FOREWORD

Like other Zoos of the country, Biological Park, Itanagar, too urgently needed a Master Plan as per recognition of Zoo rules, 1992. Therefore, it gives me immense pleasure to know that finally its Master Plan is ready for approval and acceptance by Central Zoo Authority (CZA), New Delhi.

Now, with the acceptance and approval of the Master Plan of Biological Park, Itanagar, the Park Management will surely be able to focus on holistic and integrated development of the Zoo in times to come, as the Zoo is located in pristine environment with excellent natural landscaping. Hope very soon, Itanagar Zoo would be recognized as one of the best managed Zoos of the Region/ Country by CZA.

I congratulate and offer my best wishes to Itanagar Zoo management for the approval of its Management Plan by CZA, so as to enable the Zoo Authorities to manage it in a much more effective and scientific way.

6/3/12

(J.L. SINGH)
Principal Chief Conservator of Forests
(Wildlife & Bio-diversity)
-cum-
Chief Wildlife Warden
Arunachal Pradesh :: Itanagar

CERTIFICATE

This is to certify that the Master Plan (2011-21) for Scientific and long term Management of the Biological Park, Itanagar, has been prepared by Director Biological Park, Itanagar, in consultation with the expert group on Zoo Designing of Central Zoo Authority *(CZA)* and Chief Wildlife Warden, Arunachal Pradesh, Itanagar.

Chief Wildlife Warden
Arunachal Pradesh
Itanagar

PCCF (WL & BD) & CWLW
Govt. of A.P.
Itanagar

Director
Biological Park
Itanagar

26/3/13

Master Plan is approved subject to the condition that the responsibility of the Mobilizing the Financial resources for implementation of the Master Plan will be sole responsibility of Biological Park, Itanagar.

25/Jan/13

(B. S. BONAL)
Member Secretary
Central Zoo Authority
New Delhi

B.S. BONAL
Member Secretary
Central Zoo Authority
(Ministry of Environment & Forests)
Govt. of India, New Delhi

MASTER PLAN
2011-2021
BIOLOGICAL PARK, ITANAGAR

CERTIFICATE

It is to certify that this Master Plan for Biological Park, Itanagar has been Prepared by the following:

1. **Dr. Jikom Panor**
   Veterinary Officer
   Biological Park, Itanagar
2. **Sri Likha Suraj**
   Town Planner
   Urban Development, Itanagar
3. **Sri Joram Dopum**
   Director Biological Park,
   Itanagar.
4. **Sri Tilling Taker**
   Curator
   Biological Park, Itanagar

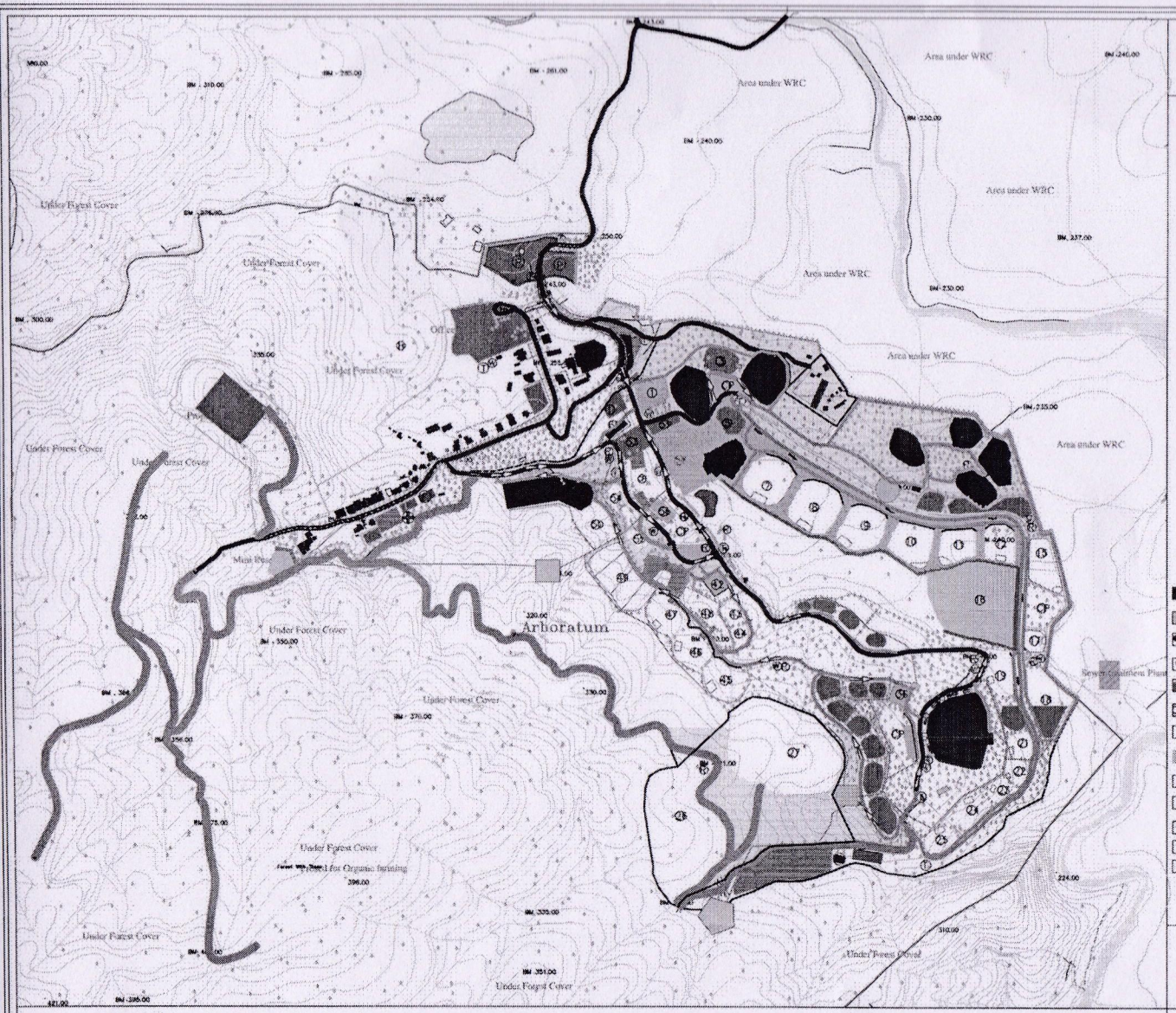
Under the Guidance of :

1. **R.S Bhardauria. IFS,**
   (Rtd. PCCF. Uttar Pradesh)
2. **Prof. Dr. Surender Sunija.**
   Dept. of Landscape Architecture.
   School of Planning and architecture.
   New Delhi.
3. **Shree J.L Singh. IFS**
   PCCF. (Wildlife & Biodiversity)
   Dept. of Environment & Forests
   Govt. of Arunachal Pradesh.

Counter signed by: **B.S Bonal**
Member Secretary
Central Zoo Authority of India.

Submitted by: **Director**
Biological Park, Itanagar

NB:-Plans of Rescue Centre & Deer Park are inclusive



ITANAGAR BIOLOGICAL PARK DEVELOPMENT PLAN-2021

Animal Enclosure Index

Enc. No.	Name of Species.	Area(sqm)
1	Otter	1200
2	Hoolock Gibbon	1600
3	Assamese Macaque	1000
4	Rhesus Macaque	2000
5	Capped Langur	900
6	Common Langur	1800
7	Sambar	2800
8	Thamin/Swamp Deer	3000
9	Spotted Deer	2600
10	Goral	2300
11	Serow	1700
12	Hog Deer	1600
13	Mouse Deer	700
14	Barking Deer	1300
15	Wild Bison	1100
16	Water birds	9000
17	Wild Boar	600
18	Rhinocerous	2600
19	White Tiger	1400
20	Dhole	800
21	Wolf	800
22	Jackal	700
23	Hyena	600
24	Fox	1100
25	Jungle Cat	900
26	Bear Rescue Centre	12200
27	Conservation Breeding Centre(Proposed)	7300
28	Common Leopard	1100
29	Clouded Leopard	900
30	Leopard Cat	700
31	Morten	500

Enc. No.	Name of Species.	Area(sqm)
32	Linsang	600
33	Binturong	700
34	Large Indian Civet	400
35	Himalayan Palm Civet	400
36	Common Palm Civet	400
37	Tiger	1300
38	Porcupine(Indian)	400
39	Porcupine(Brushtail)	400
40	Turtle & Tortoise	400
41	Amphibian	100
42	Butterfly Park	900
43	Indian Pangolin	500
44	Chinese Pangolin	300
45	Malayan Sun Bear	1700
46	Himalayan Black Bear	1600
47	Sloth Bear	1500
48	Pheasant Enclosure	1500
49	Birds Of Prey	3700
50	Drongo	1500
51	Walk Through Aviary	1300
52	Great Pied Horn Bill	1900
53	Emu	1000
54	Orchidarium	800
55	Snake House	300
56	Wreathed Hornbill	400
57	Gharial	500
58	Fish Pond	2200
59	Aquarium	500
60	Nocternal House	200
61-64	Conservation Breeding Centre (Hoolock)	5700

Map Index

Existing	proposed	Trees/Plantation
Modified	Dismantle	Bridges/Culverts(E)
Existing Roads	proposed Roads	Bridges/Culverts(P)
Proposed footpath	Water Body	MainGate
RRM Wall	Staff Quarter	Sub Main Gate
Entrance plaza	Drinking Water	Partition Gate
Interpretation Ctr	Postmortem Hse	Property Wall
Children park/Lawn	Vety Hospital	Separating/Boundary Wall
Resting Shed	Feed Store	Fencing
Toilet	Quarantine	Moat
Water Supply Line	Parking	Sewerage Treatment Plant
Storm Water Drain	Incinerator	Electric Line
Sewerage line		

N

Drawing No.

Scale

Surveyed & Prepared by:-
Urban Planner
M/s T & K Constructions, Itanagar
M/s T & K Constructions

Veterinary Officer
Biological Park, Itanagar

Director
Biological Park, Itanagar, Nahariagun

Approved by:-
Sd/-
Chief Wild Life Warden
Department of Environment & Forests
Govt. of Arunachal Pradesh
Itanagar

OFFICE OF THE DIRECTOR
BIOLOGICAL PARK, ITANAGAR
DEPARTMENT OF ENVIRONMENT & FORESTS
GOVT. OF ARUNACHAL PRADESH, ITANAGAR

MASTER PLAN
BIOLOGIOCAL PARK, ITANAGAR
2011 TO 2021
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PART-II

APPENDECES

ACKNOWLEDGEMENTS

Preparation of Master plan for a zoo without any documented history, proper record and materials to consult was really a daunting task for us. Many sittings and correspondence were made to invite expert for preparation of Master Plan for the zoo. Few attempts were also made, but nothing could be materialized. Ultimately Shri Chukhu Loma, the then Director of the zoo decided that we should prepare our own Master Plan for zoo instead of engaging any outside consultant. I am extremely thankful to him for having faith in me and allowing me to initiate and lead the core group for the preparation of this Master Plan. The decision to write the Master Plan with collective effort from the officers and staff who are working in the zoo for quite long time come out to be more useful because they know the topography, rainfall, climate, humidity, contour and even every inch of land area in the zoo and thus resulted in this document in which few changes have been made in construction of enclosure, location of specific structure in specific place etc.

The Master Plan has defined the purpose of the zoo in clear and concise terms with intended concepts and has set out the basic guidelines which are to be adopted. It has also looked into the layout including existing components like animal enclosures, visitor's amenities, veterinary facilities, parking place, education and research, landscaping, Arboretum, Butterfly Park, conservation breeding, disaster management, contingency plan etc.

However, I am very conscious of the short comings of what we have written, but as Sadhu Sunder Singh, one of the greatest Holy men of Punjab has once said "There is nothing so perfect in the world as to be quite above objection and criticism. The very Sun which gives us light and warmth is not free from spots, yet not withstanding these defects, it does not desist from its regular duty". I am sure and confident enough that this Master Plan, like the SUN will not desist from its duty and will continue to guide the developmental activities of the zoo for coming 10 years.

I acknowledge the contribution of all core group members who help me to bring out the compete shape of this document. The core group member consists of Sri Joram Dopum Director Biological Park Itanagar, Dr Jikom Panor Senior Veterinary Officer, Sri Likha Suraj , Planner Urban Development, Sri Hiba Taji former Curator of the zoo and Sri Tilling Taker Curator of the zoo. I am thankful to Sri Priya Lal Paul and all the staffs who have contributed in writing this plan. I am also thankful to Smt. Indu Gogoi for helping me out in page set up and printing out this document. I thank Sri Pema Chundup for arrangement and transportation while preparing this document. I am also thankful to Zoological survey of India, Itanagar and Dr. B.B. Bhatt for identification and survey of faunal species of the zoo.

I also acknowledge with deep sense of gratitude to Sri R.S Bhardauria IFS,Rtd. PCCF. UP, Prof. Dr. Surender Sunija, Prof & Head dept. of Landscape Architecture, School of Planning and Architecture New Delhi and Sri JL sing PCCF (WL&BD) Dept. of Environment & forests, Arunachal Pradesh, for their guidance and inputs while writing this Master Plan.

I congratulate and acknowledge my regards and gratitude to Sri Joram Dopum for his personal initiative, dedication, contribution and guidance, without whom preparation of this Master Plan could not have been possible, which is comprehensive planned document the Biological Park, Itanagar.

Dr. Jikom Panor
Senior Veterinary Officer
Biological Park Itanagar.

PREFACE

Arunachal Pradesh "The Land of Dawn Lit Mountains" is bestowed by nature with divers variety of rich flora and fauna. Many of the rare, endangered and threatened species of animals and plants exist in its dense forest, but journey of wildlife management in captivity started during the year 1978 with a small rescue centre at Naharlagun, under the Department of Environment & Forests. The idea behind setting up of this centre was to provide minimum veterinary facility for the displaced, injured, and orphan animals & birds and ultimately rehabilitate them back to the wild.

Importance of having a permanent holding facility, particularly those animals & birds considered unfit for release in the wild, was realized by the department and thus the said rescue centre had to be up graded and given the status of a Zoological Park in the year 1987, in its present location, with broader objective of education, recreation, research conservation breeding programme, etc.

But, Zoological Park, Itanagar lacked planned development. It did not have Master Plan for last so many years. Therefore, the Zoo staffs are to take extra efforts for proper shelter, feeding and health care of the animals & birds because of unplanned and ill design animal enclosures.

In view of absence of Master Plan, Central Zoo Authority (CZA) had stopped financial grants in the year 2002. The Zoological Park Itanagar was on the verge of closure due to inadequate infra structure and poor condition of animal housing facilities. Hence, preparation of layout plan of the Zoo was the top most priority to save the only zoo of the state from being de-recognized by the CZA.

Late Pushp Kumar, Rtd. PCCF, Andhra Pradesh, Consultant, Zoo design, CZA was entrusted for preparing the layout plan for the Zoo. He had visited Itanagar Zoo, many a times and held series of discussions with the department regarding themes and modalities for future development. Thus, the first every layout plan for the Itanagar, Zoological Park, was submitted to CZA in 2004 for its approval. It was Late Pushp Kumar, who advocated for changing the name of Itanagar Zoological Park to Biological Park, as the area is full of rich important floral species too. Hence, the State Govt. approved the name accordingly to "Biological Park Itanagar"A.P.

This Master Plan is prepared as per the guideline of CZA, New Delhi. Modifications of existing enclosures and construction of new enclosures in line with modern zoo concepts is the first priority for the Park authority. Construction of enclosures, creating long panoramas and simulation for their natural habitat where visitors can enjoy animals that seem to roam freely as if in their "natural habitats" is the concept adopted for new enclosures. Standardization of animal feeding pattern and emphasis on proper health care and nutrient management are important aspect of any modern Zoo.

Priority is also given on imparting training to the Zoo official, particularly, Veterinary section, to enhance their skills as well as knowledge on proper animal upkeep and health care.

The Biological Park Itanagar, has already earned the reputation of being the first Indian Zoo to breed Hoolock Gibbon in captivity. The breeding programme launched during April 2007 has successfully bred Six new young Gibbon born to three different parents during 2008-2010. Breeding of Hoolock Gibbon in Biological Park, Itanagar, is seen as one of the unique conservation success stories ever achieved by any Indian Zoo.

The entire captive born Hoolock Gibbon, after attaining five years of age or above could be considered for releasing in the wild preferably in Mehao Wildlife Sanctuary from where they actually belong to. It will however require proper assessment of the areas regarding animal distribution, availability of food source, predator problem and hunting pressure if any. In order to keep proper track of the released animals a well-planned post release monitoring mechanism has to be first developed without which the success of the project cannot be assessed.

Pairing of single animals under animal exchange programme have been accomplished with active cooperation of zoos across the country and administrative support from the CZA. The Park has been able to add quite a good numbers of attractive species of animals and birds to its existing stock much to the delight of the visitors.

Master Plan and layout plan with some changes from original plan for Biological Park, Itanagar are two landmark steps taken by the present team of the Park. The Park has now a vision plan for 2011-2021, I am optimistic and confident that this park will be one of the best managed zoos in the country.

This plan is written with the purpose of providing a wide range of strategy and designed to help the authority to manage the park in planned and scientific way for a prescribed period of 2011-2021. The development of the park is to be strictly guided by this Master Plan and modification and changes if unavoidable will require sanction from the Chief Wildlife warden and appropriate authority.

This Master Plan could be compiled due to excellent team work of the zoo staff comprising of Dr. Jikom Panor, Senior Veterinary Officer, Shri T. Taker, RFO. Curator, Shri Hiba Taji, RFO. then Curator and all executive as well as ministerial staff of the Division. My special thanks to Shri Likha Suraj, Town Planner for his unmatchable diligent work put towards this priority task. I also acknowledge with deep sense of gratitude to Shri B.S. Sajwan, IFS, PCCF, Head of Forest Force & Principal Secretary (E & F) and Shri J.L. Singh, IFS, PCCF (WL & BD) cum Chief Wildlife Warden, Arunachal Pradesh, Itanagar for their constant support and guidance in writing this Master Plan. I am immensely thankful to Sri R.S Bhardauria IFS,Rtd. PCCF. UP, Prof. Dr. Surender Sunija, Prof & Head dept. of Landscape Architecture, School of Planning and Architecture New Delhi for their constant guidance and advice during the preparation of this Master Plan. My very special thanks to Shri B.S. Bonal, Member Secretary, Central Zoo Authority, New Delhi for advice & guidance and financial support to complete this Master Plan.

Joram Dopum
Deputy Chief Wildlife Warden
Cum
Ex-Officio Director, Biological Park, Itanagar

MASTER PLAN
BIOLOGICAL PARK, ITANAGAR
2011 - 2021
PART- I

Chapter –I

1. INTRODUCTION:

1.1. History of the zoo:

A small rescue centre was established in Naharlagun during 1978 to deal with the problem of displaced and injured animals. This small rescue facility gradually became the epicenter for displaced and orphaned animals coming from all parts of the state. Having realized the importance of a permanent holding facility particularly those animals unfit to release in the wild due to one or other reason, the department decided to upgrade the rescue centre to a full-fledged Zoological Park in 1987, with the broader objective of education recreation, conservation breeding programme and rescue and rehabilitation of Wild animal. Unfortunately, the Itanagar Zoo continued to be managed without proper planning and vision till 2002. This can be very well realized from the unplanned placement of animal enclosures and haphazard development of the Zoo.

The Itanagar Zoo did not have a written master plan for last two decades except layout plan which was prepared by late Pushp Kumar Rtd. P.C.C.F. Govt of Andhra Pradesh during 2003. It was he who advocated for changing the name of Itanagar Zoo to Biological Park considering the floral species richness of the park area that could be preserved for educational values for visitors , students , researchers and scientists.

1.2. Vision of the Biological Park, Itanagar:

The Zoo was basically started for rescue and recreation, however with the advancement of time, the need to protect and conserve global biodiversity and wildlife was realized, therefore it was shifted to present location with the following visions:

1. A scientific institution engaged in Animal Welfare, Research, Conservation, Education and Sustainability.
2. Best business practice, being efficient, focused on productive motive with close attention paid to planning, ecologically sound design and pollution free environment.
3. Outstanding "Value for Money" for all who visit the zoo. Providing fun, entertainment and learning.

1.3. Mission Statement:

1. To act as Rescue Centre by receiving and keeping orphaned, seized, rescued and injured wild animals.
2. Develop amongst the visitors an understanding about the ecological linkages with the life supporting processes of nature and the need for keeping them intact by adopting sustainable life styles and living in harmony with nature.
3. Develop amongst visitor's sympathy for wildlife and motivate them to support the cause of conservation of wildlife.
4. Compliment the national effort in conservation of wildlife through planned coordinated conservation breeding of endangered wild animal species of the region.
5. Enhancing the role of the zoo in conservation of wildlife through collaborated research aiming at attaining management skilled for in-situ population and carrying out advocacy for protecting the wild animals and their natural habitat

1.4. Strategy of the zoo:

1. **Conservation;** To focus resources on securing sustainable populations of indigenous endangered species of the state and their habitats through conservation breeding and integrated zoological programmes.
2. **Animal Welfare and Husbandry:** To further advance best practice animal Husbandry and welfare that ensures physical and psychological well being of the animal collection.
3. **Research:** To be a recognized and credible resource for the wildlife research community and enable significant contributions in the field of conservation medicine and by offering support and facilities to increase scientific knowledge that will benefit conservation of wildlife.
4. **Recreation:** To provide unique botanical, wildlife and cultural experiences that delights the visitor.
5. **Education:** To provide exemplary learning opportunities that positively influences people's understanding, values, and impact on the natural world.
6. **Sustainability:** To promote sustainable practices in all aspects of the Zoo's operation.

1.5. Objectives of Biological Park:-

The Biological Park, Itanagar was established with the following objectives:-

1 Ex-situ conservation breeding of critically endangered wild animals of the State.
2 Scientific research on wild fauna and flora.
3 Rescue and rehabilitation of wild animals in distress.
4 Educating people about wild animals and the need for their conservation.
5 Providing recreation for Zoo visitors

1.6. Physical features of the zoo:- Main criteria for selection of the site for the Biological park, Itanagar is the ecological parameters including topography, forest coverage, acoustic, natural perennial streams, and pollution free atmosphere which are suitable for different species of animals and birds. It is 3 Km away from Itanagar, the capital city.

The unique configuration represented with the characters of rain fed areas of foot hills of Arunachal Pradesh. The Eastern boundary of the Zoo is Chimpu River adjoining to Dokoso River on the Southern side of Park. The Northern boundary passes through hill ridge and Western boundary passes through a stream joining Dakoso river and located within the Itanagar Wildlife Sanctuary. The area has been curbed out from the sanctuary and handed over the zoo authority. The entire area is hilly broken and undulating crisscrossed with perennial streams. The beauty of the park is due to its tropical evergreen forest, hillock and natural streams.

1.7. Geology: The whole area is gentle slope, undulating crisscross with natural perennial streams. The major portion of the area is hillock covered with evergreen forest. There is low lying plain area covered with water body and marshy land all around. The area lies between 700 to 1000 feet elevations. On survey of India's topo sheet, the area is located 83 E/2 NE. The zoo is located at the height of 235 – 421 metre, latitude 93 degree E and longitude is 27degree N.

1.8. Rock and Soil: The soil type of the area is loamy and sandy with scattered granite boulder type of rock. The soil formation is of rocky, sandy and loosely formed.

1.9. Flora and fauna in the zoo premises:

The Biological park, Itanagar is rich in wide variety of forest types. The natural vegetation of the area consists of dense evergreen patches and moist deciduous forest towards hilly slopes and moist valleys semi evergreen type elsewhere. They can be classified as follows :

2B / C1 / GI Sub Himalayan light alluvial semi evergreen forests.
3½ 152 Eastern Hollock forests.
1B / C2 upper Assam Valley tropical evergreen forests.

Wide varieties of floral species ranging from most primitive species like Tree fern to smallest species like mosses and Lichens are abundant in the zoo. Some of which are critically endangered and some highly valued medicinal plant with immense importance for education, research, and conservation. The details are given in the appendix-III.

The **faunal species** commonly found within the Park (not captive) are leopard cats, civets, barking deer, slow lories, porcupines, pangolin, flying squirrel etc. Among the reptiles, the most prominent one found in the park in in-situ are Indian python & cobra, the land tortoise and monitor lizard. Among the avifauna common hill partridge, Great Pied Hornbill, region magpie, golden headed Babbler, drongo, laughing thrush, racket tailed drongo, white throat fantail flycatcher, warblers, fiery blue birds myna, dove, barbet, owlets etc. The details are given in Appendix -III .

1.10. Climate and humidity: The area falls under semi temperate zone with four seasons, July-August being the hottest month and the December- January the coldest. The spring and autumn use to be very pleasant. The ambient temperature varies from 08-30 degree centigrade in winter and 29-39.2 degree centigrade in summer. The humidity ranges from 60- 90%. The average humidity is 80%.

1.11. Rainfall: It is monsoon almost throughout the year with heavy rainfall. The average annual rainfall is about 3500 mm. Maximum rainfall is recorded during the month of July and August. The average rainfall on it peak is 546 mm.

1.12. Season: There are four seasons namely – summer, winter, spring and autumn. The hottest months are July- August and the coldest months are December – January. Spring and autumn use to be very pleasant.

1.13. Approach: The zoo is well connected by road and is in the western most outskirt of Itanagar the capital city of Arunachal Pradesh. The nearest railway station is Harmoti, Assam which is 40km away from zoo and the nearest air service by chopper is at Naharlagun the twin city of the state capital, which is only 14 km away from zoo. However, there is no Airport in the capital city and the nearest Airport is at Guwahati, Assam.

1.14. Demography of the surrounding area:

The eastern and western side of the zoo covered with forest and under Itanagar Wildlife Sanctuary. There is no human habitation in this area, however on the western side there is small village with 50 houses and on the southern side new colony is coming up. The health status of the people of the area is good, however separate death and birth record of the area is not available. These villages are on hillock and there is no water logging. The area is clean and fresh, therefore incidence of infectious diseases seldom occurs in this human population. It is unlikely that this human population around the zoo became a source of infection for zoo animals.

1.15. Legal status and area: The biological park is established over an area of **250 hectares** belonging to the Department of Environment & Forests and therefore any legal action is within the ambit of Wildlife (Protection) Act.1972. Only 40.25 Hectares of the total area is earmarked for intensive development and the rest kept for biosphere reserve and others.

1.16. Source of pollution:

The area is free from industry and any other source of pollution. It is in the outskirt of the capital city and is covered with tropical semi-evergreen forest and thus free from any source of pollution. The climate, weather and atmosphere are very healthy, clear and congenial for zoo inmates.

1.17. Achievements:- There has been quantitative development over last 20 years, in infrastructure, in area, in staff, in housing as well as in animal collection. However, the Zoo has maintained a very rigid policy in respect of animal collection where only indigenous endangered species were given thrust. The development in infrastructure like staff quarter, separating wall between staff colony and Zoo office, veterinary hospital, post mortem house, road etc. have been satisfactory. Some very good enclosure with sufficient space simulated with natural endowment providing near in-situ condition have come up in the recent years. The hornbill enclosure, the tiger enclosure and the Hoolock Gibbon enclosure which are constructed during last three years are exceptionally good.

One of the most outstanding achievements of the zoo is the successful Conservation Breeding Programme on Hoolock Gibbon. The Biological Park, Itanagar has earned the reputation of being the first Indian Zoo to breed Hoolock Gibbon in Captivity . Conservation breeding programme on Hoolock Gibbon was started during 2007 under the initiative of Central Zoo Authority. Five pairs of Hoolocks were rescued from fragmented habitat of Delo area of Dibang Valley District of Arunachal Pradesh during the early part of 2007 and brought to the Itanagar Zoo for health care. These animals were found to be heavily infested with parasite and some of them grievously injured due to conflict with dogs. Mean while the Itanagar Zoo was selected as coordinating Zoo for conservation breeding programme of Hoolock Gibbon and participating zoo for clouded leopard, hornbill and serow. Subsequently the five pairs of Hoolock Gibbon have been identified as the parental stock for the conservation Breeding programme. The first ever captive born Hoolock in India was born in the Zoo on 5th Aug" 2008. There after two more young were born during the later part of the same year. Till the end of year 2010 the centre has bred 6 babies. Breeding of Hoolock Gibbon in Biological Park, Itanagar is seen as one of the unique ex-situ conservation success story by the Zoos across the country. The species was earlier considered unbreedable in captivity. All the captive born Hoolock Gibbon, after attaining five years of age or above could be considered for releasing in the wild preferably in Mehao Wild Life Sanctuary from where they actually belongs to. It will however require proper assessment of the areas regarding animal distribution, availability of food source, predator problem, and hunting pressure if any. In

order to keep proper track of the released animals a well planned post release monitoring mechanism has to be first developed without which behavior of animal and their survival in the wild may not be known. The other potential area for releasing the animals is Pakke Wildlife Sanctuary where the habitat is quite suitable for survival of hoolock. During the last 20 years of existence, the Zoo has bred numbers of species of animals and birds. Many of them are endangered and native to the area. Some of them are Tigers, Python, and Himalayan Black Bear etc.

1.18. Problems and difficulties: Despite the progress and achievement made during the last 20 years, there have been lots of difficulties and problems. The most serious and singular problem is that the Zoo is still running without full time Director. The Deputy Chief Wildlife warden Itanagar Wildlife Sanctuary is the Ex-Officio Director of the Zoo.

The most peculiar problem in the Zoo is that it is still without security wall. Some initiation has been started after the incidence of poisoning of five animals where one tiger succumbed to it. Total Distance of 7 Km is required for completion of security wall of the Zoo, out of which only 0.7 Km has been completed. Any person can enter the Zoo premises at any time from the open area for collection of forest product like fire wood, wooden post, bamboo etc. The Zoo has limited security personnel in contrast with the large area of the Zoo. Biological Park being in the capital city, therefore many people get them self posted in the Zoo, specially the lower staff. Some of them are not concerned with the development of Zoo and rather became a burden for the Authority. Only devoted and interested staff needs to be posted in the Zoo.

1.19. Layout plan: The first ever layout plan for zoo was prepared by Lt. Pushp Kumar, IFS Retired PCCF Govt. of Andhra Pradesh in the year 2003. Main stress in plan was given on species wise arrangement of enclosure, creation of water body by constructing bund, creation of butterfly park and biosphere reserve.

However, lots of modification and addition is required in the layout plan. Some of them are:-

i) Visitor's circulation,
ii) Visitor's amenities,
iii) Conservation breeding centre in non display area,
iv) Parking area
v) Orchidarium
vi) Aquarium
vii) Canteen/ catering area etc. needs to be included in the lay out plan.
viii) Placement of enclosure based on taxonomy and topography.

The details have been indicated in the **proposed layout plan.** The present layout plan is enclosed.

1.20. Use of the zoo area for different purposes:

The Biological Park covers an area of 250 ha. out of which 55 hectares area is earmarked for intensive development including residential area. The display area for enclosure, etc is only 40.25 hectares. Rest of the area is kept for Arboretum, and conservation breeding. The present area coverage is as follows:

1. Road and foot Paths	---- 2.70 hact.
2. Residential area and office	---- 14.75 hact.
3. Children Park	---- 0.200 hact.
4. View point	---- 0.100 hact
5. Water supply	---- 0.020 hact
6. Zoo hospital and rescue centre	---- 0.500 hact
7. Feed store	---- 0.005 hact
8. Lawn and garden	---- 0.250 hact
9. Booking office	---- 0.005. hact
10. Zoo office	---- 1.00 hact.
11. Animal enclosure display area	---- 35.47 hact.

Total Intensive Development Area including residential area= 55.00 hacts

And **intensive Development display area excluding residential area = 55.00 – 2(above)**

= 55.0-14.75= 40.25 Hectares only.

Chapter – II

2. Appraisal of present arrangement and constrains:

2.1 Animal section:

2.1.1 Most of the enclosures have come up haphazardly without any planning and does not meet the requirement of modern zoo concept. Some of them have already been modified or demolished. The aviary for water birds at the entrance of the zoo with a structure that resembles that of bus station was demolished and requires reconstruction as per new concept.

However the new enclosures that came up after the layout plan are exceptionally good, eg. the hoolock gibbon, langur and monkey enclosure. They are constructed over a large area of 3000 sqm, open sky dry moated with RCC wall of 15 ft high. The inner surface of the wall is with smooth finish to avoid escape of animals. Lot soft all trees, bamboos, climbers, shrubs etc. are enclosed giving near natural looks. Natural food trees like picus, banana, bola, jamun etc are also planted inside the enclosures.

The new tiger enclosure is open sky with brick wall, large enough to give free movement. The stereo type movements of the animals have not been noticed after the shifting of animals to this enclosure. Night shelter, feeding cubicle and squeeze cage is provided in the back yard.

The other enclosures that have come up recently as per modern zoo concept are :- Hornbill enclosure, Aviary for high flying birds and nocturnal house with a facility open area on back yard.

2.1.2 At present there are total of 25 enclosures excluding cages and rescue centre. The total displayed in the enclosures on 1/3/09 are as follows;-

Mammals	--	30 species	120 Nos
Birds	--	12 species	60 Nos
Reptiles	---	2 species	12 Nos
		Total.	192 Nos.

2.1.3. The enclosure are under the supervision of the following staff.

Range Forest Officer	1
Dy. Range Forest Officer	1
Forester	2
Forest guard	5
Animal keeper	30
Contingency labour, including sweeper	10

2.1.4. Some of the enclosures which have been constructed in the past do not serve the purpose of modern zoo management and some of them have either became very old and dilapidated. Most of them have to be demolished and some require modification.

2.1.5. The bear enclosure which was constructed during 1987 with a great vision and became a model for bear enclosure throughout the country at that time. Earlier typical bear enclosure use to be of bear pit with iron bars. This enclosure has revolutionized the concept of bear enclosure in Indian zoos. However it is too small for the species and very old. Therefore it has to be demolished.

2.1.6. The present deer park is huge covering an area of 2.5 ha. which made management very difficult. The problems of ecto-parasite infestation are very common due to the unmanageable huge area. The Sambar, Nilgai and barking deer are put together leading to incidence of infighting and also fighting between the different species. Moreover the present deer park is located in the

low lying marshy land which is ear marked for creation of water body by constructing bund. Therefore it has to be shifted and displayed species wise to new location as indicated in the proposed layout plan.

2.1.7 The old tiger enclosure which was constructed during 1995 is too small for the species and do not meet the biological requirement of the concerned animals. Therefore it will be renovated and modified for Butterfly Park as indicated in the layout plan.

2.1.8 The two very old enclosure for leopard and fox have been recommended for demolition and new enclosures for different species of pheasant will be constructed at the location as indicated in the proposed layout plan.

2.1.9. The present python house is located in moist area and is not suitable for reptiles. More over the structure and the design of the house do not meet the biological requirement of the species. Therefore it is recommended for dismantle and new reptile house as per new concept needs to be constructed in a warmer place indicated in the plan.

2.1.10 The old hornbill aviary which was constructed with sufficient space and height require replacement of wire mesh and frame.

2.1.11. The oldest Aviary of the zoo has been temporarily repaired for Emu needs to be dismantled and new enclosure will be constructed for the species in the area.

2.1.12. The night shelter of leopard enclosure and clouded Leopard enclosure is too small and without feeding cubicle. It needs extension and modification. The roof of Clouded Leopard enclosure needs repairing by replacing the thrust and wire mesh. Standoff barrier provided is not safe for the visitors and needs modification. However in the later part of the planning period, the leopard enclosure shall be demolished for creation of lawn and the clouded leopard enclosure will be modified for civet cat.

2.1.13 The elephant has been shifted out from the zoo as per CZA direction.

2.1.14 The present Gharial enclosure has been suggested by CZA for Otter display. It will need improvement and modification suitable for the species. New enclosure needs to be constructed for Gharial as indicated in the propose plan.

2.1.15 No furniture is being provided in most of the enclosures. This should be done very elaborately and be provided in all paddocks and night shelter. Wooden plank as bed on cemented night shelter should be provided in winter to prevent from cold.

2.1.16. To regulate the atmospheric temperature for animal comfort equipment like heater, blower, fan, cooler etc needs to be provided wherever and whenever require.

2.1.17. There is only one squeeze cage in new tiger enclosure. There need to be installation of squeeze cage in all the enclosure of carnivores including Himalayan black bear.

2.1.18 The doors of almost all the enclosure are very small and create problems while shifting animal for different purpose. It needs to be modified and enlarged. The drainage system in most of the enclosure needs some maintenance and modification.

2.1.19 Most of the middle level workers in the animal section are not trained and are not animal oriented. Such staff needs some exposure and training in the field of wild life and zoo management.

2.2. **Veterinary section**.

2.2.1 The modern concept of zoo management visualizes veterinary medicine as an integral component of all display and breeding programmes of captive animals. The Biological Park has full fledged Veterinary Hospital with all basic infra structure along with a full time trained Veterinarian and other Para veterinarian to look after the animals. The hospital is equipped with operation theatre, basic diagnostic facilities, and a rescue centre. Post mortem house with Fire wood incinerator for carcass disposal has also been constructed away from display area.

2.2.2. The hospital has the following staff;

1. Veterinary officer -- 1
2. Stock man -- 1
3. Animal attendant -- 2
4. Peon -- 1

2.2.3 The additional man power required in the hospital are :

1. Leave Reserved Veterinary Officer -- 1
2. Laboratory technician -- 1
3. X- ray technician -- 1
4. Sweeper -- 1
5. Attendant (daily wages). -- 1

2.2.4 **The hospital building** is very old and will be converted record keeping/ establishment section. It will require minor repairing and modification. The new hospital building will be constructed as indicated in the layout plan.

2.2.5 The zoo hospital has the complete range of tranquilizing equipment and drug. Wide range of medicines and vaccines are also available in the hospital.

2.2.6 However the zoo hospital lacks many facilities and equipment such as squeeze cage, X-ray, intensive care unit, inpatient ward etc. The up gradation of this unit has been indicated in Part –II of this plan.

2.3 **Store and Feed supply section** : Store cum kitchen is constructed within the hospital complex. At present it is under the control of range officer and work of store keeper is done by a Forester. This system needs to be changed and one regular store keeper is needed under the control of Veterinary Officer. The present kitchen is at the residential area and too small. It requires new building near proposed veterinary hospital. The other areas of concern are requirement of deep freeze, weighing machine, gas stove, fly proof netting glazed tiles floor etc.

2.4 **Sanitation section :** Sanitation is usually looked after by animal section and veterinary section. This section takes care of the general cleanliness of the park, road, lawns and garden, office, animal enclosure etc. Veterinary section and animal keepers are responsible for disinfection, fumigation and other sanitation work inside and around the enclosure. For the work of sanitation outside the enclosure there are 6 casual labours engaged at present. The section is working quite well to keep the park clean. Local made dustbins are provided in every corner of the park. The garbage are collected and disposed off, by burning. Improvement is required in pest control- mosquitoes, rodents, feral dogs etc. and introduction of manure and compost pits for disposal of animal waste.

2.5. **Workshop and maintenance section** : Biological Park Itanagar is away from the market area, therefore it requires its own work shop within the zoo itself for day to day maintenance of enclosure, building, structure, water supply etc. Without having its own work shop it will not be possible to attend the above problem on immediate basis. The safety and security of the animal is paramount and whenever there is a problem, this has to be attended without any loss of time. The zoo has a workshop available in the park with facilities like welding machine, generator, and equipment for carpentry and mason work. It also has necessary equipment required for water supply and electricity. At present it is working temporarily in one corner of the zoo covered with plastic sheet. It needs to be modified with proper housing. The workshop is directly under the control of Range officer and has the following staff:-

i) Welder -- 1
ii) Mason -- 1
iii) Carpenter -- 2
iv) Electrician -- 1
v) Plumber -- 1

All the staffs in this sector are skilled but at present they worked on daily wage basis. They need to be regularized. In addition to the above we also need black-Smith, Gang man and Project operator.

2.6. **Security section** : The zoo extended over a very large area without proper security wall. Only 0.6 km area at the entrance side is fenced and the rest of the area is not fenced. Anybody can enter any time inside the zoo from such area. There has been incidence of hunting of free living animals and bird inside the zoo area. There was also incidence of tiger poisoning and killing of zoo animals inside the zoo. Besides, felling of trees, collection of bamboo and firewood have also occurred in the past. As such the security staff has to put in lot of effort to keep it safe. The Deputy Range Officer of the zoo looks after this section.

Following staff are engaged for security :-

1. Dy. Range Forest Officer - 1
2. Forester - 2
3. Forest guard - 4
4. Night guard - 4

They function round the clock in the park in two shifts. Besides, during the night hours, other foresters, forest guard along with forest range officer also goes for patrolling. Employment of Private Company for the purpose may be considered in future.

2.7**. Water supply section.** Large quantity of water is required for cleaning of enclosure, staff quarters, gardening, drinking and toilets. Water is collected from within the park and also from outside the park. There are two collection tanks, one inside the zoo and the other outside the zoo with a capacity of 20,000 liter each. However, during winter the water source dry up and therefore it needs up gradation preferably **bore well under ground** water for providing good quality water to animals; staff and also to visitors.

2.8. **Power supply section**. The park has its own transformer with capacity of 200 K.V. connected to the main supply line. The power supply is very good and regular with very little power cut. As a back up support 5 KVA D.G Set has been installed in the Zoo Veterinary Hospital.

2.9. **Disposal of solid and liquid waste** : Solid waste of the zoo is disposed off by burning, by burying inside pit and there is also firewood incinerator which is used for disposal of carcass and bones. The dung's are collected and dump inside pits away from each enclosure which are later burnt and covered.

The disposal of liquid waste is not a problem in the zoo due to its topography. There is no stagnation of water or sewage. Drains and culvert are provided where ever required.

2.10. **Visitors amenities** : Resting shed, benches and toilets are provided in different locations. There are also viewpoints provided at strategic location. However, lots of improvement is required in this direction. Drinking water facilities, wheel chair for disable, clean toilet, proper signage, etc. are the areas of concern.

Creation of water body to attract migratory birds and hanging bridge are also proposed in the lay out plan. Cafeteria at the entrance gate with all sanitary, pool and parking facilities is also proposed.

2.11**. Lawns and garden** : The zoo has varied range of vegetation throughout the year with different type of orchid and other plant species, however to give aesthetic look floriculture and lawns have been created in the zoo. Children Park has also been created in a large area with facilities like merry go round, sea saw and swings. Proposal for orchiderium and nursery for plant and flower has been put up in proposal. At present it is looked after by animal keepers. There is need of appointment of Mali to look after this.

2.12. **Fodder cultivation and organic farming** : At present fodder are collected from within the park for feeding of ungulates. But in dry season it is scanty and therefore it needs to start our own farm and fodder cultivation. An area of 10 hectare is ear marked for the purpose outside display area.

2.13. **Entry gate and ticket counter**: There are two gates in the park, one the main gate which is common entry for both staff colony and the zoo and the gate near ticket counter for the zoo visitors into the display area. Entry gate for the zoo visitors needs to be modified with different entry and exit doors, vendors at the exit point and security cell at the gate is proposed.

3. **Animal Collection plan (Existing)**

Since inception of the zoo, main trusts in animal collection were given to indigenous and native animals, birds and reptiles of the state. Few exotic animals and birds are also included in the collection plan for the purpose of education. List of the animals and birds under collection plan which are displayed in the zoo are:-

(A) MAMMALS :

Sl. No.	Species	Present stock with the Zoo			
		M	F	U.S.	Total
1.	Indian Tiger *(Panthera tigris tigris)*	3	3	0	6
2.	Clouded Leopard *(Neofelis Nebulosa)*	1	0	0	1
3.	Leopard common *(Pantra pordus)*	3	2	0	5
4.	Leopard Cat *(Felis bengalensis)*	4	1	0	5
5.	Common Palm Civet *(Paradoxurus hermophroditus)*	1	2	0	3
6.	Himalayan Palm Civet *(Paguma larvata)*	0	1	0	1
7.	Indian Palm Civet *(Viverricula Indica)*	0	1	0	1
8.	Slow Loris *(Nycticebus coucang)*	4	1	1	6
9.	Assamese macaque (*Macaca assamensis*)	3	2	0	5
10.	Rhesus macaque *(Macaca mulatta)*	13	7	12	32
11.	Hoolock Gibbon *(Bunopheticus Hoolock)*	10	7	1	18
12.	Capped langur *(Presbytis pileatus)*	1	0	0	1
13.	Sambar *(Cervus unicolor)*	3	2	0	5
14.	Barking Deer *(Muniacus muntjac)*	6	12	6	24
15.	Himalayan Black Bear *(Selenarctos thibetanus)*	5	3	0	8
16.	Wild Boar *(Sus scrofa)*	0	1	0	1
17.	Red Indian fox *(Vulpes bengalensis)*	0	1	0	1
18.	Nilgai *(Boselaphus tragocamelus)*	1	0	0	1

(B) AVES :

Sl. No.	Species	Present stock with the Zoo			
		M	F	U.S.	Total
1.	Oriental pied hornbill *(Anthrracoceros coronatus)*	1	1	0	2
2.	Wood owl *(Strix leptogrammica)*	0	1	0	1
3.	Owl eagle *(Bubo bubo)*	1	0	0	1
4.	Himalayan griffon *(Hyps fulvus)*	0	0	1	1
5.	Jungle fowl *(Gallus gallus)*	1	3	0	4
6.	Barbet *(Megalaima spp.)*	1	2	0	3
7.	Dove *(Streptopelia spp.)*	19	10	3	32
8.	Parakeet (*Psittacula spp.)*	1	1	0	2

(C) REPTILES

Sl. No.	**Species**	**Present stock with the Zoo**			
		M	**F**	**U.S.**	**Total**
1.	Long snouted Gharial *(Gavialis gangeticus)*	1	1	0	2
2.	Tortoise Assam fresh water *(Geomyda mouhati gray)*	4	1	2	7
3.	Python *(Python molurus)*	2	1	0	3

(D) EXOTIC ANIMALS AND BIRDS :

Sl. No.	**Species**	**Present stock with the Zoo**			
		M	**F**	**U.S.**	**Total**
1.	Silver pheasant *(Lophura nycthemera)*	2	6	0	8
2.	Lady Amherst *(chrysolophus amherstiae)*	1	1	0	2
3.	Love Bird	1	2	0	3
4.	Blue & Yellow Macaw *(Ara araruana)*	1	0	0	1

4. **General zoo administration section**.

4.1. Deputy Chief Wildlife Warden cum Ex-Officio Zoo Director, Biological Park who also looks after the management of the Itanagar Wildlife Sanctuary, may at times, can't properly address the issues of the Zoo. Therefore, there is a need for posting a full time Zoo Director for better management and development of the Zoo. Equally, there is a need to strengthen and rationalization of staff in the veterinary and animal attendant sections.

An abstract of total number of staff, both regular and casual working under the establishment of Deputy Chief Wildlife Warden, Itanagar Wildlife Sanctuary posted at the Biological Park is as under.

Sl. No.	Name of the post	Staff Position
1	Director	1
2	Deputy Director	0
3	Veterinary Officer	1
4	Range Forest Officer/Curator	1
5	Dy. RFO	1
6	Stock man/ Vety. Field Assistant	1
7	Forester	3
8	Forest Guard	4
9	Office superintendent	1
10	Accountant	1
11	Senior Clerk	1
12	Junior clerk cum computer assistant	1
13	Stock man	1
14	Driver (LV & HV)	1
15	Peon	2
16	Animal attendant	2
17	Animal keeper	30
18	Chowkidar - office and Guest house	2
19	Sweeper	0
20	Welder	0
21	Night guard	4
22	Daily wages	4
	Total	**62**

5. Research. Although no research work has been done by Zoo staff; many research scholar from outside and within the state carried out their research in the park in regards to flora and fauna present in the Park. Research work on behavioral breeding, feeding etc. of some species like Hoolock Gibbon and Hornbill has been started recently. Few scientific and semi scientific papers have also been published in national and international papers.

Small grant fellowship for study of different aspect of animals displayed in Zoo and also fauna and flora species of the park are carried out from time to time.

6. Conservation Breeding.

6.1 Main emphasis is given on conservation breeding in the Park rather than displaying of animals. The Zoo has been assigned as a coordinating Zoo by the C.Z.A. for conservation breeding programme of Hoolock Gibbon. It is also the participating zoo in conservation breeding programme of Clouded Leopard, Hornbill, Serow and other species that are native to the region.

6.2 The Zoo has been successful in breeding few endangered species in the fast.

6.3 The Biological Park, Itanagar has earned the distinction of first ever plan breeding of Hoolock Gibbon in captivity in Indian Zoos. Conservation breeding was initiated during 2006-2007 with 5 (five) pairs of Hoolock rescued from Delo area. The first baby was born on 5th Aug, 2008, and there after 6 more cubs were born till 2010.

6.4. In due course of time the zoo will also start breeding programme of endangered native species of the state. A large area has been identified for the purpose in the non display area of the Zoo.

7. Education and awareness.

7.1 In a modern Zoo, education is very important and Biological Park has also contributed its bit in this respect. While educational signage on different animals, brochures and guide books have been published at different points of time starting from the inception of Zoo. There is a library with books on wildlife flora and fauna. Wild life film shows, organizing awareness camp, quiz competition etc. are organized from time to time.

7.2 Celebration of Wildlife Week, conducting tours and different types of competition for student are also organized. Researchers and students from universities, colleges and school also make use of the zoo and its facilities.

7.3. The Zoo also provide training programme on Zoo and wildlife medicine to internees coming from different veterinary colleges.

7.4. However, needs for interpretation centre still remains a dream and also needs lots of improvement in publication of brochures, signage, leveling of floral species etc.

8. Rescue and Rehabilitation. Though with limited facilities the zoo has involved in many rescue and rehabilitation of wild animals. Many animals injured or orphanage keeps on coming for treatment and hand rearing. The major one being the rescue and rehabilitation of large numbers of musth elephant every year within and outside the state. Rescue of 15 Nos. of injured, debilitated and displaced Hoolock from Delo area is one of the most outstanding achievements in this sector. However lots of improvement needs in respect of infrastructure. There is no intensive care unit for critically injured and also for infant animals. There are also shortage of equipment and medicine. There is also requirement of emergency fund in the hand of veterinarian for the purpose. Creation of quarantine facilities, treatment cell, life support equipment like oxygen musk with accessories etc.

PART-II

Chapter- III

This Master Plan is a comprehensive document giving a detailed road map of the zoo for 10 years in respect of development, improvement and up gradation of the facilities and infrastructure available at the zoo and building up of the capacity for carrying out all the operations forming part of the zoo management with greater efficiency

1. Objective of the Biological Park.

Initially, the zoo started as a rescue centre during 1978 which subsequently took the shape of zoo during the year 1987. Like any other zoological park around the world it was established for the purpose of recreation and entertainment. But with the advancement of time and expertise in the field, the concept of modern zoo has undergone drastic changes. More stresses have been laid on conservation, education and research. Keeping these in view, the objectives of Biological Park, Itanagar have been framed as follows:-

1 Ex-situ conservation breeding of critically endangered wild animals.
2 Scientific research on wild fauna and flora.
3 Rescue and rehabilitation of wild animals in distress.
4 Educating people about wild animals and the need for their conservation.
5 Providing recreation for Zoo visitors..

2. Vision of the Biological Park, Itanagar:

By considering the need to protect and conserve global biodiversity and wildlife the zoo was established with following vision:

1. A scientific institution engaged in Animal Welfare, Research, Conservation, Education and Sustainability.
2. Best business practice, being efficient, focused and productive. With close attention paid to planning, ecologically sound design and pollution free environmental.
3. Outstanding "Value for Money" for all who visit the zoo. Providing fun, entertainment and learning.

3. Mission Statement:

1. To act as Rescue Centre by receiving and keeping orphaned, seized, rescued and injured wild animals.
2. Develop amongst the visitors an understanding about the ecological linkages with the life supporting processes of nature and the need for keeping them intact by adopting sustainable life styles and living in harmony with nature.
3 Develop amongst visitor's empathy for wildlife and motivate them to support the cause of conservation of wildlife.
4. Compliment the national effort in conservation of wildlife through planned coordinated conservation breeding of endangered wild animal species of the region.
5. Enhancing the role of the zoo in conservation of wildlife through collaborated research aiming at attaining management skilled for in-situ population and carrying out advocacy for protecting the wild animals and their natural habitat.

4. Strategy of the zoo:

1. **Conservation:** To focus resources on securing sustainable populations of indigenous endangered species of the state and their habitats through conservation breeding and integrated zoological programmes.

2. **Animal Welfare and Husbandry :** To further advance best practice animal husbandry and welfare that ensures physical and psychological well being of the animal collection.

3. **Research :** To be a recognized and credible resource for the wildlife research community and enable significant contributions in the field of conservation medicine and by offering support and facilities to increase scientific knowledge that will benefit conservation of wildlife.

4. **Recreation :** To provide unique botanical, wildlife and cultural experiences that delights the visitor.

5. **Education :** To provide exemplary learning opportunities that positively influences people's understanding, values, and impact on the natural world.

6. **Sustainability:** To promote sustainable practices in all aspects of the Zoo's Operation. It is proposed to adopt board taxonomic display for convenience of management, research and education. However the habitat requirement of the species is also taken into consideration while placing the enclosure.

7. **Taxonomic display of animals** : It is proposed to adopt board taxonomic display for convenience of management, research and education.

Chapter- IV

5. Future action plan:

The Master Plan is not blue print and is subject to certain changes as per the advancement of time and requirement. However to prevent haphazard development of zoo due to frequent changes of manager and staff, future action plan is required. It aimed to provide direction for development of the zoo in coming 10 years i.e 2011 – 2021. The proposal is based on the topography of the site, water availability, vegetation climate, rainfall, visitors profile, education and research, needs and convenience. For convenience the proposal has been prepared section wise. The recommendation of CZA during evaluation of zoo from time to time has been kept in view in formulating the proposal of new structure and or modification of existing structures.

5.1. **Proposed animal collection plan**.

Animal collection plan of the zoo since inception is based on the native animal, birds and reptiles of the state. No exotic animals are considered in collection plan as per the directive of zoo expert group, only three species of exotic birds are added in its collection recently for education purpose. The lists of animals included are:

Proposed collection

(A) MAMMALS :

Sl. No.	Species	Proposed collection				Remarks
		M	F	U.S.	Total	
1.	Cat Jungle *(Pelis chaus)*	1	1		2	
2.	Large Indian Civet *(Viverricula indica)*	1	1		2	
3.	Himalayan Yellow throated *morten (Mortes ttavigula)*	1	1		2	
4.	Brushtailed porcupine *(Atherurus macrourus)*	1	1		2	
5.	Spotted linsang *(Prionodon pardicolor)*	1	1		2	
6.	Dhole *(Cuon alpines)*	1	1		2	
7.	Wolf *(Canis lupus)*	1	1		2	
8.	Jackal *(Canis aureus)*	1	1		2	
9.	Stump tailed macaque (*Macaca speciosa*)	1	1		2	
10.	Lion tailed macaque *(Macaca silenus)*	1	1		2	
11.	Lion tailed macaque *(Macaca silenus)*	1	1		2	
12.	Goral *(Nemorhaedus goral)*	1	1		2	
13.	Serow *(Capricornis sumatraensis)*	1	1		2	

14.	Hog deer *(Axis porcinus)*	1	1		2	
15.	Spotted deer *(Axix axis)*	1	1		2	
16.	Giant Flying Squirrel *(Petaurista petaurista)*	1	1		2	
17.	Himalayan Squirrels *(Dremomys lokria)*	1	1		2	
18.	Otter *(Lutra lutra)*	1	1		2	
19.	Slot bear *(Melurus ursinus)*	1	1		2	
20.	Malayan Sun Bear *(Ursus arctos)*	1	1		2	
21.	Binturong *(Arctictis binturong)*	1	1		2	
22.	Mouse deer *(Tragulus meminna)*	1	1		2	
23.	Indian Pangolin *(Manis Crassicaudata)*	1	1		2	
24.	Chinese Pangolin *(Manis pentadactyla)*	1	1		2	
25.	Wild Bison *(Bos gourus)*	1	1		2	
26.	Linsang *(Prinodon pardicolor)*	1	1		2	

(B) AVES :

Sl. No.	Species	Proposed collection				Remarks
		M	F	U.S.	Total	
1.	Great pied Hornbill *(Buceros bicornis)*	1	1		2	
2.	Assam Wreatted Hornbill *(Rhyteceros undutus)*	1	1		2	
3.	Crested Hawk Eagle (*Spizaetus cirrhatus)*	1	1		2	
4.	Serpent eagle *(Spiornis cheela)*	1	1		2	
5.	Fish owl *(Ketupa zeylonensis)*	1	1		2	
6.	Burn owl (Tyto alba)	1	1		2	
7.	Common peafowl *(Pavo cristatus)*	1	1		2	
8.	Peacock peasant *(Polyplectron bicalcaratum)*	1	1		2	

9.	Kaleej pheasant *(Lophura leucomelana)*	1	1		2	
10.	Emerald dove *(Chalcophaps indica)*	1	1		2	
11.	Dromgo *(Dicrurus spp.)*	1	1		2	
12.	Emerald dove *(Chalcophaps indica)*	1	1		2	
13.	Dromgo *(Dicrurus spp.)*	1	1		2	
14.	Pelican *(Pelecanus spp.)*	1	1		2	

(C) REPTILES

Sl. No.	**Species**	**Proposed collection**				**Remarks**
		M	**F**	**U.S.**	**Total**	
1.	Assam sawback turtle *(Kachuga sylhetens)*	1	1		2	
2.	Soft shell turtle *(Trionyx gangeticus)*	1	1		2	
3.	Land tortoise	1	1		2	
4.	Other native snake spp.					

(D) EXOTIC ANIMALS AND BIRDS :

MAMMALS :

Sl. No.	**Species**	**Proposed collection**				**Remarks**
		M	**F**	**U.S.**	**Total**	
1.	Rhinoceros *(Rhinocearos unicornis)*	1	1		2	
2.	White tiger *(Panthera tigris)*	1	1		2	
3.	Thamin *(Cervus eldi eldi)*	1	1		2	

(D) AMPHIBIAN: Very recently the importance of amphibian is gaining momentum and therefore, some of the important amphibians of the state are also proposed to display in the zoo for education, research and display purpose.

(E) Butterfly: Different species of butterfly belonging to the state will be displayed at the proposed butterfly park.

5.2 . Justification of the collection plan.

5.2.1 The species considered in the collection plan are mostly native to the state and therefore suited to the climatic condition of the zoo. Moreover most of the species have been already displayed in the zoo for long time. The zoo has a past experience in handling these animals' species of the region and some of them have been even successfully bred in the zoo. They also plays significant role in the education as these animals being more secretive endangered species and are rarely seen in the wild. Recognizing the importance of zoo in providing nature of education as well as their role in scientific research on different aspects of wild animals, emphasis has to be given to display Indian fauna with special reference to those belonging to the region. Some little known smaller animal species like Indian pangolin, giant squirrel, linsang etc. also needs to be exhibited.

5.2.2 Top priority has to be given to pair the single animals or animals of the one sex available in the zoo either by arranging mates for them or by transferring to other zoos on breeding loan or transfer in the interest of conservation of the species.

5.2.3 For long term commitment to conservation and captive breeding, the Biological Park, Itanagar has identified few mission species like Hoolock Gibbon, tiger, hornbill and clouded leopard. In addition, few core species suggested are Capped langur, Indian pangolin, Morten, Bintorong, Leopard cat, Linsang; Lion tail macaque, Stump tail macaque and Serow. Among the avian the species considered are Kaleej pheasant, Peacock pheasant, and Jungle fowl.

5.2.4 Less important species like barking deer, sambar, nilgai, spotted deer, Assamese macaque, rhesus macaque etc. shall form the limited breeding species. Such species as per requirement will have control breeding programme by means of vasectomy or spaying without disturbing their sexual behaviour and biological need of those animals.

5.2.5 **Otter.** The species is often rescued from poacher, but due to non availability of facilities it is release back to wild after treatment.

5.2.6 **Pangolin, tortoise etc**. are very often rescued in the state and are released back to wild after treatment. Therefore those species are considered in the collection plan. The enclosure for pangolin is considered in the later part of the plan period.

5.2.7 **Dhole:** The species is abundant and is a menace in the state. They hunt on livestock and large numbers of the animal are injured by farmers and often rescued and brought to zoo for treatment.

5.2.8 **Wild bison**: Bison calve are often rescued during flood from foothill areas of the state. Therefore it considered in the collection plan. The enclosure will be placed in the area ear marked for large mammals near Rhino enclosure.

5.3. Description of lay out plan of the Zoo.

5.3.1 The layout plan map is drawn on the scale of 1:2000 with contour interval of 5 meter and duly signed by concern authority and the individual involves in preparation of the plan.

5.3.2 Director arrow has been given on the layout map indicating east, west, North and south direction.

5.3.3 Legend on layout plan has been provided.

5.3.4 Existing features like water bodies, precipices, forest patches etc has been shown on the plan

5.3.5 Visitors and service circulation path has been shown in the plan.

5.3.6 Other amenities like drinking water, toilet, resting shed, gift shop etc has been shown on the plan.

5.3.7 Site for carcass disposal, post mortem house and incinerator has been shown in the map.

5.3.8 Separate map for electricity and water supply has been provided.

5.3.9 Separate map for sewerage and drainage has been provided.

5.3.10 The master plan layout of zoo also gives the detailed landscape map of the zoo with approach road, existing facilities and infrastructure. It also indicate the locations of the proposed developmental activities in animal display area, conservation breeding area, rescue centre area , visitors circulation routes, animal upkeep and healthcare facilities including animals quarantine facilities and isolation wards, service road, administrative blocks, entry plaza, car parking. New initiative in the plan are open air dry brick/boulder wall enclosure with sufficient space for land dwelling animals, butterfly park, arboretum, biosphere reserve, organic fodder farming, creation of water body.

Details are given in serial No. 2.5. of proposal to address inadequacies and shortcoming and Layout map enclosed in Annexure.

5.3.11 The layout plan is drawn with following colour code:

a. Existing animal enclosure -- **Black colour**
b. To be modified enclosure -- G**reen colour**
c. enclosure to be demolished -- **Red colour**
d. Proposed new enclosure -- B**lue colour**

5.4. Proposal to address the inadequacies and shortcoming identified in the appraisal report:

Proposal for improvement of the shortcoming in the appraisal are listed section wise in details.

5.4.1 Animal Section:

5.4.1.1 The animal section is the most important section of any zoo and various aspects of topography and vegetation has to be kept in mind to locate enclosure for different species depending upon their habits. The display will also depend on management convenience.

5.4.1.2 The maximum numbers of any species to be displayed depending on their social behaviour has to be taken into account to provide adequate space for the individual or special group. The enclosure should be designed to take care of the biological need of the species, its safety and ease of viewing by the visiting public.

5.4.1.3 An attempts shall be made to provide open air enclosure for most of the species with dry moat barrier or brick or boulder wall with RCC pillars and beam, other types of barriers like chain link mesh fence or glass shall be used whenever felt necessary depending upon the species and contour/topography of the location.

5.4.1.4 By considering the heavy rainfall in the area, the chain link, mesh wire use for aviary or enclosure shall be restricted to galvanized quality only.

5.4.1.5. All enclosure shall be provided with adequate protection to the animals against climatic variation, commensurate with the individual need of the species such as boulders, cages, trees, platform, shrubs, logs etc. This will meet their biological needs. Adequate attention has to be paid for provision of crate or isolation arrangements for protecting individuals or groups from aggression behaviour of individuals in the group, protection of expectant mothers, injured animals and young ones. Such separation will help in elimination of any problem of infighting, cannibalisms or rejection.

5.4.1.6. All Feline and canine enclosure including bear enclosure shall have in-built squeeze cages attached for restraining of the animals for providing treatment and when necessary without putting the animal to undue stress for capture or transport to the zoo hospital.

5.4.1.7. Each animal house shall be provided with adequate drainage facilities so that the liquid wastes are drained out of the enclosures and disposed off without contaminating the surrounding enclosures. Solid waste of the zoo shall be disposed off, by burning, by burying inside pit and there is also fire wood incinerator which is used for disposal of carcass and bones. The dung's collected shall be dump inside pits away from each enclosure which are later burnt and covered.

5.4.1.8. Potable water supply shall be ensured to all animal enclosures and feeding cubicles preferably from underground bore well water or treated water.

5.4.1.9. In addition to enrichment of enclosure, plantation of fruit bearing trees, shrubs etc which are natural food of the respective species shall be carried out where ever possible. Plantation of Bola, banana, urium etc. has already been done in Hoolock enclosure and deer park.

5.4.1.10. To create love, affection and awareness among people towards wildlife and also to raise funds the novel scheme of **"Adaptation of Animals"** under adaptation programme will be introduced in the Biological Park. However the signage, feeding veterinary care of such animals will be done as per zoo rules.

5.4.2. Arrangement of display:

The placement of enclosure in the zoo has come up haphazardly in past without considering geographical location and habitat of the species. It is proposed to adopt board taxonomic display for convenience of management, research and education. However the habitat requirement of the species is also taken into consideration while placing the enclosure. The board classification will be as follows:

(a) Primates.
(b) Ungulate
(c) Large mammalians like rhinoceros and bison.
(d) Porcine
(e) Water birds
(f) Large cat like tiger, leopard, clouded leopard etc
(g) Small carnivores
(h) Civets
(i) Porcupine
(j) Tortoise and turtle
(k) Butterfly park
(l) Pangolin
(m) Bears
(n) Pheasants
(0) Birds of prey
(p) High flying bird
(q) Aviary
(r) Nocturnal house
(t) Aquarium, Fishes and amphibian.
(u) Reptiles are proposed to display in the location depending upon physiological requirement of animals like gharial in sunny area, python and snake in warm area.

5.4.3. D**emolition, modification, or re-arrangement of existing enclosure**:

There are good number of enclosures exist in the zoo at present, but most of them are very old, rusted and does not fit to hold animals any more. More over such enclosure do not fit into modern concept of zoo design or do not meet the biological needs of the species housed in them. Some of them shall be completely demolished, some shall be modified for other species, or few others shall be modified to meet the minimum size for feeding or retiring cubicles recommended in the Recognition of Zoo Rules and Guidelines prescribed by CZA. The changes proposed are as follows:

(i) **Otter enclosure**: The present Gharial pond is small and does not suit the species considering the physiological and biological requirement and habitat of the species. Rather the location is suited for display of Otter and therefore shall be modified and converted into Otter enclosure.

(ii) Duck pond: The present duck pond is dismantled and abandoned. It shall be modified and improved for display of aquatic like fish and other amphibian of the state. Boulder flooring after removing silted mud, side drainage around the pond to avoid siltation. Construction of bridges over the pond and RCC benches for beautification and visitors accessibility.

(iii) Deer park: The present deer park is huge with an area 2.5 hectare, therefore difficult to manage, more over the some portion of the park falls under proposed creation of water body by constructing bund. The park therefore will be totally dismantle and rearrange for construction of bund, ungulate enclosure, wild boar and bison. The details are provided in the proposal for construction of new enclosure.

(iv) Leopard enclosure; the night shelter of present leopard enclosure is too small to provide physiological, biological requirement of the species. It will be modified for suitable species. It also requires lots of enrichment and plantation within and outside the enclosure.

(v) Clouded leopard enclosure: The angle iron thrusts of the enclosure are damaged leading to tearing of chain link wire mesh. The night shelter is also too small, and there is no feeding cubicle. Replacement of angle iron roof thrust along with chain link wire mesh is required. This enclosure will be converted for civet enclosure.

(vi) Tiger enclosure: The present old tiger enclosure with chain link wire mesh fence is recommended for dismantle and the location is ear marked for construction of butterfly park. However it will be modified for small carnivores for time being.

(vii) Old enclosure for leopard and fox has been dismantled and the area is cleared for construction of Aviary for pheasant. Details are given in the proposal for construction of new enclosure.

(viii) The present python house is very small and the location is wet and cold, therefore it is not suited for the species. It will be dismantled and the area will be cleared for construction of orchiderium as shown in lay out plan. A new reptile house is proposed in a warmer place.

(ix) The old horn bill enclosure which was constructed during the year 2000-2001 is still in good shape and meets the specification required for the species in terms of modern zoo concept. The enclosure was constructed over an area of 500 Sqm with 12 Mtr. height. Lots of enrichment has been done by planting different species of trees mostly of fruit bearing trees. However the iron angle post and wire mesh needs repairing and some part needs replacement.

(x) All the nocturnal animals are shifted to newly constructed nocturnal house and the old house for nocturnal animal has been dismantled. The area is ear marked for creation of lawn as shown in layout plan.

(xi) The oldest Aviary of the zoo near the nocturnal house is depilated and beyond possibility of repairing. Therefore it shall be demolished and area will be cleared for construction of Emu enclosure.

(xi) Old Bear enclosure is very old and small, therefore it is recommended for dismantle.

(xii) Nocturnal house: Nocturnal house will be extended from visitors side and keepers gallery will be provided at back side.

5.4.4. Construction of new enclosure.

Almost all the old enclosure are to be dismantle and re-arranged to give new look to the zoo and to provide appropriate arrangement of animal display as per their taxonomic and habitat requirement and also for the education importance to the zoo visitors. Some new enclosures are needed to be added in order to make the zoo more interesting and attractive. The enclosures proposed are:-

5.4.4.1 **Otter enclosure:** The present gharial pond will be converted into otter enclosure. The enclosure will be constructed with boulder wall with rock formation surrounding the pond.

5.4.4.2. **Primate enclosures**: New enclosure for Capped langur and Assamese macaque will be constructed at the area identified for primate. The enclosure for lion tail and stump tail macaque will be considered in the next plan period.

5.4.4.3. **Enclosures for ungulates**: All the ungulates will be displayed side by side for education purpose. The enclosure shall have moat at visitor's side, constructed with brick or boulder wall with design resembling rock and cliff. The back side of the enclosure will be either constructed with galvanized chain link mesh wire or with power fence. The proposed enclosures for ungulates as per lay out plan are:-

a. Sambar enclosure
b. Swamp deer/Thamin enclosure
c. Spotted deer
d. Goral enclosure
e. Serow enclosure
f. Hog deer enclosure
g. Mouse deer enclosure
h. Barking deer enclosure
i. Wild bison

5.4.4.4. **Enclosure for porcine**:- One enclosure is proposed for the family of porcine. Wild boar requires muddy area and therefore the enclosure is proposed in low laying area as indicated in the plan. The enclosure will have a sty away from visitors view point. The separating wall will be constructed with brick wall design with aesthetic natural look.

5.4.4.5. **Bison enclosure**: Wild Bison is often rescued from Pakke Wildlife sanctuary during flood. The enclosure is placed in the area marked for large mammals. It will have artificial salt lick and will be enriched with trees and grassland.

5.4.4.6**. Rhinoceros** enclosure is proposed over a wet land considering the habitat of the species. It will have a pool in the middle. Night shelter will be constructed with RCC structure with design of rock or cliff.

5.4.4.7. **Enclosure for small carnivores**: enclosure for dhole, jackal, fox, hyna, wolf, civet, yellow throated marten, leopard cat and jungle cat are proposed to construct side by at the area marked for carnivores with galvanized chain link mesh wire.

5.4.4.8. **Enclosure for large and medium carnivores** : Enclosure for large carnivores will be of moat type at the visitor's site and the medium with galvanized chain link mesh wire. Enclosure proposed are:-

a) **White tiger enclosure**: It is proposed to display white tiger in the zoo for education purpose therefore an enclosure is proposed for the species with the capacity of holding one pair of the species.

b) **Common leopard enclosure**: The present common leopard enclosure is not fit for the species, therefore new enclosure for 2 pair of the species is proposed.

c) **Clouded Leopard enclosure**: The present enclosure for the species will be converted for civet and therefore new enclosure is proposed.

5.4.4.9. **Binturong** enclosure: One enclosure with galvanized chain link mash wire or brick wall is proposed for the species to accommodate at least 2 pairs of animals.

5.4.4.10. **Enclosure for porcupine**: Two species of porcupine namely *Histrix indica* and *atherurus macrourus* (Brushtailed porcupine) will be displayed side by side. The enclosure will have at least three meter deep RCC flooring filled with soil for burrowing and may have full or half roofing.

5.4.4.11.**Turtle and tortoise**: Different species of tortoise and turtle are rescued from the state, therefore it is included in the collection plan. Enclosure for turtle and tortoise will be furnish with artificial cliff, water fall and rock resembling nature.

5.4.4.12.**Amphibian enclosure:** An enclosure for amphibian is proposed to display few important species found in the state. An irregular or oval shape pond with stone chip flooring and RCC wall with rock formation will be constructed to give natural look. Visitors view point will be fitted with fiber glass which will be connect with smooth finished brick wall on the back side to prevent escape of the species. The enclosure will have few partitions for different species of amphibian and will also have land portion in each partition. Light bulb will be fitted in every partition at night to attract insect and flies for feeding of the species.

5.4.4.13**. Reptile house**: It is proposed to construct reptile house for display of few species of snake in a warmer place. Unlike the usual reptile's house practiced in Indian zoos, the enclosure will have open air area with glass fitted wall to avoid escape of snake.

5.4.4.14 **Gharial enclosure**: The present gharial pond will be converted to otter enclosure. Moreover the area is cold and moist, so it does not suit the species. It will be constructed to wormer place as indicated in the layout plan. It will be island type of enclosure with sand bed over the island for basking.

5.4.4.15. **Butterfly park**: The old tiger enclosure will be modified/dismantled for butterfly Park. Only native species of butterfly will be displayed in the park.

5.4.4.16. **Pangolin** enclosure: Pangolin are rescued very often but due to lack of facilities they are released back to wild after necessary treatment. A house with half roofing concrete floor with brick wall filled with at least 1.5mtre deep soil is proposed for both Indian and Chinese pangolin in the later part of the plan period.

5.4.4.17**. Bear enclosures**: Three enclosures are proposed for display of **Himalayan black bear, Slot bear and Malayan Sun bear**. Enclosure will be placed side by side for education purposed. It will be moated on visitor's side and back side will have Galvanized chain link wire mesh or power fence or brick wall.

5.4.4.18. **Pheasant enclosure**: Pheasant enclosure will be constructed with Iron angle post and thrust, covered with galvanized chain link ware mesh. It will be single enclosure with partition to display different species of native pheasant and also exotic species we already have in the stock. Back portion will have covered area preferably of RCC for protection from rain and for nesting.

5.4.4.19. **Aviary for Birds of prey**: Single enclosure with partition or separate enclosure for each species has been proposed. However, single enclosure with partition is preferred, considering the cost involvement and proper display of birds for education purpose. It will be constructed with Iron angle post and thrust, covered with galvanized chain link ware mesh.

5.4.4.20. **Aviary for high flying birds**: In addition to the present aviary and pheasant enclosure another aviary is proposed near the present aviary for display of different species of high flying birds listed in the collection plan. Galvanized chain link wire mesh, iron angle post and thrust shall be used for construction of the aviary.

5.4.4.21. **Emu enclosure**: An open air dry moated enclosure is proposed for the species.

5.4.4.22. Enclosure for water birds is proposed near the proposed water body.

5.5. Aquarium :

An aquarium is proposed for display of different species of ornamental fish for education purposed. Some native species of fish will also be considered for display.

5.6. **Veterinary sector**: The Biological Park has full fledged veterinary Hospital with all basic infra structure like dispensary, room operation theatre, basic diagnostic facilities, and a rescue centre. Post mortem house with Fire wood incinerator for carcass disposal has also been constructed away from display area. The zoo hospital has the complete range of tranquilizing equipment. Tranquilizing drugs, wide range of medicines and vaccines are available in the hospital. However the hospital building is very old and at the residential area, therefore it is proposed to construct new building for purpose with some additional amenities. The requirements are:-

a). **X-ray unit**: It is urgently needed to install x-ray machine and equipment for Radio-graphic examination of small animals for early diagnosis and treatment.

b). **In-patient ward with isolation ward**: There is no in-patient and isolation ward in the hospital for keeping sick animals at present. Such facilities will immensely help speedy recovery and close observation and treatment of animals. It shall be constructed along the hospital with squeeze cage facilities, portable small animals and fixed for large cat.

c). **Intensive care unit** : Large numbers of infant and grievously injured animals are rescued from different part of the state and send to the zoo for treatment and rehabilitation. Due to lack of intensive care unit mortality rate or growth abnormality rate is high. Facilities for birds, mammals and reptiles needed to be constructed with facilities like air-condition, brooder, heating system, baby incubator etc.

d). Quarantine ward: It proposed to construct facilities for quarantine near proposed veterinary Hospital as indicated in the plan.

e). **Disease investigation**:- Blood smear, urine, rapid test tuberculosis, fecal examination

etc. are routinely carried out in the zoo hospital laboratory. But there is necessity of some up-gradation for taking care of the test which are possible to be carried out. Those which needs specialist and are not possible shall be sent to Disease Investigation Laboratory Department of Animal Husbandry, Nirjuli and nearest veterinary collage Khanapara, Guwahati.

f). **Formation of disease and health advisory committee**: A committee involving Veterinary expert including Director Vety & AH , CCF Wildlife, PCCF and Commissioner Vety. & AH. shall be form which will time to time meet and advice pertaining to health and management of zoo inmates.

g). **Training and education**: The Veterinary college Khanapara, Guwahati and Aizawl veterinary collage Mizoram also used the facilities of the zoo for training their internee student belonging to Arunachal Pradesh. This should be encourage because it gives fair idea about handling of tranquilizing equipment and zoo animal medicine to the students.

h).**Veterinarian, Para veterinary staff, laboratory technician** should be subjected to appropriate institute for up gradation of their skills.

i). **Organizational set up**: The hospital has the following staff;

1. Senior Veterinary Officer -- 1
2. Veterinary Officer --1
3. Stock man -- 1
4. Animal attendant -- 2
5. Peon -- 1

The additional man powers required in the hospital are:

1. Laboratory technician -- 1
2. X- ray technician -- 1
3. Sweeper -- 1
4. Attendant (daily wages). -- 1

j). Renovation work of existing Veterinary hospital building: New hospital building is proposed and therefore the present hospital will be modified for establishment building.

k). **Reference Library**: The hospital has small library for reference but needs to improve in collections of few required books and journals.

l). **Endoscopy and ultrasound** facilities may be also be created in the zoo hospital in the later part of the plan period. The man power required will be out source whenever required and also veterinary officer will be trained.

5.7. **Store and Feed supply section**:

Store cum kitchen is constructed within the hospital complex. The present kitchen is too small and within the residential complex, therefore it is propose to construct new building for kitchen cum store within the zoo area as indicated in the plan. It should be provided with washing basin, gas stove, fly proof netting, glazed tiles floor etc. Items needed to be procured are deep freeze, weighing machine, Kitchen knives, utensils and other equipments required for preparation of animal food.

5.8. Sanitation section:

5.8.1. Sanitation is one of the most important section in a zoo as lot of solid and liquid wastes are generated every day from animal enclosure as well as from visitors. Unless suitable arrangement

is made for their day to day disposal, it will be difficult to keep the zoo clean and pleasant. Hence, necessary infrastructure needed to be developed. It is essential to provide complete sewage disposal system, series of dustbins and construction of pit for dumping and burning and sweeping on daily basis. The public toilet and staff colony need proper and regular cleaning.

To achieve this, besides man power, proper equipment should be made available from time to time. Improvement is required in pest control- mosquitoes, rodent's feral dogs etc. Introduction of manure and compost pits for disposal of animal waste. However due to its topography – undulating, hillock and slope the sanitation especially the liquid wastage has not been a problem in the zoo. Specific area should be ear marked for the visitors for eating food brought with them. The sewer line has been designed as per natural gradient and disposed off after treatment. The drainage has been designed using the natural flow and topography. The existing natural drains are the collector or the main drains.

5.8.2. Polythene and tetra packs should be completely prohibited in the park. Composting of bio-degradable wastes should be done in the compost pits and manure so generated may be used in organic and fodder farm, lawns and garden.

5.9. **Workshop and maintenance section** :

Biological Park Itanagar is away from the market area, therefore it require its own work shop within the zoo itself for day to day maintenance of enclosure, building, structure, water supply etc Proper shed for workshop with CGI sheet roofing needs to be constructed with power line connection. All modern carpentry tools, welding machine both gas and electricity operated, and tools for masonry work needs to be made available. It should also have necessary equipment required for water supply and electricity. Above all creation of post for following staff under this section are required:-

Welder	--	1
Masonry	--	1
Carpenter	--	2
Electrician	--	1
Plumber	--	1
Black-Smith	--	1

5.10. Security section:

It is very important to keep the zoo animals, visitors, zoo staff and their families, zoo properties both movable and immovable secure and safe to make the zoo function properly. The zoo spreads over a large area covering 250 hectors with rich flora and free living fauna. The resources like bamboo, firewood, cane, timber species, etc. including free living fauna are always tempted to the capital dwellers. There have been incidences of tree felling, bamboo and firewood collection, killing of zoo animals and also hunting of free living fauna inside the park. The main reason for such incidences has been the lack of security wall around the park. It is almost impossible to give full proof security unless security wall is completed. The measures need to be taken in years to come are:

a. Early completion of **security wall** around the park in phase manner. The soil formation at the zoo area is loose, therefore the security wall to be constructed should have RCC horizontal beam at the base of the wall and another at the top of the wall to sustain the tensile force during rainy season and earthquake

b. Construction of **watch tower** with spot lights at vulnerable point.

c. The staff colony should be surrounded by separating wall from the display area.

d. Creating awareness among the nearby public about importance of wild life conservation in general and particular in zoo inmates and about **legal implication of wildlife protection act.**

e. Zoo may also consider employing **private security** group on tender basis in future.

5.11. **Water supply section.**

Large quantity of water is required for moat, cleaning of enclosure, staff quarters, gardening, drinking and toilets. Water is collected from within the park and also from outside the park. There are two collection tanks, one inside the zoo and the other outside the zoo with a capacity of 20,000 liter each. Besides two collection tank there are three more distribution tank at different location. However, during winter the water source dry up and there is scarcity therefore in addition to the existing facilities provision for tapping underground water through **Bore well** with power lifting facilities and also option is kept for provision of water supply from the department of Public Heath Engineering Department or Department of Urban Development.

5.12. **Power supply section**.

The park has its own transformer with capacity of 200 K.V. connected to the main supply line. The power supply is very good and regular with very little power cut. As a back up support 5 KVA D.G Set has been installed in the Zoo Veterinary Hospital. There is no power supply at the display area therefore provision for underground cable power connection with erection of light pole at different location for purpose of security and electrification of all the enclosure, water supply etc. All the enclosures will be provided with emergency lighting preparedly solar lighting to avoid disturbances to the animals.

5.13. **Disposal of solid and liquid waste**.

Solid waste of the zoo is disposed off by burning, by burying inside pit and there is also fire wood incinerator which is used for disposal of carcass and bones. The dung's are collected and dump inside pits away from each enclosure which are later burnt and covered. Creation of compost pit (**Vermicomposed**) for composting of bio-degradable wastes is proposed and the manure so produced will be used for organic farming. The disposal of liquid waste is not a problem in the zoo due to its topography. There is no stagnation of water or sewage. Drains and culvert are provided where ever required. Few more culvert and side drainage near enclosure and water body shall be taken up to avoid pollution/contamination of existing water body and adjacent enclosure.

5.14. **Visitors amenities**.

It is large park with only 40.25 hac area is proposed for intensive development for display of animals. To make the zoo visiting interesting amenities recreation facilities should be provided not only in display area but also at the proposed arboretum and biosphere reserved. Amenities required to be developed are:

5.14.1. Resting shed, benches, toilets, and points provided shall be provided in every strategic point.

5.14.2. Drinking water facilities: Installation of acquaguard or any other facilities for clean drinking water should be provided at suitable places.

5.14.3. Wheel chairs should also be provided for disable at nominal charges. The clean toilet for such visitors should be kept fully operational.

5.14.4. Proper signage for every species of animals displayed and also for important species of flora should be done for education purpose.

5.14.5. In order to make the visit enjoyable, creation of water body, for water birds & fish are proposed in the plan period.

5.14.6. Creation of natures track, hiking, and spot for family picnic will also be provided away from display area near biosphere reserve at nominal charges.

5.14.7. Children Park has also been created in a large area with facilities like merry go round, sea saw and swings. Some more improvement is still required by creating facilities for activities for children to promote wildlife conservation.

5.14.8. Solar/battery operated/non polluting vehicle will be introduced for easy movement of the visitors. Till such facilities are provided entry of private vehicle shall be allowed considering the topography of the area. However it shall be stop as when facilities are provided.

5.15. **Landscaping and gardening:**

The zoo has varied range of vegetation throughout the year with deferent type of orchid and other plant species which lends greenery to the park throughout the year. But still some formal or informal gardens do have their aesthetic appeal to the visitors and zoo inmates also.

5.15.1. **Forest area**: Only 40.25 hac. of the area is ear marked for intensive development and the rest area is left for Biosphere reserved and Arboretum which will serve as habitat s for free ranging animals who live in the zoo premises. This will also generate feeling of being in a natural forest for the visitors.

5.15.2. **Arboretum/ Botanical Garden:** Creation of botanical garden is proposed during the plan period for education, research and recreation. The propose item are sample plot for different native species of plant, timber species, cane, medicinal plant and shrub. The amenities to be created within the botanical garden are, concrete resting place, watch tower, rain shed, toilet and cafeteria.

5.15**.3 Plantation in vacant patches**. Plantation of rear and endangered species of native origin mostly of medicinal, timber, ornamental, latex, fruit and seed bearing trees which are natural feed for different species of displayed in the zoo, will be carried out in the vacant patches of the zoo. Plantation of bamboo and cane shall also be encouraged in the clear patches of zoo area. The species selected for plantation will be of native origin.

5.15.4. **Removal of exotic plant and shrub**: Many exotic species of shrub like *lantana camera*, *solinuim nigram,* has come up in the zoo and there has been incidence of poisoning of deer's with such shrub. Such shrubs need to be totally uprooted and burned. Few exotic plant have also been planted in the zoo premises which needs for phasing out through replacement by indigenous species, carefully chosen.

5.15.5. **Lawns and garden**: To give aesthetic look and pleasant atmosphere to the visitors, creation of flower garden and lawn is considered at different location.

5.15.6 **Nursery**: Nursery for plant and flower should be taken up in the park at mark area for arboretum or at free space in the display area.

5.15.7 . O**rchiderium** An area has also been identified for creation of orchiderium in the zoo for education, research and to give aesthetic look for the visitors

5.15.8. There is need for **creation of post of Mali** to look after the work of lawn and garden.

5.16. **Fodder cultivation, organic farming and vermicompost**.

At present fodder are collected from within the park for feeding of ungulates. But in dry season it is scanty and therefore it needs to start our own farm and fodder cultivation. An area of 10 hectare outside display area is ear marked for the purpose. Bio-degradable wastes like leaf, litter, animal dungs, vegetable wastes etc. should be composted or subjected to vermiculture for organic manure for the farm and flower garden.

5.17. **Road and visitors' circulation:**

5.17.1. There is only a single main road passing from entry gate to tiger land i.e the extreme display area at present and therefore visitors circulation is in back and forth manner. To give proper visitors circulation system, a road shall be constructed from entry gate via primate enclosures, proposed ungulate enclosure, and rhino enclosure joining the present main road at tiger enclosure. There will be main loop and sub loop (foot path) depending upon the topography and display area with elevation of 1:10 mtr. And 1:20 mtr. respectively for road and foot path for easy movement.

5.17.2. In later part of the plan period a connecting road will be constructed from tiger enclosure to the proposed conservation breeding centre of native endangered species.

5.17.3. At present there is 4 km. circular kucha road use for patrolling and trail purpose which needs to be converted into pucca road.

5.18**. Entrance plaza:**

Entrance plaza consists of Parking area, cafeteria, ticket counter, Telephone booths**,** Souvenir shops and Zoo gate. The details are given in **visitors amenities**.

5.18.1. **Parking place**: At present there are two parking place one each at both the gate, but considering the increased numbers of visitors it needs to be extended and black top. The Parking area of Gate –No.1 will be only for heavy vehicle and that of No. -2. for light vehicle. Facilities for telephone boot, toilet, visitor's sheds etc. needs to be provided at the parking place.

5.18.2. **Cafeteria** at the entrance gate with sanitary and parking facilities is proposed. There will be one more food courts at the other end of the zoo. No non-biodegradable materials like plastic glass, plastic plate etc will be allowed inside such food court. Catering of food item, plastic water bottles and sale of alcohol shall be prohibited.

5.18.3. **Clock room** will be provided at the centre of the park adjacent to proposed lawn.

5.18.4. **Telephone booths** shall be provided at parking place, zoo gate and at appropriate places inside the zoo.

5.18.5 **Souvenir shops** for selling curios of the park, photos, slides, guide books, stickers and other nature related artifacts like mugs, paper weight, caps, ties, T-shirt, etc. should be established in the zoo. This will not only help people take back certain durable wild animal related materials back home for long time to remember but also help the park to get some revenue like many foreign zoos. Gift shop will be attached at the zoo gate.

5.18.6. **Zoo gate**: There are two gates in the park, one the main gate which is common entry for both staff colony and the zoo and the gate near ticket counter for the zoo visitors into the display area. The inner gate that is for the visitors needs to be improved with proper design and provide list of Does and Don't and also guide map on it. The inner gate will have different entry and exit doors, security cell, **clock room** and vendors at the exit point.

5.19. **Construction of bund for creation of water body:**

RCC bund strong enough to hold large quantity of water for creation of water body in the present deer park which is recommended for dismantle is proposed in the later part of the plan period. The idea is to create water body in the zoo for water birds. It shall also be used for rearing of fish as display for visitors.

5.20. **Administrative building, Guest House and staff quarter**:

Presently there is no office building and quarter for zoo Director. It is essential to construct the office building and quarter for Director on priority basis. Few accommodations for ministerial staff and labour barrack needs to be constructed. Renovation of existing office buildings and staff quarter will be taken up from time to time. Construction of Guest House within the area ear marked for staff colony is also proposed.

5.21. **Mobility**:

Though there are few vehicles placed in the zoo for different purposes but they are very old and required to be replaced. The requirements are:-

a. Light vehicle for Director.
b. Light vehicle for Veterinary officer.
c. Rescue van. For rescue work
d. Mini truck carrying fodder and other work.
e. Tractor for fodder supply and ploughing
f. Bus for transporting staff and visitors.

Replacement of vehicle in every 10 years intervals or as prescribed should be taken up.

5.22. **Education and awareness:**

This is a very important component of zoo management. The visitors, after their visit should go back with .empathy for wild animals in captivity and also in the wild, besides getting educated about different aspects of biology and ecology of the wild animals. Hence the following steps need to be taken in the years to come in a phased manner.

5.22.1. **Creating of interpretation centre** in modern lines with the advice and involvement of experts in the field. This should be interactive with sound and lighting effects. This should not only educate visitors on the zoo animals, but provide information on different protected areas of the state and ecology. Interpretation centre will be constructed at the entry point of the zoo. However **creation of museum** inside the zoo is discouraged.

5.22.2. **Signage** are the best educative materials for the visitors. They should be properly designed, made more interesting with pictures and ecological information and put in different enclosures and in groups of enclosures. Guide maps and direction boards should be displayed at different point of the park. All the plant, bamboo, cane and medicinal shrubs naturally available in zoo should be properly leveled with **common and scientific names**.

5.22.3 **Introduction of keepers talk** will be much more meaningful and practical for the zoo visitors. To achieve this keepers need to be trained and if possible few educated (at least class X standard) need to be appointed as keeper.

5.22.4. A **guide teacher** from the zoology back ground should be appointed for educating conducted group on different aspects of conservation and captive management. This shall also facilitate zoo's outreach activities to peripheral villages, schools and educational programmes for various section of society like teachers, student, village organization, media and others.

An arrangement may be made for **zoo visit of students** from nearby schools from time to time. They can be exposed to various aspects of bio-science taking advantage of live animals, documents, and library facility of the park.

5.22.5. **Celebration of Wildlife Week**, quiz competition, radio broad casting, publicity about wildlife should be carried out from time toe in collaboration with other Department, organization and NGOs.

5.22.6. **Creation of own web site**, facilities for film shows, digital camera etc needs to be made available.

5.23. **Research**:

Although there is abundant scope of research in endangered animals of zoo, floral and free living faunal species of the park, no work has really been taken up till date. Some effort needs to be put into this direction.

5.23.1. Creation of post and appointment of **scientific officer** for record keeping and research work needs to be taken up on priority.

5.23.2. Establishment of separate office for research work. The present zoo hospital can be used for the purpose.

5.23.3. To start with, small grant fellowship project may be proposed on topic like improvement of the zoo, scientific management of zoo, Ex-situ conservation, welfare of animals, breeding and biology of species considered for conservation breeding and floral species found in the park.

5.23.4. The zoo should collaborate with different colleges and universities on animal research and provide facilities for management oriented research without involving any disturbance or discomfort to animals.

5.23.5. Research on veterinary, nutritional and physiological aspect may also be carried out for the benefit of the animals. Any other research work which is beneficial for zoo animals will be encouraged provided it does not cause any discomfort or disturbance to zoo animals.

5.24. **Off display Conservation breeding:**

The Biological park, Itanagar gives main emphasis on conservation breeding programme rather than displaying of animals. The zoo has been assigned as a coordinating zoo by CZA for conservation breeding centre for **hoolock gibbon.** It also the participating zoo in conservation breeding of clouded leopard, Serow and other species that are native to the state.

5.24.1. **Conservation breeding of hoolock gibbon**: The Biological Park, Itanagar has started off display conservation breeding of Hoolock Gibbon and earned the distinction of first ever breeding of hoolock gibbon in captivity in Indian zoos. Conservation breeding was initiated during 2006 - 2007 with 5 (five) pairs of hoolock rescued from Delo area. The first cub was born on 5th Aug"2008 and there after 6 more cubs were born till 2010. The project is divided into two phase:

a. The 1st phase concerned with construction of enclosures and other infrastructure, conservation breeding and study on feeding, breeding, biological and veterinary aspect of the species. The Project proposal for the phase has been submitted to CZA and the 1st and 2nd installment has already been released by CZA.

b. The 2nd phase will deal with re-introduction or introduction of the species into wild for which project proposal shall have to be submitted after completion of 1st phase.

c. Details of the activity and requirement are given on project proposal.

5.24.2. **Endangered native species:** In due course of time the zoo will also start off display breeding programme of endangered native species of the state. A large area has been identified for the purpose in the non display area of the zoo.

5.24.3. **Feeding of animals earmark for re-introduction**: Animals earmark for re-introduction will be fed at par with wild animals after moving them to soft release area. Carnivores will be trained for hunting in the soft release area by proving **live animals**.

5.25. Rescue centre.

5.25.1. Though with limited facilities the zoo has involved in many rescue and rehabilitation of wild animals. Many animals injured or orphanage keeps on coming for treatment and hand rearing. The zoo also involves in rescue and rehabilitation of large numbers of musth elephant every year within and outside the state. Rescue of 15 nos. of injured, debilitated and displaced Hoolock from Delo area is one of the most outstanding achievements in this sector.

5.25.2 No additional infrastructure facilities may be required if the proposed facilities are created in veterinary section. However, Creation of quarantine facilities, treatment cell, life support equipment like oxygen musk with accessories etc may be required.

5.25.3. There are always shortage of equipment, medicine and fund for transportation expenses. Therefore provision for such emergency fund may be kept in the hand of veterinarian from time to time.

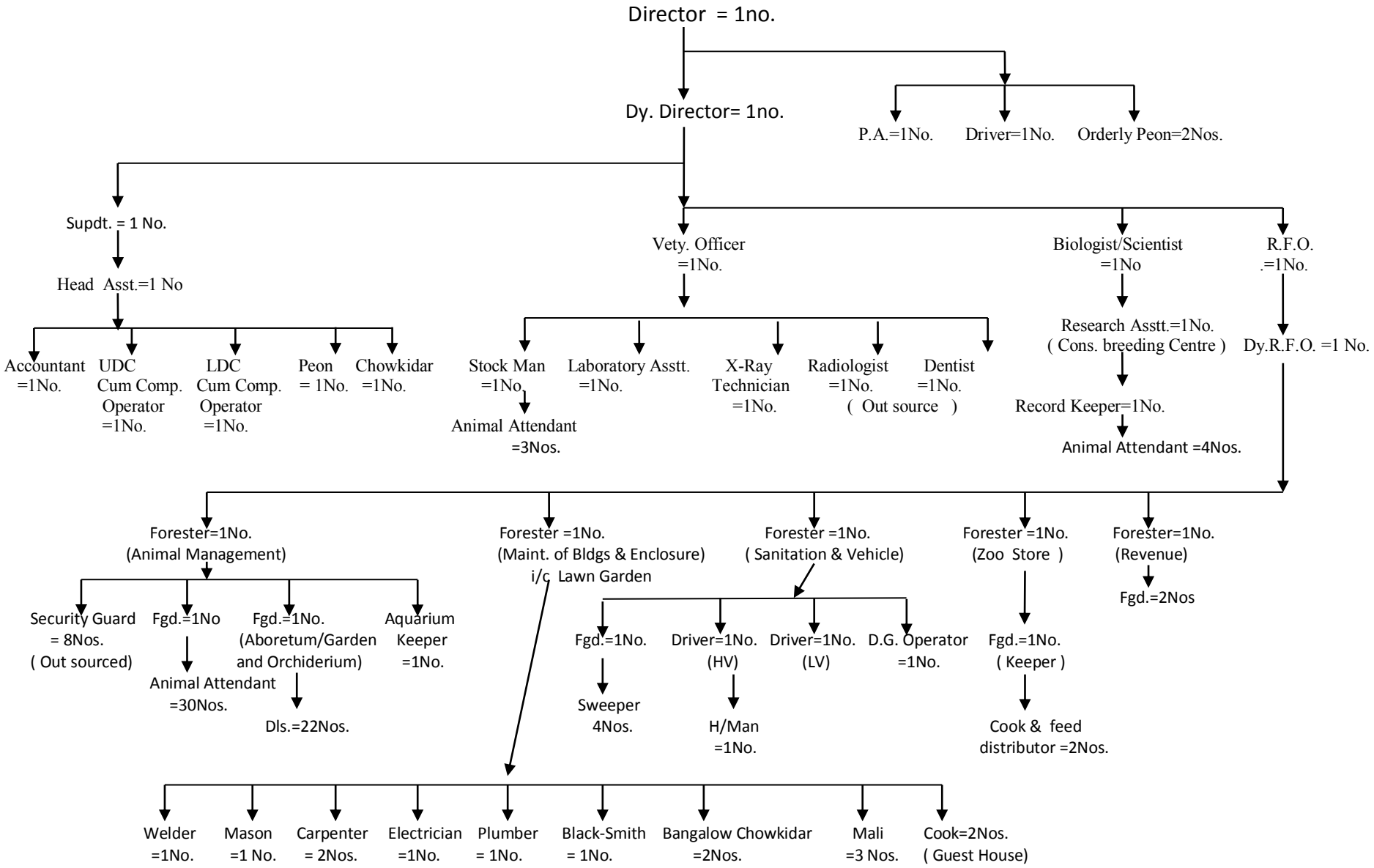
5.25.4. **Off display rescue centre for bear** is proposed considering the numbers of bear rescued in the state annually. The area has been earmarked in off display area as shown in the lay out map.

Chapter – V

6. Personnel planning.

Biological Park Itanagar, initially started as a rescue centre, slowly developed into Mini zoo than to Small zoo and finally considered as Medium zoo, considering the large area coverage. Therefore the personnel requirement varies and were reviewed and assessed from time to time. At present Deputy Chief Wildlife warden is the Ex-officio Director to look after the overall administration of the zoo and there is no full time Director. Veterinary section is headed by Veterinary Officer deputed by the Department of AH & Vety. The Forest Range Officer looks after administration, sanitation, security, animal management and maintenance of lawn & garden etc. The recruitment rule for Grade A,B, C and D category of staff are as per State/Central Government Recruitment Rules. The present strength and staff pattern is given in appendix at page 68.

6.1. **Proposed organizational set up**



6.2. **Comparative Statement with existing staff:**

Sl. No.	Name of the Post/Designation	Name of Post Required (Nos.)	No. of Post sanctioned	No. of incumbent in position	Additional incumbent/ Personal required	Remarks
1	2	3	4	5	6	7
1	Director	1	1	1	0	Existing
2	Deputy Director	1	0	0	1	New
3	Superintendent	1	0	0	1	-do-
4	Head Assistant	1	1	1	0	Existing
5	Accountant	1	0	0	1	-do-
6	U.D.C	1	1	1	0	Existing
7	L.D.C.	1	1	1	0	Existing
8	Personal Assistant	1	0	0	1	New
9	Driver	1	1	1	0	Existing
10	Peon	1	1	1	0	Existing
11	Chowkidar	1	0	0	1	New
12	Orderly Peon	2	0	0	2	New
13	Veterinary Officer	1	1	1	0	Existing
14	Dentist	1	0	0	1	outsource
15	Radiologist	1	0	0	1	outsource
16	Biologist/Scientist	1	0	0	1	New
17	Research Assistant	1	0	0	1	New
18	Stock Man Vety. Field Assistant	1	1	1	0	Existing
19	Laboratory Asstt.	1	0	0	1	New
20	X-Ray Technician	1	0	0	1	New
21	Record Keeper	1	0	0	1	New
22	Regular Animal Attendant	4	4	4	0	
23	Contg. Animal attendant	33	33	33	0	To be regularize
24	Range Forest Officer/Curator	1	1	1	0	Existing
25	Dy. RFO	1	1	1	0	Existing
26	Forester	5	3	3	2	Existing
27	Forest Guard	6	4	4	2	Existing
28	Driver (HV)	1	1	1	0	New
29	Driver (LV)	1	1	1	0	Existing
30	Handy Man	1	1	1	0	New
31	Security Guard	8	0	0	8	Out source
32	D.G operator	1	0	0	1	New
33	Contg Cook (Distributor)	4	4	2	2	To be regulaze
34	Aquarium Keeper	1	0	0	1	New
35	Welder	1	0	0	1	New
36	Masonry	1	0	0	1	New
37	Carpenter	2	0	0	2	New
38	Electrician	1	0	0	1	New
39	Plumber	1	0	0	1	New
40	Black- smith	1	0	0	1	New
41	Banglow Chowkidar	2	0	0	2	New
42	Mali	3	0	0	3	New
43	Daily wages	22	17	17	5	
44	Sweeper	4	0	0	4	New
	TOTAL	127		76	51	

Chapter – VI

7. **Disaster management:**

There is no full proof management system that will prevent destruction and causality in natural calamity; however emergency preparedness shall aid successful control and mitigation. Though the occurrence of such natural and manmade disasters is certain, they are infrequent, and the zoo has to cope with it. To deal with it an Emergency Preparedness Hand Book shall be prepared which will specify the following points:

a. Formation of emergency team with chain of command in the team.
b. Each member and employ should know exactly what his/her role is during a disaster, whom to report and work with.
c. List of the possibilities of disasters and its emergency preparedness in operational and orderly planed manner.
d. List of personal needs like water, food, first aid, lantern, battery, torches stoves, rain/ winter cloth etc. will also be provided in the hand book.

7.1. **Possibilities of disasters in the Park are**:

7.1.1. **Fire control**: There is incidence of fire on staff quarter and also in the forest at Biosphere reserved in the past which were effectively controlled by the team. The preparedness in these regard will be based on our past experience which will include storage of water, storing fire extinguishers and immediate contact to the fire brigade. In case of forest fire a designated team keep on patrolling the area in dry season with walkie talkie and shall inform the HQ immediately in case of such calamity. From the past experience, the clearing of dry leaves, trees and plant from the affected area is found to be successful in controlling further spread of the fire.

7.1.2. **Landslide and flood**:

Due to heavy rainfall in the state the incidence of flood and landslide are common in the state. To avoid any disaster due to such natural calamity the layout plan is carefully prepared and location for construction of enclosures is avoided in the landslide and flood prone areas. Construction of culvert, boulder wall and drains are proposed in strategic area. The sewerage and drains are designed carefully to prevent such disaster.

7.1.3. **Cyclone situation**:

Such natural calamities are usually not common in the area, however strong winds capable enough to destroy tall and old enclosure may come. Preparedness for such situation will be formulated with possibility for immediate evacuation of animal or repairing of enclosure etc.

7.1.4. **Breakdown of law and order**:

The management of Zoo may be put under the Essential Service Maintenance Act which will immensely help the zoo in smooth functioning at the time of such law and order breakdown. However preparedness is required in case of law and order breakdown due to external aggression or any other major situation. The preparedness will mostly concerned with stocking of food item, medicine, and other daily required materials for animal as well as for staff.

7.1.5. **Earth quake**:

Arunachal Pradesh falls under 5th seismic zone, therefore preparedness for such eventualities is of prime importance. Rapid action force shall be form to deal with such emergency situation. The team shall have pre-arranged tranquilizing drugs and equipment, rope, cages, rescue van with stretcher for immediate recapturing of escaped animal. They shall also have pre-arrange equipment like torch light, knife, spade etc. Rapid action force team shall also be send for training organized by Department of Disaster Management to deal with such situation. Such trainings are organized from time to time by the department.

7.1.6. **Feed supply**:

Sufficiently provision for emergency fund is kept in the account of Zoo Society of Biological Park, Itanagar. The Zoo society is Registered Vide Govt. order No SR/Ita/4777 dated 11/5/2011. In case of interrupted supply of feed due to different reason feeds will feed will be procure from such fund. Feeding section will take care of such eventualities.

Chapter – VII

8. Contingency Plan :

Contingency plan for emergencies like snake bite, breakdown of power supply, escape of animals from enclosure, visitors falling into enclosure etc. along with preparedness needs to be formulated for the zoo. Most of the animals if freed can cause severe problems and danger to the people. Escape of zoo animals, aberrant human behavior etc. can create unforeseen situations. Meticulous prior planning with adequate finance is needed for preparedness to face such exigencies in the interest of the zoo animals as well as public safety. Points that are considered in the plan are:-

8.1 Animal rescue from wild :

a. Rescue team comprising of Veterinary Officer, attendant, Range Officer, Forester and forest guard along with animal keepers will be kept ready any time whenever required.

b. Rescue van equipped with tranquilizing equipment and drug, movable laboratory facilities transport cages etc. will be created.

c. Quarantine ward and treatment cell will be created in the Zoo Veterinary Hospital.

d. Provision for emergency fund shall be kept for procurement of medicine, feed and other miscellaneous items during rescue operation.

e. Intensive care unit has also been proposed in the plan in the veterinary section.

8.2 Escape of animals from enclosures :

a. Rapid action force shall be form to deal with such emergency situation. The team shall have pre-arranged tranquilizing drugs and equipment, rope, cages, rescue van with stretcher for immediate recapturing of escaped animal.

b. Pre-arrange facilities for immediate evacuation of person getting injured during such operation to nearest hospital shall be made available.

c. Guns and bullets in case of unavoidable circumstances.

8.3. Monkey and dog menace:

At present the zoo has no such problem, although there were some problems with dogs own by zoo staff earlier. The problem has been solved after removing of dogs from the zoo. The rearing of domestic animal inside the zoo campus is prohibited to prevent domestic animal menace and to prevent entry of infectious diseases.

8.4. **Arrangement of food during strike**:

Deep freeze has already been installed in the feed store for preservation of perishable feed item for longer period of time. Moreover movement of vehicle on "zoo duty" is normally exempted from the purview of any strike and therefore, it has never been a problem for the zoo. However with the installment of Deep freeze and DG Set in the zoo, feed item at least for 15days can be stored.

8.5 Snake Bite: Anti- venom serum is kept in the zoo Veterinary hospital for such type of emergencies.

8.6. Visitors getting injured/ fall inside enclosure:

First aid box, vehicle, ladder, ropes etc. are made available for minor treatment and evacuation of injured person. Rapid action team to deal with such type of emergencies shall be formed. Pre-arrange tranquilizing drugs and equipments are always kept ready for such eventuality.

8.7. Fighting among Animals: Preventive measures are usually taken to prevent infighting among animals; however infighting do occurred in the zoo. Manual separation with bamboo pole or tranquilizing equipment is usually used.

8.8. Epidemic: There has been incidence of outbreak of Foot and Mouth disease in the zoo among Ungulates during the year 1998. Vaccination of ungulates in the zoo is practically very difficult and therefore, main stress is given on prevention by ring vaccination of livestock around the zoo twice in a year. After adopting the above preventive vaccination programme, there is no incidence of recurrence of the disease. However, in case of any such eventualities the diseases infected animals will be kept in isolation shed and export from Department of AH & Vety. And also from nearest Veterinary College will be Outsource.

8.9. Break down of Power supply: D.G. Set with 8 KVA capacity has been installed in the zoo to meet the emergency power supply during break down of power supply.

8.10. Free ranging animals/Feral animal menace: Rat menace is one of the most common problem in all the zoos. There is also incidence of zoo animal getting injured by feral animals, mostly by small carnivores. Rodent proof enclosure for bird section and rat trap for other species are considered.

8.11. Zoo rules and Regulation. The Biological Park Itanagar will strictly follow the 'Recognition of Zoo Rules 2009' under Section 63 of The Wild Life (Protection) Act, 1972. In addition following points are included for the zoo:

i. **Weekly closures** : For better management of the zoo and to provide stress free environment to animals the zoo shall remain closed on every Tuesday.
ii. **Opening and closing time** : During summer season the opening and closing time of the zoo shall be 9 AM to 6 PM while during winter season it will be 9 AM to 6 PM.
iii. **Film Shooting**; film shooting inside the zoo shall be permitted provided such act do not cause disturbance to the animals and their welfare.
iv. **Morning/evening walk and cycling**: The zoo shall not allow morning/evening walk, and cycling by public.
v. **Animal demonstration and handling**: The zoo shall not allow animal handling by VIP's or public and animal demonstration.
vi. **Animal feeding by zoo visitors** shall not be permitted.
vii. **Animal ride** shall not be practice inside the zoo.

viii. Zoo shall not allow its premises for holding party/function/marriage/mela etc. However it can be used for holding meeting/conference/workshops related to wildlife conservation.

ix. Smoking inside zoo premises shall not be permitted.

x. Burning of crackers or any short of explosive materials and fire arms inside the zoo premises including staff colony shall not be permitted to avoid disturbances to animals.

xi. Rearing of domestic livestock inside the zoo including staff colony shall not be permitted.

Chapter- VIII

9. Capacity building:

Modern zoos fulfill a number of roles within our society, the chief of which are conservation, education, research and entertainment. These are mostly achieved through maintaining animals in captivity and, therefore, zoos have a responsibility to ensure the highest possible standards of welfare among their animals. Increasingly, it is acknowledged that good welfare can be achieved through the use of behavioral husbandry. This refers to the application of techniques to manipulate animal behavior in order to enhance animal management and improve welfare. Wildlife medicine, feeding, species specific enclosure, education etc. needs resources, knowledge and skills. Zoos, and their personnel, with knowledge, skills and expertise can thus provide vital support through information transmission. The importance of capacity building for conservation has been widely recognized within the zoo industry and many zoos have become involved with initiatives to increase capacity for *in situ* conservation through provision of materials and workshops. Officers and staff posted in the zoo shall be deputed for short term training conducted by CZA or any other organization within or outside of the country. Forester, forest guard and animal keepers posted in the zoo shall be made mandatory to undergo keepers training programme conducted by CZA.

Chapter- IX

10. E- governance:

A comprehensive information system for database management covering all aspects of Biological Park, online reporting and suitable training of zoo staff needs to be developed. Some progress has already been made on this line. Introduction of the International Species Information System(ISIS) is under progress. The soft ware on Animal collection record keeping (ARK) system has already been installed and started functioning in the zoo. The Medical records (MedARKS) soft ware will also be installed shortly. Installation of BSNL Broad Band is under Process. The other software products of ISIS like Collection planning (REGASP), Small Population Record Keeping (SPARKS) and Viewing Physiological Reference values will also be introduce in due course of time. Creation zoo **Web site** is under active consideration.

Chapter – X

11. The broad budget analysis for the development of Biological Park.

The broad budget analysis is based on the present schedule rate from state public word department and will vary as per the cost index of materials and labour charges at the time of implementation of the work: Some of the items not included in the list may also be taken into consideration as per future requirement: The year wise development plan with financial provision for the 2011-2021 are as follows:

11.1 1st Five Year:

1 . INFRASTRUCTURE DEVELOPMENT *[All figures Rs. in lakhs]*

Sl. No.	Items	Year					Total
		2011-12	2012-13	2013-14	2014-15	2015-16	
1	Visitors circular road 1.5 Km	150.00	100.0	0	0	0	250.00
2	Construction of security wall- 6 Km.	86.00	200.00	100.00	100.00	100.00	586.00
3	Electrification.	0	50.00	0	0	0	50.00
4	Construction of security gate.	100.00	0	0	0	0	100.00
5	Construction of feed store.	0	60.00	0	0	0	60.00
6	Development of water Supply	0	25.00	0	0	0	25.00
7	Improvement of lake	0	0	100.00	0	0	100.00
8	Recreation park – Children park	7.0	0	0	0	0	7.00
9	Construction of kiosks – 2 nos.	0	0	5.50	0	0	5.50
10	Administrative building- Directors Office	0	0	100.00	0	0	100.00
11	Guest House	112.00	0	0	0	0	112.00
12	Directors Banglow	0	0	50.00	0	0	50.00
13	Const. of staff quarters	0	30.00	30.00	0	40.00	100.00
14	Interpretation centre	100.00	0	0	0	0	100.00
15	Public amenities- toilet, drinking water, dustbin etc.	10.00	20.00	20.00	10.00	10.00	70.00
16	Creation of artificial lake.	0	150.00	0	0	0	150.00
17	Eco-tourism and trekking facilities	15	0	0	0	0	15.00
		0	15.00	0	0	0	15.00
18	Construction of zoo hospital with in patient ward and x-ray unit.	0	40.00	20	0	0	60.00
	TOTAL RS.	**580**	**690**	**425.5**	**110**	**150**	**1955.5**

Sl. No	Items	Year					Total
		2011-12	2012-13	2013-14	2014-15	2015-16	
	B.F.	**580**	**690**	**425.5**	**110**	**150**	**1955.5**
19	Botanical garden/ Arboratum	0	0	30.00	30.00	30.00	90.00
20	Separating wall	50.00	50.00	0	0	100.00	200.00
21	Orchiderium and gardening	25.00	5.00	1.00	1.00	1.00	33.00
22	Medicine, tranquilizing and other veterinary hospital equipment.	5.00	6.00	6.00	6.00	7.00	30.00
23	Purchase of Vehicles, Wireless sets, Computers, Office equipment, Furniture for office, squeeze cage, LCD projector, Ticketing machines etc.,	20.00	10.00	10.00	10.00	10.00	60.00
24	Cafeteria	0	35.00	0	0	0	35.00
25	Parking Place	0	50.00	30.00	20.00	0	100.00
26	Construction of cattle proof & culvert 3 nos.in the existing road.	0	10.00	20.00	0	0	30.00
27	Construction workshop shed with store.	0	0	10.00	0	0	10.00
28	Purchase of furniture for Guest house, office and hospital		25.00	25.00	0	0	50.00
29	C.C. Footpath, small hanging bridge, railing and drain	25.00	25.00	25.00	25.00	25.00	125.00
30	Workshop section-welding machine, carpentry etc.	10.00	0	5.00	0	5.00	20.00
	TOTAL RS.	**715**	**906**	**587.5**	**202**	**328**	**2738.5**

2. CONSTRUCTION OF NEW ENCLOSURES. ***[All figures Rs. In lakhs]***

S. No.	Items	Year					Total
		2011-12	2012-13	2013-14	2014-15	2015-16	
1	Leopard common	40	0	0	0	0	40.00
2	Clouded Leopard Enclosure	0	0	30.00	0	0	30.00
3	Sambar enclosure	0	60.00	0	0	0	60.00
4	Enclosure for small carnivores like wolf, Hyena, Jackal, Fox etc,	0	50.00	50.00	25.00	0	125.00
5	Enclosure for capped langur	0	35.00	0	0	0	35.00
6	Enclosure for Porcupine.	0	0	20.00	0	0	20.00
7	Enclosure for Wild boar	30	0	0	0	0	30.00
8	Enclosure for Barking deer with 4 compartments.	0	40	40	0	0	80.00
9	Enclosure for, goral, serow, hog deer.	0	0	0	100.00	0	100.00
10	Enclosure for Gharial	0	0	0	50.00	0	50.00
11	Enclosures for Birds of prey	0	0	60.00	0	0	60.00
12	Enclosure for Emu	25.00	0	0	0	0	25.00
13	Enclosure for otter	0	0	0	50.00	0	50.00
14	Enclosure for bear	0	70	70	70.00	0	210.00
15	Reptile house	0	0	60.00	0	0	60.00
16	Off display bear rescue centre	0	100.00	0	0	0	100.00
17	Enclosure for thamin and swamp deer	0	0	0	0	80.00	80.00
18	Enclosure for common langur	0	40.00	0	0	0	40.00
19	Enclosure for wild bison	0	0	0	0	40.00	40.00
20	Enclosure for civets, leopard cat and bintorung	0	0	70.00		0	70.00
21	Pheasant enclosure	0	0	0	0	70.00	70.00
22	Enclosure for conservation breeding of hoolock gibbon	60.00	0	0	0	20	80.00
	TOTAL RS.	**155**	**395**	**400**	**295**	**210**	**1455**

3. RENOVATION AND MODIFICATION OF EXISTING ENCLOSURES AND OTHER MISCELLANEOUS ITEM:

[All figures Rs. In lakhs]

S. No.	Item	Year					Total
		2011-12	2012-13	2013-14	2014-15	2015-16	
1	Nocturnal house	50.00	0	0	0	0	50.00
2	Maintenance of aviary	0	0	5.00	0	0	5.00
3	Maintenance of Tiger enclosure with stand- off barrier and karaal	19	20.00	0	0	0	39.00
4	Maintenance of clouded leopard Enclosure	6.00	0	0	0	0	6.00
5	Maintenance of old hornbill Enclosure	5.0	0	0	0	0	5.00
6	Modification of old tiger enclosure into butterfly park	0	0	0	0	20	20.00
7	Signage, annual report and brochures,	5.00	0	0	0	0	5.00
8	Modification of aviary into walk thorough aviary.	0	0	15.00	0	0	15.00
9	Repair and maintenance of various buildings, like postmortem house, staff quarters, painting and white washing of building in the zoo. Maintenance of water supply including replacement of rusted leaking pipes and misc. maintenance in zoo.	5.00	10.00	10.00	10.00	5.00	40.00
10	Maintenance of barriers and animal enclosure railings, doors and mesh	0.50	4.00	4.00	1.50	0	10.00
11	Drinking water and Food troughs for animals	0.10	0.40	0.40	0.10	0	1.00
12	Maintenance of visitors facilities	0.20	6.00	5.00	2.00	1.80	15.00
13	Fund for Animal Exchange	2.00	2.00	2.00	2.00	2.00	10.00
14	Modification of present zoo hospital into Intensive care unit	0	50.00	0	0	0	50.00
15	Maintenance of existing road, culvert, breast wall, drain, black topping etc.	60	0	70	0	0	130.00
16	Battery operated/solar vehicle and wheel chair	0	0	100.00	0	0	100.00
17	Preparation of DPR of the zoo	30	0	20	0	0	50.00
	TOTAL RS.	**183**	**92.4**	**231.4**	**15.6**	**28.8**	**551**

4. RECURRING EXPENDITURE (MAINTENANCE BUDGET)

S. No.	Budget Head	Budget (Rs. in lakhs)					
		2011-12	2012-13	2013-14	2014-15	2015-16	Total
	NON PLAN 02-111-00-02						
1	Salary	180.00	216.00	260.00	310.00	370.00	1336.00
2	Casual	15.00	20.00	23.00	27.00	35.00	120.00
3	T.A.	1.50	1.75	2.00	2.25	2.50	10.00
4	Medical	30.00	15.00	18.00	20.00	22.00	105.00
5	Office expenditure	1.50	1.75	2.00	2.25	2.50	10.00
6	Machine and Tools	1.00	1.50	1.50	8.00	10.00	22.00
7	Vehicle Maintenance	2.00	2.25	2.50	3.00	3.25	13.00
8	Maintenance	10.00	12.00	15.00	18.00	20.00	75.00
9	Special Purchases	5.00	7.00	10.00	13.00	15.00	50.00
	Total	**246**	**277.25**	**334**	**403.5**	**480.25**	**1741**
	Total Non-Plan						
	PLAN						
10	Salary	-	-	--	-	-	-
12	Wages	20.00	25.00	30.00	35.00	40.00	150.00
13	Maintenance(feed & upkeepment, security, water supply etc.	100.00	120.00	150.00	200.00	250.00	820.00
14	Medicine	5.00	7.00	8.00	10.00	12.00	42.00
15	Rescue and treatment	50.00	75.00	100.00	125.00	150.00	500.00
16	Vehicle	10.00	5.00	7.00	8.00	10.00	40.00
17	Externally aided Forestry and Biodiversity Project, elephant project.	1.50	1.50	1.50	1.50	1.50	7.50
18	Education and Awareness	2.00	2.00	2.500	2.500	3.00	12.00
18	Capacity building	3.00	5.00	5.00	7.00	7.00	27.00
19	Conservation breeding and Research activities	10.00	10.00	11.00	15.00	20.00	66.00
20	Disaster management	1.00	1.00	1.00	1.00	1.00	5.00
	TOTAL RS.	**202.5**	**251.5**	**316**	**405**	**494.5**	**1669.5**

11.2 2nd Five year:

1. INFRASTRUCTURE DEVELOPMENT

[All figures Rs. in lakhs]

S. No.	Items	Year					Total
		2016-17	2017-18	2018-19	2019-20	2020-21	
1	Ring road (around the zoo area)	0	100.0	150.0	0	0	250.00
2	Development of organic farming	0	30.0	5.0	5.0	5.0	45
3	Drainage, retaining wall etc.	20.00	0	0	0	0	20.00
4	Conservation breeding centre for native endangered spp.	100.00	0	0	0	100.00	200.00
5	Fencing around zoo display area (zoo boundary)	0	50.00	0	0	0	50.00
	TOTAL RS.	**120**	**180**	**155**	**5**	**105**	**565**

2. CONSTRUCTION OF NEW ENCLOSURES.

[All figures Rs. in lakhs]

S. No.	Items	Year					Total
		2016-17	2017-18	2018-19	2019-20	2020-21	
1	Enclosure for Hog deer, mouse deer.	25	10	0	0	0	35.00
2	Enclosure for pangolin	0	0	30.00	30	0	60.00
3	White tiger enclosure	0	60.00	0	0	0	60.00
4	Enclosure for rhinoceros.	0	0	0	40	0	40.00
5	Enclosure for amphibian	10.00	0	0	0	0	10.00
9	Aquarium.	0	50.00	0	0	0	50.00
10	Enclosure for civets.	40	40.00	0	0	0	40.00
10	Enclosure for stump tail and Assamis macaque	30.00	0	40.00	0	0	70.00
11	Aviary for Dronggo	0	40.00	0	0	0	40.00
	TOTAL RS.	**80**	**200**	**70**	**70**	**0**	**420**

3. RENOVATION AND MODIFICATION OF EXISTING ENCLOSURES AND OTHER MISCELLANEOUS ITEM:

[All figures Rs. in lakhs]

S. No.	Item	Year					Total
		2016-17	2017-18	2018-19	2019-20	2020-21	
1	Renovation of walk thorough aviary	0	20.00	0	0	0	20.00
2	Maintenance of hornbill aviary	0	0	5.00	0	0	5.00
3	Modification of night shelter of Tiger enclosure.	30	0	0	0	0	30.00
4	Maintenance of primate Enclosure	0	6.00	0	0	0	6.00
5	Maintenance of Hospital	0	0	5.0	0	0	5.00
6	Procurement of Laboratory equipment, microchip equipment, tranquilizing equipment etc	10.00	10.00	10.00	5.00	5.00	40.00
7	Procurement of Laboratory equipment, ultrasound machine	70.00	0	0	0	0	70.00
8	Signage, annual report, brochures.	0	0	15.00	0	0	15.00
9	Repair and maintenance of various buildings, like postmortem house, staff quarters, painting and white washing of building in the zoo. Maintenance of water supply including replacement of rusted leaking pipes and misc. maintenance in zoo.	5.00	10.00	10.00	10.00	5.00	40.00
10	Maintenance of barriers and animal enclosure railings, doors and mesh	0.50	4.00	4.00	1.50		10.00
11	Drinking water and Food troughs for animals	0.10	0.40	0.40	0.10	0	1.00
12	Maintenance of visitors facilities	0.20	6.00	5.00	2.00	1.80	15.00
13	Fund for Animal Exchange	2.00	2.00	2.00	2.00	2.000	10.00
14	Maintenance of security wall, separating wall, fencing etc.	0	0	30.00	0	10.00	40.00
15	Maintenance of electrification	5.00	0	0	0	2.00	7.00
16	Maintenance of water body	15	0	0	15	0	30.00
	TOTAL RS.	**137.8**	**58.4**	**86.4**	**35.6**	**25.8**	**344**

4. RECURRING EXPENDITURE (MAINTENANCE BUDGET)

S. No.	Budget Head	Budget				(Rs. in lakhs)	
		2016-17	2017-18	2018-19	2019-20	2020-21	Total
	NON PLAN 02-111-00-02						
1	Salary	370.00	370.00	380.00	380.00	385.00	1885.00
2	Casual	35.00	35.00	35.00	35.00	35.00	175.00
3	T.A.	2.50	2.50	2.50	2.70	2.75	12.95
4	Medical	30.00	15.00	18.00	20.00	22.00	105.00
5	Office expenditure	1.50	1.75	2.00	2.25	2.50	10.00
6	Machine and Tools	1.00	1.50	1.50	8.00	10.00	22.00
7	Vehicle Maintenance	2.00	2.25	2.50	3.00	3.25	13.00
8	Maintenance	10.00	12.00	15.00	18.00	20.00	75.00
9	Special Purchases	5.00	7.00	10.00	13.00	15.00	50.00
	Total	**457**	**447**	**466.5**	**481.95**	**495.5**	**2347.95**
	Total Non-Plan						
	PLAN						
10	Salary	-	-	--	-	-	-
12	Wages	40.00	45.00	45.00	45.00	46.00	221
13	Maintenance(feed & upkeepment, security, water supply etc.	250.00	253.00	254.00	260.00	260.00	1277
14	Medicine, equipment, tranquilizing drug and equipment.	10.00	10.00	8.00	10.00	12.00	50.00
15	Rescue and treatment	10.00	10.00	10.00	10.00	10.00	50.00
16	Vehicle	10.00	5.00	7.00	8.00	10.00	40.00
17	Externally aided Forestry and Biodiversity Project, elephant project.	1.50	1.50	1.50	1.50	1.50	7.50
18	Education and Awareness	2.00	2.00	2.50	2.50	3.00	12.00
18	Capacity building	3.00	5.00	5.00	7.00	7.00	27.00
19	Conservation breeding and Research activities	10.00	10.00	11.00	15.00	20.00	66.00
20	Disaster management	1.00	1.00	1.00	1.00	1.00	5.00
	TOTAL RS.	**337.5**	**342.5**	**345**	**360**	**370.5**	**1755.5**

Chapter – XI

12. Management Plan

(2011 – 2016)

This Management plan is for the period of 10 years and prepared based on the activities to be taken up as indicated in the Master Plan on priority basis in phases and financial year wise. The development activities considered during this five year plan is based on the ground requirement on priority. The details of estimate and design of the work considered in the plan will be submitted year wise. The expected revenue to be collected and funding expected to be received from government and other funding agencies are also provided in the plan. The funding agencies indicated in the Management Plan are likely to change as per availability of fund from time to time.

The Management Plan also list out the procedure to be adopted and person responsible for carrying out different items of works with their financial and administrative powers.

12.1 YEAR WISE DEVELOPMENT PLAN
FINANCIAL PROVISIONS – 2011 to 2015

1 . INFRASTRUCTURE DEVELOPMENT *[All figures Rs. in lakhs]*

S. No.	Items	Year					Total	Funding Agency
		2011-12	2012-13	2013-14	2014-15	2015-16		
1	Visitors circular road 1.5 Km	150.00	100.0	0	0	0	250.00	NLCPR
2	Construction of security wall- 6 Km.	86.00	200.00	100.00	100.00	100.00	586.00	SPA CAMPA
3	Electrification.	0	50.00	0	0	0	50.00	SPA
4	Construction of security gate.	100.00	0	0	0	0	100.00	SPA
5	Construction of feed store.	0	60.00	0	0	0	60.00	State plan
6	Development of water Supply	0	25.00	0	0	0	25.00	SPA
7	Improvement of lake	0	0	100.00	0	0	100.00	CAMPA
8	Recreation park – Children park	7.0	0	0	0	0	7.00	Tourism CAMPA
9	Construction of kiosks – 2 nos.	0	0	5.50	0	0	5.50	State Plan
10	Administrative building-Directors Office	0	0	100.00	0	0	100.00	SPA
11	Guest House	112.00	0	0	0	0	112.00	NLCPR
12	Directors Banglow	0	0	50.00	0	0	50.00	SPA
13	Const. of staff quarters	0	30.00	30.00	0	40.00	100.00	State Plan
14	Interpretation centre	100.00	0	0	0	0	100.00	ACA
15	Public amenities-toilet, drinking water, dustbin etc.	10.00	20.00	20.00	10.00	10.00	70.00	SP
16	Creation of artificial lake.	0	150.00	0	0	0	150.00	Tourism
17	Eco-tourism and trekking facilities	15	0	0	0	0	15.00	Tourism
		0	15.00	0	0	0	15.00	SP
18	Construction of zoo hospital with in patient ward and x-ray unit.	0	40.00	20	0	0	60.00	SPA
	TOTAL RS.	**580**	**690**	**425.5**	**110**	**150**	**1955.5**	

S. No.	Items	Year					Total	Funding agency
		2011-12	2012-13	2013-14	2014-15	2015-16		
	B.F.	**580**	**690**	**425.5**	**110**	**150**	**1955.5**	
19	Botanical garden/ Arboratum	0	0	30.00	30.00	30.00	90.00	SPA
20	Separating wall	50.00	50.00	0	0	100.00	200.00	SPA &CAMPA
21	Orchiderium and gardening	25.00	5.00	1.00	1.00	1.00	33.00	State plan
22	Medicine, tranquilizing and other veterinary hospital equipment.	5.00	6.00	6.00	6.00	7.00	30.00	State plan
23	Purchase of Vehicles, Wireless sets, Computers, Office equipment, Furniture for office, squeeze cage, LCD projector, Ticketing machines etc.,	20.00	10.00	10.00	10.00	10.00	60.00	SPA/ ACA
24	Cafeteria	0	35.00	0	0	0	35.00	SPA
25	Parking Place	0	50.00	30.00	20.00	0	100.00	CAMPA
26	Construction of cattle proof & culvert 3 nos.in the existing road.	0	10.00	20.00	0	0	30.00	CAMPA
27	Construction workshop shed with store.	0	0	10.00	0	0	10.00	State plan
28	Purchase of furniture for Guest house, office and hospital		25.00	25.00	0	0	50.00	State plan
29	C.C. Footpath, small hanging bridge, railing and drain	25.00	25.00	25.00	25.00	25.00	125.00	State plan
30	Workshop section-welding machine, carpentry etc.	10.00	0	5.00	0	5.00	20.00	State plan
	TOTAL RS.	**715**	**906**	**587.5**	**202**	**328**	**2738.5**	

SPA- Special Plan Assistance

NLCPR- Non Lapsable Central pool of resources

CAMPA- Compensatory Forestation Fund Management planning Authority.

ACA – Additional Central Assistant.

SP- State Plan.

TFC- Thirteenth Finance Commission

NEC- North East Council

2. CONSTRUCTION OF NEW ENCLOSURES. ***[All figures Rs. In lakhs]***

S. No.	Items	Year					Total	Funding Agency
		2011-12	2012-13	2013-14	2014-15	2015-16		
1	Leopard common	40	0	0	0	0	40.00	SPA
2	Clouded Leopard Enclosure	0	0	30.00	0	0	30.00	SPA
3	Sambar enclosure	0	60.00	0	0	0	60.00	CAMPA
4	Enclosure for small carnivores like wolf, Hyena, Jackal, Fox etc,	0	50.00	50.00	25.00	0	125.0	State plan
5	Enclosure for capped langur	0	35.00	0	0	0	35.00	SPA
6	Enclosure for Porcupine.	0	0	20.00	0	0	20.00	State plan
7	Enclosure for Wild boar	30	0	0	0	0	30.00	State plan
8	Enclosure for Barking deer with 4 compartments.	0	40	40	0	0	80.00	SPA
9	Enclosure for, goral, serow, hog deer.	0	0	0	100.00	0	100.0	SPA
10	Enclosure for Gharial	0	0	0	50.00	0	50.00	SPA
11	Enclosures for Birds of prey	0	0	60.00	0	0	60.00	Donation
12	Enclosure for Emu	25.00	0	0	0	0	25.00	SP
13	Enclosure for otter	0	0	0	50.00	0	50.00	CAMPA
14	Enclosure for bear	0	70	70	70.00	0	210.0	NLCPR
15	Reptile house	0	0	60.00	0	0	60.00	NLCPR
16	Off display bear rescue centre	0	100.0	0	0	0	100.0	CAMPA
17	Enclosure for thamin and swamp deer	0	0	0	0	80.00	80.00	SP
18	Enclosure for common langur	0	40.00	0	0	0	40.00	SP
19	Enclosure for wild bison	0	0	0	0	40.00	40.00	SP
20	Enclosure for civets, leopard cat and bintorung	0	0	70.00		0	70.00	SP
21	Pheasant enclosure	0	0	0	0	70.00	70.00	SP
22	Enclosure for conservation breeding of hoolock gibbon	60.00	0	0	0	20	80.00	SP
	TOTAL RS.	**155**	**395**	**400**	**295**	**210**	**1455**	

3. RENOVATION AND MODIFICATION OF EXISTING ENCLOSURES AND OTHER MISCELLANEOUS ITEM:

[All figures Rs. In lakhs]

S. No.	Item	Year					Total	Funding agency
		2011-12	2012-13	2013-14	2014-15	2015-16		
1	Nocturnal house	50.00	0	0	0	0	50.00	TFC
2	Maintenance of aviary	0	0	5.00	0	0	5.00	SP
3	Maintenance of Tiger enclosure with stand- off barrier and karaal	19	20.00	0	0	0	39.00	SP
4	Maintenance of clouded leopard Enclosure	6.00	0	0	0	0	6.00	SP
5	Maintenance of old hornbill Enclosure	5.0	0	0	0	0	5.00	TFC
6	Modification of old tiger enclosure into butterfly park	0	0	0	0	20	20.00	TFC
7	Signage, annual report and brochures,	5.00	0	0	0	0	5.00	SP
8	Modification of aviary into walk thorough aviary.	0	0	15.00	0	0	15.00	SP
9	Repair and maintenance of various buildings, like postmortem house, staff quarters, painting and white washing of building in the zoo. Maintenance of water supply including replacement of rusted leaking pipes and misc. maintenance in zoo.	5.00	10.00	10.00	10.00	5.00	40.00	SP
10	Maintenance of barriers and animal enclosure railings, doors and mesh	0.50	4.00	4.00	1.50	0	10.00	TFC
11	Drinking water and Food troughs for animals	0.10	0.40	0.40	0.10	0	1.00	SP
12	Maintenance of visitors facilities	0.20	6.00	5.00	2.00	1.80	15.00	SP
13	Fund for Animal Exchange	2.00	2.00	2.00	2.00	2.00	10.00	SP
14	Modification of present zoo hospital into Intensive care unit	0	50.00	0	0	0	50.00	SP
15	Maintenance of existing road, culvert, breast wall, drain, black topping etc.	60	0	70	0	0	130.00	TFC
16	Battery operated/solar vehicle and wheel chair	0	0	100.00	0	0	100.00	TFC/CAMPA
17	Preparation of DPR of the zoo	30	0	20	0	0	50.00	NEC
	TOTAL RS.	**183**	**92.4**	**231.4**	**15.6**	**28.8**	**551**	

4. RECURRING EXPENDITURE (MAINTENANCE BUDGET)

S. No.	Budget Head	Budget					(Rs. in lakhs)	
		2011-12	2012-13	2013-14	2014-15	2015-16	Total	Funding agency
	NON PLAN 02-111-00-02							
1	Salary	180.00	216.00	260.00	310.00	370.00	1336.00	SP
2	Casual	15.00	20.00	23.00	27.00	35.00	120.00	SP
3	T.A.	1.50	1.75	2.00	2.25	2.50	10.00	SP
4	Medical	30.00	15.00	18.00	20.00	22.00	105.00	SP
5	Office expenditure	1.50	1.75	2.00	2.25	2.50	10.00	SP
6	Machine and Tools	1.00	1.50	1.50	8.00	10.00	22.00	SP
7	Vehicle Maintenance	2.00	2.25	2.50	3.00	3.25	13.00	SP
8	Maintenance	10.00	12.00	15.00	18.00	20.00	75.00	SP
9	Special Purchases	5.00	7.00	10.00	13.00	15.00	50.00	SP
	Total	**246**	**277.25**	**334**	**403.5**	**480.25**	**1741**	
	Total Non-Plan							
	PLAN							
10	Salary	-	-	--	-	-	-	SP
12	Wages	20.00	25.00	30.00	35.00	40.00	150.00	SP
13	Maintenance(feed & upkeepment, security, water supply etc.	100.00	120.00	150.00	200.00	250.00	820.00	SP
14	Medicine	5.00	7.00	8.00	10.00	12.00	42.00	SP
15	Rescue and treatment	50.00	75.00	100.00	125.00	150.00	500.00	SP
16	Vehicle	10.00	5.00	7.00	8.00	10.00	40.00	SP
17	Externally aided Forestry and Biodiversity Project, elephant project.	1.50	1.50	1.50	1.50	1.50	7.50	**SP**
18	Education and Awareness	2.00	2.00	2.500	2.500	3.00	12.00	SP
18	Capacity building	3.00	5.00	5.00	7.00	7.00	27.00	SP/donation
19	Conservation breeding and Research activities	10.00	10.00	11.00	15.00	20.00	66.00	Donation /SP
20	Disaster management	1.00	1.00	1.00	1.00	1.00	5.00	Donation /SP
	TOTAL RS.	**202.5**	**251.5**	**316**	**405**	**494.5**	**1669.5**	

12.2 2nd Five year:

1. INFRASTRUCTURE DEVELOPMENT [All figures Rs. in lakhs]

S. No.	Items	Year					Total	Funding agency
		2016-17	2017-18	2018-19	2019-20	2020-21		
1	Ring road (around the zoo area)	0	100.0	150.0	0	0	250.00	NLCPR
2	Development of organic farming	0	30.0	5.0	5.0	5.0	45	SP
3	Drainage, retaining wall etc.	20.00	0	0	0	0	20.00	SP
4	Conservation breeding centre for native endangered spp.	100.00	0	0	0	100.00	200.00	SPA
5	Fencing around zoo display area (zoo boundary)	0	50.00	0	0	0	50.00	SPA
	TOTAL RS.	**120**	**180**	**155**	**5**	**105**	**565**	

2. CONSTRUCTION OF NEW ENCLOSURES. [All figures Rs. in lakhs]

S. No.	Items	Year					Total	Funding agency
		2016-17	2017-18	2018-19	2019-20	2020-21		
1	Enclosure for Hog deer, mouse deer.	25	10	0	0	0	35.00	SP
2	Enclosure for pangolin	0	0	30.00	30	0	60.00	SPA
3	White tiger enclosure	0	60.00	0	0	0	60.00	TFC
4	Enclosure for rhinoceros.	0	0	0	40	0	40.00	TFC
5	Enclosure for amphibian	10.00	0	0	0	0	10.00	CAMPA
9	Aquarium.	0	50.00	0	0	0	50.00	NLCPR
10	Enclosure for civets.	40	40.00	0	0	0	40.00	SP
10	Enclosure for stump tail and Assamis macaque	30.00	0	40.00	0	0	70.00	SP
11	Aviary for Dronggo	0	40.00	0	0	0	40.00	SP
	TOTAL RS.	**80**	**200**	**70**	**70**	**0**	**420**	

3. RENOVATION AND MODIFICATION OF EXISTING ENCLOSURES AND OTHER MISCELLANEOUS ITEM:

[All figures Rs. in lakhs]

S. No.	Item	Year					Total	Funding agency
		2016-17	2017-18	2018-19	2019-20	2020-21		
1	Renovation of walk thorough aviary	0	20.00	0	0	0	20.00	SP
2	Maintenance of hornbill aviary	0	0	5.00	0	0	5.00	SP
3	Modification of night shelter of Tiger enclosure.	30	0	0	0	0	30.00	SP
4	Maintenance of primate Enclosure	0	6.00	0	0	0	6.00	SP
5	Maintenance of Hospital	0	0	5.0	0	0	5.00	SP
6	Procurement of Laboratory equipment, microchip equipment, tranquilizing equipment etc	10.00	10.00	10.00	5.00	5.00	40.00	NEC
7	Procurement of Laboratory equipment, ultrasound machine	70.00	0	0	0	0	70.00	NEC
8	Signage, annual report, brochures.	0	0	15.00	0	0	15.00	SP
9	Repair and maintenance of various buildings, like postmortem house, staff quarters, painting and white washing of building in the zoo. Maintenance of water supply including replacement of rusted leaking pipes and misc. maintenance in zoo.	5.00	10.00	10.00	10.00	5.00	40.00	SP
10	Maintenance of barriers and animal enclosure railings, doors and mesh	0.50	4.00	4.00	1.50		10.00	SP
11	Drinking water and Food troughs for animals	0.10	0.40	0.40	0.10	0	1.00	SP
12	Maintenance of visitors facilities	0.20	6.00	5.00	2.00	1.80	15.00	SP
13	Fund for Animal Exchange	2.00	2.00	2.00	2.00	2.000	10.00	SP
14	Maintenance of security wall, separating wall, fencing etc.	0	0	30.00	0	10.00	40.00	SP
15	Maintenance of electrification	5.00	0	0	0	2.00	7.00	SP
16	Maintenance of water body	15	0	0	15	0	30.00	
	TOTAL RS.	**137.8**	**58.4**	**86.4**	**35.6**	**25.8**	**344**	

4. RECURRING EXPENDITURE (MAINTENANCE BUDGET)

S. No.	Budget Head	Budget (Rs. in lakhs)						Funding Agency
		2016-17	2017-18	2018-19	2019-20	2020-21	Total	
	NON PLAN 02-111-00-02							
1	Salary	370.00	370.00	380.00	380.00	385.00	1885.00	SP
2	Casual	35.00	35.00	35.00	35.00	35.00	175.00	SP
3	T.A.	2.50	2.50	2.50	2.70	2.75	12.95	SP
4	Medical	30.00	15.00	18.00	20.00	22.00	105.00	SP
5	Office expenditure	1.50	1.75	2.00	2.25	2.50	10.00	SP
6	Machine and Tools	1.00	1.50	1.50	8.00	10.00	22.00	SP
7	Vehicle Maintenance	2.00	2.25	2.50	3.00	3.25	13.00	SP
8	Maintenance	10.00	12.00	15.00	18.00	20.00	75.00	SP
9	Special Purchases	5.00	7.00	10.00	13.00	15.00	50.00	SP
	Total	**457**	**447**	**466.5**	**481.95**	**495.5**	**2347.95**	
	Total Non-Plan							
	PLAN							
10	Salary	-	-	--	-	-	-	
12	Wages	40.00	45.00	45.00	45.00	46.00	221	SP
13	Maintenance(feed & upkeepment, security, water supply etc.	250.00	253.00	254.00	260.00	260.00	1277	SP
14	Medicine, equipment, tranquilizing drug and equipment.	10.00	10.00	8.00	10.00	12.00	50.00	SP
15	Rescue and treatment	10.00	10.00	10.00	10.00	10.00	50.00	SP
16	Vehicle	10.00	5.00	7.00	8.00	10.00	40.00	SP
17	Externally aided Forestry and Biodiversity Project, elephant project.	1.50	1.50	1.50	1.50	1.50	7.50	SP
18	Education and Awareness	2.00	2.00	2.50	2.50	3.00	12.00	SP
18	Capacity building	3.00	5.00	5.00	7.00	7.00	27.00	SP
19	Conservation breeding and Research activities	10.00	10.00	11.00	15.00	20.00	66.00	SP
20	Disaster management	1.00	1.00	1.00	1.00	1.00	5.00	SP
	TOTAL RS.	**337.5**	**342.5**	**345**	**360**	**370.5**	**1755.5**	

12.3. **Projected Revenue Collection**: Projected year wise revenue collection for the plan period of 5years:

Sl No	Year	Expected Revenue (in lakh)
1	2011 - 2012	11.10
2	2012 - 2013	16.00
3	2013 - 2014	16.50
4	2014 - 2015	17.00
5	2015 - 2016	17.50
6	2016 - 2017	18.00
7	2017 - 2018	18.50
8	2018 - 2019	19.00
9	2019 - 2020	19.50
10	2020 - 2021	20.00

12.4. **Duties and Responsibilities:**

12.4.1. **Director**:

Director is the overall in-charge of the zoo. He/she is responsible for smooth functioning of the zoo, proper housing upkeep and health care of the animals, proper visitor management and ensuring their safety. He is also responsible for overall administration, finance, interacting with media and any other important issues relating to zoo. For discharge of these functions smoothly the responsibilities and duties are assigned to all the zoo personnel as per **guidelines issued by CZA.** The directions issued by the Director are binding on all zoo personnel. The duties and responsibilities for the post are as follows:-

12.4.2 **Veterinarian**;

Upkeep, health care, feeding and management of zoo animal is the primary duty of the veterinarian. Frequent visits to animal enclosures and assessing general health condition of the animals and timely screening of animal for parasitic load. Preparation of disinfection schedules, prophylactic treatment schedules, vaccination of zoo animals and ensuring the implementation of same. Taking steps for timely restraining and treatment of sick animals, maintenance of treatment record card and conducting post mortem. He is also responsible for tranquilization, crafting, shifting and transportation of zoo animals. He will control the feed store and maintain record and stock ledger with the help of store keeper. He will also ensure the quantity and quality of feed supplied to the zoo animals.

12.4.3 Range Forest Officer:

Upkeep and maintenance of animal collection and animal housing, including timely cleaning and disinfection of animals enclosure, timely feeding of animals in the prescribed manner, keeping a close watch on general health conditions of the animals and taking steps for getting sick animal treated on priority basis including crafting, shifting of animals and transportation of animals within the zoo. He is also responsible for construction and maintenance of animal enclosure, building, roads and other infrastructure. He will also personally supervise the progress of Orchiderium, Arboretum, security, lawn and garden.

12.4.4 **Biologist/Scientific Officer**:

Record keeping, maintenance of animal history card, preparation of animal inventory, Education, research on behavior and biology of animal, training, genetic management of animals by formulating breeding policy and animal exchange. He is also responsible for enrichment of animal enclosure and preparation of brochures, booklets, CDs, signage etc.

12.4.3. **Formation of health advisory and expert committee** shall be done from time to time as per requirement. Technical expert like engineer, radiologist, dentist, ophthalmologist etc. will be outsourcing- as and when required.

****

Appendix- I

Existing animal collection plan:

Common Name	Zoological Name
(A) MAMMALS	
1. Indian Tiger	*Panthera tigris tigris*
2. Himalayan Black Bear	*Selenarctos thibetanus*
3. Clouded Leopard	*Neofelis Nebulosa*
4. Leopard Cat	*Felis bengalensis*
5. Common Palm Civet	*Paradoxurus hermophroditus*
6. Himalayan Palm Civet	*Paguma larvata*
7. Himalayan Yellow throated morten	*Mortes ttavigula*
8. Porcupine	*Hystrix indica*
9. Cat Jungle	*Pelis chaus*
10. Slow Loris	*Nycticebus coucang*
11. Assamese macaque	*Macaca assamensis*
12. Rhesus macaque	*Macaca mulatta*
13. Stump tailed macaque	*Macaca speciosa*
14. Indian Elephant	*Elephus maximus*
15. Sambar	*Cervus unicolor*
16. Nilgai	*Boselaphus tragocamelus*
17. Barking Deer	*Muntiacus muntjac*
18. Common Giant Flying Squirrel	*Petaurista petaurista*
19. Hoolock Gibbon	*Bunopheticus Hoolock*
20. Goral	N*emorhaedus goral*
21. Indian Pangolin	*Manis Crassicaudata*
21. Serow	*Capricornis sumatraensis*
(B) AVES :	
1. Oriental pied hornbill	*Anthrracoceros coronatus*
2 .Crested Hawk Eagle	*Spizaetus cirrhatus*
3. Owl eagle	*Bubo bubo*
4. Great pied Hornbill	*Buceros bicornis*
5. Common peafowl	*Pavo cristatus*
6. Pelican	
7. Rose ringed parakeet	*Psittacula krameri*
8. Common Myna	*Acridothares tristis*
9. Wood owl	
10. Emerald dove	
11. Dove	
12. Barbet	
13. Drongo	
14. Egret	
15. Silver pheasant	
16. Lady Amherse	
(C) REPTILES	
1. Long snouted Gharial	*Gavialis gangeticus*
2 Python	*Python molurus*

Appendix- II

Enclosure wise display of animals of Biological Park , Itanagar.

Sl.No.	Name of the enclosure	Species Displayed	No. of animals			Total
			M	F	U	
1.	Tiger enclosure	Tiger	2	1	-	3 Nos.
2.	Tiger land	Tiger	2	1	-	3 Nos.
3.	Bear moat	Himalayan Black Bear	3	1	-	4 Nos.
4.	Rescue Center	Himalayan Black Bear	2	1	-	3 Nos.
5.	Deer Park	Sambar	5	1	-	6 Nos.
		Nilgai	1	-	-	1 No.
		Barking deer	6	7	5	31 Nos.
6.	Monkey enclosure	Rhesus macaque	3	7	12	32 Nos.
		Assamese macaque	2	-	-	2 Nos.
7.	Common leopard enclosure	Leopard common	3	1	-	4 Nos
8.	Clouded leopard enclosure	Clouded leopard	1	-	-	1 No.
9.	Hoolock enclosure- 4 Nos.	Hoolock	9	4	5	18 Nos.
10.	Gharial Pond	Gharial	1	1	0	2 Nos.
11.	Python enclosure	Rock Python	2	2	2	6 Nos.
12.	Aviary-II	Parakeet	1	1	-	2 Nos.
		Spotted-dove	9	10	3	32 Nos.
		Love bird	1	1	-	2 Nos.
		Red Jungle fowl	1	3	4	4 No.
	Aviary-II(part)	Silver pheasant	2	7	-	9 Nos.
		Lady Amherst pheasant	1	1	-	2 Nos.
		Blue & Yellow Macaw	1	1	-	2 Nos.
13.	Hornbill enclosure 2 Nos.	Hornbill great pied	1	1	-	2 Nos.
		Oriental pied hornbill	1	1		2 nos.
		Forest Eagle Owl	0	0	1	1 No.
		Wood owl	-	1	-	1 No.
		Vulture	0	0	1	1 No.
14.	Emu Enclosure	Emu	1	-	-	1 No.
15.	Aviary- I	Himalayan Palm Civet	1	2	-	3 Nos.
		Leopard cat	3	-	-	3 Nos.
		Porcupine	-	1	-	1 No.
		Slow-loris	4	-	-	4 No.
16.	Tortoise	Tortoise	4	1	0	5 Nos.
17.	Capped Langur	Capped Langur	1	0	0	1 No.
18.	Fox	Fox	0	0	1	1No.
	Total					**192 Nos.**

Appendix-III

Free living floral species occurring in the zoo campus:

A. **Flora**:

Local Name	Scientific name
Borpat	*Ailanthus of integrifolia*
Kathal	*Artocarpus heterophyllus*
Moj	*Albizia lucida*
Sirish	*Albizia falcatoria*
Jutili	*Altingia excelsa*
Kanchan	*Bauhinia acuminata*
Kanchan	*Bauhinia racemesa*
Kanchan	*Bauhinia purpurea*
Kanchan	*Bauhinia veriegata*
Uriam	*Bischofia javanica*
Dhuna	*Canarium strictum*
B/Poma	*Chukrassiae tabularis*
Madar	*Erythrina stricta.*
Bor	*Ficus bengallensis*
Peeple	*Ficus religiosa*
Titachapa	*Michelia champaca*
Bola	*Morus lavigata*
H/Poila	*Ptrerosparium Acerifolum*
Lichu	*Spondias Aurilaris*
Udal	*Sterculia villosa*
Saram	*Syzygium Cuminil*
Jamera	*Syzygium jambos*
Tateli	*Tamarindus indica*
Hollock	*Termimalis Myriocarpa*
Sefali	*Nyctanthes arbortnistia*
Otenga	*Dillenia indica*
Sam kathal	*Artocapus chaplasa*
Mekahi	*Phoeba atterata*
Khokan	*Duabanga intigrifolia*
Hillika	*Terminalia chehula*

Baramthmi	*Talaina loggsonil*
Bhelu	*Tetrameles nudiflora*
Mekai sal	*Schima wallichii*
Monisal	*Sapindus faraua*
Gohora	*Premna qungalansis*
Phulsopa	*Pachylarnex plaiocarpa*
Pansopa	*Michelia montana*
Mahuna	*Madhuca butyraccoides*
Chetahola	*Hovenia acerba*

Medicinal plants,herbs and shrubs

Hilika	-	*Terminalia chebula*
Bahera	-	*Terminalia belerica*
Gamari	-	*Gmelia arborea*
Bhatgila	-	*Oruxylem indicum*
Nahar	-	*Mesua ferrea*
Tita champa	-	*Mechelia champaca*
Bogori	-	*Zizephus jujuba*
Amlokhi	-	*Emblica officinales*
Lajjalu	-	*Mimosa pudica*
Shatavari	-	*Asparagus Racemosus*
Pishach Karasa	-	*Abroma augustalinn*
Vacha	-	*Acorus calamus linn*
Bilva	-	*Aegle morelos corea*
Kanchan	-	*Bauhinia variegata linn*
Nalika	-	*Cinnamomum Tamala*
Taz pat	-	*Cinnamomum zeylanicum*
Udambora	-	*Ficus racemosa*
Bakul	-	*Mimusops elengi*
Ham pippli	-	*Piper mullesus buch*

Bamboo species:

Bijili (*Bambusa pallid*) Jati (*Bambusa tulda*) Bakal (*Bambusa vulgaris*), Kako (*Dendrocalamus hamiltonii*), Hill jati (*Oxytenanthera parvifolsa*).

Orchid species

Anoectochilus brevilabris, Anoectochilus lanceolatus, Aorchis robrovski, Ponerorchis chusha, Cymbidium Dendrobium,Keikis,Coelogyne flaccid, Cymbidium Elegane, Sacroglyphis, Rhynchospylis,Cymbidium, Renades'Arunadaya'.

Cane species

Calamus garuba (Sundi), *Calamus tenuis* (Jati bet), *Calamus flagellum* (Raidung bet), *Calamus latigolius* (Houka bet), *Calalmus floribundus* (lejai)

Miscellaneous valuable plants **:** Tree ferns, Begonias, Aroids, Pteris(ferns), Walking ferns, Bralutferns, Cletrodendrums (Shrub), Luculia (Shrub), Pavita (Shrub), Bauhinia (Climber), Aristolochia, Thumbergia, Livistonia spp. (Toko), Gereniums / Primulas, Pulsams, Mosses & Lichens, Mushrooms

B. Faunal species:

1. Birds:

Crested Serpent-Eagle	*Spilornis cheela*
Red Jungle fowl	*Gallus gallus*
Kaliz Pheasant	*Lophura leocomelanos*
Blue Rock Pigeon	*Columba livia Gmelin*
Spotted Dove	*Streptopelia chinensis*
Emerald Dove	*Chalcophaps indica*
Orange-breasted Green-pigeon	*Treron bicincta*
Red-breasted Parakeet	*Psittacula alexandri*
Asian Barred Owlet	*Glaucidium cuculoides*
Spotted Owlet	*Athene brama*
Jungle Owlet	*Glaucidium radiatum*
Common Swift	*Apus apus*
White-breasted kingfisher	*Halcyon smyrnenesis*
Common Hoopoe	*Upupa epops Linnaeus*
Great Barbet	*Megalaima virens*
Blue-throated Barbet	*Megalaima asiatica*
Cremsion/Fronted Barbet	*Megalaima rudrikpilla*
Yellow-rumped Honeyguide	*Indicator xanthonotus Blyth*
Black-naped Green Woodpecker	*Picus canus Gmelin*
Scarlet Minivet	*Pericrocotus flammeus*
Red-whiskered Bulbul	*Pycnonotus jocosus*

Red-vented Bulbul	*Pycnonotus cafer*
Red-vented Bulbul	*Pycnonotus cafer*
White-throated Bulbul	*Alophoixus flaveolus*
Black Bulbul	Hypsipetes leucocephalus
Gold-fronted Chloropsis	*Chloropsis aurifrons*
Orange-bellied Chloropsis	*Chloropsis hardwickii Jardine & Selby*
Shrikes	*Lanius schach Linnaeus*
Oriental Magpie-Robin	*Copsychus saularis*
Little Forktail	*Enicurus scouleri Vigors*

2**. Mammals** :

House shrew	*Anouroures squamies*
Jackal	*Canis aureus*
Barking Deer	*Muniacus muntijack*
Palm civet	*Paguma larvata*
Gaint Flying Squirrel	*Petaurista petaurista*
House Rat	*Rattus rattus*
The Eastern Mole	*Talpa micrura*
Tree shrew	*Tupia glis*
Long Tailed Rat	*Vandeleuria oleracea*
Fox	*Vulpes bebgalensis*
Indian porcupine	*Hystrix Indica*
Yellow throated morten	*Martes flavigula*
Slow Loris	*Nycticebus caucang*
Spotted linsang	*Prionodon pardicolor*

3.R**eptiles** :

Python molurus

Amphiesma stolatum (Linn.)

Ahaetulla prasinu

Bungarus niger Wall

Dedrelaphis pictus (Gmelin)

Elaphe radiate (Schlegel)

Liopeltis stoliczkae(Sclater)

Lycodon jara (Shaw)

Naja Naja

Naja kauthia lesson

Natrix piscator

Natrix punctulata

Python morules

Ptyas mucurus

Ptyas korros (Schelegel)

Rhabdophis himalayanus (Gunther)

Typhiops diardi (Schlegel)

Xenochrophisus jpunctulatu (Gunther)

3.**Amphibian:**

Megophrys major

M. Parva

Uperoden globulosus

Amolops formorus

Euphlyctyis cyanophlyctis

Fejervarya nepalensis

Hoplobatrachus crassus

H tigerinus

Phrynoglossus borealis

Rana tytleri

Polypedates megacephalus

P terainensis

Rhacophorus maximus

Philatus shyamrupus

Appendix-IV

Present staffing pattern and position:

Deputy Chief Wildlife Warden cum Ex-Officio Zoo Director is also given the responsibilities of protection and conservation work of Itanagar wildlife sanctuary.

Sl. No	Name of the post	Staff Position
1	Director	1
2	Veterinary Officer	1
3	Range Forest Officer/Curator	1
4	Dy. RFO	1
6	Stock man/ Vety. Field Assistant	1
7	Forester	3
9	Forest Guard	4
10	Head Assitt.	1
11	U D C	1
12	L D C cum computer assistant	1
13	Driver (LV & HV)	3
14	Handy man	1
15	Peon	1
18	Regular Animal attendant	4
19	Contingency Animal Attendant	33
20	Contg. Cook	2
21	Daily wages	17
	Total	**76**

Appendix- V

List of Building other than animal enclosure;

Residential Building

1)	SP Type III Building -- -- -- -- -- --	2 Nos.
2)	SP Type II Building -- -- -- -- -- -- --	8 Nos.
3)	SP Type I Building -- -- -- -- -- --	8 Nos.
4)	SP Type 4 roomed barrack --	3 No.
5)	M.I.B Type 4 roomed Barrack -- -- --	2 Nos.(Unserviceable)
6)	M.I.B. Type 2 roomed Barrack -- -- -- --	6 Nos.(unserviceable)
	Total	**29 Nos**.

Non-Residential Building

1)	SP Type Range Office -- -- -- -- -- --	1 No.
2)	SP Type Veterinary Hospital --	1 No.
3)	Post Mortem House -- -- -- -- -- -- -	1 No.
4)	SP Type Kitchen Cum food store -- --- --	1 No.
5)	SP Type 3 roomed Garage -- -- -- --	1 No.
6)	SP Type 2 roomed Garage -- -- -- --	1 No.
7)	SP Type conference Hall -- -- --- -- -	1 No.
8)	SP Type Ticket Counter -- -- -- -- --	1 No.
	Total	**8 Nos.**

--- @@@ ---

Enclosed please find herewith

01. **A copy of approved Master (layout) plan of Biological Park, Itanagar Zoo**

02. **A copy of forwarding letter of above**

03. **A soft copy of the Master Plan (Final) after modification, etc. as desired, vide your letter No. F No. 19-66/92-CZA(28)(Vol. IV)(M)/1109 Dtd. 03.07.2012**