Black-crowned Night Heron	*Nycticorax nycticorax*	RM3	Sch-IV
6	Black (Paharia) Kite	*Milvus migrans*	RM1	Sch.- I
7	Shikra	*Accipiter badius*	RM2	Sch.-I
8	Bronze-winged Jacana	*Metopidius indicus*	R*2	Sch.-IV
9	Red-wattled Lapwing	*Vanellus indicus*	R*A1	Sch-IV
10	Yellow-footed Green Pigion	*Treron phoenicoptera*	R*2	Sch-IV
11	Eurasian Collared Dove	*Streptopelia decaocto*	R*A1	Sch-IV
12	Spotted Dove	*Streptopelia chinensis*	R*A1	Sch-IV
13	Alexandrine Parakeet	*Psittacula eupatria*	R*3	Sch-IV
14	Rose ringed Parakeet	*Psittacula Krameri*	R1	Sch-IV
15	Common Hawk Cuckoo	*Hierococcyx (Cuculus) varius*	R*2	Sch-IV
16	Asian Koel (Koel)	*Eudynamys scolopacea*	R*1	Sch-IV
17	Greater Coucal	*Centropus sinensis*	R1	Sch-IV
18	Barn Own	*Tyto alba*	R3-4	Sch-IV
19	Spotted Owlet	*Athene brama*	R1	Sch-IV
20	Asian Palm Swift	*Cypsiurus (parvus)batasiensis*	R2	Sch-IV
21	Common Kingfisher	*Alcedo atthis*	RM1	Sch-IV
22	Stork-billed Kingfisher	*Halcyon (Pelargopsis) capensis*	R3	Sch-IV
23	White-throated Kingfisher	*Halcyon symrnensis*	R*1	Sch-IV
24	Green Bee-eater	*Merops orientalis*	R*M1	Sch-IV
25	Common Hoopoe	*Upupa epops*	RBW2	Sch-IV
26	Blue-throated Barbet	*Megalaima asiatica*	R2	Sch-IV
27	Black-rumped Flameback	*Dinopium benghalense*	N1	Sch-IV
28	Brown Shrike	*Lanius cristatus*	W2	Sch-IV
29	Eurasian Golden oriole	*Oriolus oriolus*	RMP2	Sch-IV
30	Black-hooked Oriole	*Oriolus xanthornus*	R*2	Sch-IV
31	Black Drongo (King-Crow)	*Dicrurus (adsimillis) macrocercus*	R*A1	Sch-IV
32	Asian Pied Starling	*Sturnus contra*	R*2	Sch-IV
33	Common Myna	*Acridotheres tristis*	R1	Sch-IV
34	Rufous (Indian) Treepie	*Dendrocitta vagabunda*	R2	Sch-IV
35	House Crow	*Corvus splendens*	RA**1	Sch.-V
36	Red-whiskered Bulbul	*Pycnonotus jocosus*	R1	Sch-IV
37	Red-vended Bulbul	*Pycnonotuse cafer*	R1	Sch-IV
38	Jungle Babbler	*Turdoides striatus*	E1	Sch-IV
39	Red-throated Flycatcher	*Ficedula (Muscicapa) parva*	WP1	Sch-IV
40	Common Tailorbird	*Orthotomus sutorius*	R1	Sch-IV
41	Blyth's Reed Warbler	*Acrocephalus dumetorum*	WP(B**?)1	Sch-IV
42	Oriental Magpie Robin	*Copsychus saularis*	RM1	Sch-IV
43	Olive-backed (Indian Tree) Pipit	*Anthus hodgisni*	MAW2	Sch-IV
44	White (Pied) Wagtail	*Motacilla alba*	S,W	Sch-IV
45	White-browed Wagtail	*Motacilla maderaspatensis*	E2	Sch-IV
46	Pale-billed Flowerpecker	*Dicaeum erythrorhynchos*	NA2	Sch-IV
47	Purple-rumped Sunbird	*Nectarinia zeylonica*	R2	Sch-IV
48	Purple Sunbird	*Nectarinia aslatica*	R*AM1	Sch-IV
49	House Sparrow	*Paser domesticus*	M1	Sch-IV

Symbols

E Endemic to the Indian subcontinent (resident unless otherwise indicated)
N Near endemic (resident unless otherwise indicated)
R Resident
B Breeder
S summer visitor
A Altitudinal migrant
M Migrants within the subcontinent (e.g. breeds in the Himalayas & winders in Southern India &/ or Sri Lanka)
P Passage migrant
W Winter visitor
* Subject to some (local) seasonal movement or nomadism
** Localized or patchily distributed (e.g. B**= breeds locally)
? Status uncertain
1 Abundant or very common
2 Common
3 Fairly common
4 Uncommon

Annexure-VI

Present Entry Fee Structure

Sl.No.	Tickets		Rate (in Rs.)
1	Entry fee	Adult	20&00
		Child	10&00
2	Acquarium	Adult	5&00
		Child	5&00
3	Children's Park	Adult	10&00
		Child	5&00
4	Boating		90&00 (two seater) 100-00 (four seater)
5	Mini Train	Adult	15&00
		Child	10&00
6	Group entry ticket for 25 students and more.		5&00 per student
7	Camera	Videography (personal)	100&00
		Videography (for commercial purpose)	3000&00
		Movie Camera (for film shooting)	25000&00
8	Cycling		Rs. 10/- per hour per Cycle

Annexure-VII

Proposed staffing pattern of Sanjay Gandhi Biological Park, Patna.

Sl.No.	Post	Sanctioned strength	Proposed strength
1	Director	1	1
2	Curator (animals) D.C.F.	0	1
3	Dy. Director	1	0
4	Zoo Education Officer	0	1
5	Veterinary Officer	2	2
6	Biologist	0	1
7	Range Officer of Forests	2	2
8	Head Clerk	1	1
9	Steno-Clerk	1	1
10	Assistant	7	7
11	Forester	5	6
12	Driver	5	6
13	Forest Guard	16	29
14	Head Animal Keeper	3	3
15	Animal Keeper	64	64
16	Mali	15	15
17	Veterinary Compounder	2	2
18	Pump Operator	2	1
19	Plumber	1	1
20	Museum Keeper	1	0
21	Electrician	1	1
22	Mahawat	3	2
23	Chowkidar	3	10
24	Orderly Peon	4	7
25	Sweeper	7	8
26	Waiter	2	0
27	Khansama	3	3
28	Cart pullar	1	0
29	Sapera	1	2
30	Dresser	1	1
31	Aquarium Attendant	3	2
32	Carpenter	1	1
33	Welder	0	1
34	Mason	0	1
35	Lab. Assistant	0	1
36	Computer operator	0	1
	Total	**159**	**181**

Annexure-VIII

fcgkj ljdkj]
i;kZoj.k ,oa ou foHkkxA
&&&
vf/klwpuk
&&&&&
iVuk&15] fnukad& 7@1@2005

la[;k&oU; izk.kh&18@2002&21 ¼bZ½ iŒoŒ] jkT; Lrj ij fpfM+;k?kjksa esa oU; izkf.k;ksa dh LoPNrk] iks"k.k] j[k&j[kko rFkk i'kqvksa dh ns[kHkky] LokLF; vkSj mipkj vkfn ds lanHkZ esa fpfM+;k?kj ekU;rk fu;e&1992 esa fd;s x;s izko/kkuksa ds vuqikyu ds vuqJo.k rFkk oU; izkf.k;ksa@i'kqvksa ds LokLF; vkfn ds laca/k esa fpfM+;k?kj izca/kuksa dks vko';d lq>ko nsus gsrq lat; xk¡/kh tSfod m|ku] iVuk ds fy;s LoLF; lykgkdkj lfefr dk xBu fuEuor~ fd;k tkrk gS%&

1- MkŒ vyh vgen [kku] ,e-Hkh-,l-lh- ih-,p-Mh- v/;{kA
gk:u uxj] iVukA
iwoZ izksQslj vkWQ ltZjh]
lsok fuo`r Mk;jsDVj QkSj fjlpZ]
fcjlk d`f"k fo'ofon~;ky;]
Mhu ,oa izkpk;Z] jkaph HksVujh dkWystA

2- izkpk;Z] lnL;A
fcgkj HksVujh dkWyst] iVukA

3- MkŒ chŒchŒ oekZ] ,e-Hkh-,l-lh- ih-,p-Mh- lnL;A
izkpk;Z ¼lsok fuo`r½]
fcgkj HksVujh dkWyst] iVukA

4- MkŒ ykyk ujs'k izlkn] ,e-Hkh-,l-lh- ih-,p-Mh- lnL;A
foHkkxk/;{k ¼lsok fuo`r½] iSFkkskyksth foHkkx]
fcgkj HksVujh dkWyst] iVukA

5- MkŒ lkeUr js] ih-,p-Mh- lnL;A
izHkkjh foHkkxk/;{k]
ck;ksdsfeLVªh ,oa ikjklkbZVksyksth]
fcgkj HksVujh dkWyst] iVukA

6- funs'kd] lnL;A
i'kq LokLF; ,oa mRiknu laLFkku] iVukA

7- MkŒ cnzh izlkn] ,e-,p-,e-,l- lnL;A
gksfe;ksiSFk] csfr;kA

8- i'kq fpfdRlk inkf/kdkjh] lnL;
lat; xk¡/kh tSfod m|ku] iVukA lfpoA

2& ;g lfefr le;≤ ij lat; xk¡/kh tSfod m|ku] iVuk ds tkuojksa dh LoPNrk] iks"k.k vkSj j[k&j[kko] mudh ns[kHkky] LokLF; vkSj mipkj gsrq fu/kkZfjr ekudksa ,oa ekin.Mksa ds vuqikyu dk vuqJo.k djsxh rFkk fpfM+;k?kj izca/kuksa dks blds laca/k esa lykg nsxhA

3& lfefr dh cSBd rhu ekg esa de ls de ,d ckj gksxhA vko';drk gksus ij lfefr dk v/;;u dk;ZØe ,oa cSBd dk vk;kstu dHkh Hkh fd;k tk ldsxkA

4¼i½ lfefr ds xSj ljdkjh lnL;ksa dks izR;sd cSBd ds fy;s 350&00 ¼rhu lkS ipkl :i;s½] cSBd 'kqYd ds :i esa ns; gksxkA

¼ii½ lfefr ds ljdkjh lnL;ksa dks fcgkj ;k=k HkÙkk fu;ekoyh ds izko/kkuksa ds vUrxZr fu;ekuqlkj ;k=k HkÙkk ns; gksxkA

¼iii½ iVuk ds ckgj ls vkus okys fo'ks"kK jkT; ljdkj ds f}rh; Js.kh ds inkf/kdkfj;ksa dks ns; ;k=k HkÙkk ,oa nSfud HkÙkk ikus ds gdnkj gksaxsA

fcgkj jkT;iky ds vkns'k ls]

gŒ@& ctsUnz eksgu oekZ
ljdkj ds voj lfpoA

Kkikad&oU; izk.kh&18@2002&21 ¼bZ½ iŒoŒ] iVuk&15] fnukad 7@1@2005

izfrfyfi v/kh{kd] lfpoky; eqnz.kky;] xqytkjckx] iVuk dks lwpuk ,oa vko';d dkjZokbZ gsrq izsf"krA

vuqjks/k gS fd mDr vf/klwpuk dk izdk'ku jktdh; xtV ds vlk/kkj.k vad esa dh tk; rFkk mldh nks lkS izfr;k¡ foHkkx dks miyC/k djkus dh d`ik dh tk;A

gŒ@&
¼ctsUnz eksgu oekZ½
ljdkj ds voj lfpoA

Kkikad&oU; izk.kh&18@2002&21 ¼bZ½ iŒoŒ] iVuk&15] fnukad 7@1@2005

izfrfyfi lfefr ds lHkh lnL;ksa dks lwpuk ,oa vko';d dkjZokbZ gsrq izsf"krA

gŒ@&
¼ctsUnz eksgu oekZ½
ljdkj ds voj lfpoA

Kkikad&oU; izk.kh&18@2002&21 ¼bZ½ iŒoŒ] iVuk&15] fnukad 7@1@2005

izfrfyfi iz/kku eq[; ou laj{kd] fcgkj] iVuk@lHkh eq[; ou laj{kd@eq[; oU; izk.kh izfrikyd] fcgkj] iVuk@funs'kd] lat; xk¡/kh tSfod m|ku] iVuk dks lwpuk ,oa vko';d dkjZokbZ gsrq izsf"krA

gŒ@&
¼ctsUnz eksgu oekZ½
ljdkj ds voj lfpoA

Annexure-IX

List of surplus animals/birds/reptiles.

Sl. No.	Mammals	Surplus	Remarks
1	Lion (hybrid)	0:2	
2	Jackal	2:3	
3	Rhesus Macaque	5:3	
4	Gharials	0:0:50	
5	Common Cobra	0:0:5	
6	Python	0:0:4	
7	Barking deer	1:2	
8	Spotted deer	21:13	
9	Porcupine	2:3	
10	Silver Pheasant	4:4	
11	Golden Pheasant	2:2	
12	Black buck	10:15	
13	Sambhar	2:15	

Annexure-X

List of required animals/Birds/Reptiles.

Sl. No.	Mammals	Existing (as on 31.03.2013)	Required	Remarks
1	Zebra	1:0	2:3	
2	Fishing Cat	0:0	1:2	
3	Lion Asiatic	2:1	2:3	
4	Elephant	0:1	0:0	
5	Wild Dog	0:0	1:2	
6	Wolf	0:0	1:2	
7	Hoolock Gibbon	0:0	1:2	
8	Orangutan	0:0	1:2	
9	Flying squirrel	0:0	1:2	
10	Golden Langur	0:0	1:2	
11	Baboon	0:0	1:2	
12	Tiger (Royal Bengal)	2:2	0:1	
13	Clouded Leopard	0:0	1:2	
14	Giraffee	0:2	2:3	
15	Kangaroo	0:0	2:3	
16	Chimpanzee	1:1	2:3	
Birds				
1	Spoon bill	1:0	2:3	
2	Chattering lory	0:0	3:7	
3	Great Indian hornbill	1:1	1:2	
4	Macaw	0:0	1:1	
5	African grey parrot	0:0	2:3	
6	Demossele crane	0:0	2:3	
7	Black necked stork	0:1	2:2	
8	White necked stork	0:0	1:1	
9	Lesser adjutant stork	0:0	1:1	
10	Cassowary	1:0	1:2	
11	Emu	2:2	1:1	
12	Ostrich	0:0	2:3	
13	Love Birds	2:5	18:15	
Reptiles				
1	King cobra	0:0	1:2	

Annexure-XI

Inventory of animals housed in Sanjay Gandhi Biological Park, Patna *as* on 31.03.2013

Sl. No.	Name of specie	Scientific Name	Stock			
			M	F	U	T
	BIRDS					
1	Buzzard	*Butastur teesa*	0	0	3	3
2	Eagle-Crested Serpent	*Spilornis cheela*	0	0	1	1
3	Myna-Hill	*Gracula religiosa*	0	0	6	6
4	Hornbill- Common Grey	*Tockus birostis*	0	0	3	3
5	Hornbill-Great Indian/Great Pied	*Buceros bicornis*	0	1	0	1
6	Hornbill-Indian pied	*Anthracoceros malabaricus*	0	0	2	2
7	Kite-Common Pariah	*Milvus migrans*	0	0	10	10
8	Kite-Black Winged	*Elanus caeruleus*	0	0	4	4
9	Peafowl	*Pavo cristatus*	5	5	6	16
10	Peafowl-white	*Pavo cristatus*	0	2	0	2
11	Pheasant Kaleej	*Lophura leucomelano*	0	2	0	2
12	Red Jungle fowl	*Gallus gallus*	3	4	0	7
13	Spoonbill	*Platalea leucorodia*	0	0	1	1
	TOTAL BIRDS		**8**	**14**	**36**	**58**
	MAMMALS					
14	Bear-Himalayan Black	*Selenarctos thibetanus*	3	1	0	4
15	Bear- Sloth	*Melursus ursinus*	4	1	0	5
16	Black Buck	*Antilope cervicapara*	14	26	15	55
17	Cat-Golden	*Felis temmincki*	1	0	0	1
18	Cat Jungle	*Felis chaus*	2	2	0	4
19	Cat Leopard	*Felis bengalensis*	3	2	0	5
20	Civet-Common Palm	*Paradoxurus hermaphroditus*	4	6	0	10
21	Deer-Sangai	*Cervus eldi thamin*	3	0	0	3
22	Deer Swamp	*Cervus duvaucelli*	1	2	6	9
23	Elephant-Indian	*Elephas maximus*	0	1	0	1
24	Jackal	*Canis aureus*	2	3	4	9
25	Langur-Common	*Presbytis entellus*	1	3	2	6
26	Leopard / Panther	*Panthera pardus*	1	3	0	4
27	Lion-Hybrid	*Panthera leo*	0	2	0	2
28	Lion Asiatic	*Panthera leo*	2	1	0	3
29	Loris Slow	*Nycticebus couceang*	0	1	0	1
30	Macaque-Assamese	*Macaca assamensis*	1	1	0	2
31	Macaque-Lion tailed	*Macaca silenus*	0	1	0	1
32	Macaque-Rhesus	*Macaca mulatta*	12	9	1	22
33	Macaque- Stump tailed	*Macaca speciosa*	1	0	0	1
34	Otter smooth Indian	*Lutra perspicillata*	1	1	0	2
35	Rhinoceros-Indian one horned	*Rhinoceros unicors*	5	6	0	11
36	Indian Giant Squirrel	*Ratufa indica*	1	2	0	3
37	Tiger-Royal Bengal	*Panthera tigris tigris*	1	1	0	2
38	Tiger-white	*Panthera tigris tigris*	1	1	0	2
39	Hedge Hog (Asian)		0	0	1	1
	TOTAL MAMMALS		**64**	**76**	**29**	**169**
	REPTILES					

40	Cobra-Indian	*Naja naja*	1	0	14	15
41	Crocodile-Long snouted-Ghariyal	*Gavialis gangeticus*	2	10	95	107
42	Crocodile-Marsh-Muggar	*Crocodylus palustris*	1	1	0	2
43	Goh-Common	*Varanus sylvestris*	0	0	5	5
44	Python-IndianRock	*Python molurus molurus*	4	2	18	24
45	Snake Rat-Dhaman	*Ptyas mucosus*	0	0	6	6
46	Turtle- Indian soft-shelled	*Lissemys punctata*	35	25	250	310
47	Turtle- Gangetic soft-shelled	*Aspiredetes gangeticus*	5	8	8	21
48	Turtle- Three striped roof	*Kachuga dhongoka*	1	3	0	4
	TOTAL REPTILES		**48**	**49**	**396**	**494**
	TOTAL ANIMALS		**121**	**138**	**461**	**721**
	Other species					
	BIRDS					
1	Budgeriger	*Melopsittacus undulatus*	7	26	5	38
2	Cassowary	*Casuarius casuarius*	1	0	0	1
3	Cockatiel	*Nymphicus hollandicus*	1	4	20	25
4	Cockatoo	*Cacatua galerita*	1	0	0	1
5	Coot	*Fulica atra*	0	0	2	2
6	Crane-Common	*Grus grus*	0	0	2	2
7	Crane-Sarus	*Grus antigone*	0	2	0	2
8	Dove	*Zenaida macroura*	0	0	26	26
9	Duck-Brahmini	*Tadorna ferruginea*	4	6	0	10
10	Emu	*Dromaius novaehollandiae*	2	2	0	4
11	Gadwall	*Anas strepera*	0	0	2	2
12	Goose-Bar Headed	*Anser indicus*	5	7	0	12
13	Heron-Night	*Nycticorax nycticorax*	0	0	2	2
14	Ibis-black		0	0	1	1
15	Love Birds		2	5	7	14
16	Mallard	*Anas platyrhynchos*	2	5	3	10
17	Moor Hen-Indian	*Gallinula chloropus*	2	3	0	5
18	Owl-Indian Great Horn	*Bubo bubo*	0	0	3	3
19	Owl-Screech	*Tyto alba*	0	0	10	10
20	Parakeet-Blossom Headed	*Psittacula cyanocephala*	0	0	13	13
21	Pelican-Rosy/white	*Pelecanus onocrotalus*	2	3	0	5
22	Pheasant-Golden	*Chrysolophus pictus*	7	7	0	14
23	Pheasant-Lady Amherst	*Chrysolophus amherstiae*	5	2	2	9
24	Pheasant-Silver	*Lophura nycthemera*	4	7	16	27
25	Pigeon-Common Green	*Treron phoenicoptera*	0	0	6	6
26	Pochard	*Aythya nyroca*	0	0	8	8
27	Stork-Black Necked	*Ephippiorhynchus asiaticus*	0	0	1	1
28	Goose - domesticated	(not identified)	10	24	9	43
29	Duck Moscovy	*Cairina moschata*	1	1	4	6
30	Emarald Dove	*Chakophaps indica*	0	0	3	3
31	Lesser adjutant	*Leptoptilos dubius*	1	0	1	1
32	Pintal northern	*Anas acuata*	1	1	0	2
33	Pochard red crested	*Rhodonessa rufina*	1	1	0	2
34	Temminck's tragopan	*Tragoplan satyra*	0	1	0	1
35	Falcated Duck	*Anas platyrhynchos*	0	0	2	2
	TOTAL BIRDS		**59**	**107**	**148**	**314**
	MAMMALS					
36	Deer-Barking	*Muntiacus muntjak*	6	5	7	18

37	Deer-Hog	*Axis porcinus*	1	4	5	10
38	Sambar	*Cervus unicolor*	10	15	13	38
39	Deer-Spotted	*Axis axis*	26	33	7	66
40	Hippopotamus	*Hippopotamus amphibius*	1	1	1	3
41	Hyena-Stripped	*Hyaena hyaena*	2	0	0	2
42	Nilgai- Blue Bull	*Boselaphus tragocamelus*	3	4	0	7
43	Porcupine-Indian	*Hystrix indica*	4	1	10	15
44	Rat-white		10	8	2	20
45	Zebra	*Equus burchelli*	1	0	0	1
46	Giraffe	*Giraffa camelopardalis*	0	2	0	2
47	Chimpanzee		1	1	0	2
	TOTAL MAMMALS		**65**	**74**	**45**	**184**
	REPTILES					
48	Karait-Common Indian	*Bungarus caeruleus*	0	0	2	2
49	Sand Boa	*Eryx johini*	0	0	15	15
50	Snake Water	*Enhydris enhydris*	0	0	5	5
51	Viper russels	Viperarusselli	**0**	**0**	**2**	**2**
	TOTAL REPTILES		**0**	**0**	**24**	**24**
	TOTAL ANIMALS		**124**	**181**	**217**	**522**
	GRAND TOTAL		**245**	**319**	**678**	**1243**

Annexure-XII

lat; xk¡/kh tSSfod m|ku] iVuk ds oU; tUrqvksa dks izfrfnu fn, tkus okys vkgkj dh fooj.khA

ØCE laCE	i'kq @i{kh	nSfud vkgkj	ek=k ¼fdCE xzkCE½	dqy fnol
1	2	3	4	5
1	ck?k	efg"k ekal	8.000	313
		nw/k	0.500	313
		eqxkZ	1.000	50
2	'ksj	efg"k ekal	7.000	313
		eqxkZ	1.000	50
3	rsanqvk	efg"k ekal	2.000	313
		eqxkZ	0.500	50
4	ydMc??kk	efg"k ekal	2.000	313
		eqxkZ	0.500	313
5	fl;kj	efg"k ekal	1.000	313
6	xksYMsu dSV	eqxkZ	1.000	313
7	taxy dSV	eqxkZ	1.000	313
8	ySiMZ dSV	eqxkZ	1.000	313
9	fQf'kax dSV	eqxkZ	0.500	313
		cMh eNyh	0.500	313
10	gkFkh	usokjh	15.000	313
		xsgw¡	5.000	313
		bZ[k	25.000	90
		edbZ ikS/kk	30.000	182
		cjlhe	30.000	182
11	fgliksiksVkel	dsyk	1.500	313
		d)q	0.500	313
		vkyq	1.000	313
		Mh;jes'k	3.000	313
		cjlhe@lqMku ?kkl	30.000	365
		cSxu	0.200	313
12	CySd cd	Mh;jes'k	0.750	313
		cjlhe@lqMku	8.000	365
		egqvk	0.100	90
		uokjh dqÎh	0.500	313

13	uhyxk;	Mh;j es'k	1.000	313
		cjlhe@lqMku	8.000	365
		egqvk	0.100	90
		uokjh dqÎh	1.000	313
14	phry	Mh;j es'k	0.400	313
		cjlhe@lqMku	8.000	365
		egqvk	0.100	90
		usokjh dqÎh	S	313
15	gkWx Mh;j	Mh;j es'k	0.400	313
		cjlhe@lqMku	7.000	365
		egqvk	0.100	90
		uokjh dqÎh	0.500	313
16	lQsn fgj.k	Mh;j es'k	0.500	313
		cjlhe@lqMku	8.000	365
		egqvk	0.100	90
		usokjh dqÎh	0.500	313
17	Tscjk	puk	1.000	313
		xsgw¡	0.500	313
		Mh;jes'k	2.000	313
		cjlhe@lqMku ?kkl	8.000	365
		tbZ	0.500	313
		xqM+	0.500	313
18	la?kkbZ Mh;j	Mh;j es'k	0.400	313
		puk	0.500	313
		cjlhe@lqMku	8.000	365
		egqvk	0.100	90
19	ckfdZx Mh;j $ pkSfla?kk	Mh;j es'k	0.400	313
		puk	0.400	313
		cjlhe@lqMku	3.000	365
20	xSaMk	puk	2.000	313
		Mh;j es'k	2.000	313
		uokjh dqÎh	8.000	90
		cjlhe@lqMku	30.000	365
		egqvk	0.100	90

21	lkaHkj	Mh;j es'k	1.000	313
		cjlhe@lqMku	8.000	365
		uokjh dqÎh	1.000	313
		egqvk	0.100	90
22	,ew	dsyk	1.000	313
		puk	0.250	313
			0.250	313
		ikyd lkx	0.250	100
		vaMk	2 vn~n	313
		yglqu	0.025	313
		l;kt	0.100	313
23	dS'ojh	dsyk	0.500	313
		puk lRrq	0.250	313
		ikyd lkx	0.205	313
		puk	0.205	313
		l;kt	0.050	313
		yglqu	0.025	313
24	LysaMj yksfjl	vaMk	3 vn~n	313
		dsyk	0.250	313
		nw/k	0.500	313
		eqfu;k	2 vn~n	313
25	Exj	efg"k ekal	2.000	100
26	?kfM;ky	cMh eNyh	1.000	100
27	yk;uVsYM edkd	dsyk	0.205	313
		'kdjdan	0.050	313
		lsc]ve:n]xktj	0.100	313
		cknke	0.100	313
		puk	0.050	313
		xsgw¡ jksVh	0.150	313
		l;kt	0.050	313
		yglqu	0.025	313

28	jsll eadh	puk	0.150	313
	dkeu yaxwj	dsyk	0.200	313
	LVEi VsYM eadh	cknke	0.050	313
	vklkeh eadh	'kdjdan	0.100	313
		lsc]ve:n]xktj	0.100	313
		xsgw¡ jksVh	0.150	313
		l;kt	0.020	313
		yglqu	0.010	313
29	fgeky;u Hkkyw	dsyk	1.000	313
	LyksFk ch;j	e/kq	0.075	313
		lsc]ve:n]xktj	0.250	313
		'kdjdan	0.250	313
		xsgw¡ jksVh	0.200	313
		puk	0.100	313
		nw/k	0.500	313
		egqvk	0.100	90
30	dksdkVhy	dkSuh	0.010	313
	yooM~Zl	cktjk	0.010	313
	ctjh	phuk	0.025	313
		l;kt	0.020	313
		yglqu	0.005	313
31	CywTe gSMsM ikjkdhV	lsc	0.025	313
		cknke	0.020	313
		dsyk	0.050	313
		'kdjdan	0.020	313
		puk	0.020	313
		l;kt	0.050	313
		yglqu	0.050	313
32	mtyk eksj	cMZes'k	0.050	313
	ns'kh eksj	/kku	0.025	313
		dkSuh	0.025	313
		iksyVªhQhM	0.100	313
		ikyd lkx	0.025	100
		cktjk	0.025	313
		l;kt	0.010	313
		yglqu	0.010	313

33	dkWeu ihtu ¼dcwrj½	dkSuh	0.010	313
	CywjkWd ihtu ¼dcwrj½	cktjk	0.015	313
		ljlksa	0.005	313
		xsgw¡	0.010	313
		l;kt	0.020	313
		yglqu	0.010	313
34	deu xzs gkuZfcy	/kku	0.050	313
	jkt/kus'k	dsyk	0.150	313
	bafM;u ikbZM gkuZfcy	puk lRrq	0.100	313
		l;kt	0.050	313
		yglqu	0.010	313
35	VdhZ eqxhZ	iksyVªhQhM	0.050	313
	flYdh eqxhZ	/kku	0.025	313
	pkbfut eqxhZ	dkSuh	0.025	313
	fxuh QkWy	cMZes'k	0.050	313
	bafM;u ewjgsu	ikyd lkx	0.050	100
		cktjk	0.025	313
		l;kt	0.050	313
		yglqu	0.010	313
36	Mkso	/kku	0.010	313
		dkSuh	0.010	313
		cktjk	0.010	313
		ljlksa	0.005	313
		phuk	0.010	313
		xsgw¡	0.010	313
		l;kt	0.020	313
		yglqu	0.005	313
37	CySd vkbZfcl	cMh eNyh	0.400	313
	ukbZV gsjWku	l;kt	0.020	313
		yglqu	0.005	313
38	jksth OgkbZV isfydsu	NksVh eNyh	1.000	313
		l;kt	0.050	313
		yglqu	0.025	313

39	czkgeuh Md	/kku	0.010	313
	ckjgsMsM xwt	xsgw¡	0.050	313
		cMZes'k	0.075	313
		ikyd lkx	0.040	100
		l;kt	0.050	313
		yglqu	0.025	313
40	lkjl Øsu	NksVh eNyh	0.400	313
41	dkWeu Øsu	cMZes'k	0.050	313
		l;kt	0.050	313
		yglqu	0.025	313
42	Fxygjh	dsyk	0.100	313
		'kdjdan	0.050	313
		puk	0.025	313
		cknke	0.025	313
		lsc]xktj]ve:n	0.025	313
		l;kt	0.050	313
		yglqu	0.010	313
43	dkdkrqvk	puk	0.050	313
	dwV	xsgw¡	0.025	313
		dsyk	0.100	313
		l;kt	0.050	313
		yglqu	0.010	313
		cktjk	0.025	313
		lsc]xktj]ve:n	0.050	313
44	jSfcV	puk	0.010	313
	OgkbZV jSV	cknke	0.020	313
		lsc]xktj]ve:n	0.025	313
		xsgw¡	0.010	313
		ikyd lkx	0.050	100
		l;kt	0.050	313
		yglqu	0.010	313
45	bZxy	eqxkZ	0.100	100
	dkWeu dkbZV	l;kt	0.050	313
	CySd foXaM dkbZV	yglqu	0.010	313

46	ysMh ,EgjsLV QhtsV	iksyVªhQhM	0.050	313
	flyoj QhtsV	/kku	0.025	313
	xksYMsu QhtsV	dkSuh	0.025	313
		cMZes'k	0.050	313
		ikyd lkx	0.020	100
		cktjk	0.020	313
		l;kt	0.020	313
		yglqu	0.020	313
47	/kkeu	eqfu;k	19 vn~n	100
	jlsy okbZij			
	Dkscjk			
	dSjr			
	lSUM cksvk			
48	Xksg	cM+h eNyh	0.100	50
49	okVj Lusd	cM+h eNyh	0.100	50
50	vtxj lkai	fxuh fix	2 vn~n	313
51	flosV ike	dsyk	0.250	313
		eqxkZ	0.100	313
52	fgy eSuk	puk lRrq	0.050	313
		dsyk	0.100	313
53	lkfgy	cknke	0.150	313
		edbZ njkZ	0.050	313
		dsyk	0.100	313
		puk	0.050	313
		cSxu	0.100	313
		'kdjdan	0.100	313
		l;kt	0.050	313
		yglqu	0.010	313
		xsgw¡	0.100	313
54	ikspkMZ	/kku	0.050	313
		dkSuh	0.010	313
		cMZes'k	0.010	313
		cktjk	0.025	313
		l;kt	0.050	313
		yglqu	0.010	313

55	Liwu fcy LVkSdZ	cMh eNyh	0.200	313
		l;kt	0.050	313
		yglqu	0.010	313
56	CySd usDM LVkSdZ	cMh eNyh	0.200	313
	Loku	l;kt	0.050	313
		yglqu	0.010	313
57	ftjkQ	Mh;j es'k	2.500	263
		dsyk	1.000	263
		xktj	0.300	263
		VekVj	0.150	263
		ve:n	1.500	263
		cjfle@ lqMku	4.000	263
		xsagw Hkwlk	0.300	263
		l;kt	0.100	263
		puk	0.700	263
		vkyw	0.200	263

Recognition of Zoo Rules, 1992

Ministry of Environment & Forests

New Delhi,

the 4th August, 1992

Notification

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Classification of zoos:

For the purposes of deciding standards and norms for recognition of zoos and monitoring and evaluating their performance, the zoos, on the basis of the area, number of animals and their variety exhibited, and the number of visitors, shall be classified into four categories as specified below:

Category of the zoo	**Large**	**Medium**	**Small**	**Mini**
Area of the zoo in hetares	More than 75 hectares	50-75 hectare	20-50 hectare	Less than 20 hectare
Number of animal exhibited	More than 750	500-750	200-499	Less than 200
Animals variety exhibited	More than 75 numbers	50-75 numbers	20-49 numbers	Less than 20
No. of endangered species exhibited	More than 15	10-15 numbers	5-9	Less than 5
Annual attendance of visitors per year	More than 7.5 lakhs	5-7.5 lakhs	2-5 lakhs	Less than 2 lakhs

Revised on 20.6.2012