GOVERNMENT OF ANDHRA PRADESH
FOREST DEPARTMENT

MASTER PLAN

[2020-21 to 2040-41]

of

Indira Gandhi Zoological Park, Visakhapatnam

Prepared by

Dr.NandaniSalaria, IFS
Curator
Indira Gandhi Zoological Park,
VISAKHAPATNAM

2020-21

Indira Gandhi Zoological Park, Visakhapatnam
Twenty-year Master Plan
2020-21 to 2040-41

Consultancy services by:
Prem Chaudhery Associates, New Delhi
in collaboration with CED & Target Euro

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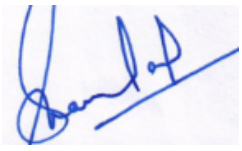
A COMPREHENSIVE PLAN FOR FUTURISTIC DEVELOPMENT

Certificate

This is to certify that Master Plan (2020-21 to 2040-41) is prepared for the scientific management of Indira Gandhi Zoological Park, Visakhapatnam by the Curator (Dr.NandaniSalaria, IFS) incorporating the restoration and redevelopment planned as part of Andhra Pradesh Disaster Recovery Project (APDRP) funded by World Bank in consultation with planning & designing consultants, Prem Chaudhery& Associates, New Delhi,CED and Target Euro.

PREPARED BY



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COUNTER SIGNED BY

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Master Plan of Indira Gandhi Zoological Park, Visakhapatnam, Andhra Pradesh was placed before the 102nd Meeting of the Expert Group on Zoo Designing held on January 20, 2022. It was subsequently deliberated in the 103rd Technical Committee meeting of the Central Zoo Authority held on February 10, 2022. The approval of the Master Plan was communicated to the Zoo vide this office letter Computer No. 140585, F. No. 19-52/92-CZA (1)(Vol.VI)(E) dated 09.03.2022. The approval is subject to that the responsibility of mobilizing the financial resources for implementation of the Master Plan will be sole responsibility of the Forest Department, Government of Andhra Pradesh.

सदस्य सचिव/Member Secretary
केन्द्रीय चिड़ियाघर प्राधिकरण/Central Zoo Authority
पर्यावरण वन और जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
भारत सरकार, नई दिल्ली
Govt. of India, New Delhi

ACKNOWLEDGEMENT

It gives me immense pleasure in presenting this Master Plan for the redevelopment and scientific management of Indira Gandhi Zoological Park, Visakhapatnam for the period 2020-21 to 2040-41.I would like to place on record the guidance and encouragement extendedbySriP. Ram Mohan Rao, IFS, Conservator of Forests, Visakhapatnam circle and Project Manager, PIU(APFD), APDRP. I am thankful to the guidance and support of the then Sri Rahul Pandey, IFS, Chief Conservator of Forests, Wildlife, O/o PCCF (HoFF), AP for his guidance and support throughout the process of the preparation of the Master Plan.

I would like to express my sincere gratitude for the guidance and reviews offered by Sri N. Prateep Kumar, IFS, Principal Chief Conservator of Forests (HoFF) &Prl.Chief Conservator of Forests (WL) & Chief Wildlife Warden,APand SriVijay Kumar G. Srkr., IAS, Secretary to Government, EFST Department, GoAPduring the course of the project which helped in refining the document at various stages with their valuable suggestions.

It was indeed a great support referring to the ideas and planning carried out by the then Curators of the Zoo while understanding the zoo, its inception, development over last 45 years for the cause of wildlife conservation. I would like to thank all of them for the services rendered and the plan encompasses the combined effort from all. I would like to place on record the hard work put in by my predecessor, Smt. Yesoda Bai R., IFS during the conceptualisation and preparation of this master plan.

The Zoo staff working in various capacities offered their suggestions and ideas to improve the zoo to make it a model zoo in the state and country. I thank Assistant Curator-I, Assistant Curator -II, Zoo Veterinarian and team of IGZP for their part in this effort. I would like to also place on record the hard work put by the Computer Operators, Technical Assistants& A.E.E (Retd)to put the document into the shape it attained.

Prem Chaudhery Associates, New Delhi, CED and Target Euro – the consultancy firm worked closely with the World Bank team in the project to update the approved layout plan of the zoo and also make a comprehensive document encompassing the redevelopment objectives after the zoo was devastated by the Hud-Hud cyclone in 2014. The updated layout plan and futuristic development of the zoo retaining the ecological significance of its location are part of this Master Plan. I acknowledge the effort put by the team towards making of this document.

I am always thankfulto Sh. Anant Shankar, IFS, DFO, Visakhapatnam and my better-half for the constant support and encouragement.

Dr.NandaniSalaria, IFS
Curator, IGZP, Visakhapatnam

MESSAGE

I am happy to learn that the Master Plan for redevelopment of Indira Gandhi Zoological Park, Visakhapatnam has been prepared by the Curator and the team working under the World Bank funded Andhra Pradesh Disaster Recovery Project for submission and approval of the Central Zoo Authority, New Delhi as per norms. The plan is envisaged for a period of twenty years (2020-21 to 2040-41) with a vision to modernize the zoo on global standards by adopting cyclone resilient structures and adhering to the guidelines by Central Zoo Authority and IUCN on the ex-situ conservation of wildlife. Indira Gandhi Zoological Park, Visakhapatnam is a large category zoo in the State of Andhra Pradesh exhibiting animals in a very naturalistic environment and it is scientifically managed with special focus on the fauna of Eastern Ghats ecosystem.

I am sure that this plan will help the zoo to achieve newer heights, further modernise its enclosures taking cyclone resilience into consideration, build world-class visitor amenities, expand the conservation breeding efforts and involve in scientific research activities to achieve the goals of being an ex-situ conservation facility in the country. I hope the implementation of the plan will make Indira Gandhi Zoological Park, Visakhapatnam one of the best among the country and world.

I wish the zoo all success.

Sri N. Prateep Kumar, IFS
Prl.Chief Conservator of Forests (HoFF)
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Chief Wildlife Warden,
Andhra Pradesh, Guntur.

FOREWARD

Master planning aimed at the redevelopment of Indira Gandhi Zoological Park, Visakhapatnam under the Andhra Pradesh Disaster Recovery Project funded by World Bank is a prerequisite for restoring the ecological and other services rendered by the Park to the publicand the damages occurred from very severe cyclonic storm 'Hud-Hud'hit the zoo in 2014. This plan is providing a comprehensive development opportunity to the zoo park by building cyclone resilient infrastructure, better equipped Disaster Management Strategy, modernising the visitor amenities and also to consider the management of the area as a single landscape unit comprising Kambalakonda Wildlife Sanctuary.

Zoo located in the SeethakondaReserveforestcontiguous to the Kambalakonda Wildlife Sanctuary-Eco Park in the heart of Visakhapatnam city form a unique ecological unit of Eastern Ghats. There are recent records of Wild dog population in the sanctuary area, whereas the zoo is co-ordinating the conservation breeding of this species in the country. There are many such avenues to be explored in future, as IGZP has the history of breeding many endangered species of national and international importance.Marine species diversity is a realm which can be incorporated in future with proper support from all quarters.

The Zoo Management had undergone various transformations over many decades in our country, the guidelines for Scientific Management by CZA is being followed at every level in order to achieve the objectives defined in this plan. The management plan for the initial period will be depending on the APDRP as a source of funding and in later stages the support from State Government and CZA would be of great help to continue the efforts to achieve its goal. Considering the unique location, availability of area for expansion and widening the horizon with more income generation activities in future would make the zoo self-sufficient.

IGZP is excelling in the field of ex-situ conservation for the past four decades and addressing the limitation of human and financial resources would place it in the world map of modern zoos.

Sri P. Ram Mohan Rao, IFS
Chief Conservator of Forests,
Visakhapatnam circle,
Andhra Pradesh

EXECUTIVE SUMMARY

The Master Plan for Indira Gandhi Zoological Park, Visakhapatnam is prepared for a period of twenty years from 2020-21 to 2040-41. The Master Layout Plan of the zoo was approved by Central Zoo Authority in 19.09.2013, all the development activities carried out since then are in accordance with this layout plan. The animal enclosures selected for modifications, redevelopment under Andhra Pradesh Disaster Recovery Project is in line with this approved layout plan. The detailing with respect to administrative block, demarcating a service entry to this block to separate the visitors from the staff are added in the modified layout plan. Apart from this,areas for landscaping, indicating locations for the additional animal collection as proposed in the collection plan, interpretation centre, visitor amenities which has to be taken up in the stage 2 of implementation of the plan are shown in the layout plan. Hence, these details can be amended to the already approved layout plan of Indira Gandhi Zoological Park, Visakhapatnam.

Here is an effort to summarise the salient features of this plan.

- This plan is aiming at modernising the existing animal enclosures. The current animal enclosures for various species are very spacious, but the night kraals are proposed to be modified with SS cages, additional day kraal for species requiring special attention other than the existing day enclosure.
- The Aviaries which suffered major damage during the cyclonic storm are proposed for rebuilding in the locations as per the approved layout plan.
- The Walk-Through Aviary location is demarcated freshly in the modified layout plan.
- Locations for Aquarium complex, Nocturnal Animal House, flightless birds, Caiman crocodile are indicated
- A modern entrance complex with increased space for parking is provided in the main entrance of the zoo. Surplus parking facility is provided in addition to main parking to deal with the heavy-visitation times.
- Interpretation centre building complex is integrated with four different utility purposes; interpretation centre, education centre, zoo canteen and amphitheatre.
- The Zoo administrative complex and Veterinary hospital complex areas are demarcated and redevelopment of both including modern surveillance facilities are part of the project.

- Quarantine facility is indicated in the current Animal Rescue Centre facility. A portion of the facility is proposed for this purpose in future.
- There are 6 watch towers proposed in the Master Plan. Taking into consideration of the undulating terrain and the presence of free ranging animals in the landscape, these towers are strategically located.
- A well-developed circulation road (4.5 km) with 8 locations to act as e-cart stoppage point with charging facility is to facilitate the operation of these battery cars in Hop-in Hop-off way.
- The visitor pathways, modification in stand-off barriers (4.5 km), improved interpretative and signages are included in it.
- Modern rest room facilities and providing differently-abled friendly ramps in them and also in front of the enclosures wherever necessary are there in the plan.
- Zoo has the potential to widen the conservation breeding efforts in future with the support of Central Zoo Authority, New Delhi.
- Human resources of the zoo have to be increased in number and quality, it is part of the plan and consecutively being brought to the notice of the higher officials and State Government for recruitment.
- Zoo has improved its fodder production unit recently to meet the requirement. It is proposed to expand the activities in this line with production of vegetables, greens, fruits, and rearing of chicken, mealy worms and goats/sheep to establishing a modern abattoir with adequate funding to arrest the pathogens getting transmitted from outside region.
- Zoo wants to adopt best Waste Management options and more greener ways of technologies in future and want to be a role model in this arena.

The total budget outlay laid for the plan is 5709.83 lakhs.The expected sources of budget are from State Government (mostly diet charges and small portion for Zoo maintenance), PBZR (Zoo's own revenue) and APDRP. The annual budget of Zoo from all schemes excluding APDRP is 7.73 crores (2019-20). Central Zoo Authority's assistance is also very much essential in meeting the financial requirements. With this master planning exercise, care has been taken to put the needs of this ex-situ conservation facility in all fronts for its futuristic development as a modern facility catering to the expectation of animal welfare, visitor experience and ex-situ conservation efforts.

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PART-I








Chapter 1 Introduction

Figure 1Main Gate of Indira Gandhi Zoological Park, Visakhapatnam

Indira Gandhi Zoological Park, Visakhapatnam is one of the two zoos in the state of Andhra Pradesh. The Secretary to Government, Environment, Forests, Science &Technology, Andhra Pradesh is the Zoo Operator and the Government of Andhra Pradesh has constituted the Zoo Authority of Andhra Pradesh to all the Zoo and Parks in the State of Andhra Pradesh under the "A.P. Societies Registration Act, 2001" for better management of all the Zoos and Parks in the State and also for expeditious utilization of the funds released by the Central Zoo Authority as well as State Government.

Indira Gandhi Zoological Park was created with the primary objective of conservation of endangered fauna of Eastern Ghats ecosystem, in the Seethakonda Reserve forests, and it enjoys a unique location in the stretch of Eastern Ghats meeting the Bay of Bengal, the shortest ever distance between this unique forest ecosystem from a marine ecosystem in its entire stretch in our country across different states. This positioning of the IGZP, Visakhapatnam in the lap of Eastern Ghats facing the Bay of Bengal itself makes it unparalleled, where we are housing both terrestrial and aquatic fauna in its near natural environment, very spacious enclosures including some representatives from other ecosystems in our country and few exotic species from African and American regions in order to create awareness and interest among the public and to educate them the need of conserving these life forms in its natural habitat for the longer survival of humanity itself.

IGZP, Visakhapatnam is a large category Zoo recognised by the Central Zoo Authority in Andhra Pradesh and one of the finest and modern zoos in India located amidst a beautiful natural setting. The zoo spreads over an area of 250 Ha (625 acres) in Seethakonda Reserved Forest which is part of the scenic Eastern Ghats in Visakhapatnam. In addition to this, an extent of 23.61 acres of Marine Land Complex area and 62.5 acres of Animal Rescue Center (ARC) land arealso under the control of Indira Gandhi Zoological Park.

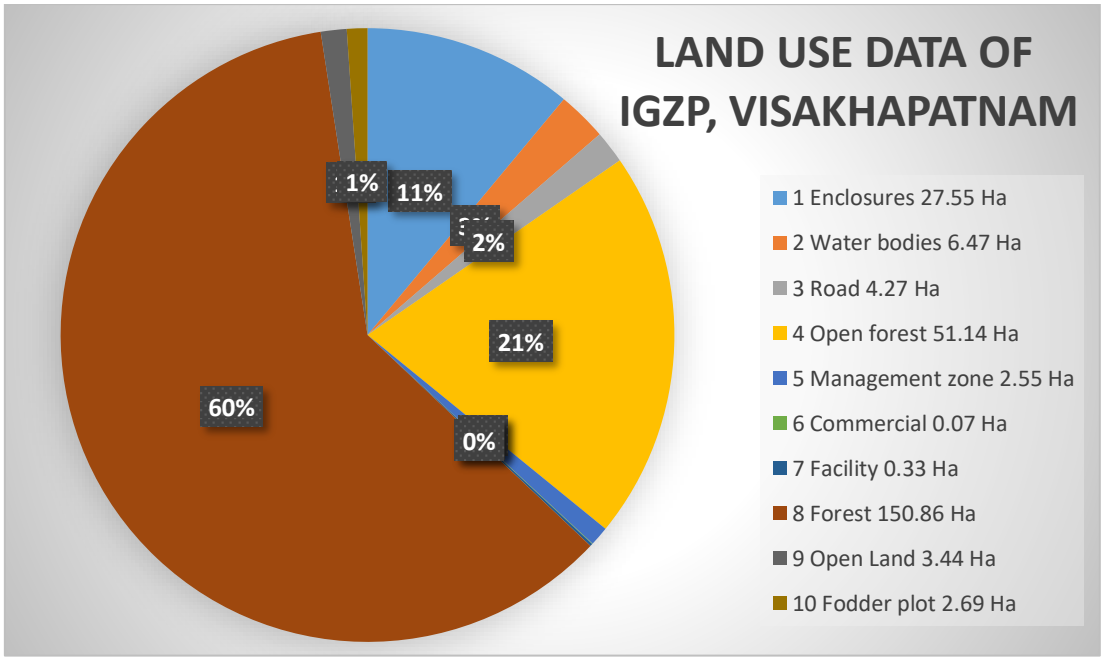
Area Statement of IGZP, Visakhapatnam is as follows:

Indira Gandhi Zoological Park (IGZP)	**625 Acres**
Animal Rescue Centre (ARC)	**62.50 Acres**
Marine Land Complex (MLC)	**23.61 Acres**

The land use classification of the zoo area is as follows:

S.No.	Land Use Category	Area	Percent of total zoo area
1	Enclosures	27.55 Ha	11.05%
2	Water bodies	6.47 Ha	2.60%
3	Road	4.27 Ha	1.71%
4	Open forest	51.14 Ha	20.51%
5	Management zone	2.55 Ha	1.02%
6	Commercial	0.07 Ha	0.03%
7	Facility	0.33 Ha	0.13%
8	Forest	150.86 Ha	60.49%
9	Open Land	3.44 Ha	1.36%
10	Fodder plot	2.69 Ha	1.08%

Pie Chart depicting the land use classification of zoo area



The Zoo was devastated by 'Hud-Hud' cyclone, classified as a very severe cyclonic storm, which made landfall on the coast of the state of Andhra Pradesh, near the city of Visakhapatnam on 12thOctober, 2014. The cyclone caused major damage in 26 cities and towns of Visakhapatnam, Vizianagaram, Srikakulam, and East Godavari districts, and affected about 9.2 million people. The Joint Rapid Damage and Needs Assessment (JRDNA) completed by the Government of India (GoI) estimated the cost of damage reconstruction to be approximately US$2.16 billion. It is with this backdrop that the state Government of Andhra Pradesh (GoAP) approached the World Bank (referred as the Bank) seeking assistance under the "Andhra Pradesh Disaster Recovery Project (APDRP)". One of the key activities in this Project is the restoration of environmental services and facilities which included restoration, rejuvenation and redevelopment of Indira Gandhi Zoological Park, Visakhapatnam.

1.1 History of the Zoo

The zoo park came into existence in the year 1972 as per GO Ms. No. 579, Forests and Rural Development (For-III) Department Dt. 10.11.1972 and it was inaugurated and opened to public by Sri Ibrahim Ali Ansari, Minister for Forests and Wakfs on 19-05-1977. Close to one million people visit the zoo every year. There are more than 750 animals and birds live in open, large moated area and aviaries surrounded by natural vegetation. This gives the animals a feeling of living close to their natural habitat. Visakhapatnam is the largest city in Andhra Pradesh after formation of the new state on 02.06.2014 which is around 410 km from Amaravathi, the state capital of AP. The zoo is situated on National Highway-5 which connects the 2 major cities of the country i.e.Kolkata and Chennai. The city is well connected by road, train and air from all the major cities of the country.

1.2 Vision

To develop self-sustaining, genetically and behaviourally viable populations of endangered animal species in order to use them as an ex-situ gene pool in long-term conservation of these species and to seek the support of the visitors and public at large through participation in these efforts of wildlife conservation.

1.3 Mission

To complement and strengthen the conservation efforts particularly of wild fauna housed in large enriched facility with good health, nutrition and care as well as carrying out knowledge dissemination and generating support for conservation effort through scientific research and conservation education.

1.4 Values

- Collaborate – we will work collectively with each other and with others in order to achieve our goals.
- Community Oriented – we will engage in initiatives and activities that support the Zoo Park and the community.

1.5 Strategy of the Zoo

i. To provide highest standards of housing, upkeep and healthcare to all animals in the zoo.

ii. To carrying out of best research for developing innovative strategy for enhancing the reproductive potential, neonatal care and genetic and behavioural management of endangered species of wildlife.

iii. To set up of state of art facility on use of innovative methods of display of zoo animals that is congenial to the welfare of the animals and motivates the visitors for conservation.

1.6 Objectives

i. To carry out ex-situ conservation of critically endangered fauna with special focus on the endemic fauna of Eastern Ghats.

ii. To carryout Conservation Breeding of various species with emphasis on endangered species of Eastern Ghats.

iii. To carryout wildlife rescue operations and provide holistic environment for rehabilitation of such rescued animals.

iv. To propagate the values of wild life and its conservation through education and interpretation aimed at wide public appreciation.

v. To make IGZP, Visakhapatnam a leader in ex-situ conservation research aimed at conservation and management

vi. To make IGZP, Visakhapatnam self-sufficient and number one in captive veterinary care and facilities

vii. To make IGZP, Visakhapatnam to be the best public place in the country adopting sustainable and green ways of waste management, recycling and reuse options.

viii. To improve the visitor amenities in IGZP, Visakhapatnam to make it the most preferred destination for any person visiting Visakhapatnam.

1.7 Location

Indira Gandhi Zoological Park is located amidst Kambalakonda Reserve Forest in Visakhapatnam, Andhra Pradesh, India. It is the third largest zoo in the country. The zoo park is about 11 kilometres (6.8 mi) from the Visakhapatnam railway station on the National Highway 5 near Madhurawada. It has Entrance and Exit gates situated oppositely, with one towards National Highway 5 and the other towards Beach Road at Sagar Nagar. It is open to public on all days of the week except Monday.

Figure 2 Location of Indira Gandhi Zoological Park, Visakhapatnam

1.8 Physical Features

The district presents 2 different geographic regions. The strip of land along the coast is one region and interior called the plains and hilly area of Eastern Ghats is the other region. Along the shore there is a series of salt and sandy swamps which supports wildlife especially avian fauna.

1.8.1 Topography

General topography of the zoo park area is undulating terrain with two hillocks on the north-east and south-west sloping towards the central valley and deep gorge and ends with small plain area near Bay of Bengal on the East. The topographical features surrounding and within the zoo park may be categorized as a) Coastline b) Valley and c) Hills.

1.8.1.1 Coastline

The important marine fauna along the coast are the endangered and threatened, Whale Shark, Bottled nose Dolphin and four species of sea turtles but reports suggest that only the Olive Ridley Turtle is found to nest here. There are 3 other species of turtles are also reported at coast i.e., the Leather Backed Turtle, Hawks' bill turtle and Green Sea Turtle. Fisheries related mortalities are the major threat to Olive Ridley turtle. Conservation efforts address these issues and also the effects of coastal development and artificial illumination especially at beaches that support relatively high densities of nesting of Olive Ridley turtle. The forest department has taken up a proactive role and various management interventions have been taken up in co-operation with fisheries department and NGOs.

1.8.1.2 Valley Portion

The valley portion is in between two hillocks having gentle to steep slopes and ravines. The important water bodies in the adjoining Kambalakonda Wildlife Sanctuary are good resources for the sustenance of various flora and fauna and excess water flows into the zoo park. Hence the zoo park looks green almost throughout the year. Most of enclosures of the zoo park are located in this valley portion.

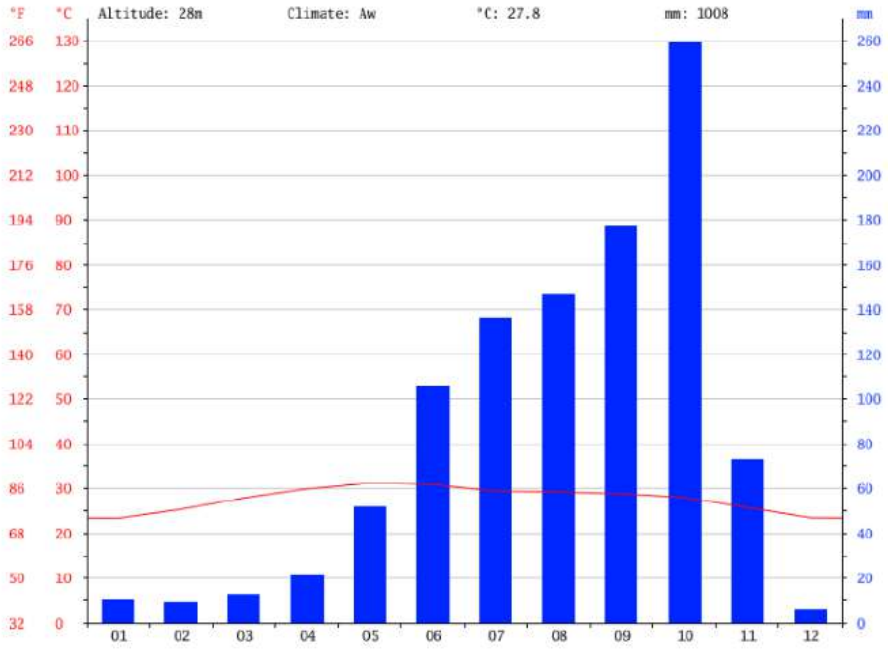
1.8.1.3 Hills

Zoo park consists of two hillocks on two opposite sides and these hills are the habitat of the flagship species like leopard, because of the fast pace of development habitat destruction is taking place and the animals are straying into human habitations.

1.8.2 Climate

This Park, lying in a tropical monsoon climate belt with two distinct rainy seasons, viz., South West Monsoon (June-September) and North East Monsoon (October-November), enjoys a humid climate with an average annual rainfall of 900–1600 mm. 70% of rainfall occurs during the SW monsoon and remainder of 30% rainfall is during the NE monsoon. Temperature falls with the onset of SW monsoon to reach a minimum in mid-January (~12ºC), but later rises a mean maximum of 30o C by the end of May. The temperature rises to 400C during the hottest months. The zonal temperature gradients are not steep on account of low elevation of hills and the months of November, December, and January are the winter months. The humidity is comparatively high and fairly uniform during most of the year and the mean daily relative humidity over a year is about 75% at 0800 hrs and 70% at 1700 hrs. Heavy winds and gales are common in summer months. Normally cyclonic storms hit this region (during June to November with wind velocities in the range of 60-90 km/h) when depressions in the Bay of Bengal transform to cyclones.

Figure 3 Climate Graph of Visakhapatnam



1.8.3 Geology

The Geology of the Park is predominantly a Khondalite group of rocks probably belongs to lower Precambrian age. The Tertiary formation is represented by the Laterite and red loam with pebble beds. Rocks of the region are essentially of Khondalite group with a few

Charnokitebands, Granites, Quartzite's, Calci-granulites and Pegmatites. The terrain of the region is undulating with gentle to steep slopes and mirrors multiple aspects (mostly) of Eastern Ghats.

1.8.4 Rainfall

The district receives annual rainfall of 1082.5 mm of which South-West monsoon accounts for 89.8% and while North-East monsoon contributes 15.2%. The rest is shared by summer showers and winter rains. Visakhapatnam city receives annual rainfall of 1202 mm of which south-west monsoon contributes 70% while north-east monsoon contributes about 30% of the rainfall.

1.8.5 Season

The season can be divided into two types: i. April to October is the summer season which is very humid and hot ii. November to March is the winter season. December to February experiences little cold during winter and other months will have little humid weather.

1.8.6 Rock and Soil

The underlying rocks are Granite, Gneiss or Plutonic Igneous rocks or Archean groups. In the plains, Quartzite and Granite are the main rocky formations. In the hills, Granite, Quartzite and seismic Gneisses are the predominant rock formations. The important minerals accruing in these tracts are Magnetite and Hematite. The Soil types vary from red loam mixed with Quartzite on hill slopes to sandy loamy and clay in laver slopes and valley with depth of 2 to 3 meters.

1.9 Flora and Fauna of the Zoo Premises

1.9.1 Flora

The zoo park is part of natural forest which is mainly deciduous in nature. Flora in valley region is denser with good under growth. As per the Champion and Seth's classification, Indira Gandhi Zoological Park, Visakhapatnam flora falls under technical description of 6 A/c1, Southern tropics dry thorny forests. The species are *Albizzia amara, Acacia leucocephala, Erythroxylon indicum,Xylophorussp., Strychnusnux-vomica,Grewiatiliaefolia,Brideliaretusa, Randiadumetorum, Wrightiatinctoria, Emblica officinalis, Feronia elephantum.* Under growthconsists of *Carissa carandus, Cassia auriculata, Dodoneaeviscosa, Asparagus recemosus,* etc. The list of the flora present is given in **Annexure - I.**

1.9.2 Fauna

The zoo park is inhabited with varieties of free ranging species like Spotted deer, Sambar deer, Porcupine, Civets, Python, Indian Cobra, Russel's Viper, common Monitor lizard, Peafowls, Owls, Rose-ringed parakeets, Alexandrine parakeets, White-bellied Sea Eagle, Brahminy Kite, Pariah Kite, Munias etc. The list of fauna of IGZP campus is given in **Annexure - II.**

1.10 Approach

Zoo is located 8 km from bus station (RTC Complex) and 12 km from Vizag Railway Station and 18 km from Airport.Visakhapatnam is the second largest city of Andhra Pradesh around 750 kilometres from Hyderabad, the state capital of AP. The zoo is situated on National Highway 5 which connects the 2 major cities of country i.e. Kolkata and Chennai. The city is well connected by road, train and air from all the major cities of the country.

1.11 Demography of the surrounding area

The population of district is 42.88 lakhs as per 2011 census and this contributes to the 5% population to the state of Andhra Pradesh. The Visakhapatnam city extended far behind the zoo park and many habitations have come up around the zoo park. The city population has increased beyond 20 lakhs.

1.12 Legal status of the Land

Indira Gandhi Zoological Park, Visakhapatnam falls in Seethakonda Forest Block of Visakhapatnam Forest Division which was notified Under Section 4 of old Madras Forest Act. The Indira Gandhi Zoological Park, Visakhapatnam falls in 563 and 564 Compartments of Seethakonda Reserve Forest. Documentary support for the legal status is appended in Annexure-XVI.

1.13 Sources of Pollution

Vehicles plying along NH-5 cause noise pollution by continuous horns and most of the vehicles running on the highway are diesel run so they emit a lot of smoke. This is not a considerable problem as the enclosures are distant from the entrance and the green belt is properly maintained along the highway and zoo premises as well.

1.14 Zoo Ethics

Zoo is run by Andhra Pradesh Forest Department and is recognized by Central Zoo Authority of India as a large zoo to serve as a role model for other upcoming zoos of the Country. Zoo gets grants from Government for salaries and maintenance in addition to zoo revenue. To provide visitor services, environmental awareness, recreation and other non-tangible benefits to the society at affordable prices, the Government provides funds to meet the gap between the revenue and expenditure.

1.15 Description about various facilities

Besides the impressive display of wildlife, IGZP is popular for its natural beauty. Visitors relax and children keep playing in several areas of the Zoo. The Zoo is a hub of high activityon all weekends, holidays, vacations of schools. For the benefit of visitors, various amenities are being maintained regularly like Battery Operated Vehicles, Benches, Shelters, Rachabandas (under tree sit outs), cold drinking water with RO points, Canteen, Interpretation Centre, Auditorium, Library, Toilets etc are set up at various places for the convenience of visitors.

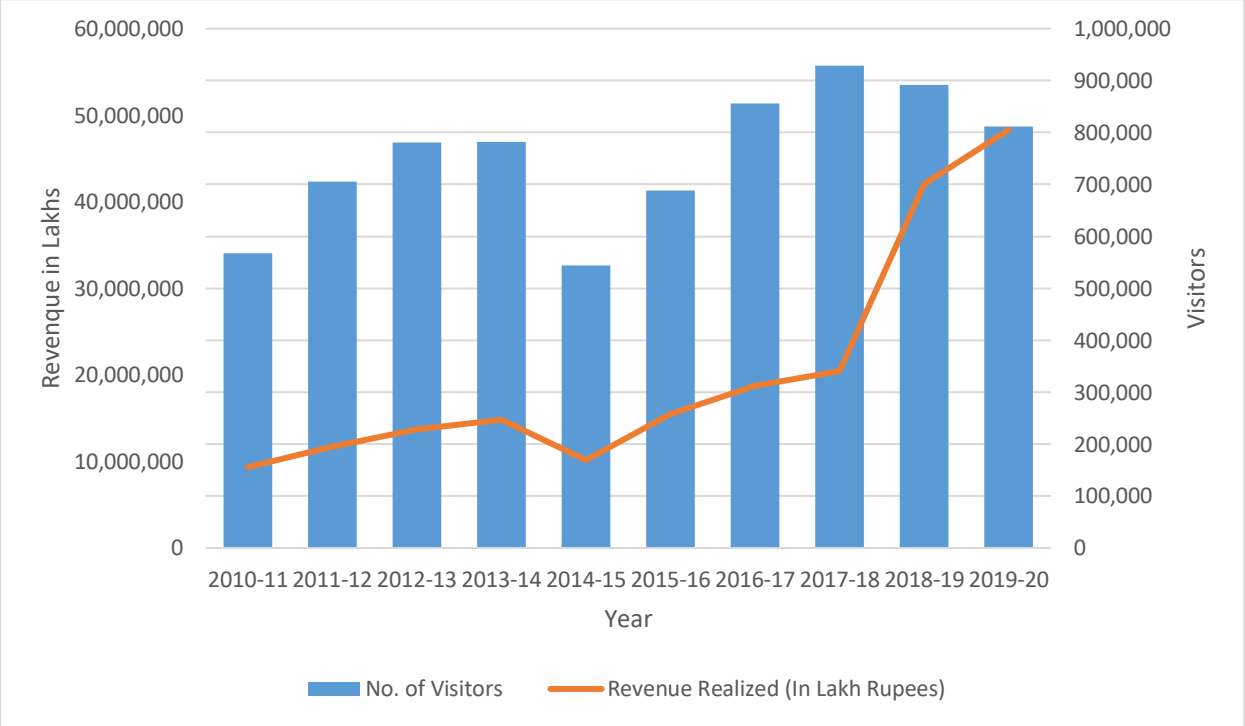
1.16 Visitation and revenue generated for the past 10 years

By analysing the past decade, we can see zoo has registered a trend of increased annual visitation every passing year. In 2014-15 damages due to ‘Hud-Hud’ cyclone impacted the annual visitation negatively, which continued in 2015-16, again from 2016-17 onwards the visitor inflow started increasing. There is a dip noticed in 2018-19 with a general impression of two cyclone warnings the city of Visakhapatnam faced during this period (Titli and Phethai cyclones) but fortunately did not suffer any damage unlike the Hud-Hud of 2014.8th Governing board meet of Zoo Authority of Andhra Pradesh (ZAAP) has approved the increase in adult ticket charges (Children ticket charge remained unchanged as Rs.10) and other entry charges in IGZP, which has doubled the gate collection income to the Zoo during 2018-19.

Table 1-1Revenue and visitation over last decade

S. No.	Year	No. of Visitors	Revenue Realized (In Lakh Rupees)
1	2010-11	5,67,199	93,40,494
2	2011-12	7,05,198	1,17,15,405
3	2012-13	7,80,352	1,37,36,977
4	2013-14	7,81,559	1,48,45,836
5	2014-15	5,43,504	1,01,77,032
6	2015-16	6,87,943	1,54,69,451
7	2016-17	8,55,692	1,87,69,385
8	2017-18	9,29,011	2,04,64,706
9	2018-19	8,91,192	4,20,14,850
10	2019-20	8,11,989	4,83,20,504

Graph 1-1the Visitation and Revenue during the past ten years



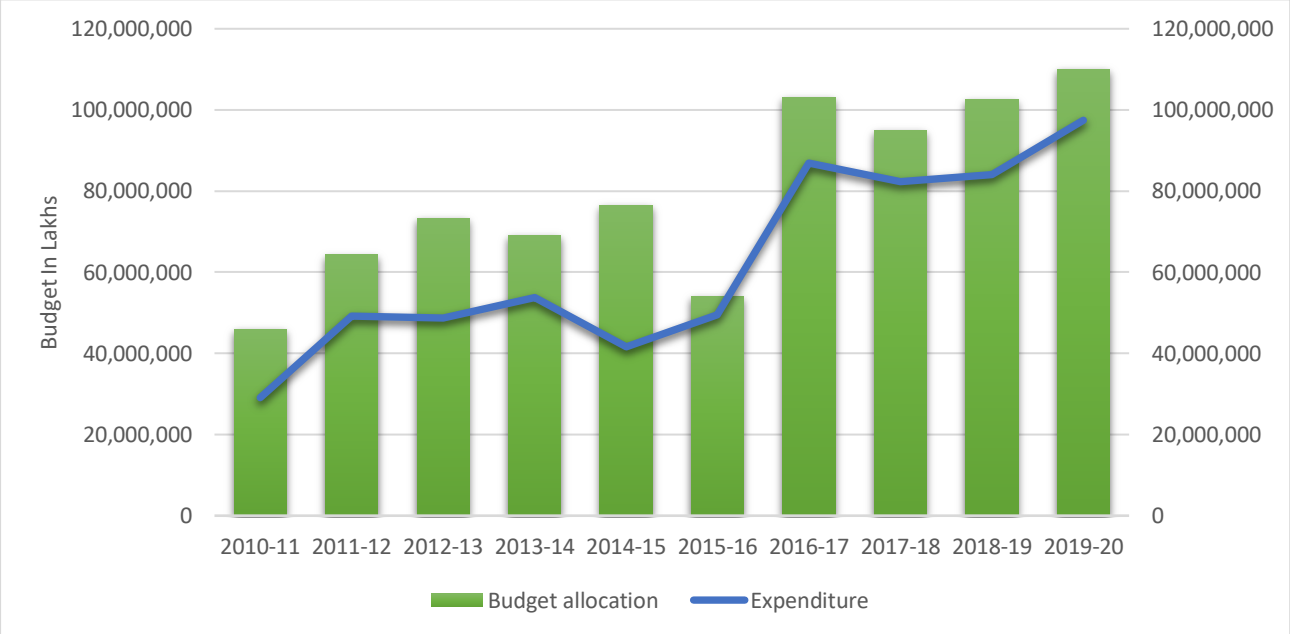
1.17 Budget allocation and Expenditure for the past 10 years

Budget received under plan and non-plan heads of various schemes in Zoo and expenditure for the last ten years gives an account of its importance both economically as well as its capacity to sustain on its own.

Table 1-2. Budget allocation and Expenditure particulars for last ten years

S. No.	Year	Budget allocation Rs. (in Lakh)			Expenditure Rs. (in Lakh)
		Plan	Non Plan	Total	
1	2010-11	3,53,23,800	1,06,07,500	4,59,31,300	2,90,80,497
2	2011-12	5,22,36,900	1,20,17,500	6,42,54,400	4,92,57,879
3	2012-13	6,02,22,000	1,30,18,000	7,32,40,000	4,86,88,982
4	2013-14	5,69,57,900	1,21,14,500	6,90,72,400	5,37,98,068
5	2014-15	6,70,43,906	94,77,900	7,65,21,806	4,16,54,688
6	2015-16	4,30,23,000	1,09,17,250	5,39,40,250	4,95,27,288
7	2016-17	6,36,59,000	3,93,56,000	10,30,15,000	8,68,26,500
8	2017-18	5,36,90,200	4,12,91,900	9,49,82,100	8,23,97,200
9	2018-19	5,86,02,000	4,40,44,900	10,26,46,900	8,40,96,800
10	2019-20	7,77,34,100	3,22,99,100	11,00,33,200	9,74,55,300

Graph 1-2the Budget allotment and Expenditure for past ten years



1.18 Brief description about APDRP- World Bank project

The very severe cyclone storm Hud-Hud on October 12th, 2014 substantially damaged the fabric and structure of the vegetation and property/infrastructure developed in the last four decades. The AP Disaster Recovery Project funded by World Bank is to restore the severely damaged Indira Gandhi Zoological Park, Visakhapatnam due to this cyclone.

Support under this component includes restoration & enhancement of damaged environmental services and facilities viz., infrastructure etc., in the Indira Gandhi Zoological Park, Visakhapatnam and to augment the facilities to international standards (as per IUCN'S ex-situ conservation guidelines).

The World Bank earmarked US$ 6 million to restore the damage occurred to office buildings, vegetation, compound walls, aviaries, carnivore enclosures, main gate, visitor facilities, ARC, stand-off barriers, vehicles, rescue shed, canteen, zoo workshop, booking counter, zoo hospital, Post-mortem room, incinerator room, in-patient ward, Quarantine block, zoo staff quarters, fodder plot, pump sheds, signages, hoardings, electrical systems, communication system, CCTV and Security system, water supply, roads etc. The proposal considers restoring and rebuilding all the damaged facilities to international standards with a focus on education, nature information and conservation.

As a part of this project the department has called for Expression of Interest to select the consultants for preparation of Master Plan, Designs etc. Learned Nature Consultants, Raipur was working as the consultancy for planning and redevelopment of IGZP. On closure of contract with this agency on grounds of non-deliverables, Prem-Chaudhery Associates, New Delhi in collaboration with CED and Target Euro has undertaken the balance work of consultancy. The updated CZA approved Master layout plan of the zoo, Master plan document incorporating the redevelopment planned as part of APDRP and the Detailed Project Reports are submitted by the agency as part of the deliverables.These details are incorporated into this Master Plan document.

Figure 4 Asian Elephants at IGZP, Visakhapatnam

Chapter 2 Appraisal of the present arrangement and constraints

Indira Gandhi Zoological Park, eventhough has geographical area of 625 Acres but much of the area is taken by two hills with steep slopes and a valley. This leaves about 200 acres in central area and another pocket of approx. 75 acres on its northern site. This pocket is less accessible and is isolated. Central area forms the existing Zoo which is accessible from South-East as well as from West. West, being the entry point, a 3.05 Km. ring road around central area forms main circulation path. Most of the exhibits are around this main BT road of 5m width and it connects visitor entry point and also the service gate. The entrance plaza is connected with the National Highway–5. A natural drain flows through the centre of the Zoo Park which is main source of recharging the water table of the zoo region with bore wells.

2.1 Animal Section

This is a vital section of the Zoological Park. Most of animals are Zoo borne or acquired from other Zoos or from the rescue - squads or general public. As per the guidelines of the National Zoo Policy (1998), Zoo Park does not collect animals from wild except for founder animals for approved breeding programme and for infusion of new blood into inbred group of animals, as far as possible, are kept in enclosures which allow them to fulfil their behavioural and physical requirements.

This zoo has specialized sections like large carnivore section, primate section, bear section, herbivore section, small carnivores, reptile section, Nocturnal Animal House, aviaries etc., for better appreciation and understanding of animal world by visitors.

2.1.1 Herbivores

This section includes Indian Elephant, Indian Rhino, Indian Gaur, Barking deer, spotted deer, Swamp deer (Barasingha), Sambar deer and Hog Deer. Among the antelope species we have Nilgai, Chowsingha and Black bucks housed in large open moat enclosures.

2.1.2 Primates

Primates housed are Rhesus, Bonnet and Stump Tailed Macaques, Common Marmoset, Sacred baboon, Ring tailed Lemurs etc.

2.1.3 Carnivores

Includes big cats like Royal Bengal Tiger, Lion, Leopard, White tiger and small carnivores section houses animals like Jackals, Wolf, Hyena and Wild dogs etc.

2.1.4 Aviaries

Birds section has exhibits for Alexandrine Parakeet, Rose Ringed Parakeet, Grey and Rosy Pelicans, White Ibis, Grey Herons and Painted Storks. The exotics like Ostrich, Emu and Green Winged Macaw, Blue Gold Macaw, Sulphur crested Cockatoo, Goffin's cockatoo etc., are housed separately in independent enclosures and parrot aviary respectively. The pheasants constitute a separate section with Golden pheasant, Lady Amherst pheasant, Silver pheasant, Ring necked pheasant, Red Spur fowl, Red jungle fowl, Grey Jungle fowl, Common peafowl and White peafowl.

2.1.5 Reptiles

This section includes the snakes like Python, Rat snakes, Indian Cobra and lizards like water and common Monitor Lizards; Terrapins and Star tortoises. All the three Indian Crocodiles- Mugger, Gharial and Estuarine Crocodiles are provided separate enclosures with large ponds inside in the zoo.

2.1.6 Nocturnal Animal House

It houses the Porcupine, Barn owl, Great Indian Horned owl, Wood owl, Fruit bats, Jungle cat, Palm civet and Rusty spotted cat.

2.1.7 Fish Aquarium

It was established in the recent past with 30 glass tubs and about 45 varieties of fishes, attracting visitors a lot. It was named Meenalokam and there is a plan for further expansion to facilitate the breeding of rare and exotic fishes.

2.1.8 Animal Rescue Centre

Zoo has an Animal Rescue Centre where the lions and the tigers are kept which is rescued from various circuses all across the country. The ARC has been constructed with the financial assistance from Central Zoo Authority. The CZA also provides assistance for its maintenance. The ARC is having a spacious day and night kraals for animals. At present, the ARC is having 2 tigers and 4 lions. ARC is a satellite facility located about 2 Km from zoo park which may be converted into a tiger/lion safari in future. A portion of it can be modified for developing a well-equipped quarantine facility for all the categories of animal species.

2.1.9 Staff at Zoo Park

The total staff strength (81 nos) was sanctioned in between 1972 to 1978 vide GO.Ms.No.1579 of F&A (For-III), dept dt.10.11.1972 and GO.Ms.No.462 of F&RD dept dt.24.04.1978 for manning the 13 enclosures for Primates (5 Nos), Sloth Bears (1), Leopard (1), Indian Guar (1), Spotted Deer (1), Sambar Deer(1), Crocodiles (2), Elephant (1) and subsequently two (2) more enclosures for Tigers & Lions was added during the year 1980. Though the enclosure / sections increased to 5 times of the initial sanction strength (during 1972 to 1978), the present sanction posts remain same besides that there are 12 more than 50% vacancies which is aggravating the problems in management of Zoo to the set standards. Out of 25 Animal Keepers, only 06 number of Animal Keepers working at present, which makes it more challenging.

The animal section is looked after by the following staff

Table 2-1 Number of staff at Zoo Park

S. no	Name of the Post	Sanctioned post	Filled	Vacant
1	Forest Range Officer	2	2	-
2	Forest Section Officer	2	2	-
3	Animal Keeper	25	6	19
4	Work Charged employees	22	6	16
5	Watchman	6	3	3

2.1.10 Status of Animals

The Indira Gandhi Zoological Park, Visakhapatnam exhibits the following number of species and specimen.

Table 2-2 Status of Animals

S. No.	Type	No. of Species	No. of Specimen
1	Mammals	33	391
2	Birds	38	219
3	Reptiles	12	212
Total		**83**	**822**

The inventory of animals as on 31.03.2021 at Indira Gandhi Zoological Park, Visakhapatnam is in **Annexure - III.**

2.1.11 Duties and Responsibilities of Animal Keepers

i. To carry out the cleaning of animal enclosures, night houses and surroundings daily.
ii. To provide feed and water to animals, birds and to submit regular ration requisition according to need.
iii. To report the condition of the animals on health, feeding, mating, breeding etc.
iv. To ensure safe capturing and transportation of animals when required.
v. To keep liaison with veterinary section for health problems and treatment.
vi. To keep liaison with maintenance section for repair and continuation of civic services.
vii. To maintain the records of all the species and inventories of the section.

2.1.12 Constraints in Animal Section

The animal section has constraints that can be broadly listed as below:

i. Inadequate trained personnel.
ii. Stump-tailed macaque, Rhesus macaque, Bonnet Macaque, Sacred baboon and Ring-tailed Lemur require new night houses as the existing ones are old, constructed below the ground level, which allows less penetration of sunlight and natural ventilation.
iii. There are no night houses/off display areas/Paddocks in Birds Aviaries, Giant Squirrel and Sambar deer
iv. The enclosure of Giant Squirrel needs to be revamped
v. Nocturnal Animal House requires improvement.
vi. Certain enclosures do not have withdrawal areas and restraining facilities – Tigers, Lions, Leopard, Bears etc.
vii. Lack of proper drainage system in some of the enclosures.
viii. Over-crowding in some enclosures like Sambar, Chital, Black buck etc.

2.2 Veterinary Section

Animal health care is one of the important disciplines in the management of the zoos. The health care system is monitored by the zoo veterinarian assisted by Junior Veterinary Officer, Biologist and Lab Technician. As per the C.Z.A guidelines zoo hospital is equipped with an inpatient ward, quarantine section, operation theatre, laboratory, post-mortem room, tranquilization equipment, portable mobile X-ray etc. This section is responsible for the health care of the animals.

2.2.1 Role of Zoo Veterinary Officer(Vet. Asst. Surgeon)

i. General inspection of zoo animals, identification of sick animals and treating them.
ii. Formulation of diet and quality control of food/feed issued to zoo inmates.
iii. Following prophylactic protocols – periodical parasitological examination of faeces, pellets and blood samples
iv. Deworming, vaccination and disinfection.
v. Planning and designing a breeding strategy of the important species and related husbandry activities.
vi. Following procedures for preventive diseases control in zoos.
vii. Physical and chemical capture of zoo animals and straying wild animals.
viii. Imparting hands-on training to Veterinary graduate students as per MOU between Veterinary University and Forest Department.
ix. To check the quality of the food received from different venter's daily.
x. To maintain inventory of the equipment and medicines.
xi. To maintain the record of all the animals housed in the zoo, animal history sheet, health card etc. and also for the animals kept in impatient ward.
xii. To update information in ZIMS module and maintain regular veterinary discussion groups for knowledge exchange with Zoos nationally and internationally.

2.2.2 Facilities available at Zoo Hospital

Zoo hospital has the following facilities to meet the requirements of Heath care management of captive wild animals.

i. Zoo hospital is having operation theatre with basic facilities.
ii. Separate Inpatient Ward is provided for treatment to sick animals
iii. A quarantine section is underway. Presently we are having a make shift 'Q' section and new section is under process of sanction.
iv. New tranquilization equipment was procured.
v. Portable mobile X-ray unit
vi. Digital X-ray with CR systemare procured in 2019-20 and more equipment for animal immobilization, restraint, rescue operations are planned for the year 2020-21.

Figure 5 Proposed Veterinary Hospital 3D View

2.2.3 Operation Theatre

The Operation theatre attached to the Zoo Hospital is serving to attend surgical operation on captive wild animals like Primates, Tigers, Lions, Leopard small herbivore animals (Deer) and other small carnivores. Cases like in-fighting, tear wounds, abdominal injuries, fracture, vasectomy, removal of antlers, amputation of injured limbs etc. are attended here. The equipment available in the Operation theatre are Foldable operation table, Halogen focusing lamp, Anaesthesia machine, Oxy-pulse meter, Surgical unit, Ultrasound Scanneretc.

2.2.4 Pharmacy

The required quantity of veterinary medicine, which includes emergency supplements, medicines, anti-venom, antibiotics, analgesics, antihistamines and anthelmintic, dressing material, vaccines and nutritional supplements are kept in Zoo pharmacy on ready to use basis.

2.2.5 Sterilization and compounding room

Sterilization is an important part of treatment being provided to the captive wild animals. All surgical equipment and tranquilizing equipment accessories are sterilized before using in hot water sterilization bath and autoclave. The medicines are compounded, measured and weighed in this room before issuing to the sick animals.

2.2.6 Tranquilizing equipment

Chemical restraining is an important procedure for providing treatment, vaccination, shifting and crating of wild animals kept under captivity. The Zoo Hospital is well equipped with tranquilizing equipment and drugs. The Zoo Hospital has got the following tranquilizing equipment.

i. Dis-inject Long Range Projectile Gun model 60 and accessories
ii. Dis-inject Short Range Projectile Gun model 30 and accessories
iii. Blowpipe and accessories.
iv. Dan-inject pneumatic gun model No.3680 MODJM and accessories

2.2.7 Laboratory

A Laboratory has basic facilities to conduct routine tests on daily basis. The laboratory is having a Trinocular microscope with camera, blood biochemical analyser, centrifuge, biological incubator, refrigerator, autoclave, hot air oven etc.

2.2.8 X-Ray Facility

Vizag Zoo has Siemens mobile X-ray unit for its radiology section. Digital X-ray with CR unit will be shortly placed in the veterinary hospital. The radiography is used to assist in diagnosis of fractures, dislocations, infighting trauma, choke, intestinal obstruction, dental problems etc.

2.2.9 Diagnostic Ultrasound Scanning Facility

Ultrasound portable equipment is purchased recently for pregnancy diagnosis and soft tissue scanning mainly in primates and carnivores.

2.2.10 In patient ward

The Zoo Hospital has inpatient facility to house individually to provide necessary treatment under close observation and monitoring. The inpatient wards have squeeze cage facility for restraining of animals.

2.2.11 Brooding room

Most of the pheasants and Peafowl eggs are incubated here for better hatchability and survivability.

2.2.12 Post-mortem room

It is situated away from the hospital and inpatient ward. It is having examination platform, good lighting and ventilation.

2.2.13 Zoo Hospital Activities

i. Routine observation for health, hygiene and breeding management.
ii. Prophylactic measures to control viral and bacterial diseases among ungulates, carnivores and birds.
iii. Periodic supplementation of mineral mixture, essential amino acids and vitamins to promote good health and to reduce stress on the animals.
iv. Treatment of sick and injured wild animals in captive situation.
v. Chemical restraining of wild animals for treatment, crating and shifting purposes.
vi. Hand rearing of rescued wild animals, rejected young ones and young one separated from dam to avoid cannibalistic behaviour of the mother.
vii. Population control of prolific breeders like Spotted deer, Sambar deer, Nilgai and Black buck by adopting control measures.Census of all the mammals, birds and reptiles to prepare inventory report for submission to Central Zoo Authority, New Delhi, which is duly completed by 31stof March every year.
viii. Internship program for final year B.V.Sc., students is being conducted for the veterinary graduates of the veterinary college of Tirupati, Gannavaram etc.
ix. Animal Record Keeping System software of “Species 360” is used for animal history recording and uploaded to “Species 360” website.

2.2.14 Prophylactic Protocols followed at Zoo Hospital

i. Faecal samples examination is done periodically every month.
ii. Mass deworming is done once in 3 months.
iii. Annual vaccination programme is taken with Inj. Fel-O-Vax for allfelids, Inj. Seven in one for all canids, Inj. Triquin for all felids.
iv. Ecto and Endo parasitological control is taken up by Butox spray and Deworming drugs and bush clearing once in three months.
v. Screening of blood for all the felines.
vi. There is approved annual calendar of operations according to CZA guidelines incorporating all the prophylactics, which is provided in **Annexure-IV**

2.2.15 Constraints in Veterinary Section

The zoo hospital certainly needs lot of support to upgrade and modernize its facilities keeping the technological advance in mind.

i. In-patient ward needs to be extended and a facility to rear endangered and orphan animals is to be created.
ii. Operation theatre facilities can be further modernised.
iii. There is need to computerize the records of all animals on studbook, treatment, feeding and post-mortem.
iv. Existing Zoo hospital library needs improvement.
v. Staff is inadequate with respect to animal section and veterinary section
vi. Equipment and accessories are to be procured.
vii. Hospital needs a separate quarantine facility preferably towards one corner to house different species.
viii. Separate hand-rearing section is required for raising orphaned and rescued neonatal animals.
ix. No proper vehicle for zoo hospital staff to go for animal health check-up and Zoo ambulance with all medical care facilities is lacking in the zoo.

2.3 Store and Free supply section

Zoo has a well-constructed store and feed supply section. Every day green feed, fish, chicken, beef and milk is brought to the feed store. The items are weighed by the zoo staff and quality of the feed is checked by the veterinary assistant surgeon before it is being supplied to different sections by feed van. Zoo is having refrigerators also where items are stored as per necessity. Dry feed, pulses, bird feed, giraffe feed, ostrich feed, emu feed, rice and cattle feed are stored in the store and supplied every day to the herbivore sections. Feed supplements are supplied daily to the sections from zoo hospital.

This section is very important as far as animal diet is concerned. Storing of quality food, preparation and supply of food to all animals requires lot of logistic arrangements. The clean and safe diet goes a long way in maintaining the health and upkeep of animals. The Zoo Stores has a total number of four employees. The overall charge of the stores lies with the Forest Range Officer. He is assisted by a Senior Assistant/ Stores in-charge.

2.3.1 Duties and Responsibilities

i. To procure, store and supply the feed items as per requirement
ii. To get the quantity of food checked by the Vet. Asst. Surgeon or Junior Vet. Officer.
iii. To keep the store neat and clean
iv. To prepare the food as per schedule
v. To procure special diet items for lactating and sick animals as per recommendations by the veterinarian
vi. To procure items as required by maintenance or other section.
vii. To keep record of the purchase and disposal of all the items.

For effective receipt and distribution of quality food articles the following equipment are installed in the Zoo stores.

i. Digital Weighing machine - 1 T capacity
ii. Small Weighing equipment - 100 kg capacity
iii. Weight Measurement Scale - 500 to 1000 Kg capacity
iv. Deep freezer - 1 No
v. Heater - 1 No
vi. Gas Stove - 1 No
vii. Geyser – 1 No
viii. Fire Extinguisher – 1 No

The Zoo store-complex has two separate feed preparation rooms each for carnivorous and herbivorous animals, two store rooms and store office. The feeding articles for the Zoo animals are procured based on the tendering procedure for a period of one year.The feed items supplied to the Zoo premises are checked for both quality as well as quantity.

The feed is supplied in feeding troughs to different animal houses, after sorting and mixing. The feed is supplied from the zoo stores to different animal houses by Zoo Transport vehicle.

All the food articles are supplied daily except the items, which are obtained on monthly basis, such as hay, food grains and miscellaneous items required for cleaning purpose such as Dettol, ropes, brooms, phenyl, etc.

2.3.2 Constraints in Stores and Feed Supply Section

Alternate supply chain must be in place in case of any emergencies and stoppage of food article beyond normal circumstances.

- Doctors are advised to work out on alternative food articles for species specific animals.
- Diet chart and Feed Schedules are updated on a regular basis keeping in view of CZA guidelines and local availability. This has to be standardized for new recent additions to our animal collection. Hence this is made part of the agendas in the regular Health Committee meetings to Standardize the Diet chart and Feed Schedule; and theHealth protocols for all animals.
- Lack of Cold Storage Unit
- Shortage of staff

In distribution of feed also, it is essential to ensure that clean and hygienic utensils are used. Personnel handling feed articles or cooking them must be encouraged to observe strict personnel hygiene at all times.

2.4 Sanitation Section

The Animal Keepers & Work Charged Employees deployed at Animal Sections at different parts of the zoo maintains the sanitation of the enclosures as well as the zoo premises. Sanitation includes daily cleaning of the animal enclosures and disinfection, disposal of the faecal and feed refuses, cleaning of water pools, day cages & periodical disinfections of moats by application of lime, bleaching powder and weed removal etc.

i. Disinfections Schedule
ii. Daily cleaning of all the animal enclosures; feeding and watering tubs with disinfectants.
iii. Daily cleaning of drains thoroughly
iv. Daily disposal of faecal& feed refuses
v. Weeding, cleaning debris, foreign particles in enclosures and sprinkling bleaching powder in drains.

2.5 Maintenance Section

All the enclosures need regular maintenance which includes plumbing, electrical, mason and carpenter works. The zoo has all the technicians to carryout the day to day maintenance work at zoo. These technicians are under control of Forest Section Officers who in turn reports to Asst. Curator/Forest Range Officer of the zoo park.

2.5.1 Duties and Responsibilities

a) All floors (wooden, concrete), rods and wiresare sterilized with blow torch twice in a year.
b) Painting of rods, wires are carried out every year.
c) Feeding & watering troughs are washed with lime regularly.
d) The top soil 1" to 2" is removed every year after rainy season.
e) All the petty repair and masonry works are attended by this section
f) They also take up species specific enrichment creation in different animal enclosures with different articles, which helps to improve the animal behaviour in captivity.

2.5.2 Constraints in this section

IGZP maintenance has always been a challenge since the Zoo exists inside a forest. The enclosures are surrounded by native free ranging fauna in natural forest set up brings lot of challenges too zoo management even though it provides a very naturalistic view to the Zoo.

a) Special aids are required to protect staff from free ranging animals while attending their duties.
b) Frequent rusting of iron frames of enclosures, across the stand-off barriers, footages, boards, fencing, bird aviaries etc.
c) Highly expensive to carry out pest control for termites, wood borers, bugs, cockroaches, mosquito, rodents, etc.
d) Presence of various poisonous snakes in the landscape makes it difficult for staff and animals against self-protection.
e) Staff strength under maintenance should be increased for welding, plumbing, sanitation, zoo keeping, electrical, carpentry and mason works respectively.

2.6 Security Section

Zoo is having watch and ward staff as well as private security services. Round the clock security is provided to the zoo park by a reputed security service provider which is finalized through tendering procedure every year. Chief security officer is provided with a vehicle/jeep from 7 PM to 6 AM for taking rounds in the zoo. Security guard work in 3 shifts of 8 hours each and there are 10 security stations during the day visitation time and 6 Security Stations during the night hours in Zoo Park. All the security guards are provided with wireless communication set and their base stations are located at front gate and back gate. This security arrangement is supported by watch and ward staff, who are the permanent employees of zoo park. Assistant Curator and Forest Section Officers supervise security on daily basis. This section takes care of the movable and immovable properties of the park. It has to maintain the law and order situation.

2.6.1 Staff

Table 2-3 Staff of Zoo Keepers

Sl. No.	Post	Sanctioned Post	Filled	Vacant
1	Gate keepers	2	1	1
2	Watch & Ward	6	4	2
3	Private Security Guards	34	34	0

2.6.2 Duties and Responsibilities

a) To protect the movable and immovable properties of the park.
b) To patrol the Zoo area day and night.
c) To ensure visitor safety and prevent attempts to feed/tease animals
d) To maintain the law and order at the entrance.
e) To assist the public in lost and found.
f) To interact with local police whenever needed.
g) To check vandalism, theft and teasing of animals.

Further strengthening of the Security wing is needed with the following measures

a) Require more number of Ex-servicemen security personnel, currently only 3 among all are ex-servicemen.
b) Facility of round the clock (Digital video recording) in all points for viewing the incidents recorded later.

c) Installation of digital public addressing systems at prominent spots to issue instructions to the visitors about Do's and Don'ts in the Zoo and also to inform about any exigencies.

d) Provision of a vehicle as standby during night hours for usage in case of emergency.

2.6.3 Constraints

a) Inadequate staff.

b) Inadequate training.

c) There is need for new wireless sets/Bare stations/Repeaters.

d) Old vehicles in the custody of zoo are causing lot of pollution, also frequent breakdowns troubling the zoo management during exigencies.

e) CCTVs coverage need to be extended to more locations.

2.7 Water Supply Section

Zoo receives its water supply from Municipal Corporation and zoo has 10 bore wells at 10 different locations. Zoo receives rain water and most of it is stored in a natural storage tank called Shanthi Sarovar. The ground water recharge is good and water table is at 6m. There are 31 drinking water points and 8 Reverse-Osmosis (cool water) plants and 04 Water Tanks are of 2 MLD, 0.4MLD, 0.1MLD, 0.1MLD capacity with overall capacity of 2.6 MLDinside Zoo Park which provides drinking water to the (including visitors, staffs and animals). Current water bill payment to GVMC amounts to Rs. 1.9 lakhs/annum (2018-19).

Table 2-4 Locations of Bore wells

S.No.	Bore Locations
1	In front of elephant Enclosure
2	Near to Tiger Enclosure
3	In between Tiger and white tiger enclosure opposite to road
4	Near to Bio-Scope
5	Near to Sagar Gate
6	Near to Nilgai
7	Fodder Sections (4 bore wells)

Table 2-5 Locations of Reverse-Osmosis Plants

S. No.	Reverse-Osmosis (cool water)
1	Near to Main Gate (2)
2	Opposite side of L.T. Macaque
3	Near to Puma Enclosure
4	Near to White Tiger
5	Near to Bio-scope
6	Near to Gharial (2)

2.7.1 Assessment of water demand:

It is imperative to assess usage wise water demand and workout a sustainable water supply system without putting pressure on the already scarce Municipal sources and avoid any further decrease in the water table. Zoo should be made water self-sufficient with abstract watershed management.

Table 2-6Total water available in Indira Gandhi Zoological Park, Visakhapatnam is calculated and tabulated as under (As per study conducted during May, 2018).

S.No.	Component	Water Requirement (in litres / day)
1.	Over Head Tank 1 (Bear Point) (Filled with Bore well water)	2,00,000
2.	Over Head Tank 2 (Pheasant Point) (Filled with Bore well water)	40,000
3.	Over Head Tank 3 (Jaguar Point) (Filled with Municipal water)	10,000
4.	Over Head Tank 4 (Hospital) (Filled with Bore well water)	10,000
	Total:	**2,60,000**

Table 2-7Total water consumption in Indira Gandhi Zoological Park, Visakhapatnam is calculated and tabulated as under (As per study conducted during May, 2018)

S.No.	Component	Water Requirement (inlitres/day)
1.	Water requirement for all the animals and birds	39,313
2.	Water requirement at management zone	5,950
3.	Water requirement for landscape	3,214
4.	Water requirement for recreational zone	33,600
5.	Water requirement for visitors drinking purpose	12,000
6.	Water requirement for facilities (toilets)	40,000
	Total:	**1,34,077**

As seen from both the tables above, there is no shortage to water supply at present in the zoo. There are shortfalls when it comes to distribution, level difference of different enclosure vis-a vis water storage point decides the water pressure to be supplied through the existing system. It is proposed to develop a more efficient water distribution system to address this issue. It is suggested that water meters be installed on water supply lines, tube well outlets and dedicated pumping systems for enclosures washing, watering hedges and lawns etc. Data collected from these meters shall form the basis for detailed designing of various components of the Water Management System.

2.7.1.1 Duties and Responsibilities:

i. To maintain a regular supply of water to all the Zoo area, animal enclosures, office, toilets and drinking points.
ii. To supply the water to the moats for cleaning.
iii. To maintain the pipe lines to check leakage etc.

2.7.1.2 Overview of Water Management System:

Available Water Sources

i. Filtered Water from Municipality
ii. 10 nos. operational bore wells within Zoo complex.
    a. Water Storage: 4 Nos. sumps placed on hillocks, filled up with bore wells water and Municipal supply.
    b. Quality of Distributed Water: Water distributed inside the zoo from Municipal connection is of drinking water quality, whereas water from borewell is distributed as such, no on-site filtration or disinfection attempted.
    c. Water Usage:
        i. For visitors and administrative offices
        ii. Drinking water for animals
        iii. Cleaning and maintenance of animal enclosures

2.7.1.3 Constraints:

At present there is only one plumber/fitter post available to attend to problems in water supply lines. Staff shortage to be addressed along with strengthening the water distribution system.

2.8 Disposal of solid and liquid waste

The solid waste generated in the zoo is segregated at source itself and is being handled scientifically. The non-biodegradable wastes such as plastics are collected at the entrance itself and the collected non-biodegradable items are transported outside the zoo.

All the carnivore sections and primate section has been provided with septic tanks and each septic tank is connected to the soak pit for disposal of waste water. Soak pit helps waste water to recharge ground water. Primates, lion, tiger, white tiger, sloth bear, hyena, wolf, jackal, leopard and wild dog sections are having individual septic tanks with soak pits and proper outlet for water.

2.8.1 Drainage System

Septic tanks have been provided for treating the domestic sewage getting generated from the toilets. In addition to these septic tanks, there are 12 septic tanks and soak pits attached to carnivorous enclosures which receive the enclosure washings. All primates' enclosures are provided with septic tanks and soak pits and then linked with small drains.

2.8.2 Constraints in Disposal of Solid and Liquid Waste

The constraint in disposal of solid waste is transport of the garbage outside the zoo premises and to the dump yard of GVMC. This problem is to be addressed by getting in to an agreement with the GVMC. The problem with liquid waste pertains to few enclosures like Hippo, all Carnivores, Primates etc. This problem is to be sufficed with construction of UGD system and linked to a STP (Sewerage Treatment Plant) unit at the end near Hippo pond. As far as bio-medical waste disposal of zoo hospital is concerned, it may be treated separately.

2.9 Visitor amenities

Visitor management is one of the important aspects of zoo management, they have to be provided with all basic amenities. From the entry to the exit, they must feel comfortable and learn many things about animals or birds. Lot of open spaces with green lawns and gardens, sitting places, drinking water points, well maintained toilets are a must for the modern zoo. Following are the existing facilities in the zoo.

2.9.1 Drinking Water

Reverse Osmosis and cold-water facility are provided at 8 different locations like near Entrance, Primate area, White Tiger enclosure, Bioscope, Serpentarium, Crocodile zone and Sambar enclosure. There are more than thirty-one other safe Municipal drinking water points provided along the visitor circulation pathway.

2.9.2 Visitor Shelters

There are 23 pagodas and 3 more resting points are present in the zoo at different sections like primates, wild dog, leopard, bears, snakes, pheasants, sambar, gaur, spotted deer etc.

2.9.3 Toilets

Toilets for both men and women are available near Primate area, Tiger Enclosure, Bioscope, Indian bird's section, Sambar enclosure, Emu enclosure, Black Buck enclosure and near to Sagar gate. These toilet facilities are maintained in hygienic condition with outsourced personnel by the zoo. Bio-toilet is introduced in the Zoo on trial basis and it is functioning well, the numbers can be increased in the coming years.

Table 2-8 Existing Toilets

S. No.	Description	Existing Numbers
1	Toilet	8
2	Bio-Toilet	1

2.9.4 Other amenities

a. Wheel Chairs at the entrance
b. Parking Stand for parking of vehicles against payment of prescribed fee.
c. First Aid facilities at Entrance and Zoo Hospital.
d. Zoo Souvenir Shop at Entrance plaza to sell gift items like 'T' Shirts, Posters, Caps, Stickers, etc.
e. Brochure containing information about the Zoo.
f. Canteen and Ice-cream Kiosks for refreshments
g. Library facility at Bioscope
h. Interpretation Centre and Museum
i. Auditorium with Wildlife film screening facility- wildlife films are screened daily from 11 am to 1pm and then from 3 pm to 4pm
j. Route Map displayed near Entrance Gate, Carnivore zone, Bear section, Pheasants area and Crocodile zone.
k. Cloak Room near Entrance Gate for keeping Luggage against payment of prescribed fee.
l. Sit outs under big trees (Rachabandas) are provided at Baboon bay, Lemur enclosure, Leopard area, Bear point, Snakes zone, Gharial enclosure, Swamp deer enclosure and Ostrich enclosure.
m. Sitting benches – about sixty well designed ornamental RCC/ wooden benches in visitor circulation area.

General Information: The General information for the visitors is as under:

1. Area - 625 acres
2. No. of Animal houses - 77
3. Zoo Holiday - Monday
4. Timings - 9 am to 5 pm.

Note: Two-wheelers and heavy vehicles are not allowed inside the park.

2.9.5 Constraints in Visitor Management

Vandalism control is the major concern in the zoo. Visitor awareness and controlling mechanism is to be developed. Visitor interaction on regular basis in designated place is not happening. There is a need of open-air theatre and Orientation hall. Non-availability of trained guides is another concern. Modern information kiosk and digital display of daily information on happenings in zoo along with conservation message would enhance the visitor experience.

2.9.6 Changes needed:

- Main ring road needs to be strengthened for long term usage. After the Hud-Hud cyclone the road network requires total revamp. Introduction of cycle track and separate pedestrian lane are part of the planning process.
- Land across Bheemili road (opposite to service gate) is meant for Marine Land Complex showcasing local marine wealth. As this land is not contiguous to the main land, a viable and seamless connection with main ring road loop is needed.
- Currently, we allow private vehicles inside the Zoo. However, we need to work in a direction to stop this practice. As, the visitors grow to a level of one million per annum, mass transport system shall be arranged around the main ring road of 3.05 km. Development of a multilayer parking facility containing the space constraint near the main-entrance as part of this effort is planned under APDRP.The creation of additional parking facility envisaged under APDRP project is yet to be materialized. Increased parking area is very much essential for the stoppage of all the private vehicles entry to the zoo. Currently the entry of vehicles constitutes 27% of total gate collection revenue, which needs to be adequately compensated to run the zoo smoothly while stopping the vehicle entry.Hence, it has been decided to phase out private vehicles in a phased manner due to the current financial position of IGZP and COVID pandemic situation. During 2021-22 to 2020-24: Reduction by 20% and 2024-25 to 2026-28: Reduction by 50% and 2028-29 to 2030-31: Reducation by total 100%.

- At present, 10 Battery operated vehicles (8 seaters and 11 seaters) are being engaged through e-tenders, on lease. This may be sufficient for fulfilling needs for some period but for next 10 years, we need to plan for various and standardized alternatives like e-rickshaws, e-bicycle, trams etc.
- Development of a multi-utility entrance plaza with modernized facilities for ticketing, security checking, cloak room, feeding room for mothers, guided interpretation centre to orient the visitors before they take up the actual visit inside the zoo, different vendors outlets for souvenir items, promotion of go green messages and to get public support for wildlife conservation is planned as part of the APDRP.

2.10 Lawns and Garden-landscape section

The zoo is situated in natural landscape interspersed with tree growth. The undulating topography keeps the park more natural on one side and Bay of Bengal on east. Eight to twelve gardeners are been deployed on contract basis to maintain the hedges and other enrichment activities apart from lawn and gardening maintenance in the zoo park.

Though, the zoopark is cradled in natural vegetation, it still needs to have more aesthetic and landscape development for pleasant appeal to visitors and for zoo inmates. Apart from Natural vegetation, *Acacia auriculiformis* is one of the major species invading most of the off-display areas and hillocks. The systematic phased removal of *Acacia auriculiformis*, *Cassia siamea*and*Eucalyptus*hybridto encourage the native species and if necessary, artificial regeneration of native species is being planned.

Undergrowth vegetation in ungulate enclosures is to be enriched, augmented on rotation basis, same needs to be done outside to support and sustain the free ranging fauna of the park. All the live hedges have to be beefed up with non-browsable, thorny and hardy species immediately on priority. Availability of water resources is to be augmented; edge plantation, lawns, hedges and shrubbery are to be fed with drip irrigation.

Staff: In the Zoo park, there are no permanent staff. Hence the following outsourcing staff are provided to look after this section.

- Garden personnel (Semi-skilled) - 1
- Ordinary garden personnel (unskilled) - 24

2.10.1 Duties and Responsibilities:

- To clean and maintain the garden and lawns
- To maintain trees, plants, lawn by watering
- To prune the drooping branches of the trees
- To maintain the hedge and adding manure in plantation
- To take up pest control measure like termite control among the natural vegetation of this area

2.10.2 Constraints:

- Lack of in-house Nursery of seedlings
- Shortage of garden equipment
- Shortage of staff and gardeners

2.11 Over view of the existing electrical system

Available Electrical Sources: At present there are different supply sources at the site. The entire site had 8 nos. of LT connections. Supply is provided by local supply company. These transformers have been provided by the supply company. LT connections have been provided from these transformers. Supply from the above transformer is from Overhead lines and rewireable fuse type distribution boards have been provided. There are four nos. of LT meter connection for the zoological park.

The details of the meters are as follows		
1	Meter no. 1	1KW single phase
2	Meter no. 2	10HP/7.5KW three phase
3	Meter no. 3	0.26KW single phase
4	Meter no. 4	3KW three phase
5	Meter no. 5	3KW three phase
6	Meter no. 6	3KW three phase
7	Meter no. 7	3KW three phase
8	Meter no. 8	1KW three phase

2.11.1 Constraints:

Existing underground cabling system is poorly maintained. There are number of cable joints. These joints have not been made as per standard practice. Wires have been just twisted and taped. This causes faults. So, installation poses clear dangers to the occupants at many places. A separate High Tension (HT) connection with underground cabling is to be done. Alternate energy sources – Solar unit and also Diesel generators are to be provided to tackle any emergency situation. The redevelopment planning under APDRP incorporates the Solar generating system for the entire zoo area and underground cabling as a cover against future disasters like cyclones.

2.12 Transport and Communication

Indira Gandhi Zoological Park has following vehicles:

1. Maruti SX-4 -For the official use of Curator
2. Assistant Curator-I and II- Bolero
3. Feed Distribution Vehicle- Bolero
4. Bi-cycle
5. Battery Vehicles- For Visitors to go rounds inside zoo

Presently all the vehicles are in working condition and shall be replaced as and when required. There is a requirement of an Ambulance/Clinic Vehicle for the Zoo Hospital, to attend the sick animals, more effectively. Five more vehicles (Battery Operated) may be pressed into service for use by the Park. For the visitors, issuing licence to firms to operate sufficient quantity of battery vehicles are adopted since 2018-19 through e-tenders.

Wireless Network: Zoo being in reserve forest, have less connectivity for various mobile networks. Walkie-Talkies are being used by all for better communication inside the park.

2.13 Animal collection (existing)

The Zoo master layout plan was approved by Central Zoo Authority during September, 2013 and based on the housing facilities described in that layout, collection plan was made and submitted for the approval of CZA. Most of the collection is zoo borne animals and the animals which are required from other zoos in exchange of surplus animals or animal which are rescued from wild. This zoo has acquired most of the animals from Nehru Zoological Park, Hyderabad. Animals are also acquired from Tirupati, Patna and Bhubaneshwar zoos. The need for a scientific collection plan is to acquire animals of strong genetic as well as

physical constitution. Most of the exchanges are the surplus of the other zoos which has been spared by them. After approval of the collection plan made, zoo needs to acquire animals on this scientific management basis for improving the genetic base of present animal collection as well as better visitor's appreciation and to have a better stock for future.

From the inception, Vizag has given importance to the indigenous, endangered, rare and exotic species. The Zoo has not only housed, reared and bred successfully, but also distributed such species to other zoos in the country and abroad. It has become role model to other zoos for scientific display and breeding of animals covering more than 85 species; various factors influencing expertise, infrastructure, climatic condition, selection of pair etc., resulted in successful housing and breeding of animals.

This Zoo has also followed the National Zoo Policy (1998) as far as animal collection is concerned. This issue is to be addressed for better visitor appreciation and to have a better stock for future. The present animal collection is detailed as below, and the future animal collection plan is discussed in the Part-II under Animal Collection Plan.

2.13.1 The present collection of animals of IGZP is appended below:

From the beginning, the zoo has acquired variety of species and this could be possible that the donor zoos having assessed the capability and reputation of Vizag Zoo had spared the animals which were exhibited by them successfully. The collection of animals initially has been on variety of species, both indigenous and exotic.

Table 2-9 Existing Species in IGZP on March 2021

S. No.	Type	No. of species	No. of specimen
1	Mammals	33	391
2	Birds	38	219
3	Reptiles	12	212
	Total:	**83**	**822**

Table 2-10 Existing Stock of Animals in IGZP, Visakhapatnam as on 31.03.2021

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
A	**CARNIVORES**					
1	Asiatic Lion	*Panthera leo*	1	1	0	Indigenous
2	Royal Bengal Tiger	*Panthera tigristigris*	2	3	0	Indigenous
3	White Tiger	*Panthera tigristigris*	3	3	0	Indigenous
4	Panther	*Panthera pardus*	1	1	0	Indigenous
5	Jungle Cat	*Felis chaus*	0	2	0	Indigenous
6	Sloth Bear	*Melursus ursinus*	2	2	0	Indigenous
7	Indian wolf	*Canis aureus*	1	1	0	Indigenous
8	Wild Dog	*Cuon alpinus*	26	10	0	Indigenous
9	Striped Hyena	*Hyaena hyaena*	5	3	0	Indigenous
10	Jackal	*Canis aureus*	8	12	7	Indigenous
11	Asian Palm Civet	*Paradoxurus hermaphroditus*	2	0	0	Indigenous
TOTAL:			**51**	**38**	**7**	
			96			
B	**HERBIVORES**					
12	Black Buck	*Antilope cervicapra*	25	41	19	Indigenous
13	Hog deer	*Axis porcinus*	1	4	3	Indigenous
14	Spotted Deer	*Axis axis*	15	15	12	Indigenous
15	Sambar	*Cervus unicolor*	13	24	12	Indigenous
16	Nilgai	*Boselaphustragocamelus*	0	3	0	Indigenous
17	Barking Deer	*Muntiacusmuntjak*	6	7	9	Indigenous
18	Indian Rhinoceros	*Rhinoceros unicornis*	1	0	0	Indigenous
19	Wild Boar	*Sus scrofa*	6	5	3	Indigenous
20	Indian Gaur	*Bos gaurus*	3	2	0	Indigenous
21	Elephant	*Elephas maximus*	2	2	0	Indigenous
22	Giraffe	*Giraffa camelopardalis*	1	1	0	Exotic
23	Zebra	*Equus quagga*	1	1	0	Exotic
24	Hippopotamus	*Hippopotamus amphibious*	1	1	0	Exotic
			75	**106**	**58**	
			239			

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
	PRIMATES					
25	Stump Tailed Macaque	*Macaca arctoides*	0	1	0	Indigenous
26	Rhesus Macaque	*Macaca mulatta*	3	2	0	Indigenous
27	Bonnet Macaque	*Macaca radiata*	8	10	5	Indigenous
28	Chimpanzee	*Pan*	0	2	0	Exotic
29	Hamadryas Baboon	*Papio hamadryas*	1	4	0	Exotic
30	Ring tailed Lemur	*Lemur catta*	4	6	0	Exotic
31	Common Marmoset	*Callithris jacchus*	1	0	0	Exotic
			17	**25**	**5**	
			47			
	RODENTS					
32	Indian Porcupine	*Hystrix indica*	3	2	3	Indigenous
33	Indian Giant Squirrel	*Ratufa indica*	1	0	0	Indigenous
			4	**2**	**3**	
			9			
	REPTILES.					
34	Indian Cobra	*Najanaja*	2	4	0	Indigenous
35	Indian Rock Python	*Python molurus*	1	6	0	Indigenous
36	Indian Rat Snake	*Pytasmucosus*	4	6	0	Indigenous
37	Water Monitor Lizard	*Varanus salvator*	1	1	1	Indigenous
38	Bengal Monitor Lizard	*Varanus bengalensis*	3	1	0	Indigenous
39	Indian flap-shell turtle	*Lissemys punctata*	2	1	0	Indigenous
40	Star Tortoise	*Geochelone elegans*	7	22	118	Indigenous
41	Gharial	*Gavialis gangeticus*	0	6	0	Indigenous
42	Salt Water Crocodile	*Crocodylusporosus*	0	3	0	Indigenous
43	Mugger	*Crocodylus palustris*	1	2	0	Indigenous
44	Red eared slider Turtle	*Trachemys scripta elegans*	1	6	0	Exotic
45	Green Iguana	*Iguana iguana*	1	2	10	Exotic
			23	**60**	**129**	
			212			

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
	AVES.					
46	Lesser Adjutant stork	*Leptoptilosjavanicus*	1	0	0	Indigenous
47	Painted Stork	*Mycteria leucocephala*	6	7	0	Indigenous
48	Sarus crane	*Grus antigone*	1	0	0	Indigenous
49	Black headed Ibis	*Threskiornismelanocephalus*	0	0	2	Indigenous
50	Grey Heron	*Ardea cinerea*	1	1	1	Indigenous
51	Spot billed pelican	*Pelecanusphilippensis*	3	2	2	Indigenous
52	Rosy Pelican/ Greater White Pelican	*Pelecanusonocrotales*	1	1	0	Indigenous
53	Bar headed geese	*Anser Indicus*	1	0	0	Indigenous
54	Black Kite	*Milvus migrans*	0	0	3	Indigenous
55	Hill Myna	*Gracula religiosa*	0	0	2	Indigenous
56	Rose Ringed Parakeet	*Psitaculakrameri*	9	10	0	Indigenous
57	Alexandrine parakeet	*Psittaculaeupatria*	8	5	2	Indigenous
58	Grey Jungle Fowl	*Gallus sonneratii*	1	0	0	Indigenous
59	Indian Peafowl	*Pavocristatus*	13	15	10	Indigenous
60	White Peafowl	*Pavocristatus*	2	0	0	Indigenous
61	White Cockatoos	*Cacatua alba*	1	1	0	Indigenous
62	Indian Great Horned Owl	*Bubo bubo*	0	0	0	Indigenous
63	Barn Owl	*Tyto alba*	2	1	0	Indigenous
64	Red spur fowl	*Galloperdixspadicea*	1	0	0	Exotic
65	Green winged Macaw	*Ara chloropterus*	0	1	0	Exotic
66	Blue Gold Macaw	*Ara ararauna*	1	1	0	Exotic
67	Orange winged Amazon	*Amazona amazonica*	1	0	0	Exotic
68	Sulphur Lesser Crested Cockatoo	*Cacatua galerita*	1	0	0	Exotic
69	Goffins Cockatoo	*Cacatua goffini*	2	0	0	Exotic
70	African Grey Parrot	*Psittacus erithacus*	0	1	0	Exotic
71	Eclectus Parakeet	*Electusroratus*	1	1	0	Exotic
72	Jandya conure	*Aratingajandaya*	0	3	1	Exotic

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
73	Sun conure	*Aratingasolstitialis*	1	1	0	Exotic
74	Budgerigar colour morphs	*Melopsittacus undulatus*	12	15	13	Exotic
75	Peach faced Love bird	*Agapornis roseicollis*	12	8	0	Exotic
76	Cockatiels colour morphs	*Nymphicus hollandicus*	5	5	0	Exotic
77	ViloletNaped Lory	*Loriusdomicella*	0	1	0	Exotic
78	Black Swan	*Cygnus atratus*	1	1	0	Exotic
79	Ostrich	*Struthio camelus*	1	0	0	Exotic
80	Emu	*Dromaiusnovaehollandiae*	4	5	0	Exotic
81	Lady Amherst's pheasant	*Chrysolophusamherstiae*	2	0	0	Exotic
82	Golden Pheasant	*Chrysolophus pictus*	0	1	0	Exotic
83	Silver Pheasant	*Lophuranycthemera*	0	1	0	Exotic
TOTAL:			**95**	**88**	**36**	
			219			

ABSTRACT

S.No.	Species	M	F	U	Remarks
A	CARNIVORES	51	38	7	
B	HERBIVORES	75	106	58	
C	PRIMATES	17	25	5	
D	RODENTS.	4	2	3	
E	REPTILES	23	60	129	
F	AVES.	95	88	36	
		265	**319**	**238**	
Grand Total:		**822**			

Existing collection of animals 2020-21 to 2040-41

Sl. No	Species	Existing collection			Percentage (%) of total collection	
		Indigenous / Endangered / National Importance species	Exotic	Total	Indigenous / Endangered / National Importance species	Exotic
1	Carnivores	11	0	**11**	13.25%	0
2	Herbivores	10	3	**13**	12.05%	3.61%
3	Primates	3	4	**7**	3.61%	4.82%
4	Rodents	2	0	**2**	2.41%	0
5	Reptiles	10	2	**12**	12.05%	2.41%
6	Aves	18	20	**38**	21.69%	24.10%
	Total:	**54**	**29**	**83**	**65.06%**	**34.94%**

Note: In the existing collection plan of IGZP Indigenous species of endangered/ regional/ national/ Indian subcontinent form 65.06% of the collection, where as 34.94 % belongs to the exotic/global collections. Out of this 34.94% of global collections other than from our country, Aves forms major part with 24.10 % and rest of the fauna belonging to mammals and reptiles put together is coming 10.84%.The Aviaries in IGZP suffered major damage during the cyclonic storm, which made it difficult for the zoo to house the indigenous bird species which made the exotic birds forming large part of the aviary collection. Hence, to compensate the deficit in indigenous species, the damaged aviaries are proposed for rebuilding in the locations as per the approved layout plan and the Walk-Through Aviary location is demarcated freshly in the modified layout plan so as to house more number of indigenous bird species, which are added in the fututre animal collection plan.

In this regard, the proposed animal collection plan under this Master Plan does include more of indigenous species(75%) and less of exotic species (25%) so as to meet the objective of conservation of the self-sustaining, genetically and behaviourally viable populations of endangered animal species in order to use them as an ex-situ gene pool in long-term conservation of these species. The addition ofmore number of indigenous species focuses on the ex-situ conservation of critically endangered fauna with special focus on the endemic fauna of Eastern Ghats with also a special focus on amphibians, reptiles and birds besides the mammals. The inclusion of more number of species in the animal collection plan will be taken over a period of time and will be housed in the new enclosures to be built in the existing area of zoo with the approval of CZA as and when required.

EXISTING STOCK OF IGZP IN ORIGIN WISE:

A. Asian (Indian Subcontinent) origin

Mammals: Royal Bengal Tiger, White Tiger, Asiatic Lion,Common Leopard, Asiatic Wild dog, Indian Grey Wolf, Striped Hyena,Goldenjackal,Jungle cat, Common palm civet, Sloth bear,Asiatic elephant, Indian Rhinoceros, Indian Gaur, Sambar, Nilgai, Black Buck, Spotted deer, Hog deer, Indian Muntjac (Barking deer) , Wild boar, Rhesus macaque, Bonnet Macaque, Stump tailed macaque, Indian giant squirrel, Indian Porcupine etc.

Birds: Grey Jungle fowl,Red Jungle Fowl, Common Peafowl, Red spur-Fowl, Common Barn Owl, Indian great horned owl, Alexandrine parakeet, Rose-Ringed parakeet, Black-crowned Night Heron, Rosy Pelican, Grey pelican, Painted stork, Lesser adjutant stork, Grey Heron, Black headed white Ibis, Silver Pheasant, Lady Amherst's Pheasant, etc.

Reptiles: Indian Cobra, Common Rat snake, Indian Rock Python, Mugger Crocodile, Estuarine Crocodile, Gharial, Star tortoise, Indian flap shelled turtle, Red eared roofed turtle, Bengal Monitor lizard, Water Monitor Lizard,

B. Australian origin

Birds: Emu, Black Swan, Violet Napped Lory, Budgerigar, Eclectus parakeet,Goffin's cockatoo, Lesser Sulphur crested cockatoo, Grey Cockatiels, White Cockatiels.

C. African origin

Mammals: Ring-tailed lemur, Northern Giraffe and Grant's Zebra.

Birds: Common Ostrich, Lovebirds, Peach-faced Love Bird, Grey Parrot.

D. North and South America:

Mammals: Common Marmoset, Hippopotamus, Green iguana.

Birds: Mute Swan, Blue Gold Macaw, Green Winged Macaw, JandayaConure, Sun Conure, Golden Pheasant, etc.

Vizag zoo is housing few single animals, and attempting to bring the opposite sex. List of single and mono-sex animals are as follows:

Table 2-11Single and mono-sex animals

S. No.	Animal Name	Existing Stock			Required Stock		
		M	F	U	M	F	U
1	Indian Rhinoceros	1	0	0	0	1	0
2	Nilgai	0	3	0	2	0	0
3	Barasingha	0	0	0	2	2	0
4	Stump tailed macaque	0	1	0	1	1	0
5	Chimpanzee	0	2	0	1	0	0
6	Gharial	0	6	0	2	0	0
7	Grey Jungle fowl	1	0	0	1	2	0
8	Common marmoset	1	1	0	0	1	1
9	Lesser Adjutant Stork	1	0	0	0	1	0
10	Goffins' Cockatoo	2	0	0	0	2	0
11	Mottled Wood Owl	0	1	0	1	0	0
12	Stump tailed Macaque	0	1	0	1	0	0
13	Indian Great Horned owl	2	0	0	0	1	0
14	Orange winged Amazon	1	0	0	1	1	0
15	Green winged Macaw	0	1	0	1	1	0
16	African Grey Parrot	0	1	0	1	1	0

2.13.2 Carrying capacity

In general, captive breeding in the zoo for conservation purpose has its limits. Every zoo has its own problems and constraints of financial, physical and human resources. These resources will decide the number of species and the number of individuals in each species that can be supported in the zoo. The zoo has proposed to procure the following animals, under animal collection plan considering the space, experience and climate. IGZP, Visakhapatnam is one of the large category zoos in India and has suitable natural setting for housing the proposed species in the animal collection plan. It is proposed to house these species in the enclosures available under the control of the zoo and also in the new enclosures which will be built over the period of time as and when required with the approval of the Central Zoo Authority.

***Table 2-12*List of Required animals for IGZP in coming future**

S.No.	Species	Scientific name	Indigenous/ Exotic
I	**Carnivore**		
1.	Fishing Cat	*Prionailurusviverrinus*	Indigenous
2.	Rusty Spotted Cat	*Prionailurusrubiginosus*	Indigenous
3.	Leopard Cat	*Prionailurus bengalensis*	Indigenous
4.	Himalayan Black Bear	*Ursus thibetanuslaniger*	Indigenous
5.	Bengal fox	*Vulpes bengalensis*	Indigenous
6.	Small Indian Civet	*Viverricula indica*	Indigenous
7.	Honey Badger	*Mellivara capensis*	Indigenous
8.	Indian Pangolin	*Manis crassicaudata*	Indigenous
9.	Common Otter	*Lutralutra*	Indigenous
10.	Smooth Coated Otter	*Lutrogaleperspicillata*	Indigenous
11.	Jaguar	*Panthera onca*	Exotic
12.	Puma/Mountain lion/cougar	*Puma concolor*	Exotic
II	**Herbivores**		
13.	Sangai deer	*Rucervuseldiieldii*	Indigenous
14.	Mouse deer	*Mosciola indica*	Indigenous
15.	Chinkara	*Gazella bennettii*	Indigenous
16.	Chowsingha	*Tetracerus quadricornis*	Indigenous
17.	Barasingha	*Rucervusduvaucelii*	Indigenous
18.	Himalayan Goral	*Naemorhedus goral*	Indigenous
19.	Red Necked Wallaby	*Macropus rufogriseus*	Exotic
20.	Grey Kangaroo	*Macropus giganteus*	Exotic
21.	White Rhinoceros	*Ceratotheriumsimum*	Exotic
22.	Pygmy Hippopotamus	*Choeropsisliberiensis*	Exotic
III	**Primates**		
23.	Lion tailed macaque	*Macacasilenus*	Indigenous
24.	Grey Langur	*Semnopithecus entellus*	Indigenous
25.	Nilgiri Langur	*Trachypithecusjohnii*	Indigenous
26.	Capped Langur	*Trachypithecuspileatus*	Indigenous
27.	Assamese Macaque	*Macaca assamensis*	Indigenous
28.	Cotton-top Tamarin	*Saguinusoedipus*	Exotic
29.	Emperor Tamarin	*Saguinus imperator*	Exotic
30.	Common Squirrel Monkey	*Saimiri sciureus*	Exotic
31.	Brown Capuchin	*Cebus paella*	Exotic
32.	Bornean Orangutan	*Pongo pygmaeus*	Exotic
33.	Mandrill	*Mandrillus sphinx*	Exotic

S.No.	Species	Scientific name	Indigenous/ Exotic
IV	**Rodents**		
34.	Slender-tailed Meerkat	*Suricata suricatta*	Exotic
V	**Reptiles**		
35.	MonocellateCobra	*Najanajakouthia*	Indigenous
36.	King Cobra	*Ophiophagus Hannah*	Indigenous
37.	Reticulated Python	*Malayopythonreticulatus*	Indigenous
38.	Burmese Rock Python	*Pythonbivitatus*	Indigenous
39.	Common Sand Boa	*Gongylophisconicus*	Indigenous
40.	Whitaker's Sand Boa	*Eryxwhitakeri*	Indigenous
41.	Red Sand Boa	*Eryxjohnii*	Indigenous
42.	Common Wolf snake	*Lycodonaulicus*	Indigenous
43.	Barred Wolf Snake	*Lycodonstriatus*	Indigenous
44.	Common Trinket Snake	*Coelognathushelena*	Indigenous
45.	Bronze-back Tree Snake	*Dendrelaphis tristis*	Indigenous
46.	Green Vine Snake	*Ahaetullanasuta*	Indigenous
47.	Common Kukri snake	*Oligodonarnensis*	Indigenous
48.	Russell's Kukri Snake	*Oligodontaeniolatus*	Indigenous
49.	Green Keelback	*Rhbdophisplumbicolor*	Indigenous
50.	Checkered Keelback	*Fowleapiscator*	Indigenous
51.	Indian Chameleon	*Chamaeleozeylanicus*	Indigenous
52.	Yellow monitor lizard	*Varanus flavescens*	Indigenous
53.	Indian Black Turtle	*Melanochelystrijuga*	Indigenous
54.	Tricarinate hill turtle	*Melanochelystricarinata*	Indigenous
55.	Ganges soft shell turtle	*Nilssoniagangetica*	Indigenous
56.	Indian roof turtle	*Pangshura tecta*	Indigenous
57.	Painted roofed turtle	*Batagurkachuga*	Indigenous
58.	Southeast Asian Box turtle	*Cuoraamboinensis*	Indigenous
59.	Travancore tortoise	*Indotestudotravancorica*	Indigenous
60.	Asian brown tortoise	*Manouriaemys*	Indigenous
61.	Yellow Anaconda	*Eunectes notaeus*	Exotic
62.	Green Anaconda	*Eunectes murinus*	Exotic
63.	Komodo Dragon	*Varanus komodoensis*	Exotic
64.	Aldabra Giant tortoise	*Aldabrachelysgigantea*	Exotic
65.	Spectacled Caiman Crocodile	*Caiman crocodilus*	Exotic
66.	Dwarf Caiman	*Paleosuchuspalpebrosus*	Exotic
VI	**AVES**		
67.	Black necked stork	*Ephippiorhynchus asiaticus*	Indigenous
68.	White stork	*Ciconia ciconia*	Indigenous
69.	Open Billed Stork	*Anastomusoscitans*	Indigenous
70.	Demoiselle crane	*Grus virgo*	Indigenous
71.	Eurasian Spoonbill	*Platalealeucorodia*	Indigenous

S.No.	Species	Scientific name	Indigenous/ Exotic
72.	Purple Heron	*Ardea purpurea*	Indigenous
73.	Black-crowned night heron	*Nycticoraxnycticorax*	Indigenous
74.	Indian pond heron	*Ardeolagrayii*	Indigenous
75.	Greater flamingo	*Phoenicopterus roseus.*	Indigenous
76.	Comb duck	*Sarkidiornis melanotos*	Indigenous
77.	Ruddy Shelduck	*Tadornaferruginea*	Indigenous
78.	Spot Billed duck	*Anas poecilorhyncha*	Indigenous
79.	White winged Wood duck	*Asarcornisscutulata*	Indigenous
80.	Lesser whistling Teal	*Dendrocygnajavanica*	Indigenous
81.	Large Whistling Teal	*Dendrocygna bicolor*	Indigenous
82.	Garganey Teal	*Anasquerquedula*	Indigenous
83.	Common Teal	*Anas crecca*	Indigenous
84.	Purple moorhen	*Porphyrioporphyrio*	Indigenous
85.	Darter - Snake Bird	*Anhinga melanogaster*	Indigenous
86.	Little Cormorant	*Microcarboniger*	Indigenous
87.	Cattle Egret	*Bubulcus ibis*	Indigenous
88.	Large Egret	*Ardea alba*	Indigenous
89.	Little Egret	*Egrettagarzetta*	Indigenous
90.	White rumped vulture	*Gyps bengalensis*	Indigenous
91.	Long billed vulture	*Gyps indicus*	Indigenous
92.	Red-headed Vulture	*Sarcogyps calvus*	Indigenous
93.	Brahminy Kite	*Haliasturindus*	Indigenous
94.	Shikra	*Accipiter badius*	Indigenous
95.	Koel	*Eudynamysscolopacea*	Indigenous
96.	Eurasian Eagle-Owl	*Bubo bubo*	Indigenous
97.	Spotted Owlet	*Athene brama*	Indigenous
98.	Jungle Owlet	*Glaucidium radiatum*	Indigenous
99.	Spot-bellied eagle-owl	*Bubo nipalensis*	Indigenous
100.	Brown Fish Owl	*Ketupazeylonensis*	Indigenous
101.	Pied imperial pigeon	*Ducula bicolor*	Indigenous
102.	Green imperial pigeon	*Duculaaenea*	Indigenous
103.	Green pigeon	*Treron phoenicoptera*	Indigenous
104.	Nicobar pigeon	*Caloenasnicobarica*	Indigenous
105.	Emerald dove	*Chalcophaps indica*	Indigenous
106.	Laughing Dove	*Spilopelia senegalensis*	Indigenous
107.	Spotted dove	*Spilopelia chinensis*	Indigenous
108.	Oriental turtle dove	*Streptopeliaorientalis*	Indigenous
109.	Common Myna	*Acridotheres tristis*	Indigenous
110.	Common babbler	*Argyacaudata*	Indigenous
111.	Yellow-billed babbler	*Argyaaffinis*	Indigenous
112.	Malabar parakeet	*Psittaculacolumboides*	Indigenous

S.No.	Species	Scientific name	Indigenous/ Exotic
113.	Plum headed parakeet	*Psittaculacyanocephala*	Indigenous
114.	Blossom headed parakeet	*Psittacularoseata*	Indigenous
115.	Red breasted parakeet	*Psittaculaalexandri*	Indigenous
116.	Slaty headed Parakeet	*Psittaculahimalayana*	Indigenous
117.	Red vented bulbul	*Pycnonotuscafer*	Indigenous
118.	Red Whiskered Bulbul	*Pycnonotusjocosus*	Indigenous
119.	House Sparrow	*Passer domesticus*	Indigenous
120.	Malabar pied hornbill	*Anthracoceroscoronatus*	Indigenous
121.	Oriental pied hornbill	*Anthracocerosalbirostris*	Indigenous
122.	Greater pied hornbill	*Bucerosbicornis*	Indigenous
123.	Grey Hornbill	*Ocycerosbirostris*	Indigenous
124.	Kalij pheasant	*Lophuraleucomelanos*	Indigenous
125.	Grey peacock pheasant	*Polyplectronbicalcaratum*	Indigenous
126.	Red Jungle fowl	*Gallus gallus*	Indigenous
127.	Grey Partridge	*Perdix perdix*	Indigenous
128.	Jungle Bush quail	*Perdicula asiatica*	Indigenous
129.	Rain Quail	*Coturnix coromandelica*	Indigenous
130.	Green peafowl	*Pavo muticus*	Indigenous
131.	Painted Spur Fowl	*Gallloperdixlunulata*	Indigenous
132.	Black headed munia	*Lonchura atricapilla*	Indigenous
133.	Scaly breasted munia	*Lonchura punctulate*	Indigenous
134.	Red avadavat	*Amandavaamandava*	Indigenous
135.	White throated Munia	*Euodicemalabarica*	Indigenous
136.	Indian roller	*Coracias benghalensis*	Indigenous
137.	Military Macaw	*Ara militaris*	Exotic
138.	Hyacinth macaw	*Anodorhynchushyacinthinus*	Exotic
139.	Scarlet Macaw	*Ara macao*	Exotic
140.	Rainbow Lorikeet	*Trichoglossusmoluccanus*	Exotic
141.	Mandarin Duck	*Aix galericulata*	Exotic
142.	Scarlet Ibis	*Eudocimusruber*	Exotic
143.	White ibis	*Eudocimus albus*	Exotic
144.	Humboldt penguin	*Spheniscus humboldti*	Exotic
145.	Mute Swan	*Cygnus olor*	Exotic
146.	Greater Rhea	*Rhea americana*	Exotic
VII	**Amphibians**		
147.	Common Indian Toad	*Duttaphrynusmelanostictus*	Indigenous
148.	Indian Skipper frog	*Euphlyctiscyanophlyctis*	Indigenous
149.	Indian Pond Frog	*Euphlyctishexadactylus*	Indigenous
150.	Indian Bull Frog	*Hoplobatrachustigerinus*	Indigenous

Table: Required collection of animals 2020-21 to 2040-41

Sl. No	Species	Proposed collection			Percentage (%) of total collection	
		Indigenous / Endangered / National Importance species	Exotic	Total	Indigenous / Endangered / National Importance species	Exotic
1	Carnivores	10	2	**12**	6.71%	1.34%
2	Herbivores	6	4	**10**	4.03%	2.68%
3	Primates	5	6	**11**	3.36%	4.03%
4	Rodents	0	1	**1**	0	0.67%
5	Reptiles	26	6	**32**	17.45%	4.03%
6	Aves	70	10	**80**	46.66%	6.66%
7	Amphibians	4	0	**4**	2.68%	0
	Total:	**121**	**29**	**150**	**80.67%**	**19.33%**

Note: *In the required collection plan of IGZP Indigenous species of endangered/regional/national/Indian subcontinent form 80.67% of the collection, where as 19.33 % belongs to the exotic/global collections. Out of this 19.33% of global collections other than from our country, Aves forms major part with 6.66 % and rest of the fauna belonging to mammals and reptiles put together is coming 12.67%.*

2.13.3 Surplus animal list:

The surplus animal list of IGZP is appended below for future animal exchange programmes and also immediate action to be taken to rehabilitate the excess stock.

Table 2-13 Surplus Animal List as on 31.03.2021

S.No.	Species Name	Excess stock/For Exchange (M:F:U)	Remarks
Carnivores:			
1	White Tiger	0:1:0	
2	Jackals	2:2:0	
3	Wild Dog	1:1:0	
4	Striped Hyena	1:0:0	
Herbivores:			
1	Barking Deer	2:2:0	
2	Black Buck	10:10:0	
3	Sambar deer	5:5:0	
4	Spotted deer	5:5:0	
5	Indian Guar	1:0:0	
Primates:			
1	Bonnet Monkey	3:3:0	
AVES (Birds):			
1	Painted Stork	1:1:0	
2	Grey Pelican	1:1:0	
3	Rose ringed Parakeet	2:2:0	
4	Alexandrine Parakeet	4:2:0	
5	Indian Peafowl	3:3:0	
6	Budgerigar	6:6:0	
Reptiles			
1	Star tortoise	10:20	
2	Indian Cobra	0:0:1	
3	Indian Rock Python	0:1	
4	Gharial	0:2	

2.13.4 Changes recommended

- Grouping of animals needs further strengthening by having one type of species displayed together. This concept can be further reinforced by developing distinct entry points to a particular Entry (to a trail supporting one family type) by naming, distinct signage, use of sculpture and creating Entry court with public amenities.
- Existing large Elephant enclosure is likely to be available for alternate future development. Large section of valley remains cut-off from the ring road. Some of the area can be used for future expansion.
- Valley remains dry most of the year, as moisture retention is less. As a result, it doesn't support more luxuriant flora. Water remains the deciding factor here. Fortunately, we have very good catchment area with good rainfall. So, we need to have strategy to retain more water for longer period of time.

2.14 General Zoo Administration Section

The IGZP has two main categories of employees working in the zoo. They are staff working on deputation from government departments and staff on out sourcing basis. Altogether 121 persons are working in Vizag zoo.

Zoo is headed by a Deputy Conservator of Forests level officer and assisted by two Forest Range Officers and two Forest Section Officers. Zoo managerial staff has been assisted by a Veterinary Assistant Surgeon and one Junior Veterinary Officer, who come on deputation from the Department of Animal Husbandry for a period of 3 years which can be extended up to 5 years. We have also engaged a junior veterinarian on outsourcing basis.

Table 2-14Zoo staff pattern is as follows

S. No.	Name of each category of post	Sanctioned strength
1	Curator	1
2	Veterinary Assistant Surgeon	1
3	Junior Veterinary Officer	1
4	Forest Range Officer	2
5	Forest Section Officer	2
6	Office Superintendent	1
7	Senior Assistant	1
8	Junior Assistant	3
9	Typist	1
10	Technical Officer (D.M.Gr.I)	1
11	Driver	2
12	Attender	1
13	Fitter	1
14	Mason	1
15	Electrician	1
16	Carpenter	1
17	Bungalow Watcher	1
18	Booking Clerk	1
19	Watch and Ward	6
20	Animal Keepers	25
21	Work Charged Employees	22
22	Gate keeper	2
23	Labour	3
	Total:	**81**

2.14.1 Benefits to Animals Keepers and other staff

The Zoo Authority of Andhra Pradesh has extended various facilities for the welfare of its staff members like Animal Keepers, Work Charged Employees etc. Following are the facilities, which were extended to the staff of this institution.

Reimbursement of Medical expenses

- Establishment of Benevolent Fund – Coverage of all the Animal Keepers and other staff under Group Insurance Scheme.
- Facility of Medical treatment to the employees who met with accidents in the zoo premises while on duty.
- Accidental Insurance coverage to staff working with wild animals.
- Monthly Risk Allowance.
- Supply of uniforms to all the field staff.
- Providing residential quarters to some of the officers according to availability.
- Providing Bicycle to some of the field staff
- Wireless communication sets to the field staff as well as security personnel.
- Exposure training to field staff members.
- Conducting Zoo Day Celebrations and Rewarding/Honouring the workers who involved in successful breeding/hand rearing of animals.
- Providing opportunity to the keepers to compete in their profession at the state level (Best Keeper Award (KVS Babu Memorial Award) extended by KVS Babu IFS Rtd,Rs-25000 Cash Award & Certificate)

2.14.2 Constraints in Organization

- Shortage of permanent staff due to norecruitment since many years.
- Adequate training and exposure for the staff is needed.
- Zoo does not have specialists in the field of mammals, reptiles and avifauna to act as curators.
- There are no permanent education and research officers.
- Hospital lacks a full time Lab Assistant and Junior Veterinary officer.

Figure 6 Proposed Administration Block 3D view

2.15 Research

Lot of work has been done, though unplanned, in Vizag zoo and not published in any in journal. There is an urgent need to do planned research work and then design the future course of action. There is a need for a full-time research officer to take care of the zoo related research activities. Trainings are being conducted to keepers quite regularly however, it is not enough. The Central Zoo Authority is sponsoring keepers training program almost every year. From time to time, keepers and supervisory staff are being sent on short term courses. Behavioural observations on Wild dogs were done from 2006 to 2008, again 2010 to 2019. There are scientific articles published in leading journals like Zoo's print about the behavioural study of various species of Vizag zoo.

2.16 Conservation breeding

Over a period, Vizag zoo has achieved recognition in breeding large mammals such as the Asiatic Wild dog, White Tiger, Royal Bengal Tiger, Leopard, Gaur, Sloth bear, Hippo, Jackals, Hyena, Estuarine Crocodile etc., as well as other endangered species. Regular breeding species are Common Peafowl, Red Jungle fowls, Pheasants (such as Golden and Silver), Hog deer, barking deer, Sambar deer, Black buck, Painted Storks, Grey Heron, White Ibis, Emu, etc., indicating the good management practices at the zoo. Most of these breeding

programmes were not planned with a vision to take it forward to next level. Conservation Breeding of Wild dog in association with Aringar Anna Zoological Park, Chennai and Tirupati Zoo are planned.

The Indira Gandhi Zoological Park, Visakhapatnam has been identified by the Central Zoo Authority for conservation breeding of India Wild dog or Dhole (*Cuonalpinus)* in captivity. The Indian wild dog is a threatened species whose number is declining in the wild. The prime reason is low tolerance by humans to animal's predation, besides habitat fragmentation and destruction of habitat. Unless detailed investigation comes through to safeguard the future of these wonderful carnivores, their survival is under threat.

During this uncertainty, the Vizag zoo offers excellent platform to safeguard the threatened species and houses its viable population in captivity, which can act as a buffer population as well as to protect the gene pool originality for future re-introduction or restocking into the wild. The complex social structure, free ranging habit, need for space and privacy apart from their untameable nature are the limitations to breed them in captivity. In spite of the above-mentioned handicaps, the wild dogs have successfully bred in Indian zoos and Visakhapatnam is one amongst them.

2.17 Red-headed vulture (Sarcogyps calvus) Conservation Project:

The red-headed vulture (Sarcogyps calvus) was once widespread in India and SE Asia but is today Critically Endangered due to an extremely rapid range and population decline. Feeding on carcasses of livestock treated with the veterinary drug Diclofenac is presumed to be one of the major causes of this massive decline and conservation breeding efforts are urgently needed for this bird.

The IGZP offers excellent platform to safeguard the threatened species and to house its viable population in captivity, which can act as a buffer population as well as to protect the gene pool originality for future re-introduction or restocking into the wild.

The steps of the project are:

- Building the off-display aviary at Indira Gandhi Zoological Park following the experience of other zoological parks or institutions that have bred vultures in captivity.
- Bringing a pair or two with the help of other zoological parks or conservation institutions.

- Monitoring the behaviour of the pair by collecting behavioural data during the pair formation and after
- Analysing the behavioural data to have a successful breeding pair
- Sharing the knowledge with other zoos
- Establishing a founder population
- Establishing standard protocols for breeding and reintroduction into the wild.

In the meantime, a census of the animals in the wild shall be done and in case there will avulture to be rescued, a protocol will be defined to recover him/her avoiding human-animalrelationship and to release the bird very soon.

2.18 Education and awareness

One of the main objectives of ex-situ conservation facility like a zoo is to educate the visitors about wildlife, besides providing amusement. Education and research activities carried out successfully in Zoos have to be brought to the notice of the public regularly. The concept of educating Zoo visitors is a subject that has not received adequate attention in most of the developing countries and hence the Zoo visit was still considered as an amusement activity. Even the National Zoo policy insists for developing an education program based on proper evaluation of local needs, and promotion of education material, through an education officer. Keeping in view of the above objectives and policies, Vizag zoo supports various education programs.

The Zoo Volunteers and the Resource persons are assisting in all fronts for the success of youth club. The club is attributed to their co-operation and hard work. About 25 resource persons share their rich experience and knowledge with the students. It is a platform for the students to listen and interact with the big names in the field of wildlife and environment. Promotion of the Volunteer programs through the Zoo website offers another platform of outreach.

2.18.1 Zoo Outreach Programs

Through ‘Zoo Outreach’ program we try to reach out the people especially the remote schools. Various schools are contacted ahead of the schedule. On specified date and time the Zoo Volunteers reach the school and talk about the Zoo through slides and power point presentations. The session ends with interaction between the Zoo volunteers and the students where the student’s doubt and myths are cleared. Every year almost 30 schools are covered and addressed to as many as 3000 students.

2.18.2 In house programmes like Keeper's talk

Various schools bring their children to the zoo as a part of their curriculum. They are taken around and explained about the animals, their habitat, diet and interesting factors about the animals. The animal keeper concerned is allowed to explain to the children/visitors about his experience of animal keeping.

2.18.3 World Environment Day

On 5th June every year the Zoo celebrates World Environment Day by contemplating various programs such as Drawing Competition, Photography, Essay writing, Quiz, Elocution, Debating, Skit etc. and distribute prizes for winners and certificates for participants.

2.18.4 Wildlife Week celebrations

Every year 'Wild life week' is being celebrated at the Zoo from 1st to 7th October. As a part of the Celebration, Drawing Competition for students from L.K.G. to 10th Standard, Photography exhibition and competition are conducted in the photography competition. All these 7 days the students between 3 to 12 years age are given free entrance. A rally on environment is organized.

2.18.5 Competitions

Competitions are always been a part of Zoo education to create awareness on wildlife, environment and the Zoo. Vizag zoo is organizing several competitions throughout the year and attractive prizes and certificates are given to the winners.

- Drawing competition for L.K.G. to 10th Std.
- Quiz competition for Upper Primary and High School students
- Essay competition for High school and College in English and Telugu
- Elocution Competition for Upper Primary and High School students in English and Telugu.
- Photography competition in Zoo and wildlife category.

2.18.6 Internship programs

In house training is imparted to students of B.V.Sc. from Veterinary Colleges since 2010-11. These students stay with our Zoo vets and study all the relevant Health Care practices being adopted at zoo. They even get hands on experience in the field. These students during their

stay at zoo are getting exposed to various aspects of zoo management including tranquilization, translocation, captive animal behaviour, enrichment, nutrition and diet, etc.

2.18.7 Signage's

Direction boards for the benefit of visitors, besides warning boards, and animal information boards have been provided. Animal pictorial signage boards have been put up for the benefit of visitors. The signage provides information on animal biology, distribution, food habits and habitat.

2.18.8 Library Facilities

The Zoo has a Library with collection of books related to wildlife, forests and environment, which is opened for the general public for referring books in the Library by enrolling themselves as members.

2.18.9 Volunteers

The Zoo Volunteers are playing an active part in carrying out Zoo education program. It is proposed to have more exposure for the volunteers in advanced training. They had played a greater role in bringing in more number of people for the restoration of facilities during the event of devastation of Zoo by Hud-Hud cyclone.

2.18.10 Project Works

Every year few students from various colleges and institutions across the state come to work on Vizag zoo. Such students are assisted in taking up project work with regard to Zoo management.

2.18.11 Auditorium/Bioscope

A full-fledged Auditorium supported with complete audio-visual aid is available for carrying out regular program on Zoo education with facility for film show.

2.18.12 Constraints in Education Programme

At present Vizag zoo organizes various education programs quite successfully. Zoo has not been able to reach the rural students and also local schools and colleges due to shortage of staff. It is the volunteers who help in such programs. In 2018 we started engaging a Zoo education Officer to carry out the education activities in a coordinated way.

2.19 Animal Adoption and donation

Zoo introduced the Animal Adoption scheme during the year 2004-05. The scheme has picked up gradually. Many Philanthropists/ animal lovers and institutions are coming forward to contribute under Animal Adoption Scheme for noble cause of conservation of wildlife in captivity. The following table gives you the description about the adoption rates adopted for various species in IGZP, Visakhapatnam. There are efforts to revise the rates and adoption is allowed for a single day to for a year. These amounts are made tax-exempted (under section 80 G(5) of IT Act) for making it popular among public. The donations given to the IGZP can claim exemption U/S 12AA 1 (B) of IT Act. The message is spread through all possible mediums, zoo website and by word.

Animal Adoption Rates In Indira Gandhi Zoological Park, Visakhapatnam

S. No.	Animal Name	No. of Animals	Duration in years	Amount
1	Elephant	1	1	4,30,000
2	Rhinoceros	1	1	2,90,000
3	Giraffe	1	1	1,80,000
4	Tiger	1	1	1,90,000
5	Lion	1	1	1,90,000
6	Hippopotamus	1	1	2,00,000
7	Leopard	1	1	1,25,000
8	Sloth Bear	1	1	1,10,000
9	Hyena	1	1	79,000
10	Golden Jackal	1	1	16,000
11	Indian Gaur	1	1	73,000
12	Sambar deer	1	1	55,000
13	Spotted deer	1	1	36,500
14	Hog/Barking deer	1	1	18,000
15	Wild Boar	1	1	40,000
16	Lemur	1	1	36,500
17	Wild Dog	1	1	40,000
18	Mugger/SW Crocodile	1	1	31,500
19	Gharial	1	1	24,000
20	Rock Python	1	1	13,000
21	Star Tortoise	10	1	11,000
22	Jungle Cat	1	1	12,000
23	Swan	1	1	18,000
24	Pelican/P. Stork	1	1	9,000
25	Pheasants	1	1	2,200
26	Eagle/ Owl	1	1	12,000
27	Love Birds			700
28	Parrot/Parakeet	1	1	1,500
29	Macaws	1	1	3,000
30	Porcupine	1	1	4500
31	Rat snake/Cobra	1	1	1000

2.20 Damage caused by Hud-Hud cyclone in 2014

About 40% vegetation is totally rooted out leaving remaining 60% stripped-off of its either branches or half cut giving an impression of a serious natural disaster. The compound wall around the Zoo has fallen at many places to a cumulative length of 1000 mts. The fallen trees strewn over the roads, in the moats of the entire area.Three Walk Through Aviaries (25 x 25 m each) were completely collapsed and the most of the birds came out, hovering in the vicinity. Animal mortality was 7 belonging to 3 different deer/antelope species, which was negligible due to precautionary measures taken to prevent such incidences. About (60) enclosures are badly damaged due to fallen trees over them and need to be repaired immediately to contain the animals from straying. The major infrastructure and visitor amenities likeshelters, Benches, Public conveniences, Signages & Hoardings etc., are badly damaged and requires replacements. The main gate of the entrance including the arch and compound wall collapsed. The enriched habitats of each of the enclosure and moats are totally damaged and lot of fallen trees had to be removed to the tune of 3000 cum.

PART-II

Chapter 3 Future Objectives Including Vision, Mission Statement/Theme and Strategy

3.1 Vision

The IGZP envisages to attain excellence in zoo management on par with the international standards for captive breeding of endangered and endemic fauna functioning as a team integrated into the world zoo community. It aims to conserve the wildlife wealth by proper and effective intervention into the matters related to captive management and health care by acquiring professional skills.

IGZP will be the leader among zoos and aquaria fostering professional skills and development in advanced animal care, animal welfare and conservation.

3.1.1 Long-term Vision

To develop self-sustaining, genetically and behaviourally viable populations of endangered animal species in order to use them as an ex-situ gene pool in long- term conservation of these species and to seek the support of the visitors and public at large through participation in these efforts of wildlife conservation.

3.2 Mission

Mission Statement: The mission of the IGZP is to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

- To complement and strengthen the conservation efforts particularly of wild fauna housed in large enriched habitat with good health care, nutrition, apart from research and conservation education.
- To develop captive management system for better analysis and record keeping to effectively implement wildlife policy.
- To develop infrastructure and capacity building of the zoo staff and officials to improve captive management of wild animals.
- To foster a professional attitude in animal keepers by encouraging them to become active members of professional teams in today's zoos.

IGZP supports the promotion and implementation of zookeeper education. The zoo is dedicated to advancing animal care, promoting public awareness, enhancing professional development and contributing to local and global conservation through fundraising and stewardship. The IGZP provides its members the services, high standards and best practices needed to be leaders and innovators in animal care, wildlife conservation and science, conservation education, and visitor experience.

3.3 Future Objectives

The future objectives are the same as envisaged in the Part I (1.5) of the Master Plan. They are again given as under:

a. To carry out ex-situ conservation of critically endangered fauna with special focus on the endemic fauna of Eastern Ghats.
b. To carryout Conservation Breeding of various species with emphasis on endangered species of Eastern Ghats.
c. To carryout wildlife rescue operations and provide holistic environment for rehabilitation of such rescued animals.
d. To propagate the values of wild life and its conservation through education and interpretation aimed at wide public appreciation.
e. To make IGZP, Visakhapatnam a leader in ex-situ conservation research aimed at conservation and management
f. To make IGZP, Visakhapatnam self-sufficient and number one in captive veterinary care and facilities
g. To make IGZP, Visakhapatnam to be the best public place in the country adopting sustainable and green ways of waste management, recycling and reuse options.
h. To improve the visitor amenities in IGZP, Visakhapatnam to make it the most preferred destination for any person visiting Visakhapatnam.

3.4 Strategies

IGZP will be recognized for leading a compelling wildlife conservation movement. It will be achieved by:

a. Caring of wildlife (animals);
b. Educating and engaging public;
c. Serving and increasing visitation;
d. Developing a good Conservation Breeding Centre for Eastern Ghats endemic and threatened species.

3.4.1 Strategic Priorities

3.4.1.1 Caring of wildlife

- Ensure the sustainability of diverse wildlife collections in the zoo; advance high standards of wildlife-focused animal care and welfare; and foster outcome-based conservation by connecting zoo to the wild.
- Sustainable Animal Collections - Implement best practices in animal management systems that ensure the sustainability of zoo animal populations for the next century.
- Animal Care and Welfare-Foster the advancement and implementation of animal care and welfare methods and standards as best practices in maintaining healthy animal collections.

3.4.1.2 Educating and engaging public

- Build effective government and public affairs capabilities, and support conservation education programs to advance conservation outcomes and support for zoos.
- Legislative, Policy, and Regulatory Impact– Ensure that IGZP recognized as trusted leaders in environmental education, biodiversity conservation and animal welfare, resulting in laws, regulations and policies to support the sustainability of zoo collections and operations as suggested by the CZA.
- Conservation Education and Public Engagement- Facilitate multi-institutional conservation education, outreach, and collaborations that activate the public to connect with and take personal action to conserve wildlife.

3.4.1.3 Enhancing Visitation

- Provide services that build and support an expanding community of individual members, and diverse facilities of all sizes, in collectively achieving the IGZP mission.
- Enhancing Visitation– Build capacity within zoo staff and while simultaneously increasing the number and professionalism of members in order to achieve the overall mission and vision of IGZP
- Accreditation – Create and manage the world's leading Zoological Accreditation Program and increase the wide recognition that IGZP accredited institutions receive for their excellence across all areas of operation.

- Professional Development - Continuously assess the need for new courses to increase member capacity and maximize new and ongoing programs that support training, professional development, certification programs and the development of new leaders.

3.4.1.4 Conservation Breeding (Developing a good conservation breeding centre for Eastern Ghats endemic and threatened species)

Assess the fundraising potential for IGZP to provide consistent, strategic support to conservation programs and to ensure a strong future for zoo conservation action.

3.5 Theme of Display

Indira Gandhi Zoological Park, Visakhapatnam focuses around providing ex-situ conservation support for many of Eastern Ghats' rare and threatened species.

3.5.1 Conservation Themes

Numerous conservation elements underline the overall display themes and these are focused around providing ex situ conservation support for many of Eastern Ghats' rare and threatened species.

3.5.1.1 Conservation Research

IGZP's proximity to Andhra University in Vizag provides it with an excellent opportunity to advance the research on many of the technical aspects of captive management for endangered species. In particular, in the areas of nutrition, clinical analysis, pathology and parasitology, this will allow IGZP to play a valuable role. A special program should be considered to put such a research project into effect.

3.5.1.2 Conservation Planning:

IGZP provides a perfect opportunity for advancing coordinated conservation planning for all of the endangered species of Eastern Ghats. Already zoo has been selected for the conservation breeding of the wild dogs.

3.5.1.3 Conservation Education

Close to 10.0 lakh visitors a year, IGZP must be regarded as Eastern Ghat's one of the best public conservation "shop window" and therefore should provide a comprehensive program aimed at all levels in the community. Conservation through education is a very powerful tool and IGZP is the perfect place to expand it.

3.5.1.4 Education and interpretation

There is difference between education and interpretation. Education can be formal with a fixed schedule, whereas interpretation is informal without any schedule. In order to achieve the objective, an education wing will be created in the park with adequate man power and infrastructure like interpretation center, published material and audio-visuals.

As can be seen in viewing the Master plan, all of the exhibits have been integrated so as to provide a flowing effect allowing each of the zones to merge (Immersion exhibits) while still retaining their individual character. Exhibit designs are of the high quality reflecting the latest techniques in modern zoo display and established in a way that will provide all visitors with a fulfilling experience. The existing infrastructure in IGZP should be utilized effectively.

3.5.1.5 Conservation Breeding

IGZP has tremendous opportunities in further extending its fine captive breeding record with wild dogs and other species, and this should be expanded to include many of Eastern Ghats' native species. Special emphasis should be place on establishing Taxon Advisory Groups for plant species from Andhra University and much of this could be coordinated from IGZP.

3.6 Visitor Services

To meet the needs of the 9.0 lakh visitors to IGZP each year, particularly under the re-developed Master Plan, an additional research and feasibility planning is to be done.

It may be described as follows:

- Visitor circulation systems need to be substantially streamlined and there is a need to provide a series of more clearly defined walking trails.
- Public transport systems for moving visitors around the zoo and providing an informative interpretation of the exhibits could be useful. This would be of particular benefit to children, school and college students, family groups and tourists.

3.7 Support Services

In line with the other redevelopment aspects of IGZP the area of support services and systems needs to be substantially upgraded. The successful operation of any modern zoo development relies extensively on the back-up and maintenance support which can be provided to keep the zoo operating in an efficient manner six days a week.

- Animal care support is an important part of maintaining a high-quality animal collection and the establishment of modern animal health care facilities needs to be addressed urgently.
- Food storage and preparation areas need to be extensively redeveloped and provision made for storing large quantities of perishable products such as meat and fish, which will be expanded as the animal collection develops

Chapter 4 Future Action Plan

4.1 Proposed/Recommended Animal Collection Plan

Indira Gandhi Zoological Park, Visakhapatnam was established in the year 1972, since its inception the main function of the zoos was to exhibit as many species of wild animals as possible, particularly the Eastern Ghats species for conservation. The zoo has good experience in successfully housing, rearing and breeding them and also distributing to other Zoos. Many factors such as natural forest, ideal climate, available infrastructure, visitors support and scientific display are responsible for IGZP to be the best natural habitat for wild animals. From the days of the Maharaja, the founders of the Zoo had good links with the foreign countries and could establish contacts with animal dealers and Foreign Zoos and this has paved way for selecting exotic species and housing them successfully.

Future action plan is aimed at development of the IGZPin a systematic way in the coming 20 years i.e. 2020 -2021 to 2040-2041.Proposal for development is based on the site requirements, future objectives, client vision, aspiration of society (ZAAP) in general, availability of water and other resources with the management, preparedness against natural calamities like cyclones, heavy rains etc. Recommendations of the CZA and wildlife expert opinion have also been takeninto consideration while formulating the future action plan.

4.1.1 Animal Collection Plan

Though the zoo area available being merely about 200 acres, it has continued the pursuit of acquiring more and more species of wild animals and at present have 33 Mammalian species, 45 Aves species and 9 Reptilian species i.e., total 87 species.

- Conservation and breeding are the main objectives of the zoo management and following goals are visualized to achieve these stated objectives.
- Ex-Situ Conservation of endangered species, particularly the ones endemic to the region with special emphasis to Eastern Ghats.
- Conservation Education to the visitors about endangered species of the region and globe 675nd strategy to conserve them through thematic display of wild animals with special emphasis to South East Asia and Africa.
- To attain a viable and sustainable genetic population of most of the species in the zoo.
- Research on behavioural aspects of zoo animals for future improvement in zoo management.

The animal collection plan aims to exhibit animals in near natural habitat, climatic conditions and the resources available. The CZA has formulated guidelines for animal collection for large category zoo as under:

Guidelines for species composition in Animal Collection Plan of zoos recognized by the Central Zoo Authority

- 75% of the species housed should be native species.
- The number of non-native species housed should not exceed 25%.

The animal collection plan has been proposed keeping in view CZA's norms, facilities available, to have a viable population, restocking, research and education value. Taking into consideration the unique collection of exotic species at the zoo, particularly the African Region, it is proposed to keep the representation of exotic species to be around 20%. The commoner exotic species are proposed to be kept out of the collection plan of the zoo.

The animal proposed in the animal collection plan will be acquired by the following method.

- By gift
- By exchange

4.1.2 Stocking Strategy

IGZP is one of the important centers of conservation of fauna of Eastern Ghats in the country. It is appropriate that its animal collection is a reflection of fauna from Eastern Ghats. In developing the stocking strategy, the following important objectives are considered.

- The high profile and volume usage of IGZP and the importance it has on promoting the conservation message to the people of Visakhapatnam.
- The ability of IGZP to become one of the finest Zoo collections in Andhra Pradesh, through its development program.
- The large areas of water body, and artificial ponds promoting water-based exhibits.
- Whenever possible, buildings such as canteen and shelters should be designed to provide better visitor's amenities
- The aim is to reinforce to the visitor that they are in a special place which is a hub of conservation and wilderness.

At Indira Gandhi Zoological Park (IGZP), earlier species collection was done to a limited extent and it was typically determined by random preferences and availability. The zoo acted as a reserve for surplus animals from zoos like -Nehru Zoological park, Hyderabad initially and then SVZP, Tirupati. Over the past few years, the zoo had developed a systematic criterion formulated within conservation targets. Currently IGZP species collection planning is managed at a regional level in particular and at global level generally there by making an impact in conserving biodiversity on both regional and global scale.

One of the major objectives of the current species collection plan is making IGZPpart of global captive breeding programmes and by raising awareness about the plight of species around the world. Most species in the current collection plan of the zoo are included if they are in need of conservation action and if they can contribute to the public education and through that can support scientific research and conservation work in the field there by acting as an effective ex situ facility. Some of the species in the current collection plan which are high priority would be for pure conservation reason, whose survival depends on human care by breeding in captivity as suggested by national and international conservation organization. While some species do have a simple education role for public to see and feel wildlife there by acting as a role of ambassadors of the region they come from and about the need for conservation, while others acts as models for research and conservation of other species in the wild.

One of the major objectives for establishing Indira Gandhi Zoological Park (IGZP) was primarily to conserve and showcase the zoological diversity of Eastern Ghats of India. So in terms of the priority, conservation of species found in Eastern Ghats of India is given precedence followed by species from India and abroad. Eastern Ghats which extends from Mahanadi in the north to Nilgiris mountains in south host a rich array of biodiversity. Though not as much species diversified as its' sister mountain ranges, it boasts an incredible wealth of diversity of both plant and animal life. The zoo would take up conservation breeding of those species in particular to species from Eastern Ghats in particular and Indian species in General.

4.1.3 Proposed collection Plan is appended in Annexure –V

The basis of proposing various species of Endangered/ Endemic/ Indigenous/ National importance/ Exotic importance in the collection plan for next 20 years period is detailed as under:

4.1.3.1 Eastern Ghats Endangered Species and Asian continent species as per the collection plan:

Asiatic Lion (*Panthera leo persica*): The Asiatic lionpopulation in wild is surviving today only in India. Since the turn of the 20th century, its range is restricted to Gir National Park and the surrounding areas in the Indian state of Gujarat. Historically, it inhabited much of the Middle East to northern India.

Bengal tiger (*Panthera tigristigris*): Royal Bengal Tiger is known to occur in Papikonda National Park, Nagarjuna Sagar Srisailam Tiger Reserve (NSSTR) and Sri Venketeswara (SV) National Park in Eastern Ghats of Andhra Pradesh. While source population of tigers from Papikonda National Park is known to be from Indrāvati National Park, the tiger in NSSTR and SV National Park are from NSSTR. Currently all tigers at IGZP and SVZP are related to the wild caught individuals from NSSTR population. Efforts would be initiated to maintain the heterozygosity of this captive population from NSTR. Efforts would also be put in start a second captive breeding group of tigers from Indravathi National Park. In this regard, zoos near to that region would be consulted to identify tigers which had known wild lineage of that region. Such tigers would be acquired and used in conservation breeding programme.

White tiger(leucistic) (*Panthera tigristigris):* White tigers are not a separate sub-species, but are white in color due to an expression of recessive genes. Interestingly, the white tigers are found only among the Indian tigers and can only be seen only in captivity now. The last white tiger reported in the wild was captured in the forests of Rewa in the state of Madhya Pradesh. The white tigers found in the zoos today are most likely descendants of this one tiger that was caught from the wild in Madhya Pradesh and later bred in captivity. White tigers have pink noses, white-to-cream coloured fur, and black, grey or chocolate-coloured stripes. Their eyes are usually blue, but may be green or amber.

Indian leopard (*Panthera pardus*): Leopards are common in Eastern Ghats in comparison to tigers and frequent reports of man-animal conflict involving this species is on the rise. IGZP would primarily act as a centre to conserve the genetic diversity of leopards from North Eastern Ghats of Andhra Pradesh and secondly as a centre to maintain conflict animals.

Dhole (*Cuonalpinus*): IGZP is one of the foremost zoos in the country which had been regularly breeding Dholes in captivity. It had taken up Dholes as a focal species and efforts had been put in to acquire animals from different genetic lineages. Currently the zoo has four

established packs from three different lineages and efforts are put in to get non related individuals from Aringar Anna Zoological Park (AAZP)/Mysore Zoo.

Indian Wolf (*Canis lupus ssp. pallipes*): Wolf has its range distribution throughout the drier parts of Eastern Ghats. Through hunting and habitat loss, the species is now restricted to certain patches. IGZP would establish two to three packs of different genetic lineages for its conservation breeding programme.

Striped Hyaena (*Hyaena hyaena*): Striped Hyaena has its range distribution throughout the Eastern Ghats. However, like Dholes and Indian Wolf, the range of the species is seriously depleted. IGZP would establish two to three pairs of different genetic lineages for its conservation breeding programme.

Bengal fox (*Vulpes bengalensis*): The Bengal Fox is known to occur in most of the drier regions of Andhra Pradesh. IGZP would establish a captive population of this species.

Fishing Cat (*Prionailurusviverrianus*): Fishing Cat is known to occur along the coastal region of Andhra Pradesh. IGZP itself had a natural breeding population within its premises. While some zoos in India do exhibit Fishing cats, there are no known sustainable captive breeding populations within zoos of India even though this species is known to do well in captivity. IGZP would put in efforts to build up genetically viable captive population of this species.

Rusty spotted Cat (*Prionailurusrubiginosus*): Rusty spotted cat in the state had few distribution records. However, the zoo has a natural population of this species. At least two Rusty cats were rescued from within the zoo premises. IGZP would put in efforts to procure more individuals from the respective zoos and start a captive breeding programme for this species.

Leopard Cat (*Prionailurusbengalensis*): Leopard cats are known to occur from Northern Eastern Ghats of Andhra Pradesh. Earlier the zoo did maintain individuals rescued from the wild in and around Visakhapatnam however could not breed them. Efforts would be initiated to maintain congenial captive conditions for the species and maintain the species as a part of the conservation breeding programme for Eastern Ghats species.

Jungle cat (*Felis chaus*):This is a medium-sized cat native to the Middle East, the Caucasus, South and SoutheastAsia and southern China.Itinhabits foremost wet-lands like swamps, littoral and riparian areas with dense vegetation. It is listed as Least Concern on the IUCN Red List, and is mainly threatened by destruction of wetlands, trapping and poisoning.

Viverrids: Small Indian civet (*Viverriculaindica*) andAsian palm civet (*Paradoxurus hermaphrodites*) are recorded from Eastern Ghats. IGZP already maintains breeding groups of both the species. Efforts would be made to infuse new blood into the existing population.

Ratel/Honey Badger (*Mellivoracapensis*): The Ratel is known to occur sparsely in most regions of Andhra Pradesh. The species was exhibited at IGZP in the past, however was a difficult species for captive breeding programme. Secondly, the number of Individuals in Indian Zoos is too low to start a conservation breeding programme. With recent success in breeding of this species in captivity and improvements in the husbandry techniques of the species, it is hoped that IGZP would start a conservation breeding programme of this species.

Indian Pangolin (*Manis crassicaudata*): Indian Pangolin was reported from drier parts of Eastern Ghats. Earlier many individuals were rescued from trade and were rehabilitated back into the wild by IGZP. Captive husbandry for this species is very scanty and efforts would be put in to start a captive breeding programme for this species based on the experience gained on this species at Nandankanan zoo.

Common Otter (*Lutralutra*):In India, the species is distributed in the Himalayan foothills, southern Western Ghats and the central Indian landscape.There hadn't been any captive breeding successes of this species in India, however this species is known to do well in zoos around the world. Efforts would be made to better understand the husbandry of this species and start a captive breeding group at IGZP.

Smooth-coated otter (*Lutrogaleperspicillata*):Smooth-coated otter is known to occur in major river drainages of Andhra Pradesh. Just like Common otter, efforts would be put in to breed this species in captivity by acquiring animals from other zoos.

Sloth Bear(*Melursus ursinus*): Sloth Bears are known to occur in most forested regions of Eastern Ghats, however their range had been on decline in the region owing to hunting and habitat loss. Having two enclosures specific for Sloth Bears, IGZP would act as a centre to maintain captive Sloth Bears population from the region.

Himalayan Black bear (*Ursus thibetanus ssp. laniger*): The Himalayan black bear (*Ursus thibetanus laniger*) is a subspecies of the Asian black bear found in the Himalayas of India, Bhutan, Nepal, China, and Pakistan.

Asiatic Elephant (*Elephas maximus*): Asian Elephants are reported in Northern and Southern Eastern Ghats. From the north, they are reported from Odisha and Andhra Pradesh state border regions. In the south they are reported from Chittoor Forest Division. The zoo shall maintain a group breeding group of this species.

Indian Gaur (*Bos gaurus*): Historically gaurs did occur along the Eastern Ghats of Visakhapatnam, East Godavari, West Godavari and Chittoor districts. However, over the past few decades, this species disappeared from most of its known range. IGZP currently has about eight individuals for five different genetic lineages. Efforts would be made to increase the number of individuals by having exchange programmes with AAZP, Mysore Zoo and Thiruvananthapuram Zoo.

Indian One Horned Rhinoceros (*Rhinoceros unicornis*):The Indian rhinoceros (*Rhinoceros unicornis*), also called the Indian rhino, greater one-horned rhinoceros or great Indian rhinoceros, is a rhinoceros species native to the Indian subcontinent. It is listed as Vulnerable on the IUCN Red List, as populations are fragmented and restricted to less than 20,000 km^2 (7,700 sq mi). Moreover, the extent and quality of the rhino's most important habitat, the alluvial Terai-Duar savanna and grasslands and riverine forest, is considered to be in decline due to human and livestock encroachment. The recovery of the greater one-horned rhino is among the greatest conservation success stories in Asia. Thanks to strict protection and management from Indian and Nepalese wildlife authorities, the greater one-horned rhino was brought back from the brink.

Deer& Antelope:

IGZP currently housed six species of deers and antelopes which includes Spotted deer, Hog deer, Barking deer, Black buck, Sambar and Nilgai. Also, we have included some deer and antelope species like Sangai deer, Mouse deer, Chinkara, Chowsinga and Barasingha.

Exotic Herbivores:

Red necked wallaby, Grey Kangaroo, Northern Giraffe, Grant’s Zebra, White Rhinoceros and Pygmy Hippopotamus

Other herbivores: Himalayan Goral and Wild boar.

Chinkara (*Gazellabennettii*): The Indian Gazelle is recorded in few drier pockets of Andhra Pradesh which is the southernmost range extension of the species. There is no captive breeding population in India of this subspecies. Efforts would be made to start a captive breeding group of this subspecies at IGZP.

Indian Spotted Chevrotain (*Moschiolaindica*): Also called as the Indian mouse deer, the species is reported from moist forests of Andhra Pradesh. The species was naturally recorded from IGZP. Previous attempts to breed this species at IGZP did not result in any success due to the low number of individuals at the zoo. Efforts would be made to acquire animals from other zoos of various pedigrees and start a breeding programme.

Primate Paradise:IGZP currently housed seven types of primates which includes Stump tailed macaque, Rhesus macaque, Bonnet macaque and exotic species includes Chimps, Sacred baboons, Ring tailed lemurs and Common marmoset. IGZP proposed some local and exotic species of primates for conservation and breeding purpose which includes Grey Langur, Nilgiri Langur, Capped Langur, Assamese langure, Cotton-top Tamarin, Common squirrel monkey, Brown Capuchin, Bornean Orangutan and Mandrill.

Rodent's road:

Indian Giant Squirrel (*Ratufaindica*): The Indian Giant Squirrel is found in most moist parts of Eastern Ghats. However due to excessive hunting of this species, it now occurs in few isolated pockets. IGZP exhibits this species which were mostly rescued animals, with no breeding success till date. Efforts would be put to improve the husbandry of this species to start a breeding group at IGZP.

Indian Porcupine (*Hystrix indica*): The Indian Porcupine is found in most moist parts of Eastern Ghats. IGZP

Reptile Row:

Snakes/Pythons:

IGZP currently housed three types of snakes which include Indian cobra, Rat snake and Indian Rock Python. Also we have included some indigenous species of snakes and pythons like Monocellate snake, Common sand Boa, Whitaker sand boa, Red sand boa, Common wolf snake, Barred wolf snake, Common trinket snake, Green wine snake, Bronze black tree snake, Common kukri snake, Green keel back, Reticulated python and Burmese Rock python.

King Cobra: King Cobra (*Ophiophagus hannah*) was reported from moist regions of Eastern Ghats. As per the collection plan, IGZP would be maintaining King Cobra in its collection as a part of conservation breeding programme for Eastern Ghats species.

Anaconda species:IGZP was planning for collection of two anacondas which includes Yellow Anaconda and Green Anaconda.

Komodo dragon: Komodo dragon (*Varanus komodoensis*), also known as the Komodo monitor, is a member of the monitor lizard family Varanidae that is endemic to the Indonesian islands of Komodo, Rinca, Flores, and Gili Motang. It is the largest extant species of lizard.

Monitor Lizards: Eastern Ghats harbour three species of monitor lizards which includeYellow monitor lizard (*Varanus flavescens*), Water Monitor lizard (*Varanussalvator*) and Bengal monitor (*Varanus bengalensis*). IGZP would maintain all three species of lizards as a part of the breeding programme.

Turtles/ Tortoises: IGZP would start a turtle breeding facility for endangered turtle species found in various river basins of the state. Leith's soft shell, Indian narrow-headed softshell turtle (*Chitra indica*), Cantor's giant softshell turtle (*Pelochelyscantorii*) and River terrapin (*Batagurbaska*), South Asian box turtle, Travancore tortoise, Asian brown tortoise, Additionally we added some Indigenous speciesn and exotic species like Indian Black turtle, Tricarinate hill turtle, Ganges soft shelled turtle, Indian roof turtle, Indian flap shelled turtle, Painted roofed turtle, Red eared slider turtle, Aldabra Giant Tortoise, which are recorded from the state and are conservation dependent would be taken up for breeding programme.

Crocodilians: Three species of crocodiles are reported from Eastern Ghats. Saltwater crocodile (*Crocodylusporosus*), Mugger crocodile (*Crocodyluspalustris*) and Gharial (*Gavialisgangeticus*) and all three are maintained at IGZP. Also planned collection of some exotic crocodiles like Spectacled Caiman Crocodile, Dwarf Caiman.

Birds Paradise:

Aquatic Birds:

Storks: Five species of storks were reported to occur in Andhra Pradesh. While Painted Stork (*Mycterialeucocephala*) and Open billed stork (*Anastomusoscitans*)are widely distributed while Black Necked (*Ephippiorhynchusasiaticus*), White stork (*Ciconia ciconia*), Lesser adjutant (*Leptoptilosjavanicus*) and woolly necked storks (*Ciconia episcopus*)are rarely reported. IGZP would initiate a captive breeding programme for all the species.

Eurasian Spoonbill (*Platalealeucorodia*): Eurasian spoonbill is found to occur in wetlands of Andhra Pradesh. A captive breeding group of this species would be maintained at IGZP by acquiring birds from other zoos.

Spot billed pelican (*Pelecanusphilippensis*): Spot Billed/Grey Pelicans are known to occur along the coastal regions of Andhra Pradesh and are residential breeders in most of the places they occur. IGZP already has a breeding flock of this species and in the future would like add more unrelated individuals to have a large breeding flock of this species.

Flamingos: Both the Greater (*Phoenicopterus roseus*) and Lesser Flamingos (*Phoenicopterus minor*) occur in wetlands of Andhra Pradesh.Efforts would be made to start breeding groups of both the species in captivity at IGZP.

Demoiselle crane (*Anthropoidesvirgo*): Demoiselle cranes are the only species of cranes which are found to visit Rollapadu Wildlife Sanctuary during winters. IGZP would start captive breeding flock by acquiring birds from other zoos in the country.

Sarus crane: Sarus cranes are common species of cranes, it's available all other zoos in the country. IGZP would start captive breeding flock by acquiring birds from other zoos in India.

Other Aquatic Birds:

Black headed Ibis, Grey Heron, Purple Heron, Black-crowned heron, Indian pond heron, Greater white pelican, Comb duck, Ruddy Shelduck, Spot billed duck, White winged wood duck, Lesser Whistling Teal, Large Whistling Teal, Garganey Teal, Common Teal, Purple moorhen, Little Cormorant, Bar headed geese, Cattle Egret, Large Egret, Little Egret, Darter Snake Bird, Scarlet Ibis, White Ibis, Mute swan, Black Swan and Humboldt penguin.

Ducks/ Geese: While there are no endemic or resident breeding species of ducks and geese known from Eastern Ghats, many species do winter in wetlands along the coast. A few species would be acquired from various zoos to start a breeding programme of those species known to winter in Andhra Pradesh.

Raptors/Birds of Prey: IGZP would be keeping certain species of Raptors/Birds of Prey. Two species of vultures which include Long-billed Vulture (*Gyps indicus)*, White-rumpedVulture (*Gyps bengalensis*), would be maintained at the zoo for conservation breeding programme.

Owls & Owlets:

IGZP currently housed two types of owls which include Indian Great Horned Owl and Barn owl. Now we are planning for new species for animal collection that includes Eurasian Eagle Owl, Spotted Owlet, Jungle Owlet, Spot bellied owl and Brown Fish Owl.

Pigeons/Doves: IGZP would be maintaining three species of Pigeons/Doves (Green Imperial Pigeon (*Duculaaenea*), Yellow-footed Green Pigeon (*Treronphoenicoptera*), Orange-breasted Green Pigeon (*Treronbicinctus*), Pied imperial pigeon, Green pigeon, Nicobar pigeon, Laughing dove, Spotted dove, Oriental turtle dove and Common Emerald Dove (*Chalcophapsindica*) as a part of the Eastern Ghats species conservation breeding programme.

Hornbills: Eastern Ghats are known to harbour three species of Hornbills. Malabar Pied Hornbill (*Anthracoceroscoronatus*), Indian Pied Hornbill (*Anthracocerosalbirostris*) and Indian Grey Hornbill (*Ocycerosbirostris*), Oriental pied hornbill, are distributed in the Eastern Ghats. IGZP would start a captive breeding programme for all three species by acquiring birds from various zoos in India.

Parrot/Parakeets/Lorikeets: Eastern Ghats are known to harbour four species of birds belonging to family Psittacidae. IGZP maintains breeding groups of Alexandrine (*Psittaculaeupatria)*, Rose Ringed (*Psittaculakrameri*) and Plum Headed Parakeets (*Psittaculacyanocephala*), Blossom headed parakeet, Red breasted parakeet, Slaty headed Parakeet.Efforts will be put in to improve captive husbandry of Vernal Hanging Parrot(*Loriculusvernalis*).

Jungle fowl: Both Grey (*Gallus sonneratii*) and Red jungle fowls (*Gallus gallus*), Red spur fowl, Painted spur fowl are reported from Eastern Ghats. IGZP would maintain breeding flocks of both the species in captivity.

Fowls:IGZP housed around two types offowl species like Common peafowl, White peafowl and planning for two more fowls for conservation and breeding which includes Green peafowl, Painted spur fowl,

Munia:IGZPPlanning three types of munias which includesBlack headed munia, Scaly breasted munia and White throated munia.

Pheasants:IGZP currently housed three types of pheasants which include Golden pheasant, Silver pheasant and Lady Amherst pheasant these three are exotic species. IGZP planning for two more local species which include Grey peacock pheasant, Kaliji Pheasant.

Macaws:IGZP currently housed two types of macaws: Blue gold macaw and Green winged macaw; we are planning for more collection of macaws which include Military macaw, Hyacinth macaw and Scarlet macaw.

Other Indigenous Birds: Brahminy Kite, Black kite, Shikra, Koel, Common Myna, Hill Myna, Common babbler, Yellow billed babbler, Red vented bulbul, Red Whiskered Bulbul, House sparrow, Grey Partidge, Red Avadavat and Indian roller.

Flightless Birds:IGZP currently housed two types of flightless bird which are Ostrich and Emu. IGZP would start a captive breeding programme for Rheabird acquiring from various zoos in India.

Other Exotic Birds: Sulphur lesser crested Cockatoo, Goffins Cockatoo, Eclectus parakeet, African Grey Parrot, Jandaya Conure, Sun Conure, Budgerigar, Peach faced love birds Cockatiels Coloured morphs, Violet Naped Lorry, White Cockatoo and Orange winged Amazon

Amphibians: Common Indian Toad, Indian Skipper frog, Indian Pond Frog and Indian Bull Frog these all Amphibians are acquiring from other Indian zoo for conservation and breeding purpose.

4.1.3.2 Captive breeding of endangered species from Indian Subcontinent:

The Indira Gandhi Zoological Park, Visakhapatnam has been successfully carrying out the conservation breeding of Asiatic Wild Dogs along with Indian Bison and Striped Hyena. Hence the IGZP for Species Conservation Planning in identified species i.e., Dhole or Asiatic Wild dogs as the Coordinating Zoo. And the Indira Gandhi Zoological Park, Visakhapatnam considered as the participating zoo in conservation breeding of two species i.e. Indian Bison and Striped Hyena.

To represent fauna from major bio-geographic zones of India, conserve and educate public about Indian wildlife, IGZP would take up captive breeding of some species.

Felids: IGZP would keep a breeding group of Asiatic Lion (*Panthera leopersica*). Other than this the zoo shall maintain a breeding population of Jungle cat (*Felischaus*).

Ursids: Among bears, other than the Sloth bear, IGZP would maintain Himalayan black bear (*Ursusthibetanus*).

Bovids: Among larger bovids, other than Gaur, IGZP shall also maintain breeding populations of Four-horned antelope (*Tetracerusquadricornis*) and Nilgai (*Boselaphustragocamelus*).

Cervids: Among cervids, species other than those involved in Eastern Ghats endangered species breeding programme, IGZP shall maintain breeding populations of Sangai deer (*Rucervuseldii ssp. eldii*), Barking deer(*Muntiacusmuntjaks*), Chital (Axis axis), Indian hog deer (*Axis porcinus*) and Indian sambar (*Rusa unicolor*).

Perissodactylids: Among the odd toed ungulates from India, IGZP would maintain breeding groups of Indian rhinoceros (*Rhinoceros unicornis*) as a part of its conservation breeding programme.

Caprinids: Among the mountain bovids, IGZP would maintain breeding groups ofGrey goral (*Nemorhaedus goral*) as a part of its conservation breeding programme.

Cercopithecids: IGZP has about seven primate enclosures currently. Among primates of India, IGZP would be establishing breeding groups of Lion-tailed macaque (*Macacasilenus*) Northern pig-tailed macaque (*Macaca leonine*),Stump-tailed macaque (*Macacaarctoides*) Bonnet macaque (*Macaca radiata*), Nilgiri langur (*Trachypithecusjohnii*),Grey langur

(*Semnopithecus entellus*). However, most of the above species are under conservation breeding programme in other zoos. Other than Lion tailed macaque, Bonnet Macaque and Grey langur most of the species are involved in regional breeding programmes and may be difficult for the zoo to procure. However, owning to their availability from the respective zoos, the animals would be acquired progressively.

Cranes and Storks: IGZP shall initially start a breeding programme for Sarus Crane (*Grus antigone*). Other than this, bothBlacknecked Stork (*Ciconia nigra*) and Lesser Adjutant Stork (*Leptoptilosdubius)* would be exhibited at IGZP.

Pelicans: Other than the Spot billed pelicans, IGZP would be maintaining flocks of Great White Pelican (*Pelecanusonocrotalus*) and Dalmatian Pelican (*Pelecanuscrispus*) which are known to occur in India.

Pigeons: Other than those species listed in the Eastern Ghats Endangered Species Breeding Programme, IGZP would maintain Nicobar Pigeon (*Caloenasnicobarica*) and Pied Imperial Pigeon (*Duculabicolor*).

Hornbills: Other than the three species of Hornbills as represented earlier, IGZP would maintain Great Hornbill (*Bucerosbicornis*) as a part of its Indian species-breeding programme.

Parrots: To the species of parrots earlier mentioned, IGZP would maintain breeding groups of Malabar Parakeet (*Psittaculacolumboides*), Rose-breasted parakeet (*Psittaculaalexandri*),Blossom-headed Parakeet (*Psittacularoseata*) as a part of Indian species collection plan.

Pheasants: Other than the two species of Jungle fowls named earlier, IGZP would be maintaining Kalij Pheasant (*Lophuraleucomelanoshamiltoni*), Grey Peacock-Pheasant (*Polyplectronbicalcaratum*), Painted Bush Quail (*Perdiculaerythrorhyncha*), Jungle Bush Quail (*Perdiculaasiatica*), Indian Peafowl (*Pavocristatus*) and Green Peafowl (*Pavomuticusspicifer*).

Ducks/Geese: Other than those ducks which winter along the wetlands of Eastern Ghats, IGZP would acquire endangered White-winged Wood Duck (*Asarcornisscutulata*) for

conservation breeding purpose. Other than this species, Grey Lag geese (*Anseranser*), Bar headed geese (*Anser indicus*) and Mute Swan (*Cygnus olor*) would also be maintained.

Turtles and tortoises: IGZP would be maintaining captive breeding populations of Asian Brown Tortoise (*Manouriaemysphayrei*), Indian Black Turtle (*Melanochelystrijuga*), Travancore tortoise (*Indotestudotravancorica*), Tricarinate turtle (*Melanochelystricarinata),* Indian Roofed turtle (*Pangshura tecta*), Red Crowned roofed turtle (*Batagurkachuga*), Indian flap-shell turtle (*Lissemys punctata*).

4.1.3.3 Exotic species collections:

The Zoo has a particular focus on species from the Gondwana 'supercontinent' which was made up of South America, India, Africa, Australia and South East Asia. The exotic species collection follows four zoogeographic regions: Africa, Southeast Asia, Tropical America and Australasia. Hence fourth a tentative list of species representing each geographical region is listed below. This doesn't mean that the zoo shall exhibit all the species listed below at one given point of time. Efforts would be put in to display species which can be suited for climatic conditions at IGZP. Many of the species are conservation dependent and are in the global conservation breeding programme and henceforth being part of such initiatives would benefit the survival of the species. Also that most of the species would be housed in the current enclosure space available. However, most of the species are currently not available within the country or in zoos in nearby countries, which makes them difficult to acquire owing to the rarity of most species. Recently IGZP has initiated exchange programmes with a number of International zoos on this front.

4.1.3.4 Australasia

The term Australasia has been used to refer to Australia and New Zealand together. This fauna at IGZP shall represent the regions of Indonesia (East of Wallace line), the Philippines, New Guinea, Australia and New Zealand. The species includes Black swan, Emus, Greater Sulphur Crested cockatoo, Goffin'scockatoo, Budgerigar, Cockatiel.

Among the mammals, Red Necked wallabies/Grey kangaroos would be maintained at the zoo.

4.1.3.5 South East-Asia

The continent of Asia is a land of extremes and unbelievable diversity. It's unsurpassed range of elevations, latitude and climatic influences produce the greatest variety of habitats on any continent. The species include Silver Pheasant, Lady Amherst's Pheasant, Mandarin duck.

Mammal species include Bornean Orangutan.

4.1.3.6 Africa

Some of the more popular zoo animals among public are representatives from Africa. IGZP shall exhibits some of familiar African Savanah and Rain-forest species like Hamadryas baboon, Mandrills, Chimpanzees. Northern giraffes, Grant zebras, White rhinoceros, Pygmy Hippopotamus and Ostrich. Also, the zoo shall exhibit species from Island nations of the African East Coast such as Lemur sp. and Aldabra tortoise.

4.1.3.7 Tropical-America

Tropical America represents a region that includes Central America and the northern two-thirds of South America. This extremely lush tropical forest is home to an incredible variety of biodiversity; and houses nearly one-half of all known species on earth. The species included in the collection plan are Jaguars/ Pumas, and South American tapirs, Green anacondas, and Green Iguana. The species of birds to be included to the South American collection would be Roseate Spoonbill, Scarlet Ibis, Green-winged macaws, Scarlet Macaws, Blue and Gold macaws, Hyacianth macaw, Military Macaw, Sun conure, Jandayaconure, Conure sp., Orange winged Amazon from the Pampas of South America, Greater Rheas would be included.

***Table 4*-1List of the species included in collection plan**

S.No.	Species	Scientific name	Indigenous/ Exotic
I	**Carnivore**		
1.	Asiatic Lion	*Panthera leo persica*	Indigenous
2.	Bengal Tiger	*Panthera tigristigris*	Indigenous
3.	White Tiger(leucistic)	*Panthera tigristigris*	Indigenous
4.	Leopard	*Panthera pardus*	Indigenous
5.	Fishing Cat	*Prionailurusviverrinus*	Indigenous
6.	Rusty Spotted Cat	*Prionailurusrubiginosus*	Indigenous
7.	Leopard Cat	*Prionailurus bengalensis*	Indigenous
8.	Jungle Cat	*Felis chaus*	Indigenous
9.	Sloth bear	*Melursus ursinus*	Indigenous
10.	Himalayan Black Bear	*Ursus thibetanusssp. laniger*	Indigenous
11.	IndianGrey Wolf	*Canis lupus ssp. pallipes*	Indigenous
12.	Dhole/ Asiatic Wild dog	*Cuonalpinus*	Indigenous
13.	Bengal fox	*Vulpes bengalensis*	Indigenous
14.	Striped Hyaena	*Hyaena hyaena*	Indigenous
15.	GoldenJackal	*Canis aureus*	Indigenous
16.	Small Indian Civet	*Viverricula indica*	Indigenous
17.	AsianPalm Civet	*Paradoxurus hermaphroditus*	Indigenous
18.	Honey Badger	*Mellivara capensis*	Indigenous
19.	Indian Pangolin	*Manis crassicaudata*	Indigenous
20.	Common Otter	*Lutralutra*	Indigenous
21.	Smooth Coated Otter	*Lutrogaleperspicillata*	Indigenous
22.	Jaguar	*Panthera onca*	Exotic
23.	Puma/Mountain lion/cougar	*Puma concolor*	Exotic
II	**Herbivores**		
24.	Black Buck	*Antilope cervicapra*	Indigenous
25.	Sangai deer	*Rucervuseldiieldii*	Indigenous
26.	Mouse deer	*Mosciola indica*	Indigenous
27.	Hog deer	*Axis porcinus*	Indigenous
28.	Spotted deer	*Axis axis*	Indigenous
29.	Sambar	*Rusa unicolor*	Indigenous
30.	Chinkara	*Gazella bennettii*	Indigenous
31.	Nilgai	*Boselaphustragocamelus*	Indigenous
32.	Barking deer	*Muntiacusmuntjak*	Indigenous
33.	Chowsingha	*Tetracerus quadricornis*	Indigenous
34.	Barasingha/Swamp deer	*Rucervusduvaucelii*	Indigenous
35.	Indian One horned Rhinoceros	*Rhinoceros unicornis*	Indigenous

S.No.	Species	Scientific name	Indigenous/ Exotic
36.	Wild boar	*Sus scrofa*	Indigenous
37.	Gaur	*Bos gaurus*	Indigenous
38.	Asian Elephant	*Elephas maximus indicus*	Indigenous
39.	Himalayan Goral	*Naemorhedus goral*	Indigenous
40.	Red Necked Wallaby	*Macropus rufogriseus*	Exotic
41.	Grey Kangaroo	*Macropus giganteus*	Exotic
42.	Northern Giraffe	*Giraffa camelopardalis*	Exotic
43.	Grant's Zebra	*Equus quagga ssp. boehmi*	Exotic
44.	White Rhinoceros	*Ceratotheriumsimum*	Exotic
45.	Common Hippopotamus	*Hippopotamus amphibious*	Exotic
46.	Pygmy Hippopotamus	*Choeropsisliberiensis*	Exotic
III	**Primates**		
47.	Stump tailed macaque	*Macaca arctoides*	Indigenous
48.	Lion tailed macaque	*Macacasilenus*	Indigenous
49.	Grey Langur	*Semnopithecus entellus*	Indigenous
50.	Nilgiri Langur	*Trachypithecusjohnii*	Indigenous
51.	Rhesus Macaque	*Macaca mulatta*	Indigenous
52.	Bonnet Macaque	*Macaca radiata*	Indigenous
53.	Capped Langur	*Trachypithecuspileatus*	Indigenous
54.	Assamese Macaque	*Macaca assamensis*	Indigenous
55.	Cotton-top Tamarin	*Saguinusoedipus*	Exotic
56.	Emperor Tamarin	*Saguinus imperator*	Exotic
57.	Common Squirrel Monkey	*Saimiri sciureus*	Exotic
58.	Brown Capuchin	*Cebus paella*	Exotic
59.	Chimpanzee	*Pan troglodytes*	Exotic
60.	Bornean Orangutan	*Pongo pygmaeus*	Exotic
61.	Hamadryas Baboon	*Papio hamadryas*	Exotic
62.	Ring tailed Lemur	*Lemur catta*	Exotic
63.	Mandrill	*Mandrillus sphinx*	Exotic
64.	Common marmoset	*Callithrix jacchus*	Exotic
IV	**Rodents**		
65.	Giant Indian Squirrel	*Ratufa indica*	Indigenous
66.	Indian Porcupine	*Hystrix indica*	Indigenous
67.	Slender-tailed Meerkat	*Suricata suricatta*	Exotic
V	**Reptiles**		
68.	Indian Cobra	*Najanaja*	Indigenous
69.	MonocellateCobra	*Najanajakouthia*	Indigenous
70.	King Cobra	*Ophiophagus Hannah*	Indigenous
71.	Reticulated Python	*Malayopythonreticulatus*	Indigenous
72.	Burmese Rock Python	*Pythonbivitatus*	Indigenous

S.No.	Species	Scientific name	Indigenous/ Exotic
73.	Indian Rock Python	*Python molurus*	Indigenous
74.	Common Sand Boa	*Gongylophisconicus*	Indigenous
75.	Whitaker's Sand Boa	*Eryxwhitakeri*	Indigenous
76.	Red Sand Boa	*Eryxjohnii*	Indigenous
77.	Indian Rat Snake	*Ptyas mucosa*	Indigenous
78.	Common Wolf snake	*Lycodonaulicus*	Indigenous
79.	Barred Wolf Snake	*Lycodonstriatus*	Indigenous
80.	Common Trinket Snake	*Coelognathushelena*	Indigenous
81.	Bronze-back Tree Snake	*Dendrelaphis tristis*	Indigenous
82.	Green Vine Snake	*Ahaetullanasuta*	Indigenous
83.	Common Kukri snake	*Oligodonarnensis*	Indigenous
84.	Russell's Kukri Snake	*Oligodontaeniolatus*	Indigenous
85.	Green Keelback	*Rhbdophisplumbicolor*	Indigenous
86.	Checkered Keelback	*Fowleapiscator*	Indigenous
87.	Indian Chameleon	*Chamaeleozeylanicus*	Indigenous
88.	Water Monitor Lizard	*Varanus salvator*	Indigenous
89.	Bengal Monitor Lizard	*Varanus bengalensis*	Indigenous
90.	Yellow monitor lizard	*Varanus flavescens*	Indigenous
91.	Indian Black Turtle	*Melanochelystrijuga*	Indigenous
92.	Tricarinate hill turtle	*Melanochelystricarinata*	Indigenous
93.	Ganges soft shell turtle	*Nilssoniagangetica*	Indigenous
94.	Indian roof turtle	*Panghsuratecta*	Indigenous
95.	Indian flap-shell turtle	*Lissemys punctata*	Indigenous
96.	Painted roofed turtle	*Batagurkachuga*	Indigenous
97.	Southeast Asian Box turtle	*Cuoraamboinensis*	Indigenous
98.	Travancore tortoise	*Indotestudotravancorica*	Indigenous
99.	Star Tortoise	*Geochelone elegans*	Indigenous
100.	Asian brown tortoise	*Manouriaemys*	Indigenous
101.	Gharial	*Gavialis gangeticus*	Indigenous
102.	Salt water crocodile	*Crocodylusporosus*	Indigenous
103.	Mugger	*Crocodylus palustris*	Indigenous
104.	Red eared slider Turtle	*Trachemys scripta ssp. elegans*	Exotic
105.	Yellow Anaconda	*Eunectes notaeus*	Exotic
106.	Green Anaconda	*Eunectes murinus*	Exotic
107.	Komodo Dragon	*Varanus komodoensis*	Exotic
108.	Green Iguana	*Iguana iguana*	Exotic
109.	Aldabra Giant tortoise	*Aldabrachelysgigantea*	Exotic
110.	Spectacled Caiman Crocodile	*Caiman crocodilus*	Exotic
111.	Dwarf Caiman	*Paleosuchuspalpebrosus*	Exotic

S.No.	Species	Scientific name	Indigenous/ Exotic
VI	**AVES**		
112.	Lesser Adjutant Stork	*Leptoptilosjavanicus*	Indigenous
113.	Black necked stork	*Ephippiorhynchus asiaticus*	Indigenous
114.	White stork	*Ciconia Ciconia*	Indigenous
115.	Open Billed Stork	*Anastomusoscitans*	Indigenous
116.	Painted Stork	*Mycteria leucocephala*	Indigenous
117.	Sarus Crane	*Grus Antigone*	Indigenous
118.	Demoiselle crane	*Grus virgo*	Indigenous
119.	Eurasian Spoonbill	*Platalealeucorodia*	Indigenous
120.	Black headed Ibis	*Threskiornismelanocephalus*	Indigenous
121.	Grey Heron	*Ardea cinerea*	Indigenous
122.	Purple Heron	*Ardea purpurea*	Indigenous
123.	Black-crowned night heron	*Nycticoraxnycticorax*	Indigenous
124.	Indian pond heron	*Ardeolagrayii*	Indigenous
125.	Spot Billed Pelican	*Pelecanusphilippensis*	Indigenous
126.	Greater white pelican	*Pelecanusonocrotalus*	Indigenous
127.	Greater flamingo	*Phoenicopterus roseus.*	Indigenous
128.	Comb duck	*Sarkidiornis melanotos*	Indigenous
129.	Ruddy Shelduck	*Tadornaferruginea*	Indigenous
130.	Spot Billed duck	*Anas poecilorhyncha*	Indigenous
131.	White winged Wood duck	*Asarcornisscutulata*	Indigenous
132.	Lesser whistling Teal	*Dendrocygnajavanica*	Indigenous
133.	Large Whistling Teal	*Dendrocygna bicolor*	Indigenous
134.	Garganey Teal	*Anasquerquedula*	Indigenous
135.	Common Teal	*Anas crecca*	Indigenous
136.	Purple moorhen	*Porphyrioporphyrio*	Indigenous
137.	Darter - Snake Bird	*Anhinga melanogaster*	Indigenous
138.	Little Cormorant	*Microcarboniger*	Indigenous
139.	Bar headed geese	*Anser indicus*	Indigenous
140.	Cattle Egret	*Bubulcus ibis*	Indigenous
141.	Large Egret	*Ardea alba*	Indigenous
142.	Little Egret	*Egrettagarzetta*	Indigenous
143.	White rumped vulture	*Gyps bengalensis*	Indigenous
144.	Long billed vulture	*Gyps indicus*	Indigenous
145.	Red-headed Vulture	*Sarcogyps calvus*	Indigenous
146.	Brahminy Kite	*Haliasturindus*	Indigenous
147.	Black Kite	*Milvus migrans*	Indigenous
148.	Shikra	*Accipiter badius*	Indigenous
149.	Koel	*Eudynamysscolopacea*	Indigenous
150.	Indian Great Horned Owl	*Bubo bengalensis*	Indigenous

S.No.	Species	Scientific name	Indigenous/ Exotic
151.	Barn Owl	*Tyto alba*	Indigenous
152.	Eurasian Eagle-Owl	*Bubo bubo*	Indigenous
153.	Spotted Owlet	*Athene brama*	Indigenous
154.	Jungle Owlet	*Glaucidium radiatum*	Indigenous
155.	Spot-bellied eagle-owl	*Bubo nipalensis*	Indigenous
156.	Brown Fish Owl	*Ketupazeylonensis*	Indigenous
157.	Pied imperial pigeon	*Ducula bicolor*	Indigenous
158.	Green imperial pigeon	*Duculaaenea*	Indigenous
159.	Green pigeon	*Treronphoenicoptera*	Indigenous
160.	Nicobar pigeon	*Caloenasnicobarica*	Indigenous
161.	Emerald dove	*Chalcophaps indica*	Indigenous
162.	Laughing Dove	*Spilopelia senegalensis*	Indigenous
163.	Spotted dove	*Spilopelia chinensis*	Indigenous
164.	Oriental turtle dove	*Streptopeliaorientalis*	Indigenous
165.	Common Myna	*Acridotheres tristis*	Indigenous
166.	Hill myna	*Gracula religiosa*	Indigenous
167.	Common babbler	*Argyacaudata*	Indigenous
168.	Yellow-billed babbler	*Argyaaffinis*	Indigenous
169.	Rose-Ringed parakeet	*Psittaculakrameri*	Indigenous
170.	Alexandrine parakeet	*Psittaculaeupatria*	Indigenous
171.	Malabar parakeet	*Psittaculacolumboides*	Indigenous
172.	Plum headed parakeet	*Psittaculacyanocephala*	Indigenous
173.	Blossom headed parakeet	*Psittacularoseata*	Indigenous
174.	Red breasted parakeet	*Psittaculaalexandri*	Indigenous
175.	Slaty headed Parakeet	*Psittaculahimalayana*	Indigenous
176.	Red vented bulbul	*Pycnonotuscafer*	Indigenous
177.	Red Whiskered Bulbul	*Pycnonotusjocosus*	Indigenous
178.	House Sparrow	*Passer domesticus*	Indigenous
179.	Malabar pied hornbill	*Anthracoceroscoronatus*	Indigenous
180.	Oriental pied hornbill	*Anthracocerosalbirostris*	Indigenous
181.	Greater pied hornbill	*Bucerosbicornis*	Indigenous
182.	Grey Hornbill	*Ocycerosbirostris*	Indigenous
183.	Kalij pheasant	*Lophuraleucomelanos*	Indigenous
184.	Grey peacock pheasant	*Polyplectronbicalcaratum*	Indigenous
185.	Grey Jungle fowl	*Gallus sonneratii*	Indigenous
186.	Red Jungle fowl	*Gallus gallus*	Indigenous
187.	Grey Partridge	*Perdix perdix*	Indigenous
188.	Jungle Bush quail	*Perdicula asiatica*	Indigenous
189.	Rain Quail	*Coturnix coromandelica*	Indigenous
190.	Indian Peafowl	*Pavocristatus*	Indigenous

S.No.	Species	Scientific name	Indigenous/ Exotic
191.	White peafowl	*Pavocristatus*	Indigenous
192.	Green peafowl	*Pavomuticus*	Indigenous
193.	Red spur fowl	*Galloperdixspadicea*	Indigenous
194.	Painted Spur Fowl	*Gallloperdixlunulata*	Indigenous
195.	Black headed munia	*Lonchura atricapilla*	Indigenous
196.	Scaly breasted munia	*Lonchura punctulate*	Indigenous
197.	Red avadavat	*Amandavaamandava*	Indigenous
198.	White throated Munia	*Euodicemalabarica*	Indigenous
199.	Indian roller	*Coracias benghalensis*	Indigenous
200.	Military Macaw	*Ara militaris*	Exotic
201.	Hyacinth macaw	*Anodorhynchushyacinthinus*	Exotic
202.	Green winged Macaw	*Ara chloropterus*	Exotic
203.	Blue Gold Macaw	*Ara ararauna*	Exotic
204.	Scarlet Macaw	*Ara macao*	Exotic
205.	Rainbow Lorikeet	*Trichoglossusmoluccanus*	Exotic
206.	Mandarin Duck	*Aix galericulata*	Exotic
207.	Scarlet Ibis	*Eudocimusruber*	Exotic
208.	White ibis	*Eudocimus albus*	Exotic
209.	Humboldt penguin	*Spheniscus humboldti*	Exotic
210.	Sulphur Lesser Crested Cockatoo	*Cacatua galerita*	Exotic
211.	Goffin's Cockatoo	*Cacatua goffiniana*	Exotic
212.	African Grey Parrot	*Psittacus erithacus*	Exotic
213.	Eclectus Parakeet	*Eclectusroratus*	Exotic
214.	Jandaya conure	*Aratingajandaya*	Exotic
215.	Sun conure	*Aratingasolstitialis*	Exotic
216.	Budgerigar	*Melopsittacus undulates*	Exotic
217.	Peach faced love bird	*Agapornis roseicollis*	Exotic
218.	Cockatiels Colour morphs	*Nymphicus hollandicus.*	Exotic
219.	Violet Naped Lory	*Loriusdomicella*	Exotic
220.	White Cockatoo	*Cacatua alba*	Exotic
221.	Mute Swan	*Cygnus olor*	Exotic
222.	Black Swan	*Cygnus atratus*	Exotic
223.	Ostrich	*Struthio camelus*	Exotic
224.	Greater Rhea	*Rhea americana*	Exotic
225.	Emu	*Dromalusnovaehollandiae*	Exotic
226.	Lady Amherst pheasant	*Chrysolophusamherstiae*	Exotic
227.	Golden Pheasant	*Chrysolophus pictus*	Exotic
228.	Silver Pheasant	*Lophuranycthemera*	Exotic
229.	Orange winged Amazon	*Amazona amazonica*	Exotic

S.No.	Species	Scientific name	Indigenous/ Exotic
VII	**Amphibians**		
230.	Common Indian Toad	*Duttaphrynusmelanostictus*	Indigenous
231.	Indian Skipper frog	*Euphlyctiscyanophlyctis*	Indigenous
232.	Indian Pond Frog	*Euphlyctishexadactylus*	Indigenous
233.	Indian Bull Frog	*Hoplobatrachustigerinus*	Indigenous

Table 4-2: Proposed Collection of animals 2020-21 to 2040-41

Sl. No	Species	Proposed collection			Percentage (%) of total collection	
		Indigenous / Endangered / National Importance species	Exotic	Total	Indigenous / Endangered / National Importance species	Exotic
1	Carnivores	21	2	**23**	9.05%	0.86%
2	Herbivores	16	7	**23**	6.90%	3.02%
3	Primates	08	10	**18**	3.45%	4.31%
4	Rodents	02	01	**03**	0.86%	0.43%
5	Reptiles	36	8	**44**	15.52%	3.45%
6	Aves	88	30	**118**	37.77%	12.87%
7	Amphibians	4	00	**4**	1.72%	0
	Total:	**175**	**58**	**233**	**75.11%**	**24.89%**

Note: In the proposed collection plan of IGZP Indigenous species of endangered/regional/national/Indian subcontinent form 75.11% of the collection, where as 25 % belongs to the exotic/global collections. Out of this 24.89% of global collections other than from our country, Aves forms major part with 12.87 % and rest of the fauna belonging to mammals and reptiles put together is coming 12.02%.

4.1.4 Surplus animals

The surplus animal list of IGZP is appended below for future animal exchange programmes and also immediate action to be taken to rehabilitate the excess stock.

S.No.	Species Name	Excess stock/For Exchange (M:F:U)	Remarks
Carnivores:			
1	White Tiger	0:1:0	
2	Jackals	2:2:0	
3	Wild Dog	1:1:0	
4	Striped Hyena	1:0:0	
Herbivores:			
1	Barking Deer	2:2:0	
2	Black Buck	10:10:0	
3	Sambar deer	5:5:0	
4	Spotted deer	5:5:0	
5	Indian Guar	1:0:0	
Primates:			
1	Bonnet Monkey	3:3:0	
AVES (Birds):			
1	Painted Stork	1:1:0	
2	Grey Pelican	1:1:0	
3	Rose ringed Parakeet	2:2:0	
4	Alexandrine Parakeet	4:2:0	
5	Indian Peafowl	3:3:0	
6	Budgerigar	6:6:0	
Reptiles			
1	Star tortoise	10:20	
2	Indian Cobra	0:0:1	
3	Indian Rock Python	0:1:0	
4	Gharial	0:2:0	

4.2 Description of Master Layout Plan of the Zoo (Annexure-VII)

Indira Gandhi Zoological Park, even though has geographical area of 625 Acres but much of the area is taken by two hills with steep slopes and a valley. This leaves about 200 acres in central area and another pocket of approx. 75 acres on its northern side. This pocket is less accessible and is isolated. Zoo layout plan was approved by the Central Zoo Authority on 17.09.2013, which is being used as the base document for carrying out various management interventions till date in the zoo. After devastation of the Zoo area due to Hud-Hud cyclone, redevelopment and restoration of the entire area was planned under world-bank funded APDRP to modernize the facilities in IGZP along with making them cyclone resilient. These efforts are underway and the modified layout plan prepared under this accordingly is described below. Mostly it aligns with the approved layout plan by CZA, whereas in some sections there are changes. A comparison of the both the layout are done below, the changes have to be approved as an amendment to the already approved layout plan by the CZA.

4.2.1 Details of Master Layout Plan (CZA approved) and newly proposed under APDRP

S.No.	Enclosure/ Infrastructure	CZA approved layout plan	Newly proposed layout plan
1	Main entrance	Towards NH-5	Towards NH-5. Multi-utility entrance in a wider area is planned.
2	Parking	Left side of the main entrance	Right side from main entrance, inside the zoo, along the NH-5, demolishing existing old Administration Building, Hospital building and Inpatient Ward to provide wider parking for four wheelers and two wheelers.
3	Primate enclosures	Enclosures for Rhesus macaque, common Langur, Bonnet macaque, LTM, Orangutan and Chimpanzees are provided.	Enclosures for Rhesus macaque, common Langur, Bonnet macaque, LTM, Orangutan and Chimpanzees are provided.

S.No.	Enclosure/ Infrastructure	CZA approved layout plan	Newly proposed layout plan
4	Pheasantry and exotic parrots	It is provided towards the right side of the main entrance.	Aviary for water birds like Pelicans is kept in the same location.
5.	Aquatic bird aviary	Next to the location given for pheasantry and exotic parrots.	Aviary for water birds like Swans is provided.
6	Rhino enclosure	While taking the left side from main entrance, second right this enclosure is located.	Same as in the approved plan
7	Elephant enclosure/Mixed herbivore enclosure	A very spacious facility of 12 acres are provided next to Rhino enclosure on the right side of the road	Only Elephant is kept in this location now.
8	Carnivore enclosure loop	Towards left side of the road uphill, carnivore enclosures for Jaguar/ Puma, Cheetah, Leopard, Tiger, White tiger, Lion are arranged.	Towards left side of the road uphill, carnivore enclosures for Jaguar/ Puma, Cheetah, Leopard, Tiger, White tiger, Lion are arranged.
9	Aquatic walk-through aviary	It is located behind the elephant enclosure and on the right side of the road	This enclosure was damaged during ‘hud-hud’ completely and it is proposed in the vacant place near the Indian Birds Aviary.
9	Bear enclosures	Followed by Lion enclosure there is a loop for displaying 3 bear species: Himalayan black bear, Malayan Sun bear and Sloth bear	The same is retained
10	Lesser Carnivore loop	Opposite to Lion enclosure, new enclosure for wild dog, Fox are proposed and there exists hyena, wolf and Jackal enclosures here.	Opposite to the Lion enclosure, new enclosure for Wild Dog, Fox and Wild Ass are proposed and there exists hyena, wolf and Jackal enclosures here.

S.No.	Enclosure/ Infrastructure	CZA approved layout plan	Newly proposed layout plan
11	Exotic Herbivore loop	Giraffe, Zebra, Gnu and Flight less bird enclosures are placed in the area behind the lesser carnivore enclosure making a new visitor path way to access them. Opposite to them are the new exotic primate enclosures	Giraffe and Zebra enclosures are now placed beside the Pheasants aviary. Gnu is now placed near the Wild Boar enclosure. Flight less bird enclosures are placed opposite to future expansion.
12	Bioscope	Followed by sloth bear enclosure on the left side is Bioscope facility for conducting conservation education and right side is Zoo canteen	Same locations are maintained.
13	Interpretation centre, amphitheatre, EducationCenter, Canteen	--------	The building/complex is integrated with four different utility purpose (InterpretationCenter, education Center, Canteen, Amphitheatre)
14	Hippopotamus and Pygmy Hippopotamus.	This enclosure is provided after Bioscope on the left side of the road	Same location is retained.
15	Butterfly Park	Opposite to Hippo	Same location is retained
16	Reptile Park	A loop of 7 enclosures for housing snakes, turtles, tortoises, monitor lizard, iguana etc are provided	Same locations are retained
17	Crocodile Park	Enclosures for housing 4 different species of crocodiles are provided. One enclosure (Gharial) being on the right side of the road	Marsh Crocodile and Estuarine Crocodile are in the same location, but for Caiman Crocodile and Gharial Crocodile are kept on the other side of Marsh Crocodile.
18	Service gate near Sagar Nagar	Facing the Ocean	Same as approved layout

S.No.	Enclosure/ Infrastructure	CZA approved layout plan	Newly proposed layout plan
19	Bird aviaries loop	While coming from Sagar Nagar gate, on the right-side aviaries for storks, Cranes are proposed and on the left side Parrot world, Birds of Prey, Hornbill house, Indian bird aviary are proposed.	While coming from Sagar Nagar gate, on the right-side aviaries for storks, Birds of Prey and Cranes are proposed and on the left side Parrot world, Cranes, Hornbill house, Indian bird aviary are proposed. Visitor amenities are added opposite to the Crane Enclosure.
20	Herbivore loop	On the right side of the road it is black buck enclosure, Nilgai, behind it is wild boar, again continuing to Barking deer, Chowsingha, Nilgai, Spotted deer, Swamp deer enclosures are there. On the left side of the road it is Indian Gaur, Sambar/Hog deer, Mouse deer, Thamin deer enclosures followed by Pheasant section and Peafowl aviary. New enclosures for Chowsingha and Swamp deer are proposed.	Existing Black Buck enclosure is now divided into two parts, one for Black Buck and other for Chinkara again continuing, Swamp and Thamin deer are now placed at a new location opposite to Indian Gaur (Eastern Ghats). Barking Deer, Mouse Deer, Nilgai, Spotted Deer, Sambar Deer, Hogg Deer, Chowsingha and Indian Gaur (Western Ghats) are in the same location followed Pheasants Aviary.
21	NAH, Crane enclosure, Giant Squirrel, Aquarium	On taking the right side from main entrance, NAH and enclosure for Sarus crane is shown on the right side and Giant Squirrel enclosure on the left side.	NAH and Giant Squirrel enclosures are shown in the same location, whereas Crane enclosure is placed new the Parrot world. Aquarium placed to near to NAH.
22	Administrative block including veterinary facilities	Director/Curator office, followed by Zoo hospital, Isolation ward, Impatient ward, Post mortem room,	Director/Curator office, followed by Zoo hospital, Isolation ward, Impatient ward, Post mortem room, Incinerator, Quarantine

S.No.	Enclosure/ Infrastructure	CZA approved layout plan	Newly proposed layout plan
		Incinerator, Zoo feed store, Workshop, Quarantine block, offices for different staff are provided.	block and offices for different staff are provided in a new location. Feed Store and Workshop are in the same location.
23	Watch Tower	--------	There are 6 watch towers proposed in the master plan layout. First watch tower is for visitors view point near to Sagar gate. Second watch tower is of 18m height to check on forest fires, it is placed near to the Zoo park entry to the backside of elephant enclosure. Two more watch towers the third and fourth are placed along the herbivore and Elephant enclosure for guards. And Two more towers are proposed for future. And are planned to be placed along the tiger and lion safari regions.
24	Surplus Parking	-------	A surplus parking facility is provided in addition to the main parking. The parking facility is planned to utilise during peak tourist vehicular flow (ex. karthikamasam etc,.) and in emergencies. It is planned in a way to divert the excess vehicles in the main parking area through the fodder track road.
25	Food kiosk	----------	Proposed near sagar gate and opposite side of Indian gaur enclosure.

S.No.	Enclosure/ Infrastructure	CZA approved layout plan	Newly proposed layout plan
26	Ticket Counter	Right side of the Main entrance.	Right side of the Main entrance
27	Keeper Changing room	----------	Beside of the New Veterinary Hospital
28	Infant Care Center	----------	Proposed Locations Main Entrance Plaza, Near Sagar Gate, Interpretation Centercomplex, proposed Landscape areas and Opposite of Zebra Enclosures

4.2.2 Layout Plan and proposal for future improvements/amendments of Enclosures

In the layout plan of IGZP, the existing enclosures are shown in black colour, whereas the future enclosures construction are depicted in blue colour, while those need some improvements and repairs to night houses etc. are shown in green colour and the those need reconstruction or redoing are shown in red colour. The IGZP is presently having 68 enclosures and most of them are in good condition, only few need some improvements. 21 enclosures need to be newly constructed,5 enclosures need to be modified and 4 enclosures need to be redone.

a. Grouping of animals needs further strengthening of enclosures by having one or two to three type of species displayed together. The Primate section will have groupingofRhesus Macaque, Common Langur, Pig-tailed Macaque, Lion-tailed Macaque with Exotic Primates 1 and 2.

b. This concept can be further reinforced by developing distinct entry points to a particular Entry (to a trail supporting one family type) by naming, distinct signage, use of sculpture and creating Entry court with public amenities.

c. The Main ring (BT) road needs to be strengthened keeping 20-year horizon.

d. Large section of valley remains cut-off from the ring road. Some of the area can be put to use for future expansion. Valley remains dry most of the year, as moisture retention is less. As a result, it doesn't support more luxuriant flora. Water remains the deciding factor here. Fortunately, we have very good catchment area with good rainfall. So, we need to have strategy to retain more water with longer period of time.

e. Currently, we allow private vehicles-four wheelers inside the Zoo. However, we need to work in direction to be able to stop this practice. At present, 10 battery vehicles are being operated on lease basis. This may be sufficient for fulfilling needs for a short period but for next 10 years, we are proposing another 10 battery vehicles. We would like to develop the central area in the future which is accessible from South-East as well as from West. Currently it is lying unused. This central valley can be developed into a beautiful space which would have animal enclosures, visitor amenities and lots of activities surrounding it. West, being the main entry. The 3.05 km ring road around central area forms the main visitor circulation path.

f. A natural drain flows through the Zoo ring road. As IGZP is part of natural forest so, it has forest like ambience. There are hardly any lawns or maintained landscape.

g. There is no separate service entry, segregated service areas, provision for visitor's vehicle parking inside IGZP's land, waiting area and modern eatery. There is an urgent need to develop these facilities for visitor comfort and better management.

h. Improvement of the existing circulation path: A well-developed circulation road (4.5 km) with 8 locations to act as e-cart stoppage point with charging facility is to facilitate the operation of these battery cars in Hop-in Hop-off way. The visitor pathways, modification in stand-off barriers (4.5 km), improved interpretative and signages are included in it. Modern rest room facilities and providing differently-abled friendly ramps in them and also in front of the enclosures wherever necessary are there in the plan.

i. Further extension of the zoo park will be taken up as and when required depending upon the acquisition of the proposed species as per the animal collection plan and the approved design of such enclosures by the CZA. With respect to the acquisition of new species as per the animal collection plan in future, the animal enclosures will be created within the Zoo Park campus owing to the large area availability after taking necessary approval from CZA as per the guidelines.

j. For further extension in future, the zoo has Deer Safari area inside the Zoo Park and Lion Safari inside the Animal Rescue Centre facility, which is under maintenance and will be brought into operation during the period of this master plan as and when the budget is available.

k. Further, the Marine Life Complex, which is also under the control of the Zoo, will also be brought into operation for some kind of marine education centre depending upon the availability of budget.

4.2.3 Design Concept

- The master plan proposed is divided into 9 zones. Depending upon the nature of species, living conditions and eating habits/ structures of animals as elaborated under:
    - Primate Zone/Apes Zone
    - Mega Carnivores Zone
    - Lesser Carnivore
    - Bear Zone
    - Reptiles/Lizards/Crocodile Zone
    - Aviaries Zone
    - Herbivores zone
    - Flightless Birds Zone
    - Administration Zone

Primate Zone/ Apes Zone: The zone will accommodateStump tailed macaque, Lion tailed macaque, Pig tailed macaque, Grey Langur, Nilgiri Langur, Leaf Spectacled Monkey, Rhesus Macaque, Bonnet Macaque, Slender loris, Capped Langur, Assamese Macaque, Eastern Hoolock Gibbon, Golden-headed lion tamarin, Cotton-top Tamarin, Emperor Tamarin, Common Squirrel Monkey, Brown Capuchin, Chimpanzee, Orangutan, Gorilla, Hamadryas Baboon, Ring tailed Lemur, Mandrill, Olive Baboon, Common marmoset,to the right side of zoo main gate. To the left side of the road, after swan and rhino enclosures, Exotic Primate-1 (Proposed), Exotic Primate-2 (Proposed) are proposed.

- Mega Carnivores Zone: The zone already accommodates Jaguar, Puma, Leopard, Tiger, White Tiger, Lion enclosures following the Primate zone/apes zones.
- Lesser Carnivores Zone: Present near to canteen area, the zone already accommodates hyena, wolf, and jackal enclosures. For Wild Dog, Fox and Wild Ass New enclosures were proposed. Wild dog enclosure to be placed beside Lion enclosure, fox and wild ass enclosures to be placed to the left side of hyena enclosure. For remaining (wild cat etc.) enclosure proposed beside the wild ass enclosure.
- Bear Zone: The zone is proposed adjacent to the lesser carnivore zone.

- Reptiles/Lizards/Crocodile zone: Caiman Crocodile is proposed beside marsh Crocodile enclosure and opposite to marsh crocodile the shifted Gharial enclosure is located.
- Aviaries zone: The zone will be newly constructed Walk through where aviary Hornbill House, Birds of prey, Parrot world, Cranes, Storks etc. will be present. It is adjacent to the Reptiles Zone.
- Herbivores Zone: After Aviaries, to the right side of the zoo main gate the zone is proposed, under which Indian Gaur (Western/ Eastern), Black Buck, Chinkara (Proposed), Swamp/Thamin Deer (Proposed), GNU (Proposed), Wild boar, Barking Deer, Mouse Deer, Nilgai, Spotted Deer, Zebra, Giraffe, Chowsingha, Hog Deer, Sambar Deer, Elephant, Rhino will be present.
- Flightless Birds zone: The zone will be developed and planned newly in the middle of the zoo. It is planned to connect the mega carnivores, lesser carnivores and herbivores with EMU (Proposed), Ostrich (Proposed) and Rheas (Proposed).

- Adjacent to National highway, inside IGZP land, near to the Zoo Main entry parking is planned. 226 Cars/ SUVs, 350 two wheelers. An extended parking facility, inside the zoo, adjacent to the boundary wall is proposed to the right side of the main entrance. The idea is to introduce increase battery-operated/ e-vehicles entry with gradual decrease in regular vehicles entry inside zoo.
- The main circular ring road is to be strengthened, with well-maintained landscape/ lawn strip. With enough number of resting places already present, no new resting places were proposed. The Natural rock outcrops are to be retained with lawn around. Secondary loops starting from the central main road, highlighting a group of similar species are to be constructed, with the aim to have single way movement. We propose two lawns near elephant enclosures and aviary zone. To make viewing more convenient and enjoyable, Battery-Operated Vehicles are to be deployed on outsourcing/ lease basis.
- Stoppage points are strategically located, to ensure that complete Zoo can be viewed. They are Main Gate, Carnivore section, Reptile section area, Pheasants section and Sagar Colony Gate.

- New E-cart stops are being proposed near Primate Section, Orangutan enclosure, Bioscope, Birds of Prey and Indian Gaur (Eastern Ghats).
- A separate service entry from back side is proposed to serve the Administration Building, Veterinary Hospital, Animal Curator office, Workshop, Quarantine Block and Animal Feeder Room.
- Further, for future expansion of enclosures, proposals were given opposite to the flightless bird's zone.
- Information centre is proposed on the right side of the zoo main entry and near to Sagar gate centre. The education centre, interpretation centre, amphitheatre and canteen are proposed to integrate at the existing canteen area. And the visitor amenities area is proposed near to aviary section.
- A surplus parking facility is provided in addition to the main parking. The parking facility is planned to utilise during peak tourist vehicular flow (eg.Karthikamasam, summer vacation etc.) and in emergencies. It is planned in a way to divert the excess vehicles in the main parking area through the fodder track road. Plan

4.2.4 Animal Zones: Particulars of animals grouped into various zones on thematic basis

4.2.4.1 Zone: I Primates

S.No	Species	*Scientific name*
1.	Stump tailed macaque	*Macaca arctoides*
2.	Lion tailed macaque	*Macaca silenus*
3.	Grey Langur	*Semnopithecus entellus*
4.	Nilgiri Langur	*Trachypithecusjohnii*
5.	Rhesus Macaque	*Macaca mulatta*
6.	Bonnet Macaque	*Macaca radiata*
7.	Capped Langur	*Trachypithecuspileatus*
8.	Assamese Macaque	*Macaca assamensis*
9.	Cotton-top Tamarin	*Saguinusoedipus*
10.	Emperor Tamarin	*Saguinus imperator*
11.	Common Squirrel Monkey	*Saimiri sciureus*
12.	Brown Capuchin	*Cebus paella*
13.	Hamadryas Baboon	*Papio hamadryas*
14.	Ring tailed Lemur	*Lemur catta*
15.	Mandrill	*Mandrillus sphinx*
16.	Common marmoset	*Callithrix jacchus*

Zone: II Apes

1	Chimpanzee	*Pan troglodytes*
2	Orangutan	*Pongo pymaeus*

4.2.4.2 Zone III:Mega Carnivores

All the Five important mega carnivores of the World are proposed to be displayed in this zone. The following species are proposed to be displayed.

1.	Asiatic Lion	*Panthera leo persica*
2.	Bengal Tiger	*Panthera tigristigris*
3.	White Tiger(leucistic)	*Panthera tigristigris*
4.	Leopard	*Panthera pardus*
5.	Jaguar	*Panthera onca*
6.	Puma/Mountain lion/cougar	*Puma concolor*

4.2.4.3 Zone IV: Canids

1.	IndianGrey Wolf	*Canis lupus ssp. pallipes*
2.	Dhole/ Asiatic Wild dog	*Cuon alpinus*
3.	Bengal fox	*Vulpes bengalensis*
4.	Striped Hyaena	*Hyaena hyaena*
5.	GoldenJackal	*Canis aureus*

4.2.4.4 Zone: V Bears

1.	Sloth bear	*Melursus ursinus*
2.	Himalayan Black Bear	*Ursus thibetanus laniger*

4.2.4.5 Zone: VI Reptiles

About 39 species mainly regional snakes and other reptiles are going to be displayed in this zone along with anaconda. The following species are proposed to be displayed.

1.	Indian Cobra	*Naja naja*
2.	MonocellateCobra	*Naja najakouthia*
3.	King Cobra	*Ophiophagus Hannah*
4.	Reticulated Python	*Malayopython reticulatus*
5.	Burmese Rock Python	*Python bivitatus*
6.	Indian Rock Python	*Python molurus*
7.	Common Sand Boa	*Gongylophisconicus*
8.	Whitaker's Sand Boa	*Eryx whitakeri*
9.	Red Sand Boa	*Eryx johnii*
10.	Indian Rat Snake	*Ptyas mucosa*
11.	Common Wolf snake	*Lycodonaulicus*
12.	Barred Wolf Snake	*Lycodon striatus*
13.	Common Trinket Snake	*Coelognathushelena*
14.	Bronze-back Tree Snake	*Dendrelaphis tristis*
15.	Green Vine Snake	*Ahaetulla nasuta*
16.	Common Kukri snake	*Oligodonarnensis*
17.	Russell's Kukri Snake	*Oligodontaeniolatus*
18.	Green Keelback	*Rhbdophisplumbicolor*
19.	Checkered Keelback	*Fowleapiscator*
20.	Indian Chameleon	*Chamaeleozeylanicus*
21.	Water Monitor Lizard	*Varanus salvator*
22.	Bengal Monitor Lizard	*Varanus bengalensis*
23.	Yellow monitor lizard	*Varanus flavescens*
24.	Indian Black Turtle	*Melanochelystrijuga*
25.	Tricarinate hill turtle	*Melanochelystricarinata*
26.	Ganges soft shell turtle	*Nilssoniagangetica*
27.	Indian roof turtle	*Panghsuratecta*
28.	Indian flap-shell turtle	*Lissemys punctata*
29.	Painted roofed turtle	*Batagurkachuga*
30.	Southeast Asian Box turtle	*Cuoraamboinensis*
31.	Travancore tortoise	*Indotestudotravancorica*
32.	Star Tortoise	*Geochelone elegans*
33.	Asian brown tortoise	*Manouriaemys*
34.	Red eared slider Turtle	*Trachemys scripta ssp. elegans*
35.	Yellow Anaconda	*Eunectes notaeus*
36.	Green Anaconda	*Eunectes murinus*
37.	Komodo Dragon	*Varanus komodoensis*
38.	Green Iguana	*Iguana iguana*
39.	Aldabra Giant tortoise	*Aldabrachelysgigantea*

4.2.4.6 Zone: VII Crocodile Area:

1	Gharial	*Gavialis gangeticus*
2	Salt water crocodile	*Crocodylusporosus*
3	Mugger	*Crocodylus palustris*
4	Spectacled Caiman Crocodile	*Caiman crocodilus*
5	Dwarf Caiman	*Paleosuchuspalpebrosus*

4.2.4.7 Zone: VIII Birds of India

Many species of birds are proposed to be displayed in this zone. Within this zone birds could be grouped on taxonomic basis. Existing enclosures are going to be modified to suit the requirements of birds. The following species are proposed to be displayed.

Cranes:

a. Sarus Crane
b. Demoiselle Crane

Hornbills:

a. Great Indian Hornbill
b. Indian Grey Hornbill
c. Malabar Pied Hornbill
d. Oriental Hornbill

Raptors or Birds of Prey:

a. White backed vulture
b. Long billed Vulture
c. Brahiminy Kite
d. Black Kite
e. Shikra
f. Koel

Storks:

a. Lesser Adjutant stork
b. Black necked Stork
c. White stork
d. Open billed stork
e. Painted stork

Other birds:

1.	Indian Great Horned Owl	*Bubo bengalensis*
2.	Barn Owl	*Tyto alba*
3.	Eurasian Eagle-Owl	*Bubo bubo*
4.	Spotted Owlet	*Athene brama*
5.	Jungle Owlet	*Glaucidium radiatum*
6.	Spot-bellied eagle-owl	*Bubo nipalensis*
7.	Brown Fish Owl	*Ketupazeylonensis*
8.	Pied imperial pigeon	*Ducula bicolor*
9.	Green imperial pigeon	*Duculaaenea*
10.	Green pigeon	*Treron phoenicoptera*
11.	Nicobar pigeon	*Caloenasnicobarica*
12.	Emerald dove	*Chalcophaps indica*
13.	Laughing Dove	*Spilopelia senegalensis*
14.	Spotted dove	*Spilopelia chinensis*
15.	Oriental turtle dove	*Streptopeliaorientalis*
16.	Common Myna	*Acridotheres tristis*
17.	Hill myna	*Gracula religiosa*
18.	Common babbler	*Argyacaudata*
19.	Yellow-billed babbler	*Argyaaffinis*
20.	Rose-Ringed parakeet	*Psittaculakrameri*
21.	Alexandrine parakeet	*Psittaculaeupatria*
22.	Malabar parakeet	*Psittaculacolumboides*
23.	Plum headed parakeet	*Psittaculacyanocephala*
24.	Blossom headed parakeet	*Psittacularoseata*
25.	Red breasted parakeet	*Psittaculaalexandri*
26.	Slaty headed Parakeet	*Psittaculahimalayana*
27.	Red vented bulbul	*Pycnonotuscafer*
28.	Red Whiskered Bulbul	*Pycnonotusjocosus*
29.	House Sparrow	*Passer domesticus*
30.	Black headed munia	*Lonchura atricapilla*
31.	Scaly breasted munia	*Lonchura punctulate*
32.	Red avadavat	*Amandavaamandava*
33.	White throated Munia	*Euodicemalabarica*
34.	Indian roller	*Coracias benghalensis*

4.2.4.8 Zone: IX Pheasantry

1.	Kalij pheasant	*Lophuraleucomelanos*
2.	Grey peacock pheasant	*Polyplectronbicalcaratum*
3.	Grey Jungle fowl	*Gallus sonneratii*
4.	Red Jungle fowl	*Gallus gallus*
5.	Grey Partridge	*Perdix perdix*
6.	Jungle Bush quail	*Perdicula asiatica*
7.	Rain Quail	*Coturnix coromandelica*
8.	Indian Peafowl	*Pavo cristatus*
9.	White peafowl	*Pavo cristatus*
10.	Green peafowl	*Pavo muticus*
11.	Red spur fowl	*Galloperdixspadicea*
12.	Painted Spur Fowl	*Gallloperdixlunulata*
13.	Lady Amherst pheasant	*Chrysolophusamherstiae*
14.	Golden Pheasant	*Chrysolophus pictus*
15.	Silver Pheasant	*Lophuranycthemera*

4.2.4.9 Zone: X Herbivores

Many important species of the region are going to be displayed in this zone to emphasis their status and measures to be undertaken to conserve them by arresting the prevailing threats. The following species are proposed to be displayed.

1.	Black Buck	*Antilope cervicapra*
2.	Sangai deer	*Rucervuseldiissp.eldii*
3.	Mouse deer	*Mosciola indica*
4.	Hog deer	*Axis porcinus*
5.	Spotted deer	*Axis axis*
6.	Sambar	*Rusa unicolor*
7.	Chinkara	*Gazella bennettii*
8.	Nilgai	*Boselaphustragocamelus*
9.	Barking deer	*Muntiacusmuntjak*
10.	Chowsingha	*Tetracerus quadricornis*
11.	Barasingha/Swamp deer	*Rucervusduvaucelii*
12.	Indian One horned Rhinoceros	*Rhinoceros unicornis*
13.	Wild boar	*Sus scrofa*
14.	Gaur	*Bos gaurus*
15.	Asian Elephant	*Elephas maximus indicus*
16.	Himalayan Goral	*Naemorhedus goral*
17.	Red Necked Wallaby	*Macropus rufogriseus*
18.	Grey Kangaroo	*Macropus giganteus*
19.	Northern Giraffe	*Giraffa camelopardalis*

20.	Grant's Zebra	*Equus quagga ssp. boehmi*
21.	White Rhinoceros	*Ceratotheriumsimum*
22.	Common Hippopotamus	*Hippopotamus amphibious*
23.	Pygmy Hippopotamus	*Choeropsisliberiensis*

4.2.4.10 Zone: XI Small mammals' area

1.	Fishing Cat	*Prionailurusviverrinus*
2.	Rusty Spotted Cat	*Prionailurusrubiginosus*
3.	Leopard Cat	*Prionailurus bengalensis*
4.	Jungle Cat	*Felis chaus*
5.	Small Indian Civet	*Viverricula indica*
6.	AsianPalm Civet	*Paradoxurus hermaphroditus*
7.	Giant Indian Squirrel	*Ratufa indica*
8.	Indian Porcupine	*Hystrix indica*
9.	Slender-tailed Meerkat	*Suricata suricatta*
10.	Indian Pangolin	*Manis crassicaudata*

4.2.4.11 Zone: XII Aquatic Birds and Mammals

Many species of birds and few mammals are going to be proposed for display in this zone in two composite and four other individual enclosures. The following species are proposed to be displayed.

Mammal

a. Smooth Coated Otter
b. Common Otter

Aquatic Birds

1	Eurasian Spoonbill	*Platalealeucorodia*
2	Black headed Ibis	*Threskiornismelanocephalus*
3	Grey Heron	*Ardea cinerea*
4	Purple Heron	*Ardea purpurea*
5	Black-crowned night heron	*Nycticoraxnycticorax*
6	Indian pond heron	*Ardeolagrayii*
7	Spot Billed Pelican	*Pelecanusphilippensis*
8	Greater white pelican	*Pelecanusonocrotalus*
9	Greater flamingo	*Phoenicopterus roseus.*
10	Comb duck	*Sarkidiornis melanotos*
11	Ruddy Shelduck	*Tadornaferruginea*
12	Spot Billed duck	*Anas poecilorhyncha*

13	White winged Wood duck	*Asarcornisscutulata*
14	Lesser whistling Teal	*Dendrocygnajavanica*
15	Large Whistling Teal	*Dendrocygna bicolor*
16	Garganey Teal	*Anasquerquedula*
17	Common Teal	*Anas crecca*
18	Purple moorhen	*Porphyrioporphyrio*
19	Darter - Snake Bird	*Anhinga melanogaster*
20	Little Cormorant	*Microcarboniger*
21	Bar headed geese	*Anser indicus*
22	Cattle Egret	*Bubulcus ibis*
23	Large Egret	*Ardea alba*
24	Little Egret	*Egrettagarzetta*

4.2.4.12 Zone: XIII Exotic Birds

About 15 exotic bird species are proposed to be housed in the IGZP Aviaries by relocating from the existing area as per the suggestion of the CZA. The following species are proposed to be displayed.

1.	Military Macaw	*Ara militaris*
2.	Hyacinth macaw	*Anodorhynchushyacinthinus*
3.	Green winged Macaw	*Ara chloropterus*
4.	Blue Gold Macaw	*Ara ararauna*
5.	Scarlet Macaw	*Ara macao*
6.	Rainbow Lorikeet	*Trichoglossusmoluccanus*
7.	Mandarin Duck	*Aix galericulata*
8.	Scarlet Ibis	*Eudocimusruber*
9.	White ibis	*Eudocimus albus*
10.	Humboldt penguin	*Spheniscus humboldti*
11.	Sulphur Lesser Crested Cockatoo	*Cacatua galerita*
12.	Goffin's Cockatoo	*Cacatua goffiniana*
13.	African Grey Parrot	*Psittacus erithacus*
14.	Eclectus Parakeet	*Eclectusroratus*
15.	Jandaya conure	*Aratingajandaya*
16.	Sun conure	*Aratingasolstitialis*
17.	Budgerigar	*Melopsittacus undulates*
18.	Peach faced love bird	*Agapornis roseicollis*
19.	Cockatiels Colour morphs	*Nymphicus hollandicus.*
20.	Violet Naped Lory	*Loriusdomicella*
21.	White Cockatoo	*Cacatua alba*

22.	Mute Swan	*Cygnus olor*
23.	Black Swan	*Cygnus atratus*
24.	Ostrich	*Struthio camelus*
25.	Greater Rhea	*Rhea americana*
26.	Emu	*Dromalusnovaehollandiae*
27.	Lady Amherst pheasant	*Chrysolophusamherstiae*
28.	Golden Pheasant	*Chrysolophus pictus*
29.	Silver Pheasant	*Lophuranycthemera*
30.	Orange winged Amazon	*Amazona amazonica*

a. Zone: XIV Africana

Twelve species of African continent are proposed to be displayed in this zone starting with Giraffe and ending with African elephant including apes and lone bird species Ostrich. The following species are proposed to be displayed.

Mammals:

a. White Rhinoceros
d. Ring Tailed Lemur
e. Mandrill
g. Northern Giraffe
h. Grant's Zebra
i. Hamadryas Baboon
k. Hippopotamus
l. Pygmy Hippopotamus

Birds: Ostrich and Rhea

4.2.4.13 Zone: XIV Amphibians

1.	Common Indian Toad	*Duttaphrynusmelanostictus*
2.	Indian Skipper frog	*Euphlyctiscyanophlyctis*
3.	Indian Pond Frog	*Euphlyctishexadactylus*
4.	Indian Bull Frog	*Hoplobatrachustigerinus*

4.2.5 Description of future development planned in IGZP

4.2.5.1 Layout plan for proposed electrical supply system:

The layout plan with proposed electrical supply systems are shown in A3 map attached. In the new plan it is proposed that the underground cabling will be done in the entire zoo that will help in overcoming the natural calamities attached in **Annexure-ix**

4.2.5.2 Layout plan for water supply system

The layout plan of water supply system is shown in **Annexure-x**. An underground reservoir of 120 m3 (120000) capacity is proposed at the back side of Existing Pheasants Aviary that will be built for storage of water for longer period.

4.2.5.3 Layout plan for Storm water drainage system

The underground drainage in the area is depicted in the following map along with the drainage of water along different watershed. Boulder masonry and dry boulder pitching along different aspects to prevent erosion is proposed. Attached in **Annexure-xi**

4.2.5.4 Layout plan for visitor circulation system

The Visitor movement is redesigned in such a way that, there are minimal conflict points of visitors internally and it gives a better experience to them.The main entry for the Zoo is from the adjacent national highway.It leads to the Information centre, where orientation and information about the zoo park is provided.From the information centre, people are directed towards the 3km main Circuit. Once people enter the main circuit, few meters into it, they can enter into the primates section, it starts at Rhesus Macaque and ends at LT macaque. The other side of the primate section of the loop the visitors can see the Exotic Primate-I and II, Elephant enclosure and rhino enclosures.

After that, another 400 minto the circuit visitors enters into a loop which covers apes and mega carnivores section,the loop starts at Apes and it ends at the white tiger enclosure.From there the visitors enters again into the main circuit. From there another 250 metreinto the main circuit takes the visitors into the lion enclosure, wild dog enclosure, which ends at the bear's zone. Opposite side to the lion enclosure, another loop covers lesser carnivores, wild ass, fox and hyena. A small loop from there takes the visitors to the jackal and wolf enclosures. A little further from that a pathway leads to the Butterfly Park. The visitors had to come back to the main circuit at the same point. Opposite to Butterfly Park another loop covers the hippo and pygmy hippo. Little ahead one can find a small circle trail, which covers the reptile section of the zoo. A pathway at the end of the circle trails leads the visitors to the crocodile section, which meets back to the main circuit at the Sagar gate.

If the visitors come back to the main circuit from the reptile section, a little further into the main circuit from there, it divides into two different directions, one leads to the Sagar gate and other one loops back towards the main gate. The parrot world, cranes, storks and Aviary

sections are located near the Sagar gate. If the visitors loop back into the main circuit theyenter into the herbivores section which covers walk through Aviary, Indian Birds, Indian Gaur (Western/ Eastern), Black Buck, Chinkara (Proposed), Swamp/Thamin Deer (Proposed), GNU (Proposed), Wild boar, Barking Deer, Mouse Deer, Nilgai, Spotted Deer, Zebra, Giraffe, Chowsingha, Hog Deer, Sambar Deer, Elephant, Rhino.After the Sambar Deer of herbivores section a small another loop connect to flightless bird's zone, this pathway also connects the lesser carnivores sections and mega carnivores section.

Further away from the herbivores sections the main circuit ends at the black swan enclosure, along the way visitors cover NAH, Aquarium and Giant Squirrel.

Refer plan attached in **Annexure-xii**

4.2.5.5 Layout plan for solid waste management plan

Compost pits will be provided near fodder Plot and Vermi-compost pits will be provided near fodder Part. Landfill site is proposed near Zoo boundary near Visakha valley road. Attached in **Annexure-xiii.**

4.2.6 Proposals to address the inadequacies and short comings identified in the appraisal report

4.2.6.1 Lack of adequately trained personnel

Trained personnel are necessary for the animal section to look after the animals in the zoo. The Forest Department of Government of Andhra Pradesh has prepared its own re-organization proposal in which the requirement of additional posts in various categories have been requested to the Government. On receipt of orders from the Government accepting the re-organization proposal the zoo will appoint well educated personnel against the identified posts, who will be trained for respective jobs.

4.2.6.2 Lack of species-specific habitat enrichment

Enrichment of animal enclosures according to the habits and behaviour of animals are most important to a Zoo. Enrichment of animal enclosure keeps the animal always active in their enclosure and helps to achieve breeding in captive condition. IGZP has taken up the work of enrichment of animal enclosures and by now more than 50% of enclosures were enriched according to the need of animals concerned and the work is in progress in other animal enclosures as well.

4.2.6.3 Certain enclosures do not have withdrawal areas and restraining facilities

IGZP is having 77 number of animal enclosures for display of various animal species. Most of the animal enclosures do not have withdrawal areas and restraining facilities, which are most important for the animals to take rest and also to hide themselves from the visitor's vision and also to rear the young animals born in the zoo. Hence it is very much essential to provide withdrawal areas and restraining facilities in the interest of animals.

4.2.6.4 Lack of uniformity in stand-off barriers

The barricades are very much essential for the animal enclosures to safeguard the animals as well as the visitors. Though the animal enclosures in the zoo are provided with barricades, there will be no uniformity in size, shape and such other specifications. Hence it is essential to provide uniform type of barricades to the animal enclosures irrespective of the species, specimens, etc. to give aesthetic look and safeguard the visitors as well as the zoo inmates.

4.2.6.5 Some enclosures lacking proper drainage system

Though drainage to all primates and carnivores was provided, but some of them were built in the yester years and the drainage system provided to those enclosures were not intact, resulting improper discharge of waste water, thus creating unhygienic atmosphere in the enclosure which will lead to breeding of flies, mosquitoes and other insects creating health hazards to the animals as well as to the keepers concerned. Hence these enclosures are needed to be provided with proper drainage system linked to the treatment plant which is being addressed under the ongoing CZA, AP State and APDRP budgetary provisions.

4.2.6.6 Overcrowding in some enclosures

Some of the animal enclosures viz., the Spotted Deer, Sambar, Black buck, Barking deer were over crowded due to the continuous breeding of species in the recent years. The problem of overcrowding causes infighting between the animals in such enclosures and many a times mortality of animals was also recorded. To prevent over-crowding the IGZP has taken measures to control the breeding of such species by way of vasectomy separation of male and females, etc. Further it is proposed to release some of them in Kambalakonda Wildlife Sanctuary following the protocols.

4.2.6.7 Improvements of drainage system and laying new underground drainage line

The drainage provided in the premises of IGZP is limited, improper and the pipe line is blocked with silt which causes frequent blockage and spilling out of drain water thus polluting the environment with foul smell. To overcome these problems, it is absolutely

necessary to improve the present drainage system and to lay new UGD line connecting all primates, carnivores, bears and Hippos with a STP unit near Reptile section.

4.2.6.8 Other important issues

- It is proposed to arrange adequate training to the personnel working in the Animal Section to upgrade their skill for better management of animals.
- It is proposed to provide species specific habitat enrichment to all species housed.
- Priority will be given to ensure withdrawal area and restraining facilities inside the animal enclosures.
- Pure potable drinking water facility shall be provided in each of the display area and holding rooms.
- Strict population control measures could be taken to manage the number of species as per the collection plan.

4.3 Proposal to address the inadequacies and shortcoming identified in the appraisal report (as appraised in part-I- chapter 2)

The activities of the Indira Gandhi Zoological Park are managed by dividing and distributing work into various sections like Administrative Section, Animal Section, Veterinary Section, Sanitary Section, Stores Section, Education Section, Research Section, Garden Section, Security Section and Maintenance Section.

4.3.1 The Animal Section

The development of animal section in the form of improving the collection, redevelopment and renovation of enclosures are proposed during the plan as laid down in the master layout plan and master plan

4.3.2 The Veterinary Section

A modern veterinary hospital with all the required equipment other than what we have in the zoo hospital is proposed as part of the APDRP project.

4.3.2.1 Maintenance of health and Hygiene in the zoo

Maintenance of health of animals in a zoo is of primary importance. The zoo management should at all-time pay a very high priority to this objective. Annual Schedule of prophylactic operations followed in the zoo in consonance with the CZA guidelines are appended in **Annexure-4**

a. Periodical prophylactic activity

- Cleaning of drinking water trough and tank with lime powder and bleaching powder.
- Maintaining the wet moats dry, during summer to disinfect the enclosure and disrupt parasitic cycles.
- Changing sand bed in an enclosure once in a year.
- Intermittent removal of excess grown weeds surrounding the enclosures.
- Intermittent cleaningof feeding chamber by phenyl.
- Maintenance of inspection path around enclosures at least to a width of 5 feet.
- Application of ecto-parasite drugs on body of tiger and leopards to prevent tick infection
- Sterilization of feeding chambers by fumigation
- Drainage of wet moats in every three months and disinfecting the area before filling the water again
- Tiger enclosures in the zoo are dry moats.

b. Vector control

- Insect and vermin control are equally important in preventing infectious diseases, especially for control of insect borne diseases.
- Use of antehelmintics and insecticides.
- Regular (monthly) usage of various prophylactic injections and body spray.
- Spray of Butox, Virkon-S and K-Oritheene.
- Weed and bush clearance in all the animal enclosures have been taken up.
- Spraying of 2-3% Butox solution in animal enclosure for every 3 months.
- Spraying of bleaching powder and lime powder 1:2 ratio in animal enclosures for every 3-month interval.

4.3.2.2 Constitution of Health Advisory Committee

Despite their best efforts, the Regional Referral Centres identified by the zoos cannot help the zoos on dealing with sick animals on day to day basis. For dealing with this problem, every zoo should have a Health Advisory Committee comprising of experienced veterinarians with a professor of veterinary college/ eminent wildlife/ zoo veterinarian as its Chairman and the Senior Veterinary Officer of the zoo as its coordinator. The Committee would advise the zoo on all matters related with sanitation, hygiene, prophylactics, nutrition and management of

sick animals. The Committee may adopt any other veterinarian or specialist as and when required.

The Committee should be kept involved with the visits of the team of the Regional Referral Centre to the zoo. It should also be taken into confidence about the implementation of the advice rendered by the Regional Referral Centre/ National Referral Centre on treatment and management of sick animals. Zoo Director and the Curator (animal) should be actively involved in the meetings of the Health Advisory Committee.

An important issue for dealing with an outbreak of an emergency animal disease in a zoo is the high public profile of zoos and the attendant media interest. This is of particular concern in dealing with endangered or highly endemic species, particularly if destruction of animals becomes necessary. Effective management of the wide range of public interest groups and the media will be one of the most critical aspects of successful disease eradication.

Zoos have the greatest risk of an emergency disease outbreak because many specimens are directly imported from facilities outside India, under special quarantine protocol.An important aspect of the quarantine regulations is that all animals imported into India must be positively identified at all times and records maintained using the Species 360 package. Every specimen within a collection has an individual identification number (accession number) and file, which remains with that animal, and is part of a range of international database systems such as ARKS or Single Population Animal Records Keeping System (SPARKS) to assist species facing the threat of extinction.

Zoos have been widely perceived as being at risk of being involved in the introduction of exotic diseases into India. The key feature in relation to the perceived risk is the importation and holding of exotic species of wild and undomesticated animals.

Some specific areas of risk are:

- a wide range of species potentially susceptible to many diseases, including animals where there is little information on the susceptibility, likely signs or severity of disease;
- frequent animal movements between zoos internationally and within India; and
- A high level of interface between zoo animals and international tourists.

Appropriate quarantine and security along with good records and animal observations can reduce the risk, but effective contingency plans and appropriate risk reduction techniques are also essential. Training of zoo staff in these areas is vital.

4.3.3 The Stores Section

Modernization of the store with all required accessories and more manpower is planned for the period.

4.3.4 The Sanitary Section

A separate team consisting of 15 members for carrying out prophylactic measures team is planned for 2019-20 to begin with, an effort to strengthen the existing sanitary wing. Following are the daily scheduled activities:

- Removal of left-over feed and bones from the enclosure and feeding chamber before providing fresh feed.
- Removal of defecated material and cleaning of feeding chamber.
- Sweeping of enclosures.
- Daily removal of left-over drinking water in water trough and replace with fresh water.
- Daily cleaning of feed receiving store.
- Daily cleaning of feed chamber of carnivorous enclosures.
- Daily removal bone and flesh from carnivorous enclosure and putting them in pit.

4.3.5 The Maintenance Section

Total revampment of Zoo workshop with procurement of more articles for animal rescue operation, disposal of scrap, a unit to design and fabricate species specific cages for transport and treatment and additional manpower is planned under section during the plan period.

4.3.6 The safety and security

The existing security services are adequate for the zoo currently, a provision to get additional personal during high visitation time is planned during the plan period. Proposal to extend the CCTV coverage to all the animal night houses other than the existing sections are planned during the period.

- More Video-Surveillance system (CCTV Cameras) to be installed at important locations to improve the effectiveness of security system
- Regular training to the security personnel to be more accountable
- Better Co-ordination among zoo staff, visitors, VIP's
- Rotation of security personnel to prevent familiarity for providing better security.
- Improving service conditions
- Updating equipment – hand sets, search lights etc.

4.3.7 The Water supply section

The water budget analysis showed that zoo is having adequate water supply, the municipal connection can be slowly curtailed, by planning watershed-based treatment of the entire zoo area. Rain water harvesting, solar pump sets, SMC works to improve the water table and storage is planned in the next 10-year period to make the zoo water self-sufficient.

Table 4-3Proposed Summary Table

Sl.No.	Proposed Features
1	Replacement of existing 10 borewell with 3HP Solar Pumping sets.
2	01 nos. Water Tank of 1,20,000 storage
3	Filtered Water supply from GVMC
4	Rainwater harvesting pits for all infrastructures (existing and proposed)

The current amount water supplied is sufficient. Water is scarce and with future projections of animals and visitors, a 20% increase of water demand is taken for the horizon year of 2030.

Table 4-4Future water requirement

Sl.No.	Component	Water Requirement (in litres/day)	Future water requirement
1	Water requirement for all the animals and birds	39,313	47,176
2	Water requirement at management zone	5,950	7,140
3	Water requirement for landscape	3,214	3,857
4	Water requirement for recreational zone	33,600	40,320
5	Water requirement for visitors drinking purpose	12,000	14,400
6	Water requirement for facilities (toilets)	40,000	48,000
	Total:	1,34,077	160892 ~ 1,60,000

a) **Quality of Supplied Water:** The water quality of borewell supplied water is not filtered and untreated whereas, GVMC supplied water is portable clean water.

b) **Gaps and Constraints:** No gaps in current water supply. Quality of borewell water is not filtered, needs on-site filtration unit.

c) **Rain Water Harvesting:** All buildings (quarters, staff building, management area, and visitors rest shelters) will have rain-water harvesting pits to replenish ground water.

d) **Solar Pumps Sets:** To maintain self-efficiency of the zoo, 3HP Solar Pump sets are proposed on existing borewells.

4.3.8 Disposal of solid waste &liquid waste

Proposed

Sl.No.	Proposed Features
1	Conversion of Waste Disposal Pits into Air tight Dumping Pits, with periodical waste collection by GVMC
2	100 nos. Segregated dustbins for bio-degradable waste, non-biodegradable waste.
3	Zero-Plastic premises

1. *Human generated solid waste*
   a. Segregated Waste Disposal pits/bins across IGZP premises for segregated Biodegradable waste, Non-Biodegradable waste and Medical waste.

   b. On-site containment system for human bio-degradable waste is proposed. This will bring leak-proof containment area for waste to spilled off or leach into the ground.

   c. Collection will be done in separate septic tanks which will be collected by GVMC under FSSM Policy. Emptying of septic tanks by GVMC will be done every year to three year interval using on-site containment system. GVMC will look into operation and maintenance of human faecal waste. *Based on FSSM Policy and Operational Guidelines, Greater Vishakhapatnam Municipal Corporation.*

   d. Collection will be non-biodegradable waste by GVMC for further treatment of waste. The non-biodegradable waste will promote 3R (Reduce, Reuse and Recycle) method to reduce plastic use throughout IGZP premises. Banning on single-use plastics material like, water bottle, straws, packaged foods, etc.

   e. Vermicomposting pit for solid waste treatment and decomposition of organic waste like, vegetables, fruits, etc.

2. *Animal generated solid waste*
   a. Leftover waste from soaking pits will be managed with vermin-composting pits.

3. *Site generated solid waste*

On-site composting: This method will be adopted at various locations for small collection of dead leaves, barks, grass trimmings, food waste. This method is highly efficient and requires no maintenance. It takes around 2-3 months for full decomposition of waste.

4.3.8.1 Drainage System

Septic tanks have been provided for treating the domestic sewage getting generated from the toilets. In addition to these septic tanks, there are 12 septic tanks and soak pits attached to carnivorous enclosures which receive the enclosure washings. All primates' enclosures are provided with septic tanks and soak pits and then linked with small drains. Septic tank of 5,000ltr capacity are proposed to each of the following buildings/ enclosures. Exotic Primate Section 1 and 2, Wild dog enclosure, fox enclosure, wild ass enclosure, near to interpretation centre and two new toilets places.

4.3.8.2 Compost pits and Vermi-compost unit

Zoo has started with the novel idea of compost pits from animals wastes and leftover feed (elephant and Gaur enclosures) in 2019 and the facility would be extended covering more number of enclosures in future and, also introduction of vermi-composting during the plan period.

4.3.9 Proposed Energy Efficiency/Solar Power, Resilience

a. As per ECBC, out of total power supplied, 20% should be from non-convention sources. Therefore 8.5kW load should be provided by non-conventional energy sources.

b. Integrated Solar-powered Street lights are proposed to bring non-conventional sources of energy. These solar powered street lights are highly energy efficient and requires annual maintenance for cleaning and battery replacements, for such activities, contractual-basis servicemen are highly advised.

c. Proposal for repairing old E-rickshaws and Battery-operated vehicles for staffs and visitors. These vehicles do not create noise and highly sustainable approach towards natural environment.
d. 02 nos. Solar Pumping Sets are proposed for existing borewell

e. Maintenance areas, offices and staff quarters can move into non-conventional source of energy like Solar-Powered, to reduce load on conventional sources. Solar-Powered lighting will be used for lighting, water heaters. Whereas, AC and heavy-duty machineries can be operated by standard conventional power sources.

f. Animal enclosures will use low lumen LED night lighting to avoid glaring and irritation for animals.

4.3.10 Visitors amenities

Creation of modern, vandalism free, aesthetic visitor amenities by upgrading the existing facilities are a core objective under APDRP to attract more footfall to IGZP.

The basic amenities provided to visitors in the IGZP are

- Comfortable and regular public transport (Road transport) to the zoo is available from important traffic points like city center, railway station, important educational institutions, important tourist centres like museums, historical monuments, churches, temples, mosques etc. and allimportant residential localities.
- taxi and auto stand for hire carriages to wait is provided very close to the zoo; parking places for private and public driven vehicles like buses, cars, scooters, cycles etc. and watch and ward to look after them at some nominal charges is provided.
- Communication facilities: public address system in case of missing children etc. is provided.
- Cloak room facilities for depositing luggage which the visitors cannot carry around with them during the zoo visit and facilities for depositing and return of lost property is located at main entrance.
- Public conveniences at various places (8 Nos.-Toilet complexes) in the park with proper arrangements to keep them clean have been provided.
- Drinking water supply: safe drinking water is provided at about 25 points with 8 RO units at various places in the zoo.
- Brochures, guide books, maps, explanatory notes about the important animals and features of the zoo at nominal cost and hand-outs are given at free of cost.

- Shelters (30 Nos.), lawns and groves where the public can rest and escape from rain and sun are also provided at strategic points.
- guide maps for visitors to go round the zoo according to their choice
- sign-boards and direction boards for guiding visitors at all junctions, turning and important points; boards on enclosures to give the name, distribution and other important information on the animals displayed at every enclosure in Regional and English language.
- Reading room and Library facilities where wildlife publications are made available to visitors.
- Auditorium where wildlife films are screened every day from 11.00am to 1.00pm and again from 3.00pm to 4.00pm and lectures delivered at periodical intervals with prior notice to School children and interested visitors.
- Canteen, kiosks etc. for refreshments are provided 3-4 places in the zoo.
- Souvenir shop for selling curios, picture post cards etc. of wildlife motifs is located at main entrance.
- Internal transport facilities like toy train, battery operated vehicles, cabin lifts, chair-lifts etc. are made available in the zoo.
- Mini-museum to display the importance of biodiversity of Eastern Ghats and zoo remains like embryo, eggs, young ones, skeletal and other parts of economic importance are displayed for education purpose.
- Guided lecturers who can take groups of visitors around and explain the habits, habitat, behavior and other important features of zoo exhibits.
- First-aid facilities to visitors are arranged at main gate and zoo hospital.

4.3.10.1 Cloak room

- Every luggage should be locked properly before depositing.
- Visitors are not allowed to leave cash /valuables/ornament/camera/mobile/laptop in the luggage to be kept at Clock Room. The Clock Room does not take any responsibility for the same.
- Visitors are provided with a safety key of their lock room.
- The luggage will be returned only on production of authorized coupon issued by the Clock Room Staff at the time of depositing luggage/belongings. In case the coupon is lost, luggage will be returned only to the satisfaction of the Clock

RoomAuthorities after producing/proving proper ownership/identification of the depositor.

4.3.10.2 Dos and Don'ts

- Please do not feed the animals. Animals are given balanced diet. Overfeeding spoils their health and sometimes they die if get wrong food.
- Please do not tease animals.
- Please do not cross barriers. You may risk being seriously injured if cross them. The animals can bite or claw you.
- Please do not damage trees, flowers and lawns.
- Please do not play Radio, Tape Recorded, and Musical Instruments. Animals do not like to be disturbed.
- Please do not bring pets, firearms, and weapons of any kind in the park.
- Please put all your garbage in dustbins.
- Please do not bring packets or polythene in the park.

4.3.11 The Garden Section

Development of landscape gardens and thematic garden in the free spaces in front of various enclosures are indicated in the master layout map. This will augment the green coverage of the zoo, and provision for more manpower for maintenance along with purchase of equipment for maintenance of garden section is planned during the period.

- The dust bins must be properly placed by adding many more and battery-operated vehicles shall be introduced for garbage collection and disposal.
- The entire garden area will be redesigned with landscaping, to give it a fresh and new look. Undulating large lawns shall be created with good quality grass.
- The Garden would be enriched with attractive fountains and with cascades, with a pool of water, with aquatic plants.
- Encouragement shall be given to grow quality seedlings of various varieties, in and around the animal enclosures and give motivation and pride to the employees.
- Tractors would be provided for the transport of Garbage.
- Proper green house of sufficient dimension shall be added in the nursery
- More than 30% of the total area is covered with greenery and still 10% of the area will be brought under green cover.

4.3.12 The Education Section

The Education Section is mandated with the dissemination of conservation awareness message of the zoo among its visitors. They carry out the works of publication of zoo literature and organize special conservation related programmes for the masses and other target groups. Various educational programs are planned annually for different target groups. Zoo has also engaged a Zoo education officer during 2018. The bioscope, a facility to carryout education programmes are provided with computer, internet connectivity with Wi-Fi and a library in 2018. Further, an Interpretation centre building complex integrated with four different utility purposes; interpretation centre, education centre, zoo canteen and amphitheatreisalso are planned. Though long back infrastructure was created for this purpose but it has been utilized as canteen. The need is to redone this interpretation cum education centre, so it can be used to create awareness among children regarding wildlife and environment conservation and important aspects of zoo management.

4.3.13 The Research Section

The Research Section is carrying out the job of in-house data collection and basic research on various aspects of animals in captivity in the zoo. They also guide and supervise the students from universities and colleges in preparation of their dissertations. This Section is under Curator with Biological Assistant to assist him.

4.3.14 The Administrative section

The Administrative section work of the zoo including establishment matter and finances are looked after by the Administrative Section headed by the Curator. He is assisted by the Office Superintendent and other ministerial staff. A new administrative building with modern facility to monitor the security arrangements, CCTV from the control room is planned as part of APDRP.

4.3.15 Rescue and Rehabilitation of wild animals

Animal Rescue Centre has been constructed with the financial assistance from Central Zoo Authority. The CZA also provides assistance for its maintenance. The ARC is having a spacious day and night kraals for animals. At present, the ARC is having 3 tigers and 5 lions. This facility is proposed to be developed into two different facilities in future.

a. A rescue center for housing the injured, disserted, orphaned and rescued animals being brought to the zoo

b. A quarantine center: It is very essential to have a quarantine facility away from the existing zoo to house the animals which are received on exchange program for observing the health protocol.

The Animal rescue facility is being used for housing rescued Crocodiles, Tortoises, Sloth Bears apart from the circus rescued lions and tigers. Also, this facility is being used as a Quarantine facility for the animals which are brought through animal exchange programs with other Indian zoos or foreign zoos. Further, there is also Lion-Tiger Safari in the premises of Animal Rescue Centre, which is currently under maintenance and necessary repairs will be taken to bring it in operational stage during the period of this master plan.

4.3.16 Conservation breeding of Wild dogs

The Asiatic Wild dog or Dhole (*Cuonalpinus*) belongs to the order Carnivore and family Canidae. Destruction of natural habitat, hunting has reduced the wild populations in to verge of extinction. For conservation and breeding this species, Indira Gandhi Zoological Park, Visakhapatnam, Andhra Pradesh, India started with one male, two females and one pair of pups (1:1) which were fell into the open moat of the Vizag Zoo enclosure in 1992 & 1994 respectively.

The natural environment provided at Vizag Zoo or Indira Gandhi Zoological Park (IGZP),Visakhapatnam has given breeding success which may set an example for other zoos in the country.

4.3.16.1 Species Biology

The Asiatic Wild dog is similar to domestic dogs in appearance. It is characterized by a distinctive red coat with a black tipped bushy tail. They are social carnivores' lives in pack and similar to other canids they have well developed jaws with a head larger than felids and prominent ears.

4.3.16.2 Conservation Research initiatives

The IGZP, Visakhapatnam has the history of breeding of Wild dogs in captivity with wild captured specimens from 1992 onwards till 2006 with the stock of 12 (6:6).

In the year 2006, Indira Gandhi Zoological Park, Visakhapatnam has got sanction of the Small Grants Fellowship for initiating research activities from Central Zoo Authority, New Delhi with an objective ***"to study the reproductive biology, breeding behaviour, enrichment***

needs of the Wild dogs in captivity and observation on growth and cub development in captivity".

Indira Gandhi Zoological Park, Visakhapatnam is one of the Zoos in the country identified by Central Zoo Authority to take up planned coordinated conservation breeding of endangered Asiatic Wild dogs in captivity with certain recommendations for Conservation breeding initiatives.

Table 4-5conservation breeding coordinated zoo

Sl. No.	Name of the Species	Coordinating Zoo	Participating Zoo
1	Wild dog (*Cuonalpinus*)	Indira Gandhi Zoological Park, Visakhapatnam, Andhra Pradesh.	Vandalur Zoo, Chennai.

4.3.16.3 Enclosure & Night house

The Wild dogs are housed in enclosure with adequate land space for facilitating the animals to have free movement & exercise, adequate area to rest in shade and sun, safe refuge from dominant animals and express their natural, social and reproductive behaviour.

The enclosure simulates the natural habitat of the canids which includes appropriate tree, shrub species of adequate extent viz., Jamun, Bamboo, Neem, *Terminalia*, *Helecteris* species and *Cassia fistula* etc.

A separate off-display conservation breeding centre was constructed under state government funds and which ensured further successful breeding of these animals in captivity.

The pedigree chart of present wild dogs housed in IGZP, Visakhapatnam are given in Annexure-xiv

4.3.16.4 Constraints:

- Small population size in captive facilities.
- Small nuclear of proven breeding.
- Genetic diversity of Founder population.
- Infuse the new blood line to population for genetic diversity.
- Transfer of females/males from other coordinated zoos to Indira Gandhi Zoological Park, Visakhapatnam for overall genetic diversity of the captive population.
- Marking technique to identify individual animals are not handy.

- Lack of essential information and coordination between coordinated zoo and participant zoos.
- Lack of suitable location for soft release site & conservation translocation.
- Lack of understanding on possible Risk factors such as Disease spread, Gene risk (Hybridization), Socio-economic risks etc.
- Lack of expertise man power to deal with Pre & Post release protocols.
- Lack of understanding on size of the Soft & Hard release sites, size of the pack, sex ratio required to release.

4.3.16.5 Way forward:

It is proposed to carry out research on the topics we require more information to carry forward the conservation breeding program for the species survival.

- Identification of site for soft release and release into wild by conducting studies in the nearby forests in the state.
- Finalizing the marking technique for the species, available micro chipping to be attempted to mark the individuals for the future identification.
- Genetic analysis of the stock for identifying the release stock and also to be maintained for further conservation breeding in collaboration with LaCONES, Hyderabad.
- Study the need to augment the present stock with wild captured individuals for improving the genetic viability of founders.

Chapter 5 Personal Planning

The assessment of personnel is very much required for the effect management of the zoo, which should be reviewed periodically meeting the requirements. The technical manpower in various capacities forms the core of the Zoo management to provide best possible animal housing conditions and health care. The IGZP has two main categories of employees working in the zoo. They are government employees as against sanctioned posts, few working on deputation from government departments and staff hired on out sourcing basis. Altogether 146 persons are working in the zoo during 2018.

Zoo is headed by a Deputy Conservator of Forests level officer (IFS cadre post)designated as Curator and assisted by two Forest Range Officers (Assistant Curator) and two Forest Section Officers. Zoo managerial staff has been assisted by a Veterinary Assistant Surgeon and one Junior Veterinary Officer, who come on deputation from the Department of Animal Husbandry for a period of 3 years which can be extended up to 5 years.

5.1 Existing Zoo staff (Strength) is as follows

Table 5-1Existing Zoo staff (Strength)

S. No.	Name of each category of post	Sanctioned strength
1	Curator	1
2	Veterinary Assistant Surgeon	1
3	Junior Veterinary Officer	1
4	Forest Range Officer	2
5	Forest Section Officer	2
6	Office Superintendent	1
7	Senior Assistant	1
8	Junior Assistant	3
9	Typist	1
10	Technical Officer (D.M.Gr.I)	1
11	Driver	2
12	Attender	1
13	Fitter	1
14	Mason	1
15	Electrician	1

S. No.	Name of each category of post	Sanctioned strength
16	Carpenter	1
17	Bungalow Watcher	1
18	Booking Clerk	1
19	Watch and Ward	6
20	Animal Keepers	25
21	Work Charged Employees	22
22	Gate keeper	2
23	Labour	3
	Total:	**81**

5.2 Proposed Cadre Strength and Planning for future

- Recruitment to vacancies of permanent staff
- Adequate training and exposure for the staff is needed.
- Zoo Animal Curator is to be appointed in the category of ACF or FRO
- Permanent or Regular contract- based officers as Zoo Education Officers and Biologist
- Regular contract based full time Lab Assistant and Junior Veterinary officer to be employed.

Table 5-2Proposed Cadre Strength

Proposed Cadre Strength		
Sl. No.	**Proposed Cadre**	**Strength**
1	Executive Director	1
2	Deputy Director	1
3	Curator (Animal section/Zoology)	2
4	Range Forest Officers/Asst. Curator	4
5	Assistant Director (Veterinary)	1
6	Veterinary Assistant Surgeon	1
7	Junior Veterinary Officer	2
8	Veterinary Assistant	2
9	Assistant Engineer	1
10	Draughtsman/Technical Officer-Gr-II	1
11	Manager	1
12	Superintendent	2

Proposed Cadre Strength		
Sl. No.	**Proposed Cadre**	**Strength**
13	Zoo Biologist	1
14	Zoo Education Officer	1
15	Lab Technician	1
16	Senior Assistant	2
17	Deputy Range Forest Officer	2
18	Horticulturist Assistant	1
19	Animal Supervisor/FSO	4
20	Junior Assistant	4
21	Typist/Stenographer	1
22	Data Processing officers	3
23	Data Entry operators	2
24	Booking clerk	4
25	Driver	4
26	Plumber	1
27	Electrician	2
28	Welder	1
29	Fitter	2
30	Mason	2
31	Carpenter	2
32	Head Animal Keeper	4
33	Animal Keeper	40
34	Work Charged Employee	22
35	Librarian (Bioscope)	1
36	Mahouts	4
37	Attender	4
38	Gardener	10
39	Animal Asst. Supervisor/FBO	4
40	Assistant Animal Keepers	15
41	Bungalow Watcher	2
42	Gate keeper	6
43	Watch and Ward	6
44	Labourer	5
	Total	**182**

Zoo is always in the process of expansion from visitor and animal collection point of view. Last decade has seen visitation doubling from 5 lakhs to 10 lakhs and similarly animal housing facilities has also been increased, it is imperative to add on the staff strength to match these requirements. Some of the services with respect to visitor amenities and maintenance like aquarium, Nocturnal Animal House, battery vehicle services, security personnel, maintenance of lawns and gardens, sanitation, parking facilities, cloak room, food courts etc. can be outsourced to manpower agencies, with the flexibility to increase or decrease the numbers according to need. The key animal keepers from the past working in the Zoo are old, most of them illiterate make the scientific management of zoo difficult. They are being trained in different animal keepers' training programme still there is need to improve the skills. There is no recruitment to the post of animal keepers in past 20-25 years, an alarming situation in which experienced keepers getting retired without transferring the knowledge and skill acquired over years to the next generation/youngsters to continue the job. Hence there is an urgent need to fill up all the vacant posts in zoo keeping staff in a phased manner. Staff at lower cadres does not have any career advancement options, which usually reduce their interest in works over a period of time, there should be mechanism to keep them motivated through financial rewards and recognition of services.

Chapter 6 Disaster Management

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources. Though often caused by nature, disasters can have human origins.

(VULNERABILITY+HAZARD)/CAPACITY= DISASTER

"Disasters Management" means a continues and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for-

- Prevention of danger or threat of any Disaster.
- Mitigation or reduction of risk of any disasters or its severity or consequences.
- Capacity-building.
- Preparedness to deal with any threating Disasters situation or Disasters.
- Assessing the severity or magnitude of effects of any Disasters
- Evacuation, rescue and relief.
- Rehabilitation and reconstruction.

Visakhapatnam is situated on the eastern coast of the country. The peak cyclone period is Nov - Dec, however, the other months may have cyclone i.e. in May, 2010, Laila - a cyclone arose in the Bay of Bengal which threatened the whole coastal line including Visakhapatnam, slowly its intensity came down and the inhabitants of the city living near coast line were spared from its devastating effect. Hud-Hud cyclone of 2014 caused heavy damage to the zoo, requiring total revampment of the zoo. The management should always plan for building cyclone resilient enclosures and other infrastructure to bear such impact. The IGZP is facing Bay of Bengal on one side. So, it will be exposed to the natural calamities like cyclone, flood and gales. The Zoo should have a proper disaster management plan to attend to such emergencies. There is need to have arrangement to attend the following calamities like Flood, Tidal surge, Haze and Gale, Cyclone, Earthquake, Heavy rains causing water logging, Aerial attack, Tsunami, Massive fire, Epidemics, Law and order problem etc.

Out of the above calamities, the Zoo is likely to come across floods, tidal surge, cyclone, epidemics, fire and heavy rains causing water logging, Law and order problem. The chances of other calamities are most unlikely. But the zoo should get prepare to combat any situations in the interest of safety of animals, visitors and staff members. In such an event, the zoo should be in a position to assess the damages and immediate steps to be taken to restore to normalcy have to be planned.

- Risk Assessment - impact and damage likely to be caused due tree uprootal, fallen branches, flooding of enclosures, snapping of power lines, breaking of water supply, breaking of barriers/mesh and escape of animals.
- In most cases it may affect animals, visitors and causes damage to property.
- Security system adopted may be breached and animals may escape zoo thus resulting in panic among public.
- Spreading of epidemic diseases
- Equipment needed to speed up restoration measures.
- Training to the staff to meet such exigencies and operate required equipment.
- Fire tracing operations
- Security personnel to be alerted and mobilized through wireless communication
- Ambulance van should be requisitioned.
- First Aid arrangements to be ensured.
- Volunteers, Police personnel and other helping hands to be utilized.
- Periodic mock drills to stimulate preparedness among staff and to test the working conditions of equipment which shall be kept maintained at all times.
- Medical help: Doctors and Hospitals need to be informed
- Communication system: All the means of communication to be maintained properly to put into use during the emergency such as telephone, fax, internet, mail and wireless communication.

6.1 Team to attend the Emergency

There should be a well-formed team demarcating the duties to attend the emergency well in advance. The team members should be well aware of the zoo topography, its inmates, facilities available and the contact persons of forest and other departments.

The team member can be:

- Zoo Director:To make the plan and to take all emergency decisions
- Coordinator: He should hold a responsible position and be able to summon person and resources during emergencies. He has to ensure the implementation of the plan.
- Unit Coordinator: The Zoo can be divided into different units or sections. Each section will work under the control and direction of unit coordinator as per plan.
- Skilled and unskilled personnel: These include drivers, cutters, plumber, electrician and labour. The number depends upon the magnitude of the problem.

6.1.1 Flood, Gale and Cyclone

For dealing the above problems, the Zoo administration should have the management skills, knowledge and resources to arrange the following:

- Quantity and quality of water
- Identify alternate sources of water
- Mobilize and park water tankers
- Water testing kit.
- Food Sanitation - It includes storage of food items above ground in water proof containers.
- Food storage area - It should have sufficient ventilation and sunlight. It should be clean. The utensils should be fully sanitized before use. The persons handling the food items should ensure personal hygiene.
- Waste Disposal –Maintenance of Sanitary condition is essential for ensuring better animal health care. Animal wastes, leftover feed, dead animals should be immediately be removed and disposed-off/burnt in the incinerator. The area may be sanitized by spraying anti-germicide powder.
- Clearing of Roads and paths - During gales, a large number of trees get uprooted. They block the roads and paths and even damage enclosures. It is essential to stock power chain saws to cut the trees to clear the roads and paths.

6.1.2 Fire Problem

As records indicate the Zoo did not face the problems of fire in its campus. However, there requires fire extinguishers at different locations like Office, Hospital, Canteen, night houses of animal enclosures, aviaries etc. Services of fire department can be made use and be updated about the contacts. The city fire station is located close to the zoo.

During summer, some time the dry patches inside the natural forest can become a fire hazard. In such areas, as a precaution, fire tracing needs to be done. Also, the fire-fighting team have been deployed to demonstrate the fire extinguishing activities and to create awareness for the zoo staff members and security staff.

6.1.3 Law and Order Situation

Vizag zoo has not witnessed any law and order problem. If the law and order problem arises within the park or in the city, the Zoo can store the essential items sufficient for a month. Perishable items can be procured departmentally. Emergency team can take the decision as the occasion arises. If there is break down due to law and order problem, alternative to be planned for supply of feeding articles, and strike by employees etc. as per the advice of the City Police Commissioner, in order to evacuate the visitors in case of emergencies, the service gate would be used as the exit gate for visitors.

6.2 Disaster handling manual

A Manual has to be prepared based on the past experience and also based on the information available from the book published by Nandankanan Zoo and similar publications may be made available to all connected staff members working in the zoo for reference and it will serve as a ready reckoner and guiding manual for handling the situation.

6.3 Emergency Items

6.3.1 Essential items required during such critical situations are mentioned here under

Sl. No.	Items required	No. required
1	Flashlight or Torch lights and spare batteries	10
2	Rubber boots	20
3	Drinking water bottles/cans	100
4	First aid kit	10
5	Protective Gloves	100
6	Helmet	50
7	Measuring tape	10
8	Disposable masks	100
9	Sealing tape and string	20
10	Residual chlorine or chlorine tablets and PH testing equipment	500 tab.
11	Shovels	25
12	Pick axe/Spade and Crow bars	10
13	Generator with sufficient fuel	3
14	Water quality field testing kits	10

Sl. No.	Items required	No. required
15	Tranquilizing gun with drugs	2 sets
16	Welding machine with sufficient welding rods	2 sets
17	Ropes (Steel, Nylon, Coir) and nets	As per requirement
18	Trapping Cages	30
19	Electric/Diesel saw, Manual saws	20
20	Construction and repair materials such as cement, iron rods, sand etc.	As per demand
21	Sand bags	As per demand
22	Gas cutters	2
23	Earth moving equipment	1

6.3.2 Equipment required for animal rescue and capture

Sl.No.	Captive Animals	Minimal Requirement
1	Large Carnivores	Nets, pole syringes, snare. Projectile guns and darts, blow dart equipment, crates, squeeze cages etc.
2	Small Carnivores	Nets, gloves, pole syringes, snare, crates, blow dart equipment, crates, squeeze cages etc
3	Hoofed Stock	Projectile guns and darts, blow dart equipment, crates etc
4	Elephants	Elephant hook, projectile guns and darts, chains
5	Small mammals (e.g. primates)	Nets, gloves, pole syringe, snares, plastic tubes, blow dart equipment, crates, squeeze cage.
6	Large primates like chimps, orangutans etc	Nets, gloves, pole syringe, projectile guns and darts, blow dart equipment.
7	Birds	Nets, gloves, towels, pole syringe
8	Reptile	Nets, gloves, snares, plastic shield, bags, plastic tubes, snake tong, snake hook etc.

6.3.3 Vehicles required

1	Jeep	1
2	Tractor Trolley	1
3	Truck	1
4	Ambulance	1

6.3.4 Other required material

- Water tankers and hose pipes
- Kerosene or Gas lights;
- Candles and match box
- Torches and Batteries
- Rope / Iron ladders
- Spare Chain linked mesh, angular iron, poles, nut and bolts with tools
- Hooters and whistle for alert and signaling
- Water jets to drive the animals

6.4 Coordination with other/outside agencies

We may have to seek support from the outside agencies since all the disasters cannot be handled with the zoo personnel. It is absolutely essential to maintain good rapport with Government and non-government agencies. Their contact numbers, addresses, fax or mail ID should be kept ready for pressing their service.

- ❖ City Police Commissioner/ Jurisdictional Police Officer
- ❖ Police Control Room
- ❖ Fire Brigade
- ❖ Disaster Management Unit of the State
- ❖ AP TRANSCO (Electricity supply company)
- ❖ Hospitals
- ❖ Ambulance
- ❖ Official superior authorities
- ❖ Volunteers / NGOs.
- ❖ Local Veterinary Doctors and Experts in Captive health care
- ❖ Veterinary Biological Research Institute, Vijayawada

- LaCONES/ CCMB
- Corporation Authorities
- Contract Agencies
- Previous experienced personnel

6.5 Line of command

The rescue and rehabilitation activities should be facilitated through well-defined line of command. Role of each official starting from the director, curator, Assistant Curator, Veterinarians to grass-root level should be clear to the team of Zoo, so that in the event of absence of any personnel/officer proper line of command is followed to tackle the situation.

6.6 Mock drills

Mock drills should be arranged from time to time to enhance the skills of staff to face sudden disasters at any point of time. The equipment procured for the purpose should be used during such drills, this would help to improve the knowledge of usage and if any lacuna can be addressed by the management.

6.7 Training and Capacity building

Proper training programmes to be conduct to build the capacity of the personnel at all levels to address disaster situation. This would enhance the ability and motivation among staff to combat disasters.

6.8 Task force

A special task force is to be set up in case of exigencies, viz. escapes, floods, accidents, fallen trees to combat the situation.

Chapter 7 Contingency Plan

7.1 Safety and Protection of Animals

Safety and protection of animals and visitors is the integral part of the management. Due to unexpected events, the management may have to face crisis situations. As it involves risk to animals, keepers and visitors, a detailed contingency plan must be in place based upon the past experiences. The plan must have details of personnel and their responsibilities fixed. The required precautionary measures should be taken in advance to prevent any untoward events like fire, floods, accidents, animal escape, falling of dried and weak tree/branches, attack by animals, infighting of animals, injury to the visitors, attack by stray animals, lightening, electric short circuit etc.

Vizag Zoo was established in the year 1972, and it has got more than 45 years of experience in captive management. Some of the untoward incidents happened in the zoo are given below. (Information collected from employees of Vizag Zoo. Period of occurrence of some of the incidents is not known)

- One Asiatic Elephant escaped from the zoo and resided 3-4 days in surrounding Kambalakonda RF about 30 years back and it was safely restrained and brought back to its enclosure.
- About 10 years ago a Leopard escaped from its enclosure and got itself hidden inside bushes in the zoo premises. The staff could capture the animal and left it in the enclosure safely.
- A male Langur escaped from its enclosure during 2011 and it was caught and safely brought back to its enclosure.
- During 2012, a Python was found struggling due to entanglement of its head in a hole inside the enclosure. Finally, the snake was saved by Sri. S Das, the Keeper concerned.
- One male Rhino after release into its night house, break open the walls and ran through the zoo premises in 2012, it jumped into the sambar enclosure after sometime, where it was immobilized.

- One male chimpanzee escaped the enclosure using a water pipe left behind inside enclosure to fill the pond inside. The animal was taken back to the enclosure by the keeper himself without tranquilizing it during 2016.

The above list of incidents amply demonstrates that most of them could have been avoided provided that precautious &pre-emptive measures were in place. In order to prevent major injuries, loss of life and in the interest of safety to animals, visitors and staff members, and the zoo should have a plan and well-defined protocol measures to meet all these contingencies.

As the experience goes, the animal keepers in most of the cases shall not carry safety equipment while entering the animal enclosures. Since wild animals are unpredictable and get scared, they may attack the keepers. In such cases the keepers with the help of a stick, helmet, abdomen guard, chest guard and their presence of mind could help them in avoiding major mishaps. The regular inspection and thorough checking of all the enclosures from the point of safety with respect to animal escape, wear & tear of mesh, condition of lock & bolt system, annual and periodic maintenance of enclosures and training of keepers, supervisors and other concerned should be taken up without fail.

7.2 Contingency Measures

The following precautionary measures must be in place for meeting the contingencies in a better way.

- Round the clock security must be provided. The Zoo has engaged the ex-military personnel along with personnel employed from the private security agency. These personnel provide round the clock security cover both for animals and visitors.
- Adequate number of cages is to be kept handy for capturing animals like panthers, bear, etc.
- A suitable vehicle in good condition for transportation of animals and injured to the Hospital
- Tranquilizing equipment along with the required drugs to be kept ready.
- Non supply of feed – To plan alternative arrangement.
- Disruption of power supply and consequent water supply – Alternative arrangement.

- Deep Freezer for Meat / Non-Veg food, as well as vegetables and fruits
- Anti-Snake Venom drugs
- Fire Brigade / Police control room telephone numbers to be kept ready
- Hose pipe with pressure pump and water jets.
- Siren/Loud speaker
- Lifesaving medicines for animals
- Fire-fighting equipment like fire extinguishers, buckets, sand, etc.

Vizag Zoo has prepared a detailed plan to handle various crisis management situations with responsibility fixed to concerned officials for co-ordination and to take up the necessary measures.

7.2.1 Safety and Protection measures

- Personal safety equipment to be kept for the persons attending crisis situations, such as helmets, gloves, chest guards, etc. (minimum 5 sets).
- Periodical checking and pruning of over grown tree branches, remove weak and dried branches inside enclosures of animals which are prone to jump out from trees or escape with the help of fallen branches.
- Regular checking of existing barricades, moat walls, mesh and to provide necessary repairs, replacements and to provide weld mesh barricade wherever necessary.
- To check regularly the existing biological barricades, particularly around animal enclosures and to provide required replanting so as to keep the barricade wherever necessary.
- To procure equipment to protect persons in danger, such as portable mechanical lifts to stretch into enclosures from outside (which can also be used for other works), human size cylindrical cage with bottom open, rope ladders, light weight metal ladders, etc.
- To procure equipment to control animals creating danger/havoc, such as nylon nets, nylon ropes, chain linked mesh easy to unfurl and furl, water jets, tarpaulins, gunny bags
- Other equipment such as road dividers to control visitors and for other purposes, crackers to scare animals, movable crates, mesh cutter, forceps with long hand to catch big and small animals, etc.

- To explore the possibilities of making use of suitable equipment and devices used in adventure sports by obtaining more details, pictorial brochures and rate list.
- To close main gate to avoid visitors, to cover the animal by holding/wearing safety equipment etc. whenever there is an escape of animal.

7.2.2 Planning

A prudent plan shall be evolved to meet all these contingencies as and when they occur and steps to be taken shall be suggested in consultation with experienced persons in the zoo. A brain storming session can produce an excellent document. A detailed guide covering disaster and contingency plans shall be prepared in English and local language and to be distributed among all the staff working in the zoo.

7.2.3 Drill

Mock drills shall be carried out at periodic intervals so that the individuals are aware of their duties and responsibility. During such drills all equipment shall be used to ensure its operational stability. It shall be also ensured that no equipment fails for want of consumables. All equipment and consumables should be made readily available in the Zoo.

7.3 Rescued from Wild

In order to accommodate the animals rescued from wild, zoo needs to develop additional facility for short-term and long-term captive management of the species concerned. Monkeys, deer species, leopard, crocodiles, birds etc. are rescued occasionally from the region and taken to the zoo for temporary housing and veterinary care. Some of these animals are successfully released back into the wild. There is a need to create a facility exclusively for this purpose, preferably nearer to the ARC funded by CZA for the rescued animals from circus in 2003-04. There are only 8 animals left in two different portions of this facility as of now, which was built for housing 70+ animals (tigers and lions). Any one portion can be modified for housing rescued animals or a separate rescue centre can be created for usage by different species commonly rescued from the region.

7.4 Escape of animals from enclosures

Zoo is well protected on all sides with a compound wall of 8 ft height to 10 ft at places which will act a barrier to escape the animals outside the zoo premises. Regular perimeter checking along chain-links and moat wall are attended meticulously at the zoo. But to deal with any such incident zoo is having tranquilizing equipment and trained personnel to use it during emergency. The veterinary team at the zoo is equipped and had handled several rescue operations in the region. Zoo has three tranquilizing guns, 1 blow gun, 1 pistol and 1 blow pipe. The selected staff is also being trained in chemical immobilization of wild animals. Emergency rescue vehicle can be designed for future and trap cages need to be kept ready with lock and key, assigned to designated staff. Public-address system needs to be placed in the zoo, to use during emergency evacuation of crowd.

7.5 Monkey and Dog menace

Vizag zoo is not facing any monkey problem. City also does not face any such problem except a few incidents. The zoo is surrounded by a 10 feet compound wall, so dog menace is also curtailed.

In any case to deal with such a situation due to breach of boundary wall, dog capture drive with the help of animal husbandry department had to be carried out, along with taking measures to close the breach.

7.6 Arrangement of food in case of strike (non-supply by contractor)

Alternate arrangement would be made with the help of district administration to procure food for the animals. In case of herbivores, the zoo is developing and improving its own fodder plot and natural forest to feed them without any outside/contractor's help for some duration. Vegetables would be arranged from various other sources or directly from nearby farmers. Carnivore food like beef, chicken, fish etc. can be arranged from local market or from nearby farmers.

7.7 Snake bite

Zoo has a beautiful reptile section as well as lot of snakes in the forest surrounding it. The poisonous species are Cobra, Russell's viper and Banded Krait are frequently seen. Zoo is having its own stock of anti-venom to act on any situations. Whereas King George hospital is situated 6 km away from the zoo where anti-venom and further treatment can be attended. With respect to animal sections we have to undertake regular checking of burrows, to fill them with sand or pour water to fill it. The animal keepers are also trained for capturing/handling reptile species, the enclosures can be provided with hook and bags to capture the snakes. Veterinary hospital is provided with first-aid kit to attend to any emergency, also occasional snake bites to the animals.

7.8 Visitors getting injured/visitors falling inside of enclosure.

The enclosures are provided with standoff barrier and plant hedges. The enclosures of Leopard and Jaguar are covered with chicken mesh and bamboo barricading also. There is no scope for visitor to put either finger or hand in the day house. ESRI 108-Ambulance van can be called immediately if any injury occurs to the visitors.To rescue visitors falling into enclosures especially wet moats, ladders made of aluminium are kept ready. These ladders can of two types. First type can be 2m height and second type can be of 3m. These aluminium ladders can be of telescopic type. In case of still bigger sites, ladders made of rope can also be set up, which will be useful in any situation. The Smithsonian institute team visited the Zoo in 2017 recommended replacement of all the stand-off barrier provided in the zoowith stronger and taller alternatives to ensure better safety for visitors and maintenance. This is included as part of the redevelopment of the zoo under APDRP. Proper signages indicating the ‘dos and don’ts’ are provided all over the zoo to create awareness among public.

7.9 Fighting among Animals

To avoid the infighting among the animals a long protocol is being followed before the animals are mixed in a group. The animals are kept in adjacent night kraal for a month or two and its behaviour is observed. If animals show affinity to each other they are mixed in night kraal and again being observed for about a month or so then only they are released to the day house to avoid fighting among each other. After taking all the precautions, if injury is there the animals are taken to the treatment cage and treated for the wound. But such incidents are minimal in the Zoo Park. All carnivore enclosures and deer enclosures are provided with treatment cage, while primates are being taken into a cage for the treatment.

7.10 Epidemics

IGZP follows the strict vaccination schedule as per CZA norms. All the carnivores arevaccinated twice a year with Triquin and once with Felo'vex. Wild dogs are vaccinated with seven in one vaccine once in a year. The zoo health committee meeting is convened once in 3 months with senior veterinarians of the district regarding health status of zoo animals. Foot baths are made in all the enclosures to avoid the outbreak of epidemics. Regular prophylactics are carried out in all the enclosures according to the schedule. Communicable diseases from outside can get into the captive stock through various way, major source can be the surrounding cattle population and free-ranging animals who can be potential carriers of many vector borne diseases. A close watch is kept on the occurrence of Foot and Mouth disease etc. around the zoo park in coordination with animal husbandry department, who ensures the ring-vaccination around at least 10 Km radius of Zoo. Zoo vets meticulously do the ante-mortem and post-mortem checking of the buffalo meat provided in the zoo to prevent any disease through this source to the zoo animals. An own captive slaughter house would ensure further quality of the meat provided to the animals.

7.11 Breakdown of the Power Supply

Visakhapatnam is the second largest city of Andhra Pradesh. Whenever there is a power break down, immediately within no time it is restored by the AP Transmission company. The zoo is having high power generator for any emergency situation. Supply of water through pump-sets, powers supply to zoo hospital, feed store etc. are ensured through back-up systems.

7.12 Free ranging animals - Rodent menace

Vizag zoo has severe rodent menace and we have to work out a plan for controlling the menace. There are about 150-200 free ranging animals like Spotted deer, Sambar, Porcupine, Wild boar etc. which damages any new planting activity. Every plantation/fodder plot shall be protected with chain link mesh. All the future facilities to be created be made rodent proof and as far as possible the existing infrastructure to be made rodent-proof in the available budget.

Chapter 8 Capacity Building

Capacity Building of different category of office staff and frontline personnel is very essential for better care of animals, providing better nature education and smooth function of the zoo. There are a number of training programmes in Zoo management, sponsored by CZA which are conducted regularly. The details of a few programmes are given below.

- Training for middle level officers
- Training for Zoo keepers
- Zoo educator training

8.1 Training for Middle Level officials

The duration of this training is usually for two weeks. The middle level officers from different Zoos of the country participate in it. The faculty includes the experienced and retired Zoo personnel. Every aspect of Zoo management is covered in this training. The Wildlife Institute of India and the Central Zoo Authority regularly conduct special and focused training and workshops on different aspects of wild life management and policy. Participation of top-level management of zoo is must and essential to upgrade their knowledge and bring changes and adopt newer techniques as enunciated in national zoo policies and rules. Regular interaction and opportunity to visit other zoos would help to acquire suitable animals, enrichment of enclosure and other aspects of zoo management such as crowd management and initiation of better visitor facilities etc. it also provides an opportunity to interact with many experts in the field, who shall participate as faculty in the training programme. The zoo should take the benefit of the training to have trained officers in the management for better results.

8.2 Training for Zoo Keepers

This training is usually of one week. All the aspects of animal keeping, house cleaning, reporting, feeding and handling are covered. Again, experienced and retired staffs are involved for lecture and presentation. This Zoological Park can available for the benefit by sending its keepers in the said training.

8.3 Zoo Educator Training

This training has been started last year by the CZA with the help of one of the zoos in the country. The Indira Gandhi Zoological Park can benefit by deputing its educational staff for training in future training programmes. As conservation education is one of the fundamental objectives of zoo, the Education officer should be trained properly to organize training programme for the students, NGO's and Zoo volunteers.

8.4 In House Training

Documentation and regular demonstration of the skills and knowledge acquired has to be done on regular basis. Therefore, it is proposed to organize training sessions with experienced people for the benefit of youngsters. A group of youngsters would be attached to such senior staff for some time, so that all the fine skills and nuances of animal handling and care could be learnt on site. The park should conduct training for zoo keepers, horticulture and sanitation staff for one week at the zoo itself. There is language barrier for the staff to go to northern states for the training. Zoos in southern part of the country can organize training with proper translation facility for the ground-level staffs every year.

8.4.1 Interaction with Retired Personnel

A number of retired Zoo personnel are available who have contributed significantly in zoo management at different levels. These personnel should be requested to act as resource persons. They can interact with the staff on the following issues.

- Animal keeping, their cleanliness and feeding.
- Duties and responsibilities of Zoo keepers
- Security problem of the Zoo
- Veterinary care
- Education and awareness
- Zoo architect

8.5 Administrative training

The personnel working with the administrative wing in the zoo were not sent for training to improve their skills. Normally after initial recruitment, they will be working continuously without any opportunity to enhance their skills. Their talents need to be recognized and encouraged for exposure training for the benefit of the zoo and general administration.

8.6 Zoo Vets Training

The veterinary care forms the integral part of captive management of wildlife.Trained veterinary professionals play an important role in upkeep of animals. The Zoo houses valuable animals, and failure to diagnose and provide treatment in time may lose the animal. The Zoo vets in majority of the Zoos work on deputation for 3 to 4 years. It takes at least 2 years to have control and by the time he gains experience he will be transferred to his parent department. The deputation period not less than 5 years is to be fixed and sent to foreign countries including New Jersey Wildlife Preservation Trust and also to participate in workshop/conference to acquire knowledge. A Regional committee of experts constituting leading veterinarians should be nominated to train Zoo vets and to assist in handling the case as and when required.

Zoo is currently having one Veterinary Assistant Surgeon post. Its promotion post as Assistant Director is still under consideration of the government. Being a large category zoo, we need two to three junior veterinarians along with the senior vet to look after different sections. JVO post is filled on deputation basis and para-vets are arranged on outsourcing basis. Imparting training to the temporary staff, many a time goes in vain with change in staff member every two or three years, and completely lack experienced hands to deal with emergency or other health care issues.

8.7 Zoo volunteers training

The volunteers should be given orientation training regularly, so that they can assist the Zoo management in due necessities.

8.8 Rewards to staff members

Motivation is important to sustain the interest of staff members. Therefore, the zoo has newly introduced giving rewards to staff members recognizing their service for exemplary services. Cash awards are being given to the animal keepers, gardeners and other staff with appreciation certificate.

Formal training courses can be promoted through research, knowledge sharing with other zoos etc. Specializations can be encouraged in different aspects of animal behaviour and ecology.

Chapter 9 E-GOVERNANCE

9.1 Introduction

Andhra Pradesh state is a forerunner in using the updated technology in all fields of governance. E-governance is part of the state government policy and Zoo administration has implemented Bio-metric attendance system, e-office for disposal of files during 2018-19. Further the financial management system of the state took a technological advance since April, 2018, with the implementation of CFMS (Comprehensive Financial Management System) for bill submission to treasury and PAO under plan and non-plan schemes. This system was introduced in Andhra Pradesh with a vision to enhance efficiency in financial transactions, effectiveness in control, transparency in operations, accountability at all levels, sustainability in long run to all the stakeholders. This is facilitating agility in decision making and improved financial discipline in the State.

Indira Gandhi Zoological Park, Visakhapatnam adopted e-tendering system to finalise all tenders/leases with respect to works, feed supply and other services providers in the zoo. This has created healthy competition among different bidders, fetching the best price for the (L1/H1) tendered item.

Vizag zoo in coordination with Reliance-Jio under CSR made the zoo premises free wi-fi enabled for all the visitors. Otherwise being inside a reserve forest area, Zoo has less mobile network coverage from different service providers. Zoo internet connection was upgraded from broadband to fibernet connection during 2018, enabling the smooth disposal of files in e-office, bio-metric attendance and e-mail communications to reach out print and electronic media in shortest time.

Application of information and communication technology for dissemination of accurate information, exchange of information and interaction with other zoos and organizations, maintenance of records and data in digital format would help the zoo to reach out the stake holders and clients.

Zoo has made use of significant advances in Information Technology sector and has put in lot of efforts to computerize in all aspects to make fast, accurate and paperless office and to store the required data for better management.

Conservation education is one of the important objectives of Zoo. The available technologies such as internet, website hosting, e-mail, digital photography, all helped the zoo to reach out to many print and electronic mass media agencies with little expense in real time.

There is need to strengthen e-governance system by adding the following facilities.

- An online reporting and providing data should be developed.
- Computerization all records of animals viz status, transfer, death, treatment, post mortem, stud book and feed etc.
- Development of online library facility for Vets, and other officers.
- The computerization of ticketing system in a full way to be done urgently and also the online ticketing system to be developed in future for local and outside visitors.

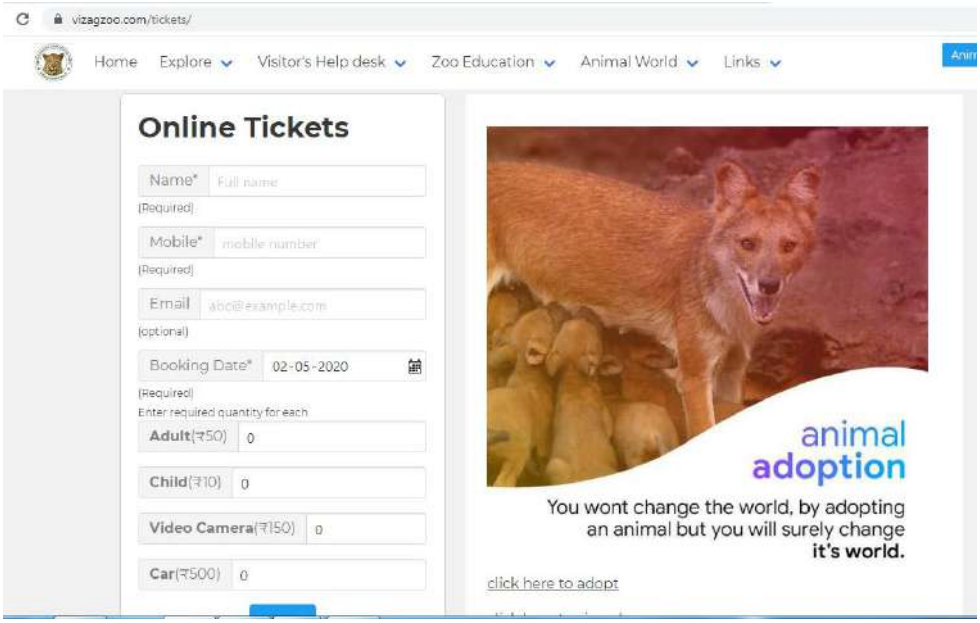
9.2 Computerized ticketing

It is essential to regulate crowd at the entrance and revenue realization. The entrance tickets issued to the visitors have been computerized with facilities to monitor the flow of visitors and amount realized may be viewed in the Director's chamber. This facility will enable accuracy, efficiency and transparency. There are different layers of scrutiny and supervision over the entry of visitors with valid tickets. Ticket issuing is outsourced to reputed agency with clearly defined functions and facilities to be provided. Security will allow the visitors after ensuring valid tickets. A permanent staff is kept in charge to monitor the ticket issuing.

9.3 Zoo website and online ticketing

Zoo is having a website designed in 2019 with the url: www.vizagzoo.com. This was created based on modern designs and look. It is provided with provision for online booking of tickets and also to adopt animals by making payments online. This will be a boost to the achievements of zoo. Payment gateway service provider is ICICI bank and a mobile application for the verification part is under development and would be ready for launch in a month time.

Figure 7Online Booking Service at Vizagzoo



9.4 Close Circuit Cameras with TV monitors

Vizag Zoo has registered record foot falls in recent years with annual growth 10-15% visitors' increase. Coupled with multitude of educational and other learning programs, the security and surveillance for the safety of animals, visitors and property, it is inevitable to have different layers of security system in place. CCTV's have become very handy to monitor the movement of crowd and keep an eye on vandalism and theft on busy crowded weekends and festivals.

At present there are three monitoring units in the chambers of Curator, Security Room with 10 Close Circuit Cameras installed at different strategic points viz. Tiger enclosure – 1 No., White Tiger enclosure - 1 No., Wild dog enclosure – 2 Nos., Ticket counter - 2 Nos., Entrance gate - 2 Nos., Jaguar and Leopard – 1 each. It is proposed to install some more cameras at sensitive points such as Cheetah, Rhino, Giraffe etc. enclosures. Expansion of CCTV system to cover all the animal night houses and other strategies locations (85 points) are planned for this financial year under CZA and state government budget.

9.5 Wireless Communication system

There is an effective wireless communication System with 12 handsets, which are provided to the security personnel stationed at strategic points. Handsets were also provided to the Curator, Asst. Curator, Vet.Doctor, FSOs. The Security Officer will be monitoring and

collecting the information for every 30 minutes throughout the day and several times. It is working efficiently to prevent major mishaps and to take corrective steps. The security is in constant touch with the Director and reports immediately any accident of significance.

9.6 Media management

Media plays an important role in the dissemination of conservation message and activities being taken up in the zoo. Photographs of new born animals, press release on new acquisition, training camps and any other development related to Zoo is always communicated to both print and electronic media through e-mail attached with digital format to large number of agencies and media channels. Correct and factual reporting of happenings in the Zoo helps us to maintain transparency and credibility. Animal adoption is mainly due to the positive coverage in the media, so the available technology must be utilized effectively.

9.7 Hospital computerization

Separate computers with internet facility are provided in the veterinary hospital and system of file movement is through e-office. Information pertains to animal inventory, data entry on Speceis 360 and reports are generated using this facility. Online record keeping for global access in the ZIMS software developed by Species 360 is being adopted for better record keeping in zoos and it is user friendly. ZIMS can be used through internet. Required training to the concerned staff will be ensured.

Chapter 10 Board Budget analysis for implementing the plan

The IGZP is located in midst of fast growing Vizag city. It has got very good basic infrastructure and located in lush evergreen forest area. The zoo has been recording highest footfall in recent years in the City of Vizag.

Central Zoo Authority has designated Vizag Zoo as the coordinating zoo for Conservation Breeding of Asiatic Wild dog. The plan period of the Master Plan of Vizag Zoo is for 20 years starting from 2020-21 to 2040-41.

During the financial year 2018-19, total revenue of Rs.1026.46lakh was realized with an expenditure of Rs. 840.96 lakh. At the current prices annual expenditure of Rs.532.00 lakh on day to-day maintenance is required. Total revenue expected for the financial year 2019-20 as per the approved budget is about Rs.532.00 lakh. For the new developmental works, it was proposed about Rs.339.26 lakh for the year 2019-20.

The developmental works are prioritized after meeting the recurrent expenditures as given below:

10.1 Construction and Development

As per the proposed layout plan some of the enclosures are to be modified, some are to be redone and new enclosures may also have to be built. Accordingly, line estimates considering current rates are prepared for different item of works as detailed below:

Sl.No	Particulars of work	Estimated Cost (In Lakhs)
1	Road Surface Improvement	271.21
2	Pathways	82.84
3	Walkways	64.47
4	Cable Trenches	116.37
5	Stand of Barrier (G.I)	165.73
6	Bridge (Length : 21 m)	16.92
7	Bridge (Length : 19 m)	15.92
8	Bridge (Length : 5.5 m)	5.86
9	Culvert	43.7
10	E-Cart Stop Station	44.48
11	Signage	50
12	Street Lighting	18.98
13	Veterinary Hospital	165.76
14	Admin Block	208.81
15	Post Mortem Room	22.03
16	Incinerator Building	8.64
17	Inpatient block	147.62
18	Aviaries	1349.34

Sl.No	Particulars of work	Estimated Cost (In Lakhs)
19	Aquarium	149.53
20	Nocturnal Animal House	160.41
21	Exotic Primate-I and II	141.28
22	Lesser Carnivore enclosures	129.34
23	Wild Dog Enclosure	129.34
24	Fox Enclosure	129.34
25	Giant Squirrel enclosure	14
26	Night of houses of Rhino, Sloth Bear, Himalayan Black Bear, Hyena, Sambar deer and Nilgai	310.31
27	Landscaping	35
28	Interpretation+Canteen+Education Centre	396.01
29	Amphitheatre	58
30	Quarantine Blocks	195.12
31	Parking	100
32	External Electrical System	145.8
33	External Plumbing System	48.23
34	Solar System	47.45
35	Ticket Counter	81.46
36	Entrance Plaza	16.09
37	Information Centre	93.68
38	Rest Shelters	24.23
39	Vehicle Parking	149.01
40	Toilets	178.06
41	Additional Cost of Services for Animals cubicles/Night shelters (All Electrical, Plumbing)	40.18
42	Animal Enrichment	139.28
	Total Cost	**5709.83**

10.2 Day to-day maintenance

At present following recurring expenditure is incurred (2020-21) on various items as given below:

Table 10-1 Day to Day Maintenance

Day to day maintenance		
Sl. No.	**Particulars**	**Amount**
1	Annual Establishment charges (Permanent and temporary staff)	464.42
2	Feed and fodder	180.00
3	Health care	6.17
4	Maintenance cost (Engineering, Gardening, Enclosures, Water, Electricity, Education, Vehicles, Training, etc.)	101.30
5	Miscellaneous/Unforeseen expenditure	21.64
	Total: Rs.	773.53

Chapter 11 Management Plan

11.1 Introduction

Indira Gandhi Zoological Park was created with the primary objective of conservation of endangered fauna of Eastern Ghats ecosystem, in the Seethakonda Reserve forests, and it enjoys a unique location in the stretch of Eastern Ghats meeting the Bay of Bengal, the shortest ever distance between this unique forest ecosystem from a marine ecosystem in its entire stretch in our country across different states. This positioning of the IGZP, Visakhapatnam in the lap of Eastern Ghats facing the Bay of Bengal itself makes it unparalleled, where we are housing both terrestrial and aquatic fauna in its near natural environment, very spacious enclosures including some representatives from other ecosystems in our country and few exotic species from African and American regions in order to create awareness and interest among the public and to educate them the need of conserving these life forms in its natural habitat for the longer survival of humanity itself.

It is a large category Zoo recognised by the Central Zoo Authority in Andhra Pradesh and one of the finest and modern zoos in India located amidst a beautiful natural setting. The zoo spreads over an area of 250 Ha (625 acres) in Seethakonda Reserved Forest which is part of the scenic Eastern Ghats in Visakhapatnam. In addition to this an extent of 23.61 acres of Marine Land Complex area is also under the control of Indira Gandhi Zoological Park.

The Zoo was devastated by ‘Hud-Hud’ classified as a very severe cyclonic storm made landfall on the coast of the state of Andhra Pradesh, near the city of Visakhapatnam on 12th October, 2014. The cyclone caused major damage in 26 cities and towns of Visakhapatnam, Vizianagaram, Srikakulam, and East Godavari districts, and affected about 9.2 million people. The Joint Rapid Damage and Needs Assessment (JRDNA) completed by the Government of India (GoI) estimated the cost of damage reconstruction to be approximately US$2.16 billion. It is with this backdrop that the state Government of Andhra Pradesh (GoAP) approached the World Bank (referred as the Bank) seeking assistance under the “Andhra Pradesh Disaster Recovery Project (APDRP)”. One of the key activities in this Project is the restoration of environmental services and facilities which included restoration, rejuvenation and redevelopment of Indira Gandhi Zoological Park, Visakhapatnam.

11.1.1 Damage by the Hud-Hud cyclone

About 40% vegetation is totally rooted out leaving remaining 60% stripped-off of its either branches or half cut giving an impression of a serious natural disaster. The compound wall around the Zoo has fallen at many places to a cumulative length of 1000 mts. The fallen trees strewn over the roads, in the moats of the entire area.Three Walk Through Aviaries (25 x 25 m each) were completely collapsed and the most of the birds came out, hovering in the vicinity. Animal mortality was 7 belonging to 3 different deer/antelope species, which was negligible due to precautionary measures taken to prevent such incidences. About (60) enclosures are badly damaged due to fallen trees over them and need to be repaired immediately to contain the animals from straying. The major infrastructure and visitor amenities likeshelters, Benches, Public conveniences, Signages & Hoardings etc., are badly damaged and requires replacements. The main gate of the entrance including the arch and compound wall collapsed.The enriched habitats of each of the enclosure and moats are totally damaged and lot of fallen trees had to be removed to the tune of 3000 cum.

11.2 Mission

To complement and strengthen the conservation efforts particularly of wild fauna housed in large enriched habitat with good health, nutrition, care apart from research and Conservation education.

11.3 Objectives

- Ex-situ conservation of critically endangered fauna with special focus on the endemic fauna of Eastern Ghats.
- To propagate the values of wild life and its conservation through education and interpretation aimed at wide public appreciation.
- To promote wild life research aimed at conservation and management
- Conservation Breeding of the animals of Eastern Ghats

The zoo houses several endangered species of regional significance that include three species of crocodiles (Gharial, Marsh and Estuarine Crocodiles), Sambar, Black Buck, Tiger, Leopard, Small Indian Civet, Ibis, Painted storks, Pelicans,Barking Deer, a variety of snakes, monitor lizards, fresh water turtles etc. Other species like Olive Baboon, Stump tailed monkey, Jaguar, Emus, Hippopotamus, Macaw, Himalayan Black Bear etc. are also housed in the zoo.

11.4 Salient Features

The above objectives are proposed to be achieved by adopting location specific strategies for each of them.

11.4.1 Conservation Breeding

The Zoo has sizeable collection of animals, both endangered, and exotic species. Among the endangered, it is proposed to concentrate on breeding of Wild Dogs, Tigers (both Yellow and White Tigers), for the purpose of genetic diversity, and other carnivores like Hyena etc. Breeding of Bison, Barking deer, Chowsingha and other herbivores is proposed to be taken up. Among birds, conservation breeding of various Pheasants in general, Peacocks in particular, would be taken up.

11.4.2 Research on Animal Behaviour

Basically, the services of Andhra University are being utilized for this purpose. The AU are studying the breeding habits of Wild Dogs. They are collecting various data on the behaviour of the species. In addition, it is proposed to engage animal biologists for taking care of breeding and behavioural enrichment of animals in the Zoo.

The Indira Gandhi Zoological Park, Visakhapatnam has been nominated by Central Zoo Authority for conservation breeding of India Wild dog or Dhole (*Cuonalpinus*) in captivity. The Indian wild dog is a threatened species whose number is declining in the wild. The prime reason is low tolerance by humans to animal's predation, besides habitat fragmentation and destruction of habitat. Unless detailed investigation comes through to safeguard the future of these wonderful carnivores, their survival is under threat.

11.4.3 Promotion of Wildlife Education

With a view to enlighten the visiting public, simple and effective signage boards are set up at each Animal enclosure giving basic information of the distribution and status of each animal. These are done both in English as well as vernacular languages. Also, signage boards are set up at prominent places, with general information about variety and distribution of various species.

In addition, it is proposed to set up Signage boards about the role of wildlife in Ecology and the need to conserve them. Also, special programmes of lectures, guided tours, competitions etc., would be arranged for school and college students, so as to foster love for wildlife.

Interested individuals / Institutions are encouraged to take up various activities in the zoo for their employee's viz., shramadan (voluntary free work) in zoo upkeep, contributions for maintenance of certain amenities, adoption of animals/enclosures in the zoo, sponsoring zoo literature, etc.

The local and regional print and electronic media are actively focusing the activities of the Zoo.

It is proposed to arrange orientation programmes and conducted tours to select groups of visitors from institutions. Volunteers and NGO's would be encouraged to take up such activities. In addition, it is proposed to engage on contract competent personnel for Zoo Education, with suitable honorarium.

11.4.4 Wholesome recreation to Public

Besides the impressive display of wildlife, IGZP is popular for its beautiful natural setting. Visitors relax and children keep playing in several areas of the zoo. The zoo is a hub of high activity on all weekends, holidays, vacations of schools. In addition, on several religious functions, people flock to the Zoo for recreation.For the benefit of visitors, amenities like benches, drinking water points, restaurants, toilets etc are set up adequately. Visitors' cabs are also arranged for taking visitors round the Zoo.

With a view to minimize inconvenience to visitors, musical instruments, radios, play equipment, etc is prohibited inside the Zoo.

11.5 OPPORTUNITIES

Over the period, the IGZP, has become a premier zoo in the country, the following are the notable opportunities here:

11.5.1 Layout Plan

The arrangement of the animals is as per Zoological classification in open enclosures, simulating Natural ambience. A Circular path takes the visitors smoothly round the important enclosures. Subsidiary loops and cross paths are formed, for easy access to chosen enclosures, without the strain of monotonous and long walks. The entire area bears good vegetation.

11.5.2 Water

Zoo is having Shanthi Sarovar which receives rain water and it recharges the ground water also. Zoo has 5 bore-wells in working condition. Zoo also gets municipal water. There is no scarcity of water in Zoo Park.

11.5.3 Veterinary Care

The zoo animal health care is one of the important disciplines in the management of the zoos. The health care system is monitored by the zoo veterinarian assisted by Junior Veterinary Officer, Biologist and Lab Technician. As per the C.Z.A guidelines zoo hospital is equipped with an inpatient ward, quarantine section, operation theatre, laboratory, post-mortem room and incinerator.

11.5.4 Specialties

Apart from the scientific layout, and naturalistic enclosures, the zoo has specialized natural enclosures for Lions, Tigers, white tiger & beer. Also the Nocturnal Animal House, and Walk through Aviaries are added attractions.

11.5.5 Visitor's amenities

New Visitors facilities have been provided to the zoo park during last financial year. The following facilities have been provided. Drinking Water Coolers, Renovated toilets and Pagodas, Wheel Chairs for physically challenged people, New Stone benches, New Shelters against sun and rains and wall paintings at main gate.

Indira Gandhi Zoological Park, Visakhapatnam is open all days of the week except Monday. The timings of the zoo for visitors are 9.00 A.M to 5.00 P.M. Two wheelers and heavy vehicles are not allowed in the zoo.

11.6 CONSTRAINTS

In spite of best efforts, the following aspects are affecting the functions of the Zoo

The zoo lacks in having an interpretation cum education centre. Though long back infrastructure was created for this purpose but it has been utilized as canteen. The need is to redone this interpretation cum education centre, so it can be used to create awareness among children regarding wildlife and environment conservation and important aspects of zoo management.

The night houses of Bonnet monkey, rhesus monkey and langur are old and needs to be redone. Though the existing night houses are improved to a great deal but in long run they need to be redone in a phased manner, to minimize the inconvenience to the animals housed there during the construction period.

Zoo does not have a closed reptile section. At present the snakes, monitor lizards and tortoises are displayed in open moats. This section is one of the most beautiful sections of zoo, and it gives the feeling of wilderness to the visitors. It is proposed to maintain this section as such and in addition to this a reptile house needs to be constructed.

Zoo has a well-equipped hospital and in-patient ward, but it lacks a quarantine section. It is proposed to have a quarantine section for use of zoo as well as rescued animals.

The standoff barriers are not of high standard. They need to be redone in phased manner. Already good plant hedges have been grown along all the barriers.

Several of the Zoo staff, especially Animal Keepers, was recruited long ago. They are aged, and not literate. The rest of the staff, though literate, is not trained properly in handling Animals. All these are affecting scientific management of animals in the Zoo.

11.7 PROPOSED ACTION PLAN

11.7.1 Salaries and allowances of staff

a) Regular Staff:

Salaries and allowances of staff and officers of the Zoo are seen to be the major portion of expenditure. The wage bill of 39 members of Zoo including officers and ministerial staff comes to about Rs.1445lakh is required for 5 years. This recurring expenditure is being met from State funds so far.

b) Contract Staff:

In view of sizeable vacancies among the regular staff (i.e. about 77) Skilled, Semi- skilled and unskilled staff are being engaged on contract basis.

In addition, maintenance of Zoo office needs facilities like stationery, and other contingency items. The wages of contract staff, and office maintenance is likely to be Rs. 978.20 lakh for 5 years.

11.7.2 Water Supply

Water supply is the most critical aspect in Zoo maintenance. Zoo is almost self-sufficient is water, except for close to Rs.2.00 lakh annual bill to GVMC. It is always important to conserve water and avoid wastage.

There are nine bore wells in the park which are being used to supply water to all the moats. After assessment developing more numbers of bore wells in the zoo can be taken up as there is sufficient ground water recharge.

Further there is urgent need for construction of series of over-head tanks to the enclosure. Existing water supply lines have become corroded over the years, and are leaking or getting blocked often. There is need to repair / replace them urgently. The likely expenditure for all these would be Rs.15.00 lakh.

In addition, there will be a Recurring expenditure of Rs. 1.0 lakh for maintenance of water pipes, Rs. 6.00 lakh per annum towards water supply payment to GVMC and electrical charges for pumping. Thus the totalamount of Rs. 35 lakhsare required for 5 years and it will be met from state funds

11.7.3 Security

It is very important to keep the Zoo animals, Zoo property both movable and immovable, visitors safe and secure to make the Zoo a safe place and to run the establishment properly. IGZP which spreads over an area of 625 Acres with beautiful forest in the midst of habitations is prone to security hazards. The following items are to be attended on priority.

Concertina Razor coil has to be provided all around the compound wall. It has to be checked every day and maintained everyday. It is proposed to set up solar pulsating fence also along with concertina coils, as an additional security.

Extending CCTV coverage to all-important large cat enclosures like Tigers, Leopards and Jaguars. Also, the Main Entrance Gate and Service Gate needs to be covered with this system. Alarm siren system also would be fitted into it.

Watch towers with spot lights would be established at vulnerable points like Tiger point, beer point, deer safari, store etc. to avoid sneaking of miscreants into the Zoo.

Every year the jungle growth would be cleared all along the compound wall for easy inspection. It is proposed to form a fair-weather road.

For this non-recurring purpose, an amount of Rs.150.00 lakh is required to be utilized over next 5 years. The required funds would be mobilized from State Government of Zoo.

The present arrangement of Security services, i.e. have private security during three shifts and to have Zoo staff during night shifts to support private security, is effective. The Recurring expenditure on this count is likely to be Rs. 410.00 lakh is required for 5 years. This would also be met from State Government funds or Zoo revenue.

11.7.4 Zoo Orientation Centre

As already highlighted earlier, the zoo lacks in having an orientation centre. This will be used to create awareness among children regarding wildlife and environment conservation and important aspects of zoo management. An amount of Rs.30 lakh is required for this purpose which can be met from normal state plan or plough back zoo revenue.

11.7.5 New night houses for primaes

As already highlighted, the night houses of Bonnet monkey, rhesus monkey and langur are old and needs to be redone. Though the existing night houses are improved to a great deal but in long run they need to be redone in a phased manner, to minimize the inconvenience to the animals housed there during the construction period. It requires an amount of Rs.108 lakh.

11.7.6 Reptile House

As already explained, zoo does not have a closed reptile section. At present the snakes, monitor lizards and tortoises are displayed in open moats. This section is one of the most beautiful sections of zoo, and it gives the feeling of wilderness to the visitors. It is proposed to maintain this section as such and in addition to this a reptile house needs to be constructed. An amount of Rs.204.34 lakh is required for this purpose. The CZA already approved the design and allocated Rs.75 lakh and the remaining may be adjusted from State funds/Central funds/PBZR funds.

11.7.7 Quarantine ward

Zoo has a well-equipped hospital and in-patient ward, but it lacks a quarantine section. It is proposed to have a quarantine section for use of zoo as well as rescued animals. For this specified purpose an amount of Rs.60 lakh is required.

11.7.8 Workshop

As mentioned earlier, the workshop section functions under Asst. Curator. The vacant posts like Carpenter etc have to be engaged on contract basis.

A register has to be maintained to record the problems from various enclosures. The Asst. curator shall allot the work as per the priority every day. The curator shall inspect this register every day and see that the workshop staff goes according to the Register.

Another Register (large bound) is to be maintained for entering the purchased items and their utilization at various places in the park. This has to be maintained by the Asst. Curator.

In addition, the old store shed, with AC sheet roofing would be repaired, refurnished to suit current requirements. The store yard would be protected by a compound wall. Adequate quantity of tools, equipment and spare parts would be kept in stock. While Rs. 25lakh would be required for onetime renovation of the store shed and procuring new equipment for Workshop.

11.8 ANIMAL COLLECTION PLAN

11.8.1 Procurement / transfer of Animals

When they were acquired, they were in pair, but due to natural process of life, their partners have departed. It is indeed sad, and a sin to keep these in forced celibacy. Therefore, top priority is to be given to pair up such single animals, either by acquisition or by transfer to other Zoos. Also, charismatic animals like jaguar, Puma, and chimpanzee, are proposed to be imported from abroad. These will be procured in breeding pairs. Breeding pairs of other animals like Gaur, Chimpanzee, Jungle Cats, Civet Cats, etc. would be collected soon. Likewise, the several herds of Spotted Deer, freely ranging in the Zoo, are to be translocated to natural habitats. The approximate cost of this non-recurring item would be Rs. 20 lakh. This proposed to be met from State funds or Zoo revenue from 2019-20 onwards.

11.8.2 Conservation Breeding

Keeping in view, the primary objective of conservation breeding of endangered species, the Zoo has identified some core species for special attention. Larger Carnivores like Tigers, would be bred for genetic diversity. Barking deer, Four horned antelope, Wild dogs, Slender Loris, Small Indian civet cat and in Reptiles - Gharial, etc.

In addition to Conservation breeding of animals, it is proposed to transfer them by exchange to other Zoos, or to be released into wild. The recurring expenditure for this is likely to be Rs. 20 lakh per annum.

11.9 Animal Enclosure renovation

It is proposed to set up additional Kraals for Sambar, Nilgai etc. so as to give comfortable space for living. Also, in built squeeze cages would be provided to most of the Carnivores and important herbivores, so as to handle them comfortably for treatment. It is also proposed to renovate all the feeding bins and water troughs in the enclosures/night cubicles. The likely expenditure for thiswould be Rs. 157.90 lakh.

11.10 Capacity building

The supervisory cadre like Asst. Curator,Foresters, Dy Range officer, Animal keepers etc, need to be trained in wildlife management and animalhandling. The supervisory staff toattendworkshops and seminars at different training institutes is proposed. It will help them in keeping touch with latest developments on the wildlife front.Efforts are being made to send Assistant Curator (F.R.O cadre) for short term courses organized by the Wildlife Institute of India, Dehradun.

11.11 Veterinary faciities

The following amenities are proposed to be provided to make the hospital responsive to all the immediate needs of animal health care.

11.11.1 In-patient Ward

The present old in-patient ward is housed in a cramped shed which can accommodate small animals and birds. It is proposed to set up a well-equipped in-patient ward, attached to the Hospital, at a cost of Rs.10 lakh.

11.11.2 Diagnostic Lab

At present, all faecal samples, blood smears and urine etc., are being sent to Local laboratories or Veterinary Biological Research Institute, Hyderabad. In case of public holidays and Sundays, the veterinary section of the Zoo is facing problem and the investigation and diagnosis is becoming late. Therefore, it is necessary to have a small diagnostic laboratory to take up faecal samples, blood smears, urine etc. The likely cost would be about Rs.8 lakh.

11.12 Conservation Education

With a view to help organized groups of visitors to the Zoo, guides would be trained and provided. This is especially required for school children and employees from Institutions.

In addition, the signages would be renovated periodically. Pamphlets, Brochures would also be prepared and supplied to the visitors either free of cost, or at nominal price. Annual reports would be prepared and published as per CZA norms. The anticipated expenditure for these is Rs.50 lakh is required for 5 years.

11.13 Maintenance of Zoo

The Zoo is infested with weeds like *Lantana* and *Ipomea* climbers. While the climbers are seen to damage well grown natural trees, the weeds are suppressing regeneration of useful species. It is proposed to eradicate these weeds annually and this will require around Rs.100 lakh is required for 5 years which will be met from normal state plan budget.

11.14 Conservation Breeding of Wild dog

We know very little about dhole biology and behaviour. In an effort to fill these gaps in knowledge, systematic data collection on the behavioural, social and reproductive aspects of the species will be made. This would eventually help us in effective management of dholes in captivity. A technical assistant/biologist with skills in zoology and conservation biology will be engaged for this purpose. Data will be collected on a standard observation sheet on a regular basis. Once we have sufficient data on the behavioural, social and reproductive behaviour of the species on hand, re-designing of the existing enclosures can be taken up to make them as naturalistic as possible to the species.

Capacity building training programmes and workshops will be conducted to the zoo personnel involved in the project on all aspects of husbandry of the species.

Over a period of time, the research findings will be published in the form of reports and articles which can be circulated to all national and international ex-situ breeding facilities on issues pertaining to the captive management and behavioural aspects of the species.

11.14.1 BUDGET PROVISIONS

The budget for five years, with annual break up is given below:

Table 11-1 Budget provision for Conservation Breeding of Wild Dog in IGZP

Budget provision for Conservation Breeding of Wild Dog in IGZP *Rs. in lakh*							
Sl No	**Particulars**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
1	Consumables: Chemicals, sample tubes, preservatives etc. for analysis of hormones, stationary, literature procurement	5	2	1	1	1	10.00
2	Equipment and its maintenance: CCTVs, Computer & Peripherals, Binoculars, SLR Camera, Video Camera, Microscope etc.	5	4	4	4	3	20.00
3	Contingencies	1	1	1	1	1	5.00
	Total Amount	**11**	**7**	**6**	**6**	**5**	**35.00**

11.15 BUDGET JUSTIFICATION:

Fellowship and Wages: A resident biologist (JRF) would be appointed for monitoring, data collection and record keeping.

Salaries: Two persons will be appointed initially as keepers on contract basis. This budget is proposed for their salaries.

Enclosures: Enclosures would be built in the form of off-display ex-situ breeding facilities to meet the ecological, behavioural and reproductive needs of the dogs. Construction of off display facilities each year is proposed in the Budget. Depending on the success rate and available captive stock at the end of first year, the subsequent construction of new enclosures will be taken up.

Consumables: Several chemicals such as preservatives, reagents and antibodies, sample Tubes etc., are required for the analysis of reproductive hormones if necessary. Expenditure for photographic films, postage, communication has also been included.

Travel: The project participants are expected to visit the participating zoos and other Zoos and laboratories to gain first-hand experience of zoo conditions, laboratory analysis of samples and for discussion of project related issues. Frequent travel by the research student between the zoos is needed.

Workshops and training: To get a common understanding of the project goals, setting a plan of action, time schedule, reviewing of enclosure design, research design etc., workshops and training programmes at the national level are critical.

Preparation of manual and reports: Scientific reports on various aspects of dholes biology and captive management are essential for determination of findings to other zoos in the country. This budget also includes document preparation and printing costs.

Referral Centre: A referral centre to address all issues related to captive management of the species is to be set up in Indira Gandhi Zoological Park, Visakhapatnam.

Supply of feed and feed supplements: It is proposed for the regular supply of feed and feed supplements especially during the breeding season.

11.15.1 Equipment:

Computers: A computer and associated peripherals are proposed to be purchased for the purpose of entry and analysis of data collected on various aspects of captive colonies. Computer furniture costs have also been included.

Binoculars, SLR Camera and Video Camera: One pair of binoculars would be needed to make observations on social and reproductive interactions in the captive animals and also to observe the groups in wild during sample collection. SLR camera with 300 mm tellers is needed to make photographic records of animals in captivity and wild for individual identification. A video camera is also required in order to record social and reproductive interaction in captive colonies.

Microscope: A 10 – 20 x microscope with photo micrometry is needed for examination and identification of intestinal and other parasites in the captive colony.

Transporting animals: The animals may have to be transported from one zoo to another Zoo in special crates.

11.16 FINANCIAL FORECAST:

The item wise, likely annual expenditure for next (5) years i.e. 2019-20 to 2023-24, is given in the enclosed statements. The total Non-Recurring and annual Recurring expenditure are given separately.

Table 11-2 Non-Recurring and Recurring expenditure

The abstract of these expenditures is as follows:						**Rupees in Lakhs**	
Sl. No.	**Particulars**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**Total**
1.	Non-Recurring:	**57**	**62**	**155**	**160**	**136.24**	**570.24**
2.	Recurring:	**705**	**747**	**767**	**800.20**	**847**	**3866.20**

Table 11-3Non- Recurring Expenditure

NON-RECURRING EXPENDITURE							
Sl. No	**Item of Work**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**Total**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Orientation centre	-	-	10	10	10	30.00
2	New Night Houses for Primates	27	27	20	20	14	108.00
3	Reptile House	-	-	75	75	54.34	204.34
4	Quarantine Ward	-	-	-	30	30	60.00
5	Re-structuring of old in-patient ward	-	-	5	5	-	10.00
6	Animal Enclosure Renovations	30	35	45	20	27.90	157.90
TOTAL		**57**	**62**	**155**	**160**	**136.24**	**570.24**

Table 11-4 Recurring Expenditure

RECURRING EXPENDITURE							
Sl. No.	**Item of Work**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**Total**
1	**Salaries and Allowances of Staff:**						
	a. Regular staff	270	280	285	290	320	1445
	b. Contract Staff	180	190	195	203.20	210	978.20
2	Water Supply& Electricity	7	7	7	7	7	35
3	Security	80	80	80	85	85	410
4	Workshop	5	5	5	5	5	25
5	Animal Collection Plan: Procurement & transfer of animals	20	25	25	30	30	130
6	Conservation breeding	11	7	6	6	5	35
7	Capacity Building	2	3	4	4	5	18
8	Feed and Fodder	100	120	130	140	150	640
9	Conservation Education	10	10	10	10	10	50
10	General Maintenance	20	20	20	20	20	100
	TOTAL:	**705**	**747**	**767**	**800.20**	**847**	**3866.20**

Annexures

ANNEXURE-I

List of flora: trees, shrubs, climbers, herbs, grasses, epiphytes and non-flowering plants in Indira Gandhi Zoological Park, Visakhapatnam.

TREES:			
Sl. No.	**Botanical Name**	**Local Name**	**Family**
1.	2	3	4
1	*Acacia leucophloea*	Tellatumma	Mimosaceae
2	*Acacia chundra*	Sundra	Mimosaceae
3	*Ailanthus excelsa*	Peddamanu	Simarubaceae
4	*Alangiumsalvifolium*	Vooduga	Alangiaceae
5	*Albiziaamara*	Nallaregu, cheekireni	Mimosaceae
6	*Alseodaphnesemecarpifolia*	Naramamidi	Lauraceae
7	*Anacardiumoccidentale*	Jeedimamidi	Anacardiaceae
8	*Antidesmadiandrum*	Pullagummadi	Euphorbiaceae
9	*Atlantiamonophylla*	Advinimma, Karunimma	Rutaceae
10	*Azadirachtaindica*	Vepa	Meliaceae
11	*Baringtoniaacutangula*	Kadmi	Barringtoniaceae
12	*Bauhinia recemosa*	Ari	Caesalipinaceae
13	*Bauhinia retusa*	Godari	Caesalipinaceae
14	*Bauhinia variegata*	Bodaddam	Caesalipinaceae
15	*Borassusflabellifer*	Tati, Tadi (Aracacum)	Palmae
16	*Brideliatomentosa*	Balli	Euphorbiaceae
17	*Canthiumdicoccum*	Nakkina, Nallabalusu	Rubiaceae
18	*Cassia fistula*	Rela	Caesalpinaceae
19	*Cedrealatoona*	Galimanu	Meliaceae
20	*Chloroxylonswietenia*	Billa, Billudu	Meliaceae
21	*Cipadessafruiticosa*	Rana billa (Ranabheri)	Meliaceae
22	*Cordia myxa*	Lriki, Nakeri, Bhootankusum	Ehretiaceae
23	*Cretaeva religiosa*	Tellavulimidi	Capparidaceae
24	*Dalbergiapaniculata*	Pachari, Sayaboddi	Fabaceae
25	*Dalbergia spinosa*	Chillangi	Fabaceae
26	*Dichostachyscinera*	Velthuru	Mimosaeae
27	*DiospyrousClyloroxylon*	Vullinda (Tokarika)	Ebenaceae
28	*Diospyrusferrea*	Alli	Ebenaceae
29	*Diospyrus sylvatica*	Tellagatha	Ebenaceae
30	*Diospyrousmontana*	Yerragatha	Ebenaceae
31	*DiospyrousCrispa*	Nironddi	Ebenaceae
32	*Elaeodendronglaucum*	Neridi	Celastraceae
33	*Emblica officinalis*	Rach usirika	Euphorbiaceae
34	*Elaeodendronglaucum*	Neridi (Neerijia)	Celastraceae
35	*Erythroxylon monogynum*	Adavigorinta	Linaceae

TREES:			
Sl. No.	**Botanical Name**	**Local Name**	**Family**
36	*Euphorbia tirucalli*	Jemudu	Euphorbiaceae
37	*Ficusbenghalensis*	Marri	Moraceae
38	*Ficushispida*	Boddamarri	Moraceae
39	*Ficusretusa*	Yerrajuvvi	Moraceae
40	*Ficus religiosa*	Ravi	Moraceae
41	*Ficustomentosa*	Juvvi	Moraceae
42	*Ficustsiela*	Pitta juvvi	Moraceae
43	*Garcinia spicata*	Pidatha	Clusiaceae
44	*Gmelina asiatica*	Karugummadi	Verbenaceae
45	*Grewia laevigata*	Potrika	Tiliaceae
46	*Grewiapilosa*	Nalli	Tiliaceae
47	*Grewiaasiatica*	Bankarara	Tiliaceae
48	*Grewiatiliaefolia*	Thada	Tiliaceae
49	*Grewia hirsute*	Chrijana	Tiliaceae
50	*Gymnosporia spinosa*	Chinni, Danti	Celastraceae
51	*Helectresisora*	Gubathada	Sterculiaceae
52	*Holarrhenaantidysenterica*	Pala	Apocynaceae
53	*Hymenodyctyonexcelsum*	Dudippa	Rubiaceae
54	*Ixora arborea*	Korivi, Korimpala	Rubiaceae
55	*Lantana camara*	Sitammavaripoda	Verbenaceae
56	*Lanneacoromandelica*	Gumpena	Anacardiaceae
57	*Mangiferaindica*	Mamidi	Anacardiaceae
58	*Memecylonedulae*	Alli	Melastomaceae
59	*Manikerahexandra*	Pala	Sapotaceae
60	*Morindiatinctora*	Togaru	Rubiaceae
61	*MurrayaKoeinigii*	Karivepaku	Ruraceae
62	*Ochnajabotapita*	Tammi	Ochnaceae
63	*Phoenix sylvestris*	Ita	Palme
64	*Polyalthiacerasoides*	Chilakadudduga	Annonaceae
65	*Petrospermumsuberifolium*	Lolugu	Sterculiaceae
66	*Pterolobiumindicum*	Korintha, Kodimudusu	Caesalpinaceae
67	*Sapindusemerginatus*	Kunkudu, Ritta	Sapindaceae
67	*Semecarpusanacardium*	NallaJeedi	Anacardiaceae
68	*Spondiasmangifera*	Adavimamidi	Anacardiaceae
69	*Streblus asper*	Barinika	Moraceae
70	*Terminalia bellerica*	Thadi, Thani	Combretaceae
71	*Terminalia chebula*	Karaka	Combretaceae
72	*Wrightiatinctoria*	Ankudu	Apocynaceae
73	*Zyzyphusxylopyrus*	Gotti	Rhamnaceae

SHRUBS

Sl. No.	Botanical Name	Local Name	Family
1.	2	3	4
1	*Abutilon indicum*	Tutturabenda	Malvaceae
2	Acacia pinnata	Mulla korintha	Caesalpinaceae
3	*Acanthus ilicifolius*	Alchi	Acanthaceae
4	*Asparagus racemosus*	Pilli teegelu	Liliaceae
5	*Canthiumparviflouum*	Balusu	Rubiaceae
6	*Capparis sepiaira*	Nalluppi	Capparidaceae
7	Carissa carandas	Kalivi	Apocynaceae
8	*Carissa spinarum*	Peddavaka	Apocynaceae
9	*Casearia tomentosa*	Chilakadudduga	Flacourtiaceae
10	*Cassia auriculta*	Thangedu	Caesalpinaceae
11	*Cassa Montana*	Pagadi, tangedu	Caesalpinaceae
12	*Carissa tora (occidentails)*	Kasivinda, Kasinda	Caesalpinaceae
13	*Celastruspaniculta*	Danti	Celastraceae
14	*Clerodendruminfortunatum*	Pisinika, backeda	Verbenaceae
15	*Dichrostachyscinera*	Veluthuru	Mimosoideae
16	*Dodoneaeaviscosa*	Pulledu	Sapindaceae
17	*Euphorbia nivulia*	Brahmajemudu	Euphorbiaceae
18	*Euphorbia trigona*	Kattimandu	Euphorbiaceae
19	*Flacourtiaramontchi*	Kanregu, Peddakanregu	Flacourtiaceae
20	*Flacourtiasepiaria*	Kanregu	Fabaceae
21	*Hemidesmus indicus*	Sugandhapala	Ascepiadaceae
22	*Gmelina asiatica*	Challagummadi	Acanthaceae
23	*Glycosmis pentaphylla*	Golugu	Rutaceae
24	*Helecteresisora*	Adavichamanti	Sterculiaceae
25	*Hugoniamystax*	Pentapeedakakibeera	Linaceae
26	*Lantana camara*	Lantana	Acantanceae
27	*Pavettaindica*	Papidi	Rubiaceae
28	*Randiadumetorum*	Manga	Ribiaceae
29	*Randiamalabarica*	Pedda manga	Rubiaceae
30	*Syzygiumbraceatum*	Arivita	Myrtaceae
31	*Memocylanedule*	Alli	Melastromaceae
32	*Mimosa pudica*	Attipatti	Mimosaideae
33	*Murrayapaniculata*	Golimi	Rutaceae
34	*Pterobiumindicum*	Korintha	Caesalpinoideae
35	*Vernonia divergens*	Kampurodda	Asteraceae
36	*Zizyphusoenoplia*	Pariki	Rhamnaceae

H E R B S

Sl. No.	Local or vernacular Name	Botanical Name	Family
1	Vishnukrantham	Evolulusalsinoides	Convolulaceae
2	Seetammasavaram, pasitivva	Cuscutarefexa	Convolulaceae
3	Uttareni	Achyranthes aspera	Amaranthaceae

C L I M B E R S

Sl. No.	Local or vernacular Name	Botanical Name	Family
1	Adavinabhi	*Gloriosa superba*	Liliaceae
2	Konda thivva, Adonda	*Capparihorrida*	Capparidaceae
3	Surugudu	*Ventilagodenticu*	Rhamnaceae
4	Gacha	*Cacsalpiniabonducella*	Caesalpiniaceae
5	Gurivinda	*Abrusprecatorius*	Papilionaceae
6	Sankupushpam	*Clitoriaternata*	Papilionaceae
7	Korintha	*Acasiaintsia*	Mimosaceae
8	Kumari teega	*Smilax zeylanica*	Smilcaceae
9	Mukkutummudutheega	*Leptadenia reticulata*	Asclepiedaceae
10	Nallateega	*Derris scandens*	Fabaceae
11	Nalleru	*Vitisquadrangularis*	Vitaceae
12	Pala theega	*Ichnocarpusfrutescens*	Apocynaceae
13	Pilli theegalu	*Asparagus racemosus*	Liliaceae
14	Seethammavarisavaram	*Cuscutareflexa*	Cuscutaceae
15	Sugundhapala	*Hemidesmussindicus*	Periplocaceae
16	Tippateega	*Tinosporacordifolia*	Menispermaceae
17	Undrakampa	*Mimosa rubicailis*	Mimosaceae
18	Yenugudulagonda	*Mucunapruriens*	Fabaceae

B A M B O O S

Sl. No.	Local or vernacular Name	Botanical Name	Family
1	Sadhanamveduru	*Dendrocalamusstrictus*	Graminae
2	Mulla veduru	*Bambusabambos*	Graminae

G R A S S E S

Sl. No.	Local or vernacular Name	Botanical Name	Family
1	Chippera gaddi, Paraka gaddi	*Aristida setacea*	Graminae
2	Gurramthoka gaddi	*Chrysopoganmontanus*	Graminae
3	Kanchini, Kasi gaddi	*Cymbopogon martini*	Graminae
4	Kurdara gaddi	*Ischaemumpilosum*	Graminae
5	Nendra gaddi	*Schimanervosum*	Graminae
6	Sabari gaddi	*Elaloipsisbinata*	Graminae
7	Yedagaddipandiballalu	*Andropogonocontortus*	Graminae

ANNEXURE-II

List of free ranging fauna of the Indira Gandhi Zoological Park, Visakhapatnam

Mammals

1. Flying fox
2. Common grey mongoose
3. Black tip mongoose
4. Indian Palm civet
5. Small Indian civet
6. Sambar deer
7. Spotted deer
8. Barking deer
9. Mouse deer
10. Black napped hare
11. Indian Jackal
12. Leopard
13. Wild dog
14. Wild boar
15. Porcupine
16. Fishing cat
17. Rusty spotted cat
18. Jungle cat

Reptiles:

1. Garden lizard
2. Common monitor lizard
3. Fan-throated lizard
4. Indian Chameleon
5. Peninsular Rock agama
6. Asian House gecko
7. Termite hill gecko
8. Clouded Indian gecko
9. East Indian leopard gecko

10. Many-keeled grass skink
11. Bronzed grass skink
12. Indian cobra
13. Rat snake
14. Indian Rock Python
15. Common wolf snake
16. Barred wolf snake
17. Russel's viper.
18. Common krait
19. Dumerills' black headed snake
20. Bronze back snake
21. Green vine snake
22. Yellow green cat snake
23. Common cat snake
24. Common kukri
25. Russel's kukri
26. Common sand boa
27. Bamboo pit viper
28. Brahminy blind snake
29. Common shield tailed snake
30. Checkered keel-back
31. Stripped keel-back
32. Indian Star tortoise
33. Indian black turtle

Amphibians:

1. Common Indian toad
2. Indian Skittering frog
3. Wart frog
4. Indian bull frog
5. Burrowing frog
6. Ornate narrow mouthed frog
7. Indian tree frog
8. Srilankan painted frog

Annexure-III

The inventory of animals as on 31.03.2021at Indira Gandhi Zoological Park, Visakhapatnam

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
A	**CARNIVORES**					
1	Asiatic Lion	*Panthera leo*	1	1	0	Indigenous
2	Royal Bengal Tiger	*Panthera tigristigris*	2	3	0	Indigenous
3	White Tiger	*Panthera tigristigris*	3	3	0	Indigenous
4	Panther	*Panthera pardus*	1	1	0	Indigenous
5	Jungle Cat	*Felis chaus*	0	2	0	Indigenous
6	Sloth Bear	*Melursus ursinus*	2	2	0	Indigenous
7	Indian wolf	*Canis aureus*	1	1	0	Indigenous
8	Wild Dog	*Cuon alpinus*	26	10	0	Indigenous
9	Striped Hyena	*Hyaena hyaena*	5	3	0	Indigenous
10	Jackal	*Canis aureus*	8	12	7	Indigenous
11	Asian Palm Civet	*Paradoxurus hermaphroditus*	2	0	0	Indigenous
TOTAL:			**51**	**38**	**7**	
			96			
B	**HERBIVORES**					
12	Black Buck	*Antilope cervicapra*	25	41	19	Indigenous
13	Hog deer	*Axis porcinus*	1	4	3	Indigenous
14	Spotted Deer	*Axis axis*	15	15	12	Indigenous
15	Sambar	*Cervus unicolor*	13	24	12	Indigenous
16	Nilgai	*Boselaphustragocamelus*	0	3	0	Indigenous
17	Barking Deer	*Muntiacusmuntjak*	6	7	9	Indigenous
18	Indian Rhinoceros	*Rhinoceros unicornis*	1	0	0	Indigenous
19	Wild Boar	*Sus scrofa*	6	5	3	Indigenous
20	Indian Gaur	*Bos gaurus*	3	2	0	Indigenous
21	Elephant	*Elephas maximus*	2	2	0	Indigenous
22	Giraffe	*Giraffa camelopardalis*	1	1	0	Exotic
23	Zebra	*Equus quagga*	1	1	0	Exotic
24	Hippopotamus	*Hippopotamus amphibious*	1	1	0	Exotic
			75	**106**	**58**	
			239			

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
	PRIMATES					
25	Stump Tailed Macaque	*Macaca arctoides*	0	1	0	Indigenous
26	Rhesus Macaque	*Macaca mulatta*	3	2	0	Indigenous
27	Bonnet Macaque	*Macaca radiata*	8	10	5	Indigenous
28	Chimpanzee	*Pan*	0	2	0	Exotic
29	Hamadryas Baboon	*Papio hamadryas*	1	4	0	Exotic
30	Ring tailed Lemur	*Lemur catta*	4	6	0	Exotic
31	Common Marmoset	*Callithris jacchus*	1	0	0	Exotic
			17	**25**	**5**	
			47			
	RODENTS					
32	Indian Porcupine	*Hystrix indica*	3	2	3	Indigenous
33	Indian Giant Squirrel	*Ratufa indica*	1	0	0	Indigenous
			4	**2**	**3**	
			9			
	REPTILES.					
34	Indian Cobra	*Naja naja*	2	4	0	Indigenous
35	Indian Rock Python	*Python molurus*	1	6	0	Indigenous
36	Indian Rat Snake	*Pytasmucosus*	4	6	0	Indigenous
37	Water Monitor Lizard	*Varanus salvator*	1	1	1	Indigenous
38	Bengal Monitor Lizard	*Varanus bengalensis*	3	1	0	Indigenous
39	Indian flap-shell turtle	*Lissemys punctata*	2	1	0	Indigenous
40	Star Tortoise	*Geochelone elegans*	7	22	118	Indigenous
41	Gharial	*Gavialis gangeticus*	0	6	0	Indigenous
42	Salt Water Crocodile	*Crocodylusporosus*	0	3	0	Indigenous
43	Mugger	*Crocodylus palustris*	1	2	0	Indigenous
44	Red eared slider Turtle	*Trachemys scripta elegans*	1	6	0	Exotic
45	Green Iguana	*Iguana iguana*	1	2	10	Exotic
			23	**60**	**129**	
			212			

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
	AVES.					
46	Lesser Adjutant stork	*Leptoptilosjavanicus*	1	0	0	Indigenous
47	Painted Stork	*Mycteria leucocephala*	6	7	0	Indigenous
48	Sarus crane	*Grus antigone*	1	0	0	Indigenous
49	Black headed Ibis	*Threskiornismelanocephalus*	0	0	2	Indigenous
50	Grey Heron	*Ardea cinerea*	1	1	1	Indigenous
51	Spot billed pelican	*Pelecanusphilippensis*	3	2	2	Indigenous
52	Rosy Pelican/ Greater White Pelican	*Pelecanusonocrotales*	1	1	0	Indigenous
53	Bar headed geese	*Anser Indicus*	1	0	0	Indigenous
54	Black Kite	*Milvus migrans*	0	0	3	Indigenous
55	Hill Myna	*Gracula religiosa*	0	0	2	Indigenous
56	Rose Ringed Parakeet	*Psitaculakrameri*	9	10	0	Indigenous
57	Alexandrine parakeet	*Psittaculaeupatria*	8	5	2	Indigenous
58	Grey Jungle Fowl	*Gallus sonneratii*	1	0	0	Indigenous
59	Indian Peafowl	*Pavo cristatus*	13	15	10	Indigenous
60	White Peafowl	*Pavo cristatus*	2	0	0	Indigenous
61	White Cockatoos	*Cacatua alba*	1	1	0	Indigenous
62	Indian Great Horned Owl	*Bubo bubo*	0	0	0	Indigenous
63	Barn Owl	*Tyto alba*	2	1	0	Indigenous
64	Red spur fowl	*Galloperdixspadicea*	1	0	0	Exotic
65	Green winged Macaw	*Ara chloropterus*	0	1	0	Exotic
66	Blue Gold Macaw	*Ara ararauna*	1	1	0	Exotic
67	Orange winged Amazon	*Amazona amazonica*	1	0	0	Exotic
68	Sulphur Lesser Crested Cockatoo	*Cacatua galerita*	1	0	0	Exotic
69	Goffins Cockatoo	*Cacatua goffini*	2	0	0	Exotic
70	African Grey Parrot	*Psittacus erithacus*	0	1	0	Exotic
71	Eclectus Parakeet	*Electusroratus*	1	1	0	Exotic
72	Jandya conure	*Aratingajandaya*	0	3	1	Exotic

S.No.	Species	Scientific name	Numbers			Indigenous/ Exotic
			M	F	U/ cub	
73	Sun conure	*Aratingasolstitialis*	1	1	0	Exotic
74	Budgerigar colour morphs	*Melopsittacus undulatus*	12	15	13	Exotic
75	Peach faced Love bird	*Agapornis roseicollis*	12	8	0	Exotic
76	Cockatiels colour morphs	*Nymphicus hollandicus*	5	5	0	Exotic
77	ViloletNaped Lory	*Loriusdomicella*	0	1	0	Exotic
78	Black Swan	*Cygnus atratus*	1	1	0	Exotic
79	Ostrich	*Struthio camelus*	1	0	0	Exotic
80	Emu	*Dromaiusnovaehollandiae*	4	5	0	Exotic
81	Lady Amherst's pheasant	*Chrysolophusamherstiae*	2	0	0	Exotic
82	Golden Pheasant	*Chrysolophus pictus*	0	1	0	Exotic
83	Silver Pheasant	*Lophuranycthemera*	0	1	0	Exotic
TOTAL:			**95**	**88**	**36**	
			219			

ABSTRACT

S.No.	Species	M	F	U	Remarks
A	CARNIVORES	51	38	7	
B	HERBIVORES	75	106	58	
C	PRIMATES	17	25	5	
D	RODENTS.	4	2	3	
E	REPTILES	23	60	129	
F	AVES.	95	88	36	
		265	**319**	**238**	
Grand Total:		**822**			

Annexure-iv

Calendar of Prophylactic operations

Annexure -5: PROPOSED COLLECTION PLAN OF IGZP, VISAKHAPATNAM 2020-21 to 2040-41

Enclosure	Species	Current stock				Future collection				Target Collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
LION	Asiatic Lion	1	1	0	**2**	2	4	0	**6**	3	5	0	**8**
TIGER	Royal Bengal tiger	2	3	0	**5**	2	1	0	**3**	4	4	0	**8**
WHITE TIGER	White tiger	3	3	0	**6**	1	1	0	**3**	4	4	0	**8**
LEOPARD	Leopard	1	1	0	**2**	2	2	0	**4**	3	3	0	**6**
LESSER CATS	Fishing cat	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Rusty spotted cat	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Leopard cat	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Jungle cat	1	2	0	**3**	2	3	0	**5**	3	5	0	**8**
SLOTH BEAR	Sloth Bear	1	2	0	**3**	2	2	0	**4**	3	4	0	**7**
HIMALAYAN BLACK BEAR	Himalayan Black Bear	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
INDIAN GREY WOLF	Indian Grey Wolf	1	1	0	**2**	2	4	0	**6**	3	5	0	**8**
DHOLE (On Display)	Dhole	14	3	0	**17**	4	6	0	**10**	18	9	0	**27**
DHOLE (Off-Display Conservation Breeding Centre)	Dhole	12	7	0	**19**	0	0	0	**0**	12	7	0	**19**
FOX	Bengal Fox	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
HYAENA	Striped Hyaena	5	3	0	**8**	0	2	0	**3**	5	5	0	**10**
JACKAL	Golden Jackal	8	12	7	**27**	8	12	-7	**20**	8	12	0	**20**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Otters	Common Otter	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Smooth Coated Otter	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
Nocturnal Animal House (NAH)	Small Indian civet	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Asian Palm civet	2	0	0	**2**	1	3	0	**4**	3	3	0	**6**
	Indian Porcupine	3	2	3	**8**	1	1	0	**2**	4	3	3	**10**
	Honey Badger	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Indian Pangolin	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Giant Indian squirrel	1	0	0	**1**	1	3	0	**4**	2	3	0	**5**
Black buck	Black buck	25	41	19	**85**	-5	-11	-9	**-25**	20	30	10	**60**
Sangai deer	Sangai deer	0	0	0	**0**	4	8	0	**12**	4	8	0	**12**
Mouse deer	Mouse deer	0	0	0	**0**	5	10	0	**15**	5	10	0	**15**
Hog deer	Hog deer	1	4	3	**8**	4	3	0	**7**	5	7	3	**15**
Spotted deer	Spotted deer	15	15	12	**42**	0	0	-7	**-7**	15	15	5	**35**
Sambar	Sambar	13	24	12	**49**	0	-1	-8	**-9**	13	23	4	**40**
Nilgai	Nilgai	0	3	0	**3**	2	0	0	**2**	2	3	0	**5**
Barking Deer	Barking Deer	6	7	9	**22**	0	3	-5	**-2**	6	10	4	**20**
Goral	Goral	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**
Chowsingha	Chowsingha	0	0	0	**0**	4	8	0	**12**	4	8	0	**12**
Barasingha/Swamp deer	Barasingha/ Swamp Deer	0	0	0	**0**	5	8	0	**13**	5	8	0	**13**
Rhinoceros	Indian Rhinoceros	1	0	0	**1**	1	2	0	**3**	2	2	0	**4**
Wildboar	Wildboar	6	5	3	**14**	0	0	0	**0**	7	7	0	**14**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Indian Bison/Gaur	Gaur/Indian Bison	3	2	0	**5**	2	3	0	**5**	5	5	0	**10**
Elephant enclosure	Indian Elephant	2	2	0	**4**	1	2	0	**3**	3	4	0	**7**
Chinkara	Chinkara	0	0	0	**0**	5	8	2	**15**	5	8	2	**15**
Indian Primates Section with separate enclosures for each species	Stump tailed macaque	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**
	Lion tailed macaque	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**
	Grey Langur	0	0	0	**0**	4	6	0	**10**	4	6	0	**10**
	Nilgiri Langur	0	0	0	**0**	4	6	0	**10**	4	6	0	**10**
	Rhesus Macaque	1	2	0	**3**	0	0	0	**0**	1	2	0	**3**
	Bonnet Macaque	8	9	5	**22**	-2	1	-5	**-6**	6	10	0	**16**
	Capped Langur	0	0	0	**0**	3	4	0	**7**	3	4	0	**7**
	Assamese Macaque	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
EXOTICS													
Jaguar	Jaguar	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
Puma	Puma	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
Wallaby	Red Necked wallaby	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
Grey Kangaroo	Grey kangaroo	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
Giraffe	Northern Giraffe	1	1	0	**2**	2	4	0	**6**	3	5	0	**8**
Zebra	Grant's Zebra	1	1	0	**2**	2	2	0	**4**	3	3	0	**6**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
White Rhinoceros	White Rhinoceros	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**
Hippopotamus	Hippopotamus	1	1	0	**2**	1	1	0	**2**	2	2	0	**4**
Pygmy Hippopotamus	Pygmy Hippopotamus	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
Chimpanzee	Chimpanzee	0	2	0	**2**	2	3	0	**5**	2	5	0	**7**
Orangutan	Bornean Orangutan	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**
Slender Tailed Meerakat	Slender Tailed Meerkat	0	0	0	**0**	3	4	0	**7**	3	4	0	**7**
Exotic Primate enclosure 1& 2	Hamadryas baboon	0	4	0	**4**	3	9	0	**12**	3	13	0	**16**
	Ring Tailed Lemur	4	6	0	**10**	2	4	0	**6**	6	10	0	**16**
	Mandrill	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**
	Cotton top Tamarin	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**
	Emperor Tamarin	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**
	Common Squirrel Monkey	0	0	0	**0**	4	8	0	**12**	4	8	0	**12**
	Brown Capuchin	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**
	Common Marmoset	1	0	0	**1**	4	5	0	**9**	5	5	0	**10**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Serpentarium with separate enclosure for each species as laid in layout plan.	Indian Cobra	2	4	0	**6**	2	2	0	**4**	4	6	0	**10**
	Monocellate Cobra	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	King cobra	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Reticulated python	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Burmese Rock Python	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Indian Rock Python	1	6	0	**7**	2	1	0	**3**	3	7	0	**10**
	Indian Rat snake	4	6	0	**10**	0	0	0	**0**	4	6	0	**10**
Reptile House	Whitaker's Sand Boa	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Common Sand Boa	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Red Sand Boa	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Common Wolf snake	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Barred Wolf Snake	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Common Trinket Snake	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Bronze back Tree Snake	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Green Vine Snake	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Common Kukri Snake	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Russells Kukri Snake	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Green Keelback	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Checkered Keelback	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Indian Chameleon	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Yellow Anaconda	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Green Anaconda	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Komodo dragon	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Water Monitor Lizard	Water Monitor Lizard	1	1	1	**3**	2	5	0	**7**	3	6	1	**10**
Bengal Monitor Lizard	Bengal Monitor Lizard	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
Yellow Monitor Lizar	Yellow Monitor Lizard	0	0	0	**0**	2	3	0	**5**	2	3	0	**5**
Turtles& Tortoises	Indian Black Turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Tricarinate Hill Turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Ganges soft shell Turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Indian roof Turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Indian flapshell Turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Painted roofed turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Southeast Asian Box turtle	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Travancore tortoise	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Star Tortoise	7	22	118	**147**	13	8	-118	**-97**	20	30	0	**50**
	Asian brown tortoise	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Red eared slider turtle	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
Gharial	Gharial	0	6	0	**6**	3	1	0	**4**	3	7	0	**10**
Salt water crocodile	Salt water crocodile	0	3	0	**3**	2	3	0	**5**	2	6	0	**8**
Mugger	Mugger	1	2	0	**3**	1	2	0	**3**	2	4	0	**6**
Caiman Crocodile	Spectacled Caiman Crocodile	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Dwarf Caiman	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
Green Iguan	Green Iguana	1	2	10	**12**	2	2	-10	**-6**	3	4	0	**7**
Aldabra Giant Tortoise	Aldabra Giant tortoise	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Cranes	Lesser Adjutant stork	0	0	1	**1**	3	3	-1	**5**	3	3	0	**6**
	Black necked stork	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	White stork	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Open Billed stork	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Painted Stork	6	7	0	**13**	-2	-1	0	**-3**	4	6	0	**10**
	Sarus crane	1	0	0	**1**	2	3	0	**5**	3	3	0	**6**
	Demoiselle crane	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Eurasian Spoon bill	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Black headed Ibis	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Grey Heron	1	1	0	**0**	3	3	0	**6**	4	4	0	**8**
	Purple Heron	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Black-Crowned night heron	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Indian Pond Heron	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Spot billed pelican	3	2	2	**7**	1	3	-2	**2**	4	5	0	**9**
	Greater White Pelican	1	1	0	**2**	2	2	0	**4**	3	3	0	**6**
	Greater flamingo	0	0	0	**0**	10	10	0	**20**	10	10	0	**20**
	Comb duck	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Ruddyshell duck	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Spot billed duck	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	White winged Wood Duck	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Mandarin Duck	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Lesser Whistling Teal	0	0	0	**0**	10	10	0	**20**	10	10	0	**20**
	Large Whistling Teal	0	0	0	**0**	10	10	0	**20**	10	10	0	**20**
	Garganey Teal	0	0	0	**0**	10	10	0	**20**	10	10	0	**20**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Cranes	Common Teal	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Purple moorhen	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Darter-Snake Bird	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Little Cormorant	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Bar headed geese	0	0	5	**5**	5	5	-5	**10**	5	5	0	**10**
	Cattle Egret	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Large Egret	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Little Egret	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Scarlet Ibis	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	White Ibis	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
Birds Of Prey	White rumped vulture	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Long billed vulture	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Red-headed vulture	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Brahiminy Kite	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Black Kite	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Shikra	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
	Koel	0	0	0	**0**	5	5	0	**10**	5	5	0	**10**
Nocturnal Animal House (NAH)	Indian Great Horned Owl	2	0	0	**2**	0	2	0	**2**	2	2	0	**4**
	Barn Owl	2	1	0	**3**	1	2	0	**3**	3	3	0	**6**
	Eurasian Eagle Owl	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Spotted Owlet	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Jungle Owlet	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Spot bellied eagle owl	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Brown Fish Owl	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Walk Through Aviary	Pied imperial pigeon	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Green imperial pigeon	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Green pigeon	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Nicobar pigeon	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Emerald dove	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Laughing dove	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Spotted dove	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Oriental turtle dove	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Common Myna	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Hill Myna	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Common Babbler	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Yellow billed Babbler	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Rose ringed parakeet	9	10	0	**19**	-3	0	0	**-3**	6	10	0	**16**
	Alexandrine parakeet	8	5	2	**15**	-2	5	-2	**1**	6	10	0	**16**
	Malabar parakeet	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Plum headed parakeet	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Blossom headed parakeet	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Red breasted parakeet	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Slaty headed parakeet	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Red Vented Bulbul	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Red Whiskered Bulbul	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	House Sparrow	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Malabar pied hornbill	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Oriental pied hornbill	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Walk Through Aviary	Greater pied hornbill	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Grey Hornbill	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
	Black headed munia	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Scaly breasted munia	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Red adavat	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	White throated munia	0	0	0	**0**	6	6	0	**12**	6	6	0	**12**
	Indian roller	0	0	0	**0**	4	4	0	**8**	4	4	0	**8**
Pheasants Aviary	Kalij pheasant	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**
	Grey peacock pheasant	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**
	Grey Jungle fowl	1	0	0	**1**	3	6	0	**9**	4	6	0	**10**
	Red Jungle fowl	1	0	0	**1**	3	6	0	**9**	4	6	0	**10**
	Grey Patridge	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**
	Jungle Bush Quail	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**
	Rain Quail	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**
	Indian Peafowl	13	15	10	**38**	-3	-5	-10	**-18**	10	10	0	**20**
	White Peafowl	2	0	0	**2**	1	3	0	**4**	3	3	0	**6**
	Green Peafowl	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Red spur fowl	1	0	0	**1**	2	3	0	**5**	3	3	0	**6**
	Painted Spur fowl	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Lady Amherst pheasant	2	0	0	**2**	1	5	0	**6**	3	5	0	**8**
	Golden Pheasant	0	1	0	**1**	3	4	0	**7**	3	5	0	**8**
	Silver Pheasant	0	1	0	**1**	3	4	0	**8**	3	5	0	**8**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
African Parrots Aviary	Military Macaw	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Hyacinth Macaw	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Green winged Macaw	0	1	0	**1**	3	2	0	**5**	3	3	0	**6**
	Blue Gold Macaw	1	1	0	**2**	3	3	0	**6**	4	4	0	**8**
	Scarlet Macaw	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Rainbow lorikeet	0	0	0	**0**	4	6	0	**10**	4	6	0	**10**
	Sulphur Lesser Crested Cockatoo	1	0	0	**1**	4	5	0	**9**	5	5	0	**10**
	Goffins Cockatoo	2	0	0	**2**	3	5	0	**8**	5	5	0	**10**
	African Grey Parrot	0	1	0	**1**	4	3	0	**7**	4	4	0	**8**
	Eclectus Parakeet	1	1	0	**2**	3	3	0	**6**	4	4	0	**8**
	Jandaya Conure	0	3	1	**4**	4	1	-1	**4**	4	4	0	**8**
	Sun conure	1	1	0	**2**	4	4	0	**8**	5	5	0	**10**
	Budgerigar	7	8	8	**23**	3	2	-8	**-3**	10	10	0	**20**
	Peach faced Love bird	4	1	0	**5**	6	9	0	**15**	10	10	0	**20**
	Cocktaiels / Colour morphs	7	7	0	**14**	3	3	0	**6**	10	10	0	**20**
	Violet Naped Lory	0	1	0	**1**	3	4	0	**7**	3	5	0	**8**
	White Cockatoo	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Orange winged Amazon	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
Humboldt Penguin	Humboldt Penguin	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
Swans Enclosure	Mute Swan	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**
	Black Swan	1	1	0	**2**	2	2	0	**4**	3	3	0	**6**
Ostrich	Ostrich	1	0	0	**1**	2	5	0	**7**	3	5	0	**8**

Enclosure	Species	Current stock				Future collection				Target collection			
		M	F	U	Total	M	F	U	Total	M	F	U	Total
Flightless Birds	Greater Rhea	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
Emu	Emu	5	5	0	**10**	0	0	0	**0**	5	5	0	**10**
Amphibians House	Common Indian Toad	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Indian Skipper frog	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Indian Pond frog	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**
	Indian Bull frog	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**

Annexure-VI

Surplus animal list:

The surplus animal list of IGZP is appended below for future animal exchange programmes and also immediate action to be taken to rehabilitate the excess stock.

S.No.	Species Name	Excess stock/For Exchange (M:F:U)	Remarks
Carnivores:			
1	White Tiger	0:1:0	
2	Jackals	2:2:0	
3	Wild Dog	1:1:0	
4	Striped Hyena	1:0:0	
Herbivores:			
1	Barking Deer	2:2:0	
2	Black Buck	10:10:0	
3	Sambar deer	5:5:0	
4	Spotted deer	5:5:0	
5	Indian Guar	1:0:0	
Primates:			
1	Bonnet Monkey	3:3:0	
AVES (Birds):			
1	Painted Stork	1:1:0	
2	Grey Pelican	1:1:0	
3	Rose ringed Parakeet	2:2:0	
4	Alexandrine Parakeet	4:2:0	
5	Indian Peafowl	3:3:0	
6	Budgerigar	6:6:0	
Reptiles			
1	Star tortoise	10:20	
2	Indian Cobra	0:0:1	
3	Indian Rock Python	0:1:0	
4	Gharial	0:2:0	

Annexure-VII

Approved CZA Layout Plan

Annexure-VIII

Layout Plan of Zonal Plan

Annexure-IX

Layout plan of Electrical supply

Annexure-X

Layout plan of water supply

Annexure-XI

Layout plan of Storm Water Management

Annexure-XII

Layout plan of visitor circulation

Annexure-XIII

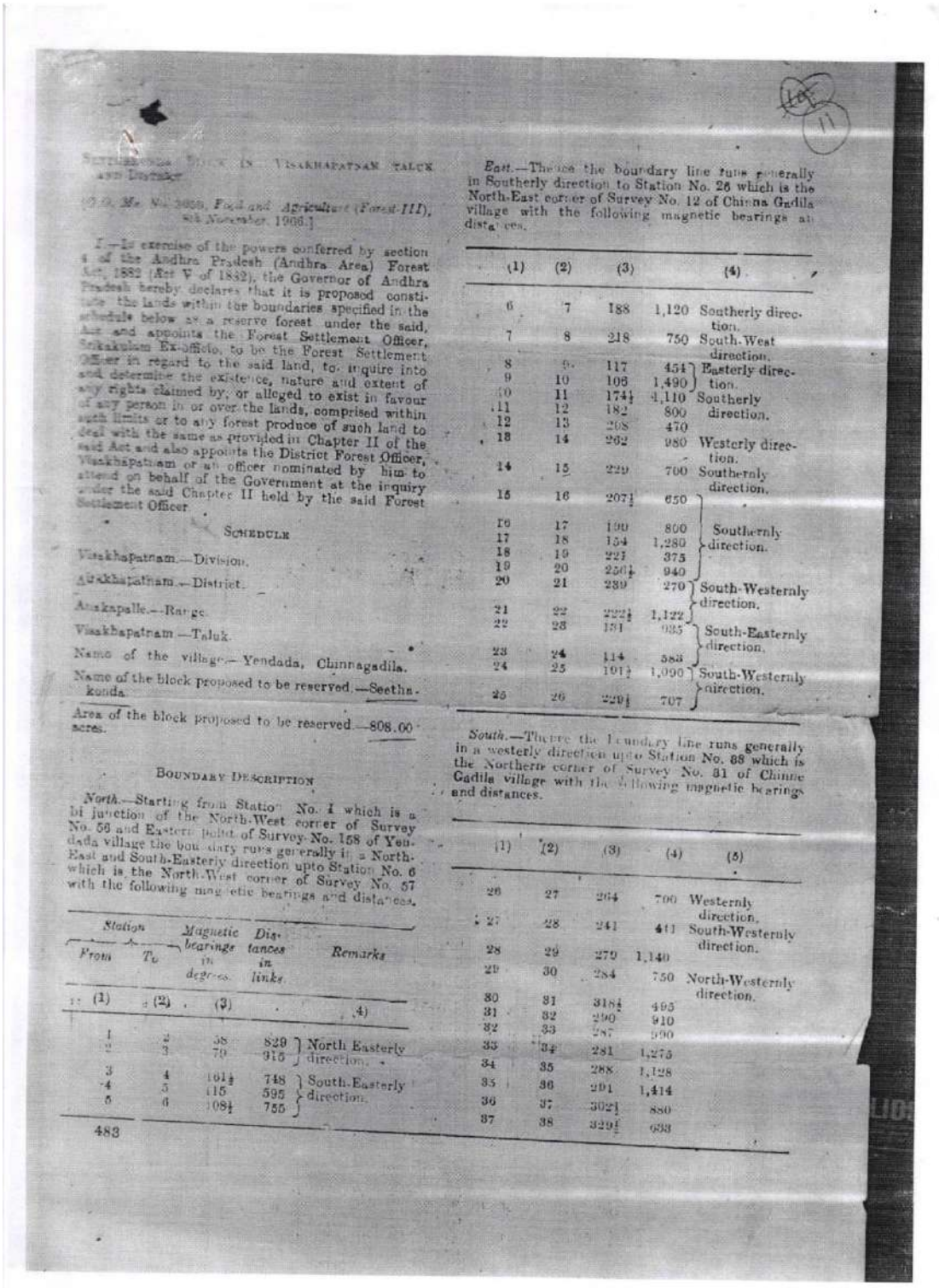
Layout plan of solid waste management

Annexure-XIV

Pedigree chart of Wild dogs

Annexure-XV

Seethakonda block in Visakhapatnam.



Reserved Block in Visakhapatnam Taluk and District

[G.O. Ms. No. 3008, Food and Agriculture (Forest-III), 8th November, 1966.]

In exercise of the powers conferred by section 4 of the Andhra Pradesh (Andhra Area) Forest Act, 1882 (Act V of 1882), the Governor of Andhra Pradesh hereby declares that it is proposed constitute the lands within the boundaries specified in the schedule below as a reserve forest under the said Act and appoints the Forest Settlement Officer, Srikakulam Ex-officio, to be the Forest Settlement Officer in regard to the said land, to inquire into and determine the existence, nature and extent of any rights claimed by, or alleged to exist in favour of any person in or over the lands, comprised within such limits or to any forest produce of such land to deal with the same as provided in Chapter II of the said Act and also appoints the District Forest Officer, Visakhapatnam or an officer nominated by him to attend on behalf of the Government at the inquiry under the said Chapter II held by the said Forest Settlement Officer.

SCHEDULE

Visakhapatnam.—Division.

Visakhapatnam.—District.

Anakapalle.—Range.

Visakhapatnam.—Taluk.

Name of the village.—Yendada, Chinnagadila.

Name of the block proposed to be reserved.—Seethakonda.

Area of the block proposed to be reserved.—808.00 acres.

BOUNDARY DESCRIPTION

North.—Starting from Station No. 1 which is a bi junction of the North-West corner of Survey No. 56 and Eastern point of Survey No. 158 of Yendada village the boundary runs generally in a North-East and South-Easterly direction upto Station No. 6 which is the North-West corner of Survey No. 57 with the following magnetic bearings and distances.

Station From	Station To	Magnetic bearings in degrees.	Distances in links.	Remarks
(1)	(2)	(3)	(4)	
1	2	38	829	North Easterly direction.
2	3	79	915	
3	4	161½	748	South-Easterly direction.
4	5	115	595	
5	6	108½	755	

East.—Thence the boundary line runs generally in Southerly direction to Station No. 26 which is the North-East corner of Survey No. 12 of Chinna Gadila village with the following magnetic bearings and distances.

(1)	(2)	(3)	(4)	
6	7	188	1,120	Southerly direction.
7	8	218	750	South-West direction.
8	9	117	454	Easterly direction.
9	10	106	1,490	
10	11	174½	1,110	Southerly direction.
11	12	182	800	
12	13	208	470	
13	14	262	980	Westerly direction.
14	15	229	700	Southerly direction.
15	16	207½	650	Southerly direction.
16	17	190	800	
17	18	154	1,280	
18	19	223	375	
19	20	256½	940	
20	21	239	270	South-Westernly direction.
21	22	222½	1,122	
22	23	151	935	South-Easternly direction.
23	24	114	588	
24	25	101½	1,090	South-Westernly direction.
25	26	229½	707	

South.—Thence the boundary line runs generally in a westerly direction upto Station No. 88 which is the Northern corner of Survey No. 31 of Chinna Gadila village with the following magnetic bearings and distances.

(1)	(2)	(3)	(4)	(5)
26	27	264	700	Westerly direction.
27	28	241	441	South-Westernly direction.
28	29	279	1,140	
29	30	284	750	North-Westernly direction.
30	31	318½	495	
31	32	290	910	
32	33	287	590	
33	34	281	1,275	
34	35	288	1,128	
35	36	291	1,414	
36	37	302½	880	
37	38	329½	693	

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West.—Thence the boundary lines runs generally in Northerly and North-Westernly direction to Station No. 1 which is the starting point.

(1)	(2)	(3)	(4)	(5)
38	39	13	650	North-Easternly direction.
39	40	38	350	
40	41	46	430	
41	42	74	207	
42	43	86	700	
43	44	102½	1,280	Easternly direction.
44	45	94	770	
45	46	102½	640	
46	47	105	900	
47	48	16	410	Northernly direction.
48	49	292	1,125	North-Westernly direction.
49	50	293	690	
50	51	299	690	
51	52	2	100	
52	53	40½	284	
53	54	48	1,245	North-East direction.
54	55	37½	480	
55	56	48½	1,035	
56	57	88	1,310	
57	58	53	1,960	
58	59	52½	1,100	
59	60	42	700	
60	61	0.00	800	Northernly direction.
61	1	4.00	912	

Starting point.

Remarks.—(A) Enclosures to be allowed within the block.—Nil.

(B) Rights of way to be admitted within the block.—Nil.

II.—In exercise of the powers conferred by section No. 14 of the Andhra Pradesh (Andhra Area) Forest Act, 1882 (Act V of 1882), the Governor of Andhra Pradesh hereby appoints the Collector of Visakhapatnam district Ex-officio to hear appeals from the orders passed under sections 11, 12 and 18 of the said Act by the Forest Settlement Officer, appointed under section 4 of the said Act.

SYED GHULAM RASOOL,
Deputy Secretary to Government.

P—I 1-12-66.