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O/o Central Zoo Authority

Diary No. 001

Date 13/9/12



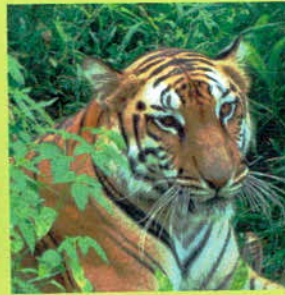
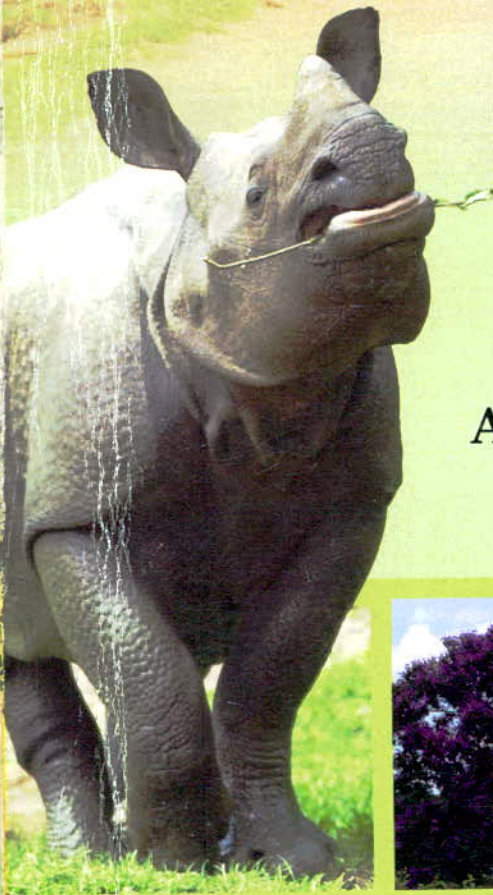
MASTER PLAN

(2011-12 to 2020-21)

of

Assam State Zoo-cum-Botanical Garden

Assam Forest Department



Prepared by
Utpal Bora, IFS

O/o Central Zoo Authority

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OF

ASSAM STATE ZOO *cum* BOTANICAL GARDEN

Prepared by



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1940

1941

1942

CONTENTS

PART – I, CHAPTER – I		Page No
1.	Introduction	1
1.1	History	4
1.2	Location	7
1.3	Bio-geographic region	7
1.4	Physical feature	7
1.4 (a)	Topography	7
1.4 (b)	Geology, rock and soil	8
1.5	Land used pattern of the zoo	8
1.6	Flora and Fauna	10
1.6(I)	Flora	10
1.6 (II)	Fauna	19
1.7	Climate and rainfall	20
1.8	Season	21
1.9	Approach	21
1.10	Demography of the surrounding area	22
1.11	Legal status of the land	23
1.12	Sources of pollution	23
1.13	Present ground situation	24
1.14	Layout	25
1.15	Description of different facilities	26
1.16	Difficulties faced in the management	27
1.17	Attempts for a new master plan	29
PART – I, CHAPTER – II, APPRISAL OF THE PRESENT ARRANGEMENT AND CONSTRAINTS		
1.	Animal section	30
1.1	Breeding in captivity	31
1.2	Successful Captive Breeding	31
1.3	Single sexed animals	32
1.4	Collection plan	33
1.5	Conservation Breeding	33
1.6	Rescue and rehabilitation	34
1.7	Adoption of animals	35
1.7 (I)	The salient features of the scheme	35

1.8	Identification of zoo captives	37
2.	Zoo administration	37
2.1	Divisional Forest Office	37
2.2	Zoo Range Office	37
2.3	Veterinary wing	38
2.4	Botany wing	39
2.5	Engineering wing	40
3	Veterinary Hospital	41
3.1	Functioning of veterinary section	41
4.	Store and feed supply	42
4.1	Feed store	43
4.2	Kitchen	43
4.3	Supply of food	44
5.	Maintenance	45
5.1	Dewatering of the moats	45
5.2	Sanitation	46
5.3	Disposal of solid & liquid waste	46
6.	Security	46
6.1	Security threat	46
6.2	Security arrangement	47
6.3	Gates and barriers	47
7.	Water and power supply	47
7.1	Water supply	47
7.2	Power supply	48
8.	Visitors amenities	49
9.	Educational awareness	52
10.	Road	54
11.	Research	55
12.	Administrative building	55
13.	Residential colonies	56

PART – II, CHAPTER – I, FUTURE OBJECTIVE INCLUDING MISSION STATEMENT /THEME

1.	Concept plan	57
1.1	Objectives	57
1.2	Mission	57
1.3	Vision	58
1.4	Theme	58

1.5	Master Plan Period	58
2.	Strategy for achieving the objectives	58
2.1	Scientific study and database	58
2.2	Conservation breeding	59
2.3	Conservation Education and Awareness	60
2.4	Housing, Health Care and Environment Enrichment	60
2.5	Rescue and Rehabilitation	61
2.6	Capacity building	62

PART- II, CHAPTER- II, FUTURE ACTION PLAN

1.	Proposed Animal Collection Plan including population size	63
1.1	Animal collection plan and justifications	63
2.	Layout plan	64
2.1	Animal enclosures	65
2.2	Details of animal enclosures	67
3.	Visitor's circulation & amenities	76
3.1	Visitor's circulation	76
3.2	Visitor's amenities	79
4.	Water supply	84
5.	Electricity supply	85
6.	Solid and liquid waste disposal	86
7.	Roads/path	86
7.1	Improvement	87
7.2	New construction	88
8.	Residential colony	88
9.	Gates & barriers	89
9.1	Improvement/ renovation	89
9.2	New gates	89
10.	Administrative building	90
11.	Veterinary section	91
11.1	Veterinary Hospital	91
11.2	Reference library	91
11.3	Assistance from specialist	92
12.	Store & feed supply section	92
13.	Sanitation section	92
14.	Flora & Fauna	92
14.1	Flora	92
14.2	Fauna	95

15.	Problem faced	95
16.	Rescue and rehabilitation	97

PART-II, CHAPTER-III, PERSONNEL PLANNING

1.1	Proposed cadre strength	99
1.2	Staff recruitment	102
1.3	Management of cadre & mode of deployment	102
1.4	Outsourcing	102

PART-II, CHAPTER-IV, DISASTER MANAGEMENT

1.	Anticipated disasters	103
1.1	Fire	103
1.2	Natural causes	103
1.3	Earthquake	104
1.4	Heat wave	104
1.5	Cold waves	104
1.6	Law and Order Breakdown	104
1.7	Feed supply	105
1.8	Requirement of Tools	105
1.9	Linkages with others	105
1.10	Line of Command	106
1.11	Training and Capacity building	108
1.12	Mock drills	108

PART-II, CHAPTER-V, CONTINGENCY PLAN

1.	Wild Animal Rescued	109
1.1	Trap cages	110
1.2	Vehicles	110
1.3	Tranquilizing equipment and chemicals	110
2.	Escape of animals from enclosures	110
2.1	Forewarning people & staff about emergencies	112
2.2	For detailing of animal escape	113
2.3	Use of tranquilization gun & technique of chemical restrain	113
2.4	Quick response unit	114
3.	Free living monkey & stray dog menace	114
3.1	Monkey menace	114
3.2	Control of stray dogs	114
4.	Arrangement of food in case of strike	115

5.	Snake bite	115
6.	Visitors getting injured/falling inside enclosure & First-Aid	116
7.	Fighting among animals	116
8.	Epidemics	117
9.	Break down of power supply	117

PART-II, CHAPTER-VI, CAPACITY BUILDING

1.1	In house Training	118
1.2	On the Job training	119
1.3	To encourage specialization	119
1.4	Annual rewards	120
1.5	Recreation/ Relaxation	120
1.6	Training abroad	120
1.7	Plan to upgrade skills of zoo staff	120
1.8	Interaction with other zoos- Regional co-operation	120

PART-II, CHAPTER-VII, e-GOVERNANCE

1.1	Local area networking	121
1.2	GIS Mapping	122
1.3	CCTV's	122
1.4	Wireless Network	122
1.5	Main Gate entry	123
1.6	Animal History	123
1.7	World Association of Zoos & Aquarium (WAZA)	123
1.8	Web site & e-mail	123

PART-II, CHAPTER-VIII, BROAD BUDGET ANALYSIS FOR IMPLEMENTING THE PLAN

Construction and Development (Non-recurring & Recurring)	124
Abstract	130

PART-III, CHAPTER-I, MANAGEMENT PLAN (BUDGET) 131

LIST OF ANNEXURE

<i>Annexure – I</i>	: Flora of the Assam State Zoo cum Botanical Garden
<i>Annexure – II A</i>	: Fauna of the Assam State Zoo cum Botanical Garden
<i>Annexure – II (B)</i>	: Check-list of the Birds of ASZBG campus
<i>Annexure – II (C)</i>	: Check-list of the Reptiles of ASZBG campus
<i>Annexure – II (D)</i>	: Check-list of the Amphibians of ASZBG campus
<i>Annexure – III</i>	: Existing Layout map of ASZBG

<i>Annexure – IV (A)</i>	: Animal Inventory (2010-11)
<i>Annexure – IV (B)</i>	: Stock position of Birds, mammals and reptiles, 2010-11
<i>Annexure – V</i>	: Breeding of Zoo Captives
<i>Annexure – VI</i>	: Single sexed animal available in Assam State Zoo as on 31/03/2011
<i>Annexure – VII</i>	: Rescue of wild animals & birds by Assam State Zoo (2010-11)
<i>Annexure – VIII</i>	: Health Advisory Committee
<i>Annexure – IX</i>	: Details of visitors & revenue collected during the last 10 years
<i>Annexure – IX (A)</i>	: Entry fee etc.
<i>Annexure – X</i>	: Concept Plan
<i>Annexure – XI</i>	: SMART (Strength, Measurable, Achievable, Reasonable and Time) on OBJECTIVES:
<i>Annexure – XII (A)</i>	: Proposed Collection Plan (Animal)
<i>Annexure – XII (B)</i>	: Bird Collection Plan
<i>Annexure – XII (C)</i>	: Abstract of Collection Plan
<i>Annexure – XIII (A)</i>	: Master Layout Plan of ASZBG
<i>Annexure – XIII (B)</i>	: Layout map showing electric line, water supply and distribution line, drainage, vision shed, primary water point, toilet etc.
<i>Annexure – XIV</i>	: Check-list for the Butterflies of ASZBG campus
<i>Annexure – XV</i>	: Suggested staffing pattern



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PREFACE

The Assam State Zoo *cum* Botanical Garden, one of the large zoo and important *Ex-situ* conservation centre of the country with an area of 175 ha, was established in the year 1957. Apart from 113 species of zoo animals, a tract of natural forest and a Botanical Garden also exist in the zoo campus providing habitat for many free ranging animals and birds. The Zoo has been playing as an important *ex-situ* conservation as well as environment education institution. Special emphasis has been given to incorporate necessary elements of behavioural and habitat requirements of the animal housed in the animal enclosures. The modern zoo hospital is a well equipped one and capable of providing good health care and monitoring on daily basis. Assam State Zoo *cum* Botanical Garden (ASZBG) has been playing praise worthy role in rescue and rehabilitation of distressed mammals, reptiles and birds and so far numerous rescued animals have been rehabilitated after providing necessary treatment.

An area of 125 ha comprising Botanical Garden and natural forest existing inside the zoo campus acts as of the finest tract of floral conservation and hence considered very important for nature education. The unique rock formation and few natural lakes of the zoo campus have enough potentialities which can be utilized for studying geological study and wetland ecology.

Every zoo of the country must have a long term Master Plan as per the mandate of Central Zoo Authority and National Zoo Policy. Zoo Master Plan envisions the future of the zoo and provides strategies to achieve various objectives of zoo management. Necessary steps were initiated in the past to have a scientifically prepared master plan the origin of which goes back to 1998, the year of Government notification no.FRW.25/98/6 dated 12th October'1998. In this notification 8 members were selected for preparation of a long termed Master Plan for ASZBG. Subsequently another notification, No FRW.25/98/pt/3 dated 30th June'1998 was issued notifying 13 members to initiate necessary steps for preparing a Master Plan for ASZBG. It was followed by holding of two meetings, one in July'1999 and another in April'2000. The Central Zoo Authority asked Pushpa Kumar, a Zoo Consultant to prepare the Master Layout Plan for Assam State Zoo *cum* Botanical Garden. The Master Layout Plan prepared by him was submitted in Novermber'2005, but had not been accepted by the Central Zoo Authority (CZA). An effort was made by Shri N. Mahanta the then DFO, Assam State Zoo Division and a draft plan was submitted to the CZA. However, the expert committee raised several issues pertaining to this draft master plan. Hence, a serious and scientific effort was made to compile and prepare a Master Plan by addressing all the issues raised by the expert committee, such as guideline for preparation of Master plan, preparation of a proper map etc. The present master plan will encompass comprehensive and detailed information on Assam State Zoo *cum* Botanical Garden that will provide a clear road

map for next 10 years (2011-12 to 2020-21). The present plan is based on the concept plan approved by the Central Zoo Authority for ASZBG. Following are the salient features of this Master Plan:

Objectives: Focusing mainly on the complementing and strengthening the national efforts in conservation of rich biodiversity, particularly the wild fauna of the Northeast region, following objectives of the Master Plan for Assam State Zoo cum Botanical Garden (ASZBG) are set -

- (i) To provide opportunities for doing scientific studies and creation of database useful for both *in-situ* and *ex-situ* conservation.
- (ii) To carry out coordinated breeding of the endangered species of the region in *ex-situ* condition for restocking and reintroducing whenever require.
- (iii) To provide unique opportunity to visitors for wildlife education utilizing ambience of the zoo in consistence to the adequate safety and upkeep of zoo for eliciting empathy towards wild fauna.
- (iv) To provide adequate and near natural housing for zoo captives by ensuring high standard health care and ethical treatment.
- (v) To function as rescue and rehabilitation center for distressed wild fauna

Master Plan Period:- The Master Plan for Assam State Zoo-cum-Botanical Garden is for a period of 10 years i.e. from (2011-12 to 2020-21).

Mission: To sensitize people, in consistence with the finest upkeep of the species, through adequate visitation, recreation facilities and education to elicit support in conserving wild fauna and flora of the North East Bio-geographic zone; and to elevate Assam State Zoo-cum-Botanical Garden into an ideal institution for conservation breeding of the rare, endangered and endemic species of fauna of the Region.

Vision: This Zoo envisions creating a mechanism for enhancing expertise on excellent upkeep and *ex-situ* conservation of the rare and endangered fauna and flora of the region.

Theme: Considering the unique physical feature, location and the existing infrastructure, the theme of the plan for the ASZBG is adapted as "mixed theme comprising ecological and behavioral aspects with some elements of taxonomic display of wild animal species of national importance with special emphasis on fauna of north eastern India. The objectives so delineated have been examined under SMART (Strength, Measureable, Achievable, Reasonable and Time) analysis.

Animal Collection Plan: The environment and location of this zoo are suitable for breeding and exhibiting Indian fauna of tropics and sub tropics. Recognizing the importance of large zoos in providing nature education as well as their role in scientific research on different aspects of wild animals, emphasis is given on displaying fauna of the North East region in particular and the country in general. The mammalian species, such as hog badger, clouded leopards, otter, giant squirrel, different reptiles and birds of regional importance and the endemic species like pygmy hog, wild buffalo, golden langur, hoolock gibbon etc. have been included in the collection plan. The zoo has the

past experiences on caring and up keeping these animal species. These will not only play significant role in education, collecting information on biology, behaviour, management and conservation of these endangered species in their *in-situ* habitats but also will help creating awareness among the public for their protection and conservation.

ASZBG has gathered sufficient experience and manpower to care of these animals. With the changes of the objectives of zoo in the country, though exhibition of such species are not encouraged now, yet at present the zoo has still some of these exotics species like Giraffe, white rhino, emu, macaw, and cockatoo etc. which are certainly need to be kept for future exhibition. ASZBG has sufficient space for accommodating more such animals according to the norms of the CZA within its allotted area. Since long back, procurement of exotic animals has been almost ceased. As a result some of them are surviving as singled sex or lone. Therefore, in the plan, provisions for acquiring animals are also made.

Layout Plan: The Master Layout Plan for the ASZBG has been prepared according to the specifications of the CZA in prescribed scale, contour intervals and specific colour indications of the enclosures. The map has been prepared in two different sets to show clearly all the features as per the CZA's direction, - (i). map showing comprehensively different categories of enclosures with colour, types of barriers, hedge, and location of footpath, night house etc. and other (ii) showing electricity network, water supply, drainage etc. to avoid clumsiness. The Master Layout Plan has been approved by the CZA.

Animal Enclosure: Consistent to the theme of the plan maximum importance have been given on ecology, behavior, habitat preferences, biological requirement, etc. of a species while selecting enclosure location. In the Layout Plan housing location, screening night house etc. are indicated for the animals, birds and reptiles. In the same time, effort has been made to display the exhibits in a systematic order and attractive manner so that visitors are exposed to a conservation education friendly atmosphere. The proposal on enclosures has given emphasis on physical well being of the zoo animals and also maintaining the unique topography and natural vegetation to a greater extent. Effort has been made so that modification of topography and vegetation need a bare minimum change. Enclosures for herbivores, carnivores, some of the primates are provided with open air ones with dry and wet moat barriers. Chain link mesh fence, glass or wall like barrier is also to be provided in some specific cases. For new enclosures, immersion effect is also considered. However, most of the enclosure/cages are quite old and hence need to be dismantled and redone and all elements of scientific enclosure are to be incorporated.

Few primate and herbivores enclosures and also carnivore enclosures (tiger, lion, and clouded leopard) have been provided with appropriate feeding cubicles locations.

Primate enclosure for Hoolock gibbon, Golden Langur, Common langur and enclosures for Royal Bengal Tiger, Lion, Rhino, aquatic birds etc. have adequate space and cover for young ones. The enclosures proposed for new construction, modification and redone are being provided with well located feeding cubicles-cum night-shelter, proper enrichment so as to commensurate with individual requirement of the species along with keeping more than the prescribed area of the CZA for each enclosure.

In the layout plan of the master plan, altogether 93 structures have been proposed which include 75 enclosures for animal exhibits and 14 for other related structures viz. conservation breeding areas, site for rescued wildlife, site for excess animal, quarantine facility, beef house, fodder house, silo pit, interpretation centre, and isolation ward etc. Besides 4 sites have been earmarked as 'available' for future requirement i.e one in the old site of elephant enclosure, 2nd in primate section, 3rd in Thuja area and 4th in Conservation Breeding area, so that similar classes of species may be housed in future. The proposed 75 animal enclosures will accommodate 180 captive species, the details of which are provided in the animal collection plan. As a matter of fact, majority of enclosures are very old as they were constructed at least 4-5 decades ago. Further, these are found not suitable for housing animals in a scientific manner and do not correspond to the standard of modern zoo management concept. Hence, the zoo management has no other option except to initiate drastic changes on housing facilities.

Accordingly, master plan proposes to accommodate 11 completely new enclosures for new species, 40 to be modified to a large extent for existing species and 17 to be demolished and redone. The existing 9 enclosures including two Rhino Breeding enclosures of recent origin are found still to be in better condition, will be retained as such.

Conservation breeding : Out of the total 5 designated species suggested by the CZA for conservation breeding, the zoo has initiated steps for systemic conservation breeding programme for 3 species - Rhino, Golden Langue and Serrow. Accordingly, enclosure for one horned rhinos is under construction, proposal for construction of Golden Langur breeding enclosure has been approved and step has been initiated to construct the same, while plans and estimates for conservation breeding enclosures for Serrow has been submitted to the Central Zoo Authority for necessary scrutiny. Provisions for housing facilities in off display locations have been earmarked in the Layout Plan already for Serrow, Golden cat and Grey Peacock Pheasant. The plan indicates exploring the possibility of breeding of other species of North East Bio-geographic region. Two locations for conservation breeding have been identified and marked in the Layout Plan.

Rescue and Rehabilitation: ASZBG has been playing a major and important role as a rescue centre ever since. The CZA has notified this zoo as off display life time care facilities for leopards and black bears. The proposed master plan provides enough scope for achieving objectives of scientific rescue activity and successful release of the rescued wildlife in their natural home. A site with sufficient area is earmarked for providing

both temporary and permanent houses for rescued animals. The existing staff engaged for rescue has to be provided further training on this aspect with the collaboration of Centre for wildlife Rehabilitation and Conservation (CWRC) and other such institutions. scientifically designed in-house rescue facilities with separate enclosures for individuals of different species are to be established. Some infrastructures are to be created for life time care for permanently injured animals. Isolation ward, treatment facility, water supply, power supply, squeeze chamber, keeper's house, etc. are to be created adjacent to the Rescue site.

Excess animal: Assam State Zoo-cum-Botanical Garden has acute problem of some excess herbivore with special reference to Sambar, Hog deer and Chital. An area is earmarked for keeping excess animals with provisions of sexing to prevent further proliferation. This may also help to make them accustom with natural environment for possible future release in potential area which will solve problem of congestion and further multiplication in display enclosure. The enclosure will be off from display. There will be provision of salt lick, water hole, etc. as per requirement. Since the area identified is a natural forest with even harbouring free ranging such species now also, management supplemented food may perhaps suffice which will not be much of difficulty for the management.

Health Care: Present zoo veterinary hospital is not spacious and there is little further scope for its expansion. With the expansion of the zoo according to the Plan and to render better and timely health management, there need to be secured more resources and modern equipments, tools for the hospital. The Evaluation Team had also suggested shifting the hospital to some other location. In future, the authority should explore the possibility and take necessary action. The zoo should have a separate library of its own as reference library for zoo hospital with latest publications containing papers on treatment of different diseases. In future the authority should take help from the Animal Advisory Committee make it more active. Further Suggestions of the Evaluation Team and the steps for formal signing of MOU with the Collage of Veterinary Science for conducting health monitoring and related activity in a sustained basis should be completed in time.

Feed: Food and other items required for the zoo captives are classified in to 16 groups, viz. Group 'A' to 'P'. Every year open tender is floated from intending contractors/suppliers to supply the items at competitive rates. Approved contractors supply the required food items regularly. Non perishable commodities are stored separately, while perishable commodities such as fruits, vegetables, meat, beef, fishes etc. are supplied on daily basis. Zoo veterinarian and officers regularly check the supplied items for its quality and quantity. Electronic weighing machine has been provided in the ration house to maintain accuracy in weight of the food items. Freezing facility is also available for storing some perishable items. All effort has been made to maintain hygienic condition

in the ration house by using disinfectants and sufficient running water. The ration house is smaller than the requirement; storage capacity is not optimum and also lacking modern facility. In future a spacious and planned ration house is to be made with provisions for adequate storage for materials including the cold storage for long time preservation of foods as per the requirement are to be made to meet the exigencies. The feed store is administered by Range Officer, Zoo HQ Range. The old Assam type building located adjacent to divisional office has been used for the purpose. One section of the building is used for collection feed of all groups, provided with weighing machine and one Forester maintains all records of daily receipt. Proper records are maintained on receipt and issues and also maintain inspection register on quality and quantity, etc. The adjacent section is for preparing the feed for zoo captives. Supply of sufficient fresh water, utensils, buckets, etc and also other implements, etc. ensure functioning of this section in a fairly good way. it is suggested that this section need building of enough space and more room for proper management of this important activity. Although a feed store exists, the storage capacity is not optimum and also lacking modern facility. Hence, a well designed store house for storing both perishable and non-perishable commodities is to be proposed during the master plan period.

Security: The approach to two staff colonies are in constant use by the families and visitor of the staff, causing considerable disturbance to zoo environment and possibility of attempt of mischief by someone cannot be ruled out. Hence proper arrangement is to be made to isolate both the colonies from main zoo campus at an earliest. Accordingly proposal on this regard has been submitted for the financial year 2011-12 which has been approved by CZA and action has been initiated to execute it.

Water Supply: Day to day smooth zoo captive management demands huge quantum of water to meet drinking water, cleaning of enclosures, maintaining wet moat, enclosure enrichment purposes, etc. Apart from these a considerable quantum of water is required for official purpose, ration house maintenance and requirement for staff and officers colonies. At present major sunk of water is supplied by public health engineering department on payment basis and supplemented by a large ring well to meet crisis situation. Recently another deep tube well has been installed to revamp the water supply system particularly to meet huge water requirement for wet moats, of primates enclosures, for the water bodies of hippopotamus and rhinos. Water supply system is maintained by laying pipes along the gradients and all enclosures are connected. Regular maintenance of such pipes is an unavoidable task performed by engineering wing of the zoo. However, the old pipes need to be replaced by new ones to prevent spoilage and wastage of this precious commodity. Besides the present master layout plan, already examined by the expert committee, will demand augmentation of new supply line to new section such as conservation breeding area, rescue site, woodland species section, etc. A hydrological survey may be considered to explore the possible to utilize the water

of natural lakes of the campus for the usage of zoo to strengthen the increased water requirement in future.

Power Supply: The source of power supplied to the zoo is from the Assam State Electricity Board. The power is supplied by maintaining a 33 KV line through only one 250 KVA transformer located on the north side of the children park, near the *Bandar Tila*. The location of the transformer is in unsafe position and need a change. Though the power supply is by and large regular, but low voltage is a problem in staff colony. Upgrading the entire power line to 3 phases one is to be done and providing a silent generator of considerable capacity will solve the problem of occasional power failure specially in night time. Further, an additional 250 KVA transformer will be required to maintain efficient power supply. Enclosures are also to be provided with some provision for power connection to meet emergency situation. Besides, the quantum of power is to be enhanced as more establishments are contemplated in proposed plan.

Road: The zoo has three types of roads - black-topped, metal road and *kutchra* road. The main road starts from the gate and runs eastward up to the watch tower situated on the top of the hill with a length of 0.931km. The southern black-topped road is of 1.20km length starts from the *Bandar Tila* and runs up to the easternmost staff colony and ends in the Lower Lake. A black-topped road opens up from behind the tiger enclosure run 0.80km and joins the southern road near the rhino enclosure. Two black-topped roads start from the gate of the Botanical Garden and joined the southern road near the boundary. In the Plan few new roads have been proposed which required due to the expansion of the present set of enclosures and construction of new ones accessing new areas. Besides, the some of the existing roads need to be improved according to the need.

Solid and Liquid Waste Disposal: The present practice of burning the biodegradable waste is discouraged and instead recycling and composting should be considered in future. Necessary steps need to be taken during the period of the implementation of the Plan. The present practice of draining the liquid waste to the municipality drain needs to be gradually stopped. In the proposed Plan two sewerage treatment plants, at the ends of two drainage trenches, on southwest and northwest corner have been proposed to treat the liquid wastes before draining to municipality drains. The present ban on the use of *polythene and poly packs inside the zoo* should be continued strictly. For dumping the carnivore's bone near the incinerator need to be done by using a vehicle. For that a dedicated vehicle is proposed to procure for transportation of left-over bones from carnivore enclosures to the afore mentioned the bone pit, from where the bone contractor would lift the left-over bones at regular intervals.

Natural forests: The zoo is the catchment of few perennial streams. Moreover, this catchment is one of the only few left out relict forested hillocks of the city. Hence it has a crucial role to play in recharging the ground water cycle of the city in future. Therefore,

it is that, no disturbances of any kind should be caused to the natural forest patches of the zoo. The forest should be left with the nature so that biological successions remain unabated and the ecosystems function in its natural way. Not even the dead, dying, diseased or wind-fallen trees including any sort of cultural operation and removal of any forest produces should be allowed to be carryout in this forest.

PERSONNEL PLANNING: The proposed plan emphasizes enough importance on maintenance of skilled, trained and well experienced field staff who are the back bone of entire administration. Over a period of more than 50 years, the animal keepers, head animal keepers, etc. who perform day to day animal care gained enormous skill and ability owing to constant and direct contact with daily upkeep of zoo captives and training. It is observed that except some complicated issues, this work force can be easily depended upon provided some monitoring activity and motivational mechanism are in operation. Regular association with animals making the lives of animal keepers, etc. more intimate which are giving them a unique feeling similar to that usually one maintain toward his family. The permanent staff have been allotted with specific job based upon their ability, attitude and interest. Based on some issues, sometimes new assignment is also allotted to them to improve the work performance. Many of them have developed specialized skills and expertise in certain fields for which they have to be retained for longer periods. Promotional opportunity for field staff is very scanty, which need urgent attention to improve work performance and career advancement while serving in the zoo

Orientation/Interpretation centre: It is proposed to construct a double storied building on the south western corner of the exhibit area behind the children park as shown in the Layout Plan. The ground floor will be used as interpretation cum orientation centre where the visitors will get first-hand information regarding the zoo. The 1st floor may be use as auditorium where the visitors will be shown small films on history, uniqueness of the zoo and interesting exhibits of the zoo.

Ticket counter: The 7 ticket counters now available may be adequate for few years to come. It needs to be modernized by installing computers, and CCTV etc. to monitor the day to day activities along with installation of automated entry system as well. A cloak room along with the counter may be arranged which will help visitors in a big way.

e-Governance: The different wings and sub-wings of the ASZBG administration will come under one e-network so that, from any wing the data may be procured at any time. For that LAN (Local Area Network) system will be adequate. The main Server will be placed in the Divisional Forest Office and network will connect the wings through different clients. A LAN with 15 clients are proposed and in the initial phase, Zoo Veterinary office, Store receipt and issue sub-wing, Range Office along with Assistant Conservator's chamber will be installed. In the subsequent phases, Vehicle parking wing,

Ticket counter, Engineering and Botany wing will come under it. The Server will be installed in the Director's chamber.

Animal History: The existing maintenance of animal history records is obsolete and out-dated. Although many information including stud book, animal health care, inventory etc. have been computerized yet there is need for further up-gradation in view of many advance record keeping and information sharing system. However in the mean time, Assam State Zoo has been submitting all the details on zoo captives to International Species Information System (ISIS), U.S.A through ARKS- Animal Record Keeping System. It has been proposed to join the ZIMS (Zoological Information Management System) being coordinated by International Species Information System (ISIS), U.S.A.in future, as well.

World Association of Zoos & Aquarium (WAZA): Since the World Association of Zoos and Aquarium (WAZA) is a very prestigious World Association responsible for strict implementation of world zoo conservation strategy an effort is to be made to make Assam State Zoo-cum-Botanical Garden as a member of this Association in near future.

It is hoped by the authors of this Master Plan that at the end of the plan period of the present Master Plan of Assam State Zoo-cum-Botanical Garden, the mission of the plan will be a reality and all the noble objectives so determined will be effectively achieved.

Guwahati

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(Utpal Bora)

Director

Assam State Zoo cum Botanical Garden

FOREWORD

Growing awareness for nature and wildlife conservation has made Zoos a popular institution. There is history of scientific interest in conservation and welfare of captive wild animals. Earlier the wildlife resources were abundant, so no one paid much attention to them. Consequently, scientific management of captive wild animals in the Zoos evolved slowly. Now there are mandatory standards and norms for scientific management of Zoos in India and necessary Master Plan has to be prepared in conformity with such standard and norms for each Zoo.

Assam State Zoo cum Botanical Garden came into being in the year 1957 with an area of 130 ha. With the passage of time several significant developments such as, increase in area, animal collection, breeding of rare species, improved housing and husbandry, animal health care etc. took place in this Zoo which have helped to elevate its position in the Country. Now, it is one of the few recognized large Zoos in the Country and in fact, it is the largest Zoo in N.E. India. It's present area is 175 ha. Success in breeding rare and endangered animals and birds has been achieved by Assam State Zoo cum Botanical Garden over a period of time. Although, initially the Zoo was started as mere exhibition of animals, this unique entity had to accommodate new paradigms and trends with the passage of time. In this process, a Museum and a Botanical Garden were added to it's original layout. The Assam State Zoo now exhibits an impressive collection of about 900 captive animals, birds and reptiles belonging to 113 species, both indigenous and exotic. The Zoo with it's patch of virgin forest of about 100 ha is also safe home for several free ranging mammals, birds, reptiles and butterflies. The Assam State Zoo cum Botanical Garden is actively involved in rescue of distressed wildlife in the State, their treatment and eventual release into the wild.

Preparing a scientific Master Plan for the management of Assam State Zoo has been a long drawn process which was initiated way back in 1998 at the instruction of Central Zoo Authority (CZA). The present Master Plan has been finalised after a series of in-house discussions and meetings with the CZA. The issues raised by the expert committee of CZA have been duly addressed and guidelines for preparation of the Master Plan have been followed in later and spirit. The present Master Plan comprises comprehensive and detailed information on Assam State Zoo cum Botanical Garden which will provide a clear road map for next 10 years for the management and development of this Zoo and enable the Assam Forest Department to achieve the vision inscribed in the Plan in the coming days.

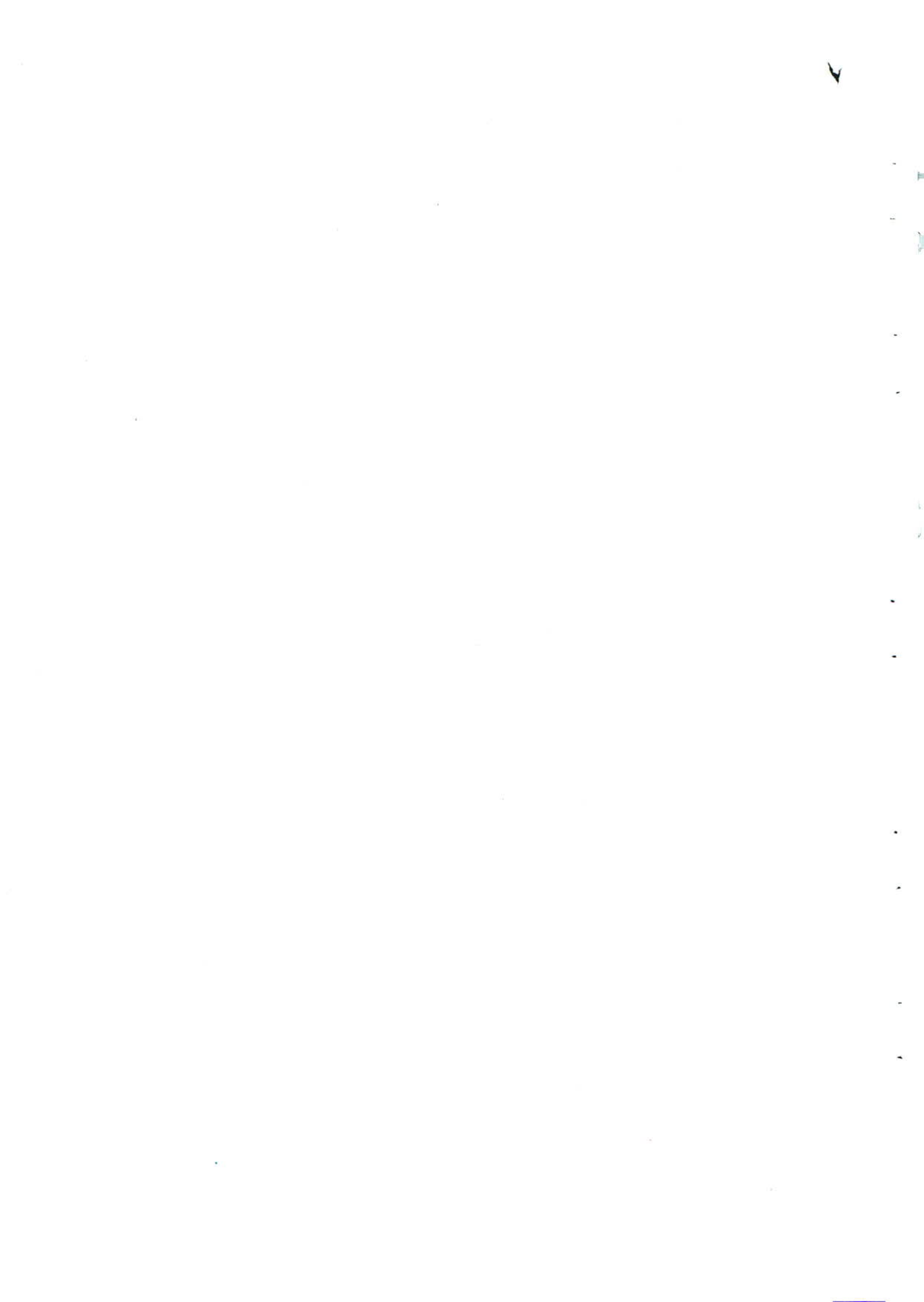

29.07.2012

(Suresh Chand)

Principal Chief Conservator of Forests, Wildlife &
Chief Wildlife Warden, Assam.

Part -I

Chapter	Content	Page No.
I	Introduction	1-29
I	Appraisal of the present arrangement & constraints	30-56



PART - I

CHAPTER - I

1. INTRODUCTION:

The Assam State Zoo cum Botanical Garden (ASZBG) had its origins in a humble menagerie, way back in 1957. That year the 63rd session of the Indian National Congress was held at Pandu, Guwahati, and for the entertainment of the delegates a few animals and birds were displayed in a small exhibition. A female Leopard cub named *Spotty* was the star attraction of the collection and was a hot favourite among the delegates. After the Congress Session ended, the animals had to be housed somewhere and here lies the genesis of the zoo. Initially the exhibited animals were shifted to a suitable and scenic hillock, near a village called *Japori Gog* (which in *Karbi* language means 'Hilly hamlet') in what then was considered the outskirts of Guwahati. Thus, when Assam State Zoo was established in 1957 *Spotty* and her animal friends formed the seed collection. The zoo was opened to the public in 1958.

Over the years, what started off as a mere exhibition of animals grew and expanded to accommodate new paradigms and trends. In course of time, a Museum and a Botanical Garden was added to the original layout. In the initial years, the focus was on exhibiting more species and that too the attention-getting exotic ones. Thus the zoo, during various periods of time, had Chimpanzees, White and Black Rhinos, Zebras, Ostriches and Giraffes from Africa; Puma, Jaguar and Llama from S. America and Kangaroos from Australia.

With the formation of the Central Zoo Authority (CZA) by the Government of India, the objectives of the zoo gradually shifted to the exhibition of indigenous species and the role of zoos as *ex-situ* conservation centres also gaining currency. Accordingly, ASZBG began to emphasize on the collection of regional species. It also undertook captive breeding programme and was successful in breeding endangered species like

the Pygmy Hog (*Sus salvanius*) and White Winged Wood Duck (*Cairina scutulata*). The zoo was also fortunate to have a white tigress, brought from Alipore (West Bengal) Zoo in 1974.

The wildlife stranded in the city of Guwahati in particular and the state as a whole are rescued and brought to the zoo. So the Assam State Zoo's collection reflects the diversity of wildlife extant in the state.

Though many housing facilities were created and charismatic animals were housed in the zoo, there was no written plan for the zoo. Many of the activities were undertaken on *ad-hoc* basis by experienced Foresters of the Department. In the initial years in the matter of collection of both indigenous and exotic species public entertainment was the main criterion. And such animals were collected both from the forests and the animal traders. There was more a craze for exotic animals because the indigenous animals could be easily seen. We must remember that at that time areas of animal habitat of Assam were intact and local people commonly sighted indigenous animals in such areas which lay in close proximity to their villages.

It is pertinent also to remember that the exchange programme of species adapted by the CZA now was in practice long time ago in Assam. The State authority through the ASZ used to send indigenous animals like Indian one horned rhinoceros to many other countries and in return received exotic animals like Chimpanzee, Giraffe, Zebra, Kangaroo, and Tapir. The old system of caging gave the visitors both the opportunity and excitement to view the animal from close quarters but what was a recreational benefit was in the evolving zoo concept considered detrimental to the animals. Animals were confined to small cages and did not get the opportunity to carry out their normal activities and existed under conditions of enormous stress as a result of which their longevity was reduced and they did not breed well. Once animals died new animals were brought and this sequence of practice continued. Providing proper housing facility to the animals in order to allow them the chance to perform their normal activities was not then the prevailing zoo concept. There was no written plan available for collection of animal. Rescued animals were also brought to the zoo and dumped in small cages

without considering its importance and carrying capacity. The effect of inbreeding was never studied.

The status altered due to certain statutory introductions like the Indian Wildlife (Protection) Act, 1972, Recognition of Zoo Rule, 1992 and National Zoo Policy 1998. The setting up of Central Zoo Authority has resulted in a paradigm shift in the thinking and functioning of the zoos in the country. Even then, due to the lack of proper exposure and training in managing wild animals in captivity, the process of development in the changing scenario has not received the proper momentum. But the greatest single positive decision lay in the wisdom of the authorities to expand the zoo area to 175 ha at a time when there was a tremendous pressure on suburban land in Guwahati. Today because ASZBG possesses relatively vast area of land in the middle of Guwahati there is a scope for planning for the future. As late as in 1982 the authority took over about 80 ha of land to establish a Botanical Garden attached to the zoo in order to preserve and propagate rare, endangered and threaten plants of the Northeast India.

CZA has graded the Assam State Zoo as one of the few large zoos of India and the first of its kind among the Northeastern States. Today, in keeping with the modern concept of Zoo management, Assam State Zoo *cum* Botanical Garden is also initiating certain new ideas. Today it exhibits an impressive collection of about 895 animals, birds and reptiles belonging to 113 species, both indigenous and exotic. Among them are rare and endangered species like the Great Indian One-Horned Rhinoceros, Golden Langur, Hoolock Gibbon, Clouded Leopard, Golden Cat, Brow-antlered Deer, Binturong, Slow Loris etc. (all found only in North East India) and others like Asian Elephant, Tiger, and Leopard. Care is taken to exhibit them in spacious, airy enclosures and regular monitoring ensures that their diet, health and hygiene meet high standards. The zoo today has a modern hospital with experienced veterinarians to look after the health of the animals. Conservation breeding of several endangered species has been initiated.

For future management of the zoo, the Master Plan has been prepared giving utmost importance to the unique physical features of the area by adapting a mixed theme. The ASGBG has already finalized the new Master Layout Plan along with the

Collection Plan which have been approved by the CZA and originating an all-out attempt to create the finest modern zoo of the twenty first century that will cater to the cherished desire of not only the people of Assam but also that entire Northeastern states.

1.1. History:

In 1957, the 64th Indian National Congress Session was held at Pandu, which was then an active rail station and a very busy port on the south bank of the river Brahmaputra as the present Saraighat Bridge was then not in existence. To commemorate the session, Assam Forest Department arranged to display some wild animals for attracting and amusing both the delegates and the public. A female Leopard cub named *Spotty* drew crowds and was the principal attraction. The Congress Session ended but the animals had to be housed somewhere and this germinated the idea of a zoo in Assam. Initially the exhibited animals were shifted to Jalukbari Forest School campus and then to the Cutchery Forest Office, Pabazar, Guwahati. To create facilities to house those animals a hillock, with an area of 130 hectare of scenic landscape was selected. It was located near a village called *Japori Gog*. Thus, *Spotty* and her animal friends formed the seed collection when the Assam State Zoo was established here in 1957 and opened to public a year later. The total number of animals and birds, at the time of the zoo's inception was 42 individuals (22 species) and 236 (31 species) respectively.

Over the years, what started off as a mere exhibition of animals grew and expanded to accommodate new prototype and examples. In course of time, a Museum and a Botanical Garden were added to the original layout. Due to public demand the focus was on having greater quantity of species and that too the more spectacular and eye-catching exotic ones. Thus, the zoo during various periods of time had Chimpanzees, White & Black Rhinos, Zebras, Ostriches and Giraffes from Africa; Puma, Jaguar and Llama from S. America and Kangaroos from Australia. With time, the importance shifted to indigenous species and role of zoos as *ex-situ* conservation centres also started gaining prominence. Accordingly, ASZBG began to emphasize on captive breeding programme and was successful in breeding several endangered species. As a part of this captive breeding exercise, 4 Pygmy Hogs, a species endemic to Assam, were brought from Barnadi RF in 1974 and kept in specially designed enclosures away from

visitors. The efforts were rewarded, as 4 piglets were born in 1976. In 1970 White-Winged Wood Ducks were regularly brought and they bred well in the zoo till they succumbed to disease.

Wildlife that stray into Guwahati or are stranded in its vicinity or marooned elsewhere in the State are rescued and sent to the Assam State Zoo. As a matter of fact before the establishment of the Centre for Wildlife Rehabilitation and conservation (CWRC) at Panbari, near Kaziranga in 2002, Assam State Zoo was the only rescue centre for the entire state and was successful in rearing innumerable wild species ever since it was established. The rescued animals in Assam State Zoo make it a sort of source book of animals found in suburban Guwahati and also reflects the diversity of wildlife extant in the state.

In 1982 a Botanical Garden (80 ha area) was established in the Assam State Zoo. At that time the zoo campus had an area of 130 ha. The Botanical Garden is located in the hilly landscape that lies east of the exhibit-area. In 2002 another 45 hectare area of the Hengrabari Reserved Forests was added to the Zoo. Today the total area of the zoo is 175 hectares. The zoo area was entirely hilly with a patch of plain domain that lies to its west i.e. near its entrance gate from the R.G.Baruah Road. Zoo authority procured a small strip of plain land on the south western part of the zoo area from a private owner. This is the area that lies between the Pelican and aquatic bird enclosures. During the period 1999-2000 almost 170 ha of zoo area was demarcated by erecting a boundary wall.

Over a period of time, many housing facilities were created and several magnificent animals were housed in the zoo, however, many of these activities were undertaken in an *ad hoc* manner.

When the Assam State Zoo was established an officer of the rank of Assistant Conservator of Forests was in-charge of the zoo. In 1959 a Forest Division i.e. Assam State Zoo Division was created and the Zoo was put under this Division. In the initial years the quantity of animals collected from the wild and procured from animal dealers and animal traders were more. The intention was to collect diverse species of animals, both indigenous and exotic, which had display value to the visitor. The general public

of that time wished to view the exotic animals as at that time the animal habitat of Assam were intact and the local people commonly sighted indigenous animals in the forests located in the proximity of their villages. The Assam State Zoo used to send indigenous animals like Indian one horned rhinoceros to many other countries and in return received exotic animals like Chimpanzee, Giraffe, Zebra, Kangaroo, Tapir etc.

Since 1958 zoo management concepts has been evolving and Assam State Zoo cum Botanical Garden has coped and kept pace with the dynamics of such concepts and taken many enterprising measures. Today it exhibits an impressive collection of about 895 animals, birds and reptiles belonging to 113 species, both indigenous and exotic. Among them are rare and endangered species like the Great Indian One-Horned Rhinoceros, Golden Langur, Hoolock Gibbon, Clouded Leopard, Brow-antlered Deer, Binturong, Slow Loris, Small Cats, Serrow, etc. (all endemic to North East India) and other non-endemic species like the Asian Elephant, Tiger, and Leopard. Under due guardianship the animals are exhibited in commodious, airy enclosures and regular supervision ensures that their diet, health and hygiene are handled under accepted prescriptions. The zoo today has a good zoo hospital with experienced veterinarians to look after the health care of the animals. Conservation breeding of several endangered species has been initiated.

To carry further its conservation awareness efforts, Assam state zoo cum Botanical Garden has of late, introduced a series of new outreach features for involving the public in its conservation efforts. One among them, which has become highly popular, is the Animal Adoption Scheme launched in August, 2005. The zoo has also been actively involved in the rescue of wildlife that strays into the city and also in their treatment and eventual release into the wild. Assam State Zoo cum Botanical Garden has indeed come a long way, from a mere menagerie to one of the most important *ex-situ* conservation centres in the entire country.

Of the total Zoo area, about 50 ha is occupied by animal enclosures and buildings. The Botanical Garden comprises 30 ha of land. The rest of the area is natural forest. Roughly 95 ha of forest are almost remains virgin and forms part of the Hengerabari RF. The vegetation type is a mixture of Tropical Moist Deciduous and Semi evergreen Forests, in different *seral* stages of secondary succession. Bamboo Forests which is

another subset of this type is also well represented. There is a teak plantation on the eastern boundary with a patch of tall grass and scrub growing along the exposed slopes and a small sal patch planted during 1963.

1.2. Location:

The Assam State Zoo cum Botanical Garden is located between 26°9'30' N to 26°10'13' N Latitude and 91°47'01' E 91°48'30' E Longitude. It lies in the heart of Guwahati City within the Guwahati Metropolis under Ward No. 42. The City is dotted with few isolated hillocks which are actually the continuation of the Khasi Hills Range outlying the Shillong Plateau. On the north of the Assam State Zoo lies the BSF cantonment on a similar hilly terrain having a metro settlement of citizens belonging to divers religion, castes, occupation.. On its east there is a hill slope where human populace has recently settled, adjacent to which is a pass and a few hillocks. On the south of the Zoo compound lies a highly populated settlement on undulating to plain ground. On the west lies a plain area. The small river Bharalu originates in the Basistha Hill and flows through this area. The Bharalu cuts through the R.G.Baruah Road (formerly the Zoo Road) and flows into the Brahmaputra. The R.G.Baruah Road that lies to the Zoo's west is one of the busiest road of Guwahati. At present the zoo is surrounded all along its boundary by crowded human settlement and Metropolitan roads of various widths.

1.3. Bio-geographic region:

According to the Bio-geographical classification of India (2000), Assam State Zoo-cum-Botanical Garden falls under the 9 A Brahmaputra Valley Biotic Province of the Northeast Bio-geographic zone (9).

1.4. Physical feature:

1.4(a). Topography:



The area of the zoo is comprised primarily of hillocks which are actually the continuation in the form of spur of the Khasi Hills Range, outlying the Shillong Plateau. The altitude of these hillocks ranges from 50m to 200m, the northern portion being the tallest. Except short stretch on the west and the south-west corners of the zoo, the entire area is hilly.

The altitudes increase towards the eastern, northeastern and southeastern portion. Several perennial streams originating from these hillocks flow towards the western and eastern plains. Some of these streams run through the zoo. There are two permanent water sources in the form of medium sized lakes situated on the Northeastern and Southeastern corner of the zoo. Both these lakes are interlinked by perennial streams.

1.4(b). Geology, rock and soil:

The principal rocks of this outlying hill are acid and basic gneisses, intruded by granite, pegmatite and quartz veins. The area covered by the zoo is mainly a part of hillock masses of varying altitudes which merge with the plain except for the western and the southern-western parts. Soil is mainly alluvium of recent and sub-recent origin in the plain while in the crest and ridges of the hill it is coarse and gritty with entrapped pockets of good loam in between boulders. The middle and lower slopes are composed of a deep tropical red-loam, except for places in the southeastern part which is subjected to heavy erosion..

1.5. Land use pattern of the Zoo:

At the time of inception of ASZBG, the total number of animals and birds was 42 (22 species) and 236 (31 species) respectively covering all together an area of 40 ha. This included the exhibit area, two colonies and the unused areas. Later on its eastern side from the Hengrabari RF, 80 ha of area was allotted to the Botanical Garden. The area adjacent to the Botanical Garden was expanded again by adding 45 ha on its eastern side, thus raising the area of the Assam State Zoo cum Botanical Garden up to 175ha.

Out of this above area presently the land use classification is shown as below –

Sl. No.	Description	Area (in ha)
1	Animal Enclosure	40
2	Botanical garden	30
3	Forest area	95
4	Office buildings (Parking area)	5
5	Residential are	5

The Botanical Garden, established in 1982, forms an integral part of Assam State Zoo cum Botanical Garden and is considered as one of the finest in the region. The garden has over 280 species of introduced plants, which include some endangered ones like the insectivorous pitcher plant *Nepenthes Khasiana*. Of the total area of the Zoo about 50 ha is occupied by the animal enclosures The Botanical Garden and Bambusetum occupies 20 ha. The remaining area is occupied by natural forest.

Since its inception the number of animal enclosures has according to requirement increased gradually and at present there are 60 enclosures (both old and new) erected in an area of 40 ha area.

There are two colonies that have developed gradually over the years. One colony lies in the Northwest and are for the officers and Divisional assistants and the other is located at the Southeast corner and houses the subordinate staff. Both these areas cover about 5 ha area.

The administrative building which is now in a dilapidated condition was built 50 years ago. At the beginning it was a single house built to accommodate the then tiny establishment. Later on, it had to be expanded gradually by attaching extra rooms. However, the vehicle parking area was prepared in 2007 and has now become more spacious than what it was earlier.

The area under Botanical Garden extending an area of 30ha, was divided into several zones by laying grids at 50m intervals and different endemic, exotic, indigenous plants were planted systematically as follows –

Plot No	Plot Name	Area in (ha)
1	Palm grove	5 ha
2	Flora of N.E. India	12 ha
3	Bamboo grove (along southern boundary)	2 ha
4	Threatened trees of Assam	4 ha
5	Gymnosperm plot	5 ha
6	Cane grove	2 ha
7	Medicinal plot	4 ha
8	Nursery	5 ha
	Total	30 ha

1.6. Flora and Fauna:

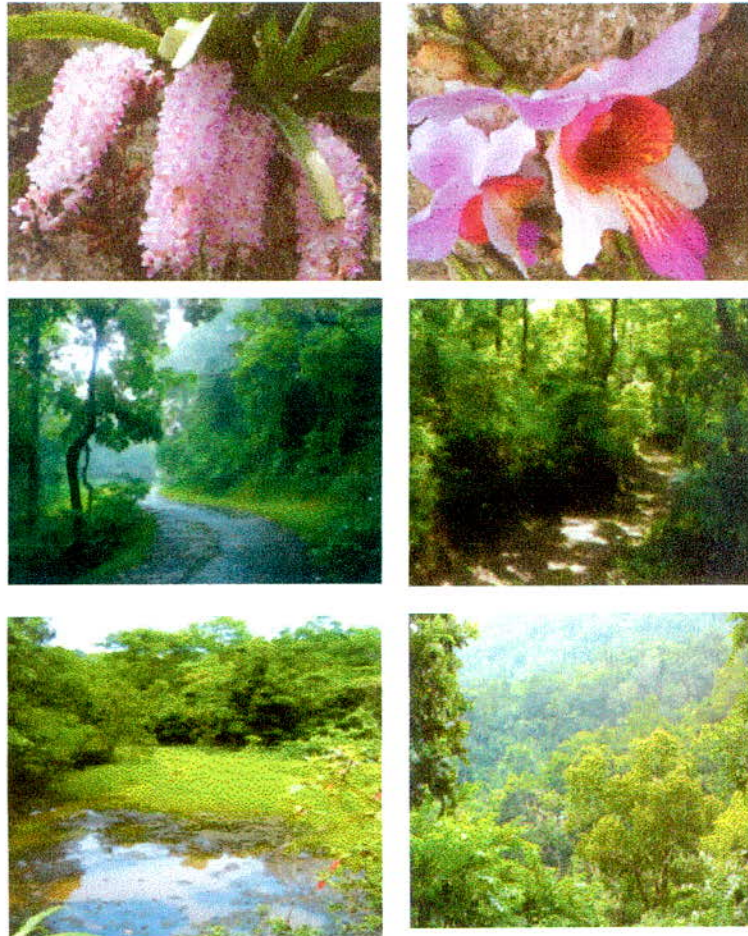
By virtue of its very location, the zoo has inherited a rich biodiversity in the form of natural forest. The area was an integral part of a contiguous forested belt stretching up to the bank of the mighty river Brahmaputra on the north, the river Digaru (a tributary of the great river) on the east, and on the south, - the vast stretches of forest connecting passes and ridges of the Shillong plateau and on the west it was mostly plain agricultural land dotted by big and small wetlands. Hengrabari RF now exists as a relic of the earlier vast forests and hence still harbours substantial diverse fauna and flora of the area. Earlier there had been some exploitation of this RF and almost all the mature and over mature stands have been eliminated from the forests. The present natural forest comprises of all age-gradations of diverse species from the stage of recruitment to the middle-aged trees.

Over the years, besides the naturally regenerated forests many species of both indigenous and exotics were planted systemically in the area in the form of plantation, groves, strips etc. Even some rescued small wildlife species were released in the forests of the zoo campus.

1.6.(i) Flora:

The present zoo campus consists of two types of forests; - one is the naturally regenerated forests which were in existence when it was established and the second component is the thinned out natural forest created for suitably constructing the animal enclosures, mixed with planted trees. This has made the Assam State Zoo cum Botanical Garden stand in splendid isolation like a green fortress, playing an important role of being the major destination for the interested plant lover. The Botanical Garden and the natural forest of the zoo act as an island of solitude in the midst of a sea of built up area of crowded streets and haphazard settlements i.e. Guwahati Metro. The plant resource of the zoo campus is very rich. About 622 plant species out of which 354 are indigenous are found wild in this forest tract. The floral diversity has been brought to light by a painstaking and meticulous work of documentation by the dedicated staff of the Botany Wing, especially Nagen Das, the Forest Botanist. The vegetation type here is of a mixed formation, – a combination of deciduous and evergreen elements. One can broadly class it as a 'moist deciduous' type of vegetation with semi-ever green patches along the depressions, stream and on the banks of the lakes. Abstract of floral diversity is shown below –

Sl.No.	Plants	Species	Sl.No.	Plants	Species
1	Tree spp.	94	5	Shrubs spp.	80
2	Herbs	118	6	Climbers	33
3	Pteridophytes	7	7	Bamboo spp.	4
4	Orchids spp.	6			



Almost the whole aspect of the area is sunny except a few northern slopes falling inside the garden area. A wide range of plant communities have been observed throughout the area a brief account of which has been detailed below:

a) The Hydrophytic community: This primary community can be observed in the permanent water bodies, the edges of running streams and waterlogged waste areas. The most common members of this community are the filamentous algae like *Spirogyra*, *Oscillatoria*, and *Batrachospermum* fixing themselves to the rocks at the edges of water current. *Pistia stratiotis* is a common floating species with occasional presence of *Azolla*

which is often noticed in stagnant water bodies. Moreover *Hydrilla*, *Monochoria hastata* etc. are also observed in the waterlogged waste places. Undisturbed dead remains of these plants add enough moisture for the next community to colonize.

b) The Amphibious community: This community is chiefly confined within the southern portion of the garden where they make their appearances and also in the banks of streams. The chief constituents of this community are *Limnophylla conferta*, *Ludwigia octovalvis*, *Polygonum serratum*, *Polygonum barbatum*, *Ranunculus sceleratus*, *Pouzolzia zeylanica*, *Osbeckia nepalensis* etc. *Alpinia allughas* is one of the tall members of this community. *Ageratum conyzoides*, a seasonal plant, grows in abundance in the rich soil prepared by this community. Innumerable plants of this community with their lower portions entangled offer considerable resistance to water current by slowing down its velocity. The death and decay of these plants on the edges of streams and low-lying areas create thick humus beds. The level of the area gradually grows higher and prepares a suitable site for the next community to colonize.

c) The Sedge community: Several types of sedges soon colonize on the remains of the amphibious community, common among them being *Carex indica*, *Carex stramentitia*, *Cyperus diffusus*, *Cyperus compressus*, *Cyperus digitatus*, *Cyperus iria*, *Floscopa scandens*, *Fimbristylis dichotoma*, *Mariscus compectus* etc. The main role of this community is to further consolidate the soil.

d) The Fern community: Though the whole area of the garden is almost entirely exposed to sunlight, there are small pockets with moisture in the air specially on the northern slopes where a few species of this community have been observed. *Glychenia linearis*, a straggling fern is seen in a few shady locations. Along the streams *Pteris biaurita*, *Pteris cretica*, *Pteris ensiformis*, *Angiopteris evecta* etc. ferns occur. This community combined with some members of the Shrub community, specially *Dalhousea bracteata* create suitable condition for germination of arborescent flora and seedlings could develop without the fear of being washed away.

e) The Shrub community: This community provides a complete green cover to the garden. *Holmskioldia sanguinea*, with the red flowers borne on long slender branches, the scandent shrub *Combretum decundrum* with white showy bracts and *Antidesma*

diandrum, with nearly succulent acid leaves are the chief constituents of the shrub community. The dry western part of the garden is full of thorny shrubs like *Randia dumetorum*, *Randia longiflora*, *Randia fasciculata* associated with *Mimosa himalayana*, the troublesome weed with inverted bristles, *Coffea bengalensis* with white flowers, *Glochidion sphaerogynum* etc. In wet places *Dalhousea bracteata*, *Sarcochlamys pulcherrima*, *Phlogacanthus thyrsiflorus* etc. are common. *Macaranga indica*, *Leea crispa*, *Tabernaemontana divaricata*, *Solanum indicum*, *Sida acuta*, *Urena lobata*, *Cassia hirsuta*, *Cassia alata*, *Cassia occidentalis*, *Premna pinguis*, *Callicarpa macrophylla*, *Glycosmis pentaphylla*, *Micromelum pubescens* etc. are scatteredly available within the area.

f) The ground cover: The ground cover of the garden is chiefly composed of *Imperata cylindrica*, *Sporobolus indicus*, *Eleusine indica*, *Pogonanthum ruffobarbatum*, *Hackelochloa granularis* etc. Tall grasses like *Arundo donax*, *Saccharum arundinaceum*, *Saccharum procerum*, *Thysanolenia maxima* etc. make their appearances here and there in the garden. Moreover, annuals and biennials like *Eupatorium odoratum*, *Reidia hamiltoniana*, *Desmodium gangeticum*, *Desmodium aegyptiacum*, *Desmodium motorium* along with rhizomatus species like *Zingiber zerumbet*, *Costus speciosus* etc. complete the ground cover of the area.

Bamboos common in the area are *Bambusa arundinacea*, *Bambusa tulda*, *Bambusa pseudopallida* and *Dendrocalamus hamiltonii*.

g) The Tree community: This community is composed mostly of deciduous species with a few evergreen trees like *Dysoxylum binectariferum*. Semi-evergreen species like *Syzygium cumini*, *Syzygium syzygioides* also occur at various heights. The canopy in the northern hilly tract is open. The dominating tree species are *Haldina cordifolia*, *Careya arborea*, *Schima wallichii*, *Aegle marmelos* which grow in abundance. *Sapium baccatum*, *Toona ciliata*, *Bursera serrata* are growing well. *Eugenia balsamea*, *Holarrhena antidysenterica*, *Wrightia arborea*, *Semecarpus anacardium*, *Cassia fistula* is quite common in the locality. *Artocarpus chama* with straight trunk and nearly orbicular leaves has some healthy individuals throughout the area. Scattered occurrence of *Vitex canescens*, *Vitex peduncularis*, *Premna latifolia*, *Kydia calycina*, *Marlea begonaefolia*, *Aporusa oblonga*, *Glochidion lanceolarium*, *Casearia glomerata*, *Dillenia pentagyna*,

Derris robusta, *Diospyros variegata* can also be observed throughout the area. *Lannea grandis*, *Sterculia villosa* are abundant while *Shorea robusta*, *Gmelina arborea* and *Pterospermum lanceaefolia* can be said to be in traces.

h) Epiphytes, Parasites and Climbers: Most of the trees and shrubs of the area are laden with either some climbers or parasitic shrubs or epiphytes. The climbing community is a very secured one, the chief constituents of which are *Spatholobus roxburghii* with its broad tri-foliolate leaves and brown hairy pods, *Dioscorea hamiltonii* with tubers and winged stems, *Smilax macrophylla* with broad leaves and hooked prickles. *Hoya parasitica*, the favorite fodder of elephant is a common sight on big old trees. *Thunbergia alata* with yellow flowers and winged petioles grow on some low lying places while *Thunbergia grandiflora* is observed climbing over bamboo bushes and branchy trees. *Vitis bracteolata* are common throughout the area. Seasonal climbers like *Cissampelos pariera*, *Stephania japonica*, *Ipomoea hirta*, *Ipomoea pestigrides*, *Ipomoea undulate*, *Myriopteron extensum* etc. are found in cool, low but sunny places. *Ikania micrantha*, the deadly climber is always posing threat to the newly created plantations.

Epiphytes are very few, e.g. *Cymbidium aloifolium*, *Aerides odoratum*, *Vanda teres*, *Saccolobium trichomum*, *Bulbophyllum careyanum* are there only to mention.

Dendrophthe falcata, *Macrosolen cochinchinensis*, *Scurrula parasitica* and *Viscum monoicum* are the common parasitic shrub within the area seen taking shelter on *Artocarpus integrifolia*, *Zizyphus mauritiana*, *Punica granatum*, *Mangifera indica*, *Aegle marmelos* etc. fruit trees. *Cuscuta reflexa*, the yellow filamentous parasite is also seen covering *Zizyphus mauritiana* and *Polyalthia suberosa*.

Moreover, *Ficus* which is a parasite in its early life can also be observed on some trees. *Premna latifolia*, *Phoenix sylvestris*, *Streblus asper*, *Zanthoxylum rhetsa* etc. are the principal species on which *Ficus benjamina*, *Ficus bengalensis*, *Ficus infectoria*, *Ficus rumphii* etc. begin their life.

Apart from the above epiphytes and parasites some trees are the hosts of many species of Pteridophytes and flowering plants. The old trees like *Mangifera indica*, *Haldina cordifolia*, *Syzygium cumini* etc. are suitable hosts for colonization of Pteridophytic flora such as, *drynaria quercifolia*, *Pyrrosia lanceolata*, *Pyrrosia nummularia*, *Pyrrosia mollis*, *Lycopodium clavatum* etc.

The gymnospermous flora is represented by only one species e.g. *Cycas pectinata* growing mostly on rocky or gravelly hill slopes.

(ii). The upcoming Bambusetum: The ambitious project to set up a bambusetum is ongoing. The bambusetum has a wide collection of bamboos, with special emphasis on those of the N.E. region. This shall serve both as an invaluable germplasm bank as well as an informative introduction to the immense potential of our priceless bamboo resources.

The details of Flora of the Assam State Zoo cum Botanical Garden is given in **Annexure – I.**

(iii). Activities in the Botanical Garden:

(a). Plot No 1: Palm grove:

The palm grove was created by covering an area of 5 ha on the southern periphery of the one horned rhino enclosure. Seeds of different palm species were collected from the Palmatum of the Indian Botanical Garden, Sibpur, Kolkata in the year 1983 and were sown directly in the palm grove area. The following are the important palm species surviving at present.

- | | |
|-----------------------------|----------------------------------|
| i) <i>Hyphaena thebaica</i> | ii) <i>Corypha umbraculifera</i> |
| iii) <i>Oreodoxa regia</i> | iv) <i>Areca lutescens</i> |
| v) <i>Licuala peltata</i> | vi) <i>Livistona chinensis</i> |
| vii) <i>Caryota urens</i> | viii) <i>Caryota mitis</i> |

(b). Plot No 2:- Flora of N.E India (12 ha):

The plantation in this plot were carried out in the following years –

1983 – 85 = 4 ha

1985 – 86 = 5 ha

Total = 9 ha

Some important timber species of N.E. India were planted in this plot the surviving ones of which have been mentioned below:-

- | | |
|--|--|
| i) <i>Michelia champaca</i> (Titachopa) | xvii) <i>Menua ferrea</i> (Nahor) |
| ii) <i>Michdia macroura</i> (Bola) | xviii) <i>Michelia oblonga</i> (Phul chopra) |
| iii) <i>Michdia montana</i> (Pan chopra) | xix) <i>Ailanthus grandis</i> (Borpat) |
| iv) <i>Podocarpus nerifolia</i> (Jinari) | xx) <i>Aquilaria malaccensis</i> (Agaru) |
| v) <i>Phoebe goalparensis</i> (Bon chom) | xxi) <i>Dipterocarpus turbinatus</i> (Garjon) |
| vi) <i>Dipterocarpus retusus</i> (Holong) | xxii) <i>Schizocheton paniculatus</i> (Rata) |
| vii) <i>Maniltoa polyandra</i> (Ping) | xxiii) <i>Palaquium polyanthum</i> (Kurta) |
| viii) <i>Canarium resiniferum</i> (Dhuna) | xxiv) <i>Canarium bengalense</i> (Dhuna) |
| ix) <i>Albizzia proura</i> (Koroi) | xxv) <i>Acacia catechu</i> (Khoira) |
| x) <i>Terninalia myriocarpa</i> (Halokh) | xxvi) <i>Terminalia arjuna</i> (Arjun) |
| xi) <i>Chrysophyllur roxburghii</i> (Bonpitha) | xxvii) <i>Wendlandia glabrata</i> (Kakoi chera) |
| xii) <i>Polyalthia longifolia</i> (Debdaru) | xxviii) <i>Elaeocarpus ganitrus</i> (Rudraksha) |
| xiii) <i>Sapindus mukorossi</i> (Manichal) | xxix) <i>Acrocarpus fraxinefolius</i> (Mandhani) |
| xiv) <i>Manonia dipikri</i> (Jatibadam) | xxx) <i>Mangifera sylvatica</i> (Bon-am) |
| xv) <i>Garcinia pedunculata</i> (Bor-thequera) | xxxii) <i>Trewia nudiflora</i> (Bhelkor) |
| xvi) <i>Tetrameles nudiflora</i> (Bheleu) | xxxii) <i>Gnedina arborea</i> (Gamari) etc. |

Some new species of the N.E. India may be planted in the rest 3 ha area of the plot (list of species enclosed).

(c). Plot No 3:- Bamboo grove:

As suggested, the Bamboo grove was created along the southern boundary of the Botanical Garden covering an area of 2 ha of land. The species planted and surviving as on today are –

- | | |
|---|--|
| i) <i>Bambusa vulgaris</i> var <i>vittata</i> (Yellow bamboo) | ii) <i>Mambusa</i> <i>teras</i> |
| iii) <i>Debdrocalamus strictus</i> | iv) <i>Bambusa vulgaris</i> of <i>wonuni</i>
(Pitcher bamboo) |

(d). Plot No 4:- Threatened / vulnerable trees of Assam (4 ha)

This plot is available for creation of an Arboratum of 36 species of threatened and vulnerable trees of Assam as identified by P.C. Das which are as follows:-

1. *Alseodaphne owdenii* Parker (Jatisundi, Tilsundi)
2. *Aquilaria malaccensis* Lamk. (Agaru, Sachi, Eagle wood)
3. *Altingia excelsa* Noronha. (Jutuli, Duang)
4. *Adina oligocephala* Benth. (Haludchopa)
5. *Bombax insigne* Wall. (Dumboil)
6. *Bursera serrata* Colebr. (Mirtenga)
7. *Bischofia javanica* Bl. (Uriam)
8. *Cinnamomum glaucescens* (Nees.) Hand-Mazz. (Gandhsoroi)
(Syn. *C. cecicodaphne* Meissn.)
9. *Celtis australis* Linn. (Mohita)
10. *Maniltoa polyandra* (Roxb.) Harms. (Ping)
(Syn. *Cynometra polyandra* Roxb.)
11. *Dipterocarpus turbinatus* Gaertn. (Garjun, Kuroisal)
12. *Diospyros toposia* Ham. (Gulal)
13. *Dysoxylum binectariferum* Hk. f. et Bedd. (Bandardima)
14. *Dysoxylum alliaria* Balakr. (Gendheli poma, Keotai)
(Syn. *D. Hamiltonii* Hiern.)
15. *Endospermum chinense* Benth. (Bola)
16. *Holigarna longifolia* Roxb. (Jhawa)
17. *Kayea floribunda* Wall. (Karol)
18. *Lophopetalum wightianum* Arn. (Rumu)
(Syn. *L. fimbriatum* Wight)
19. *Michelia champaca* Linn. (Tita chopa)
20. *Michelia oblonga* Wall. (Phul chopa)
21. *Michelia Montana* Bl. (Pan chopa)
22. *Morus macroura* Miq. (Bola)
(Syn. *M. laevigata* Wall.)
23. *Mangifera sylvatica* Roxb. (Bon-am)
24. *Mansonia dipikii* (Jati badam)
25. *Euphoria logan* Steud. (Nagalichu, Tokra)
(Syn. *Nephelium logana* Camb.)
26. *Podocarpus nerifolia* D. Don.
(Jinari, Kath bhaluka)
27. *Pachylamax pleiocarpa* Dandy
(Kathalpatia chopa)
28. *Polyalthia simiarum* Benth. & Hk.f.
(Bor koliori, Boga khamtuo)
29. *Palaquium polyanthum* Benth. (Kurta)
30. *Phoebe attenuata* Nees. (Bon chom)
31. *Phoebe cooperiana* Kanjilal (Mekahi)
32. *Salix tetrasperma* Roxb. (Bhe, pani hijal)
33. *Magnolia baillonii* Pierre. (Khorika chopa)
(Syn. *Talauma phellocarpa* King.)
34. *Trewia nudiflora* Linn. (Bhelkor)
35. *Elaeocarpus sphaericus* K. Schum.
(Rudraksha) (Syn. *E. ganitrus* Roxb)
36. *Zanthoxylum rhetsa* DC. (Bajranali)
(Syn. *Z. budrunga* Wall)

(e) Plot No 5:- Gymnosperm plot (5 ha)

In this plot several gymnosperm species were planted in the year 1987-88 such as –

- | | |
|--------------------------------|----------------------------------|
| i) <i>Pinus caribaea</i> | vi) <i>Pinus longifolia</i> |
| ii) <i>Pinus khasya</i> | vii) <i>Callitris glauca</i> |
| iii) <i>Cupressus torulosa</i> | viii) <i>Cupressus arizonica</i> |
| iv) <i>Thuja compecta</i> | ix) <i>Thuja orientalis</i> |
| v) <i>Agathis robusta</i> etc. | |

But due to several wild fire and biotic interferences such as grazing by cattle of the neighbouring areas none of the above species planted in the plot survived. Later, in the year 2005-06 an attempt was made to create a Bambusetum for superior quality bamboos of the N.E. region. About 1 ha area in the gymnosperm plot was covered by planting the following bamboos collected from different places of Assam.

- | | |
|---|---|
| i) <i>Bambusa balcooa</i> (Bhaluka) | vii) <i>Bambusa tueda</i> (Jati) |
| ii) <i>Bambusa pallid</i> (Bijuli) | viii) <i>Bambusa nutans</i> (Makal) |
| iii) <i>Bambusa vulgaris</i> var <i>vittata</i> (Yellow bamboo) | ix) <i>Bambusa teres</i> (Barua) |
| iv) <i>Bambusa polymerpha</i> (Betua) | x) <i>Bambusa vulgaris</i> var <i>vulgaris</i> (Bakal) |
| v) <i>Bambusa mulliplex</i> (Fencing) | xi) <i>Bambusa pseudopallida</i> (Mirtinga) |
| vi) <i>Bambusa burmanica</i> (Konkoid) | xii) <i>Bambusa vulgaris</i> f <i>womini</i> (Pitcher bamboo) |
| vii) <i>Bambusa assamica</i> (Saru bijuli) | xiii) <i>Dendrocalamus giganteus</i> (Bor bhaluka) |
| <i>Dendrocalamus strictus</i> (Solid bamboo) | |

The available 4 ha of this plot is at present available for planting gymnosperm species.

(f). Plot No. 6:- Cane grove (2 ha) –

In the year 1991-92 the following species were planted in this plot.

- i) *Calamus flagellus* ii) *Calamus erectus* iii) *Daemonorops jenkinsionus*

But the plants did not survive. Hence the plot is available at present for replanting of cane species.

(g). Plot No. 7:- Medicinal plot (4 ha) –

Planting in the Medicinal plot was done in the years 1989-90 and 1990-91. Some tree species having medicinal properties had been planted in the plot, such as–

- | | |
|---|---|
| i) <i>Terminalia arjuna</i> (Arjun) | iv) <i>Terminalia belerica</i> (Bhomoka) |
| ii) <i>Terminalia chebula</i> (Silikha) | v) <i>Anacardium occidentale</i> (Kaju badam) |
| iii) <i>Shorea robusta</i> (Sal) | vi) <i>Aquilaria malaccensis</i> (Agaru) |

Planting of medicinal herbs, shrubs and climbers in the plot is yet to be done.

(h). Plot No. 8:- Nursery (0.5 ha)-

A nursery was created at the South-east portion of the Garden covering an area of 0.5 ha to raise seedlings of required species in 1983-84.

(i). Plot No. 9:- Orchid house –

Orchids have been maintained in the zoo cum Botanical Garden since the establishment of the zoo. At the beginning they were maintained in a bamboo-roofed house. In 1985 they were shifted to a fibre-glass roofed house. In 2007 a new house was constructed inside the Botanical Garden with agro-shed net for the orchids and at present following orchids are maintained in it.

- | | |
|--|--|
| i) <i>Aerides odoratum</i> | xii) <i>Aerides multiflorum</i> |
| ii) <i>Acampe rigida</i> | xiii) <i>Agrostophyllone khasiamrm</i> |
| iii) <i>Cymbidium aloifolium</i> | xiv) <i>Cymbidium aloifolium</i> |
| iv) <i>Cymbidium graminifolium</i> (?) | xv) <i>Coelogyne barbata</i> |
| v) <i>Debdrobium finbriatum</i> | xvi) <i>Dendrobium maschatum</i> |
| vi) <i>Dendrobium oniceps</i> | xvii) <i>Dendrobium ashylum</i> |
| vii) <i>Phajus tankervillea</i> | xviii) <i>Pholidota imbricate</i> |
| viii) <i>Pholideta sp</i> | xix) <i>Dendrobium macrei</i> |
| ix) <i>Vanila pilifera</i> | xx) <i>Vanda teres</i> |
| x) <i>Paphiopedilum venustum</i> | xxi) <i>Rhynchosstylis retusa</i> |
| xi) <i>Dendrobium jenkinsiana</i> | xxii) <i>Dendrobium aggregatum</i> |

1.6. (ii) Fauna:

The zoo at present has two kinds of animal population, - a) Captives inside the enclosures, and b) Free ranging species.

Among the free ranging species, some may be called *feral like* as those were the animals that were once kept inside the enclosure or were rescued from different areas and released in the zoo's forest. It has been mentioned elsewhere above that the zoo campus is a relic of what was a contiguous forested belt stretching up to the bank Brahmaputra to river Digaru in the east and the stretches of forest connecting Shillong plateau and by big and small wetlands which is now main Guwahati. As a matter of fact Hengrabari RF is a relic of that

past habitat. So the fauna of that habitat of the past has taken refuge and protection in this forest relic and is part of it. So today such wildlife freely range not only in the zoo campus forested areas but even percolate in to the exhibit area also.



In short the zoo campus harbours as many as 15 species of mammals, including a thriving population of Sambar, Barking Deer and Serow. Apart from this, whole hosts of lesser fauna like reptiles, amphibians and butterflies range freely in its campus. The campus is also a bird watchers' paradise where 152 species of birds have so far been recorded by different ornithologists. The biodiversity richness, pertaining to free ranging faunal species, of Assam State Zoo cum Botanical Garden is indicated by the resources –

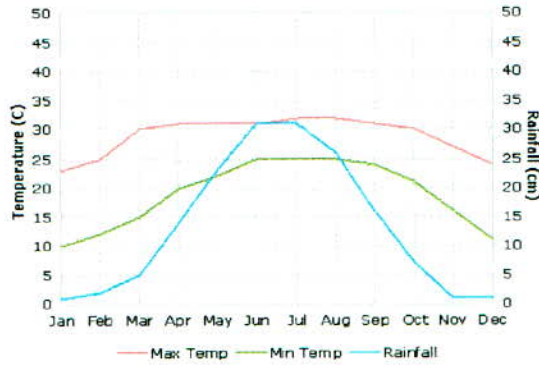
- (i) Butterflies & moths : 227 species
- (ii) Insects : 153 species
- (iii) Spiders : 40 species
- (iv) Herpeto fauna : 41 species
- (v) Avifauna : 173 species
- (vi) Mammals : 24 species

Details of Fauna are given in **Annexures – II (A), (B), (C) & (D)**

1.7. Climate and Rainfall:

Guwahati enjoys mild tropical climate with moderate weather with average highest monthly temperature of 32°C in the month of August and average minimum monthly temperature of 9.8°C in the month of January. However, Summer (April-May) has a maximum of 40°C and winter (October to March) has a minimum 5°C. Pre monsoon during April and May and monsoon during June to October give good rainfalls. The Guwahati has a monthly minimum Mean total rainfall of 5.1mm and monthly minimum mean number of rain days of 0.4 days in the month of January and monthly maximum mean total rainfall of 353.6 mm and monthly mean maximum number of rain days of 16.8 days in the month of July. Relative humidity in Guwahati city is usually 70-80% in summer and about 20 % in winter months.

Month	Mean Temperature°C		Mean Total Rainfall (mm)	Mean Number of Rain Days
	Daily Minimum	Daily Maximum		
Jan	9.8	23.6	11.4	1.2
Feb	11.5	26.4	12.8	1.3
Mar	15.5	30.2	57.7	4.6
Apr	20.0	31.5	142.3	9.0
May	22.5	31.0	248.0	14.3
Jun	24.7	31.4	350.1	16.1
Jul	25.5	31.8	353.6	16.8
Aug	25.5	32.1	269.6	13.9
Sep	24.6	31.7	166.2	10.3
Oct	21.8	30.1	79.2	5.3
Nov	16.4	27.4	19.4	1.5
Dec	11.5	24.6	5.1	0.4



Note: These are average maximum and average minimum temperature for Guwahati. The highest temperature in Guwahati for the month is usually higher than the average maximum temperature. Similarly, the lowest temperature in Guwahati for the month is usually lower than the average minimum temperature.

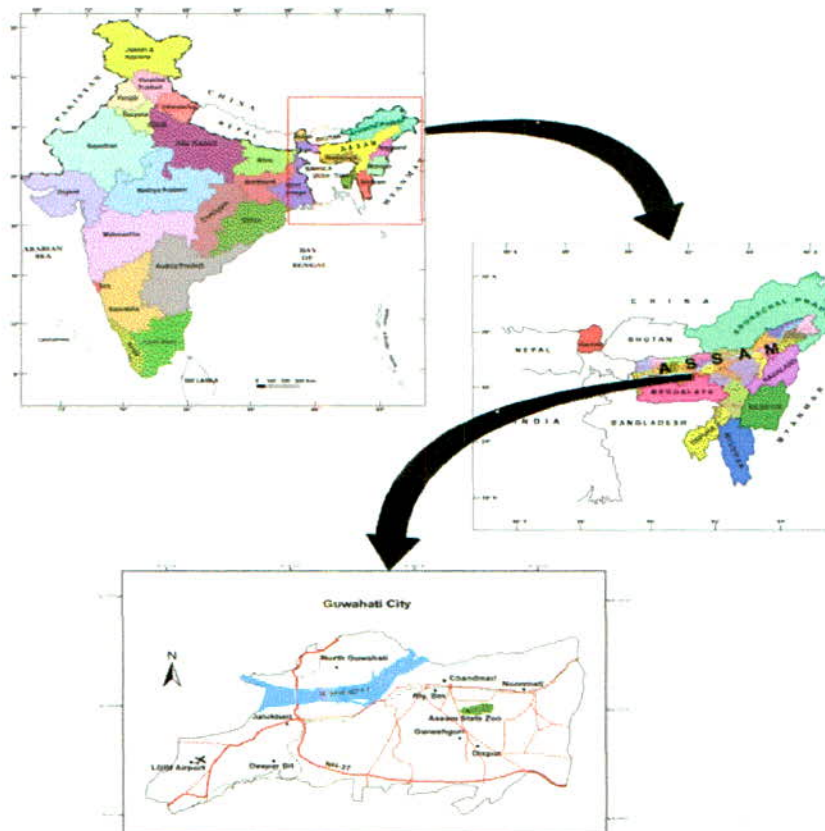
1.8. Season:

According to temperature and amount of rainfall, three seasons can be distinguished. The cold weather with misty night and mornings generally commence from November and remains till the end of February. Winter rain is negligible and frost is unknown to this zoo area. The months of March to middle of May are generally hot and dry. Moderate to brisk rain with a cloud burst generally occurs from mid-April. During this season violent thunderstorms with brisk showers are also common. Hailstorm is infrequent, Monsoon breaks out either in last part of May or in June and rainfall tapers off toward the end of October. In between the showers when the sun emerges from the cloud, the heat is steamy and the intensity is more under a closed canopy forest.

1.9. Approach:

During the time of its establishment, the area was at the outskirts of the then Guwahati city when Shillong was the capital of the then Assam. The capital of the state shifted to Guwahati, the gateway to Northeast India, when Mizoram, Arunachal, Meghalaya were vivisected during 1971. As a result the city started expanding enormously engulfing the zoo campus in its heart which is now at a stones throw distance from the capital complex. The zoo is located at R.G. Baruah Road, only 8 km from Guwahati Railway station and about 25 km from the Gopinath Bordoloi Airport. The distances of Guwahati from different capitals of the NE States are as follows –

Capital	Distance in KM
Aizol	588
Agartola	579
Gangtok	624
Itanagar	420
Imphal	487
Kohima	342
Shillong	100



Location map of Assam State Zoo cum Botanical Garden

1.10. Demography of the surrounding area:

The hillock where the zoo was established in 1957 is known as *Japori Gog*, a Karbi word which means a hilly hamlet. Till 1970 the entire area on both sides of the present RG Baruah Road (then Zoo Road) where fields where wet rice cultivation was practiced by the *Karbi* people whose homestead were located on the elevated (hilly) land that is the *Japori Gog* hill. The Assam State zoo lay amidst such an agrarian

ruralscape till 1971. This was actually part of the reserved tribal belt and due to the transfer of the capital of Assam from Shillong it was de-reserved and the entire paddy land, even the land on the slopes and hills of the Japori Goj and its surrounding areas, were soon covered by office and residence initially of the Assam government employees and their families who came down from Shillong. In the aftermath of such sudden migration most of the local Karbi people not only sold their agricultural land but also their homestead plots and migrated to other remote parts of the state. Hence the demography of the surrounding area is now cosmopolitan similar to any other such metropolitan city.

1.11. Legal status of the land:

As mentioned elsewhere, the present zoo area was a part of the Proposed Hengrabari Reserved Forest (PRF) comprising an area of 628 ha. This PRF was declared a Reserved Forest (RF) in 1992. Initially an area of 130 ha was handed over for establishment of the Assam State Zoo and then more areas were added from the same RF to create a Botanical Garden. In 1998 another 45 ha area of the RF was added to the eastern portion of the zoo campus increasing its campus to 175 ha. Hence the legal status of the area continues to be that of a Reserved Forest (RF) notified as per the provisions of the Assam Forest Regulation, 1891.

1.12. Sources of pollution:

As mentioned earlier, the zoo campus is now in the midst of a cityscape which is also fast changing. The biggest and costliest multi storied apartments of Guwahati are in the vicinity of R G Baruah Road which is easily one of the roads in the city having maximum vehicle plying at any given time. Noise pollution in this road is the maximum in Guwahati. Thousands vehicles of different categories run on the streets of the city every day. Air pollution in Guwahati is at a 75% constant along with drinking water pollution. Guwahati is the gateway of the Northeast India and is a very fast developing city. Till date there is no notable factory in the vicinity of the zoo but the urban settlement touches its very walls. Human activity all around the zoo will naturally be detrimental to its flora and fauna. The positive aspect in this matter is the vastness of the zoo campus

and because it is located primarily on a hilly location the chances of pollution by runoff water from its surrounding are almost negligible.

1.13. Present ground situation:

The entire periphery of the zoo campus has a brick wall of 5.579km length and 2.00m height. As mentioned above, the human settlement starts from the boundary wall of the zoo. Pilferage of the firewood, bamboo etc from inside the zoo forest is a common occurrence and for this the wall is deliberately broken. Because of this repairing the boundary wall to prevent such intruders has become a recurring activity.

About 90% of the exhibit area of the zoo is hilly with a low slope gradient. The slopes is west and south facing. The tree cover in this zone is comprised of mixed form, both natural and planted in origin. In the exhibit area the canopy formation of such trees is not enough, (unlike the non-exhibit area) to reduce top soil erosion. Besides, in the existing setup, the regulation of visitor's flow is not as per proper plan. Foot paths for visiting the exhibits have been constructed but visitors tend to go away from it and take shortcuts as these paths are not hedged in. Because of this visitors take their own path and such random foot-fall in the inclined slopes loosens the soil by trampling and the ground vegetation cover erodes leading to significant top soil erosion during the monsoons. This is one of the major potential threats to the zoo as in some places the root system of trees are severely exposed.

As has mentioned earlier, the exhibit area is covered by moderate density of trees both of natural origin and planted. Breaking and uprooting of trees during the late summer and monsoon is a common natural event in this zone. The trees in the zoo campus are in the south facing slope and they get uprooted and damage the enclosures.

The human settlements including multi-storied buildings are closely adjacent to the zoo's compound wall. As a result the compound is vulnerable to the intrusion of offenders into the zoo who may steal, harm or injure or even poison zoo animals. Such incidents have occurred earlier.

The zoo presently has two colonies; one is located in the southeastern corner and it is mainly for the subordinate staff and the other one is located at the northwestern

corner and houses the officers and office staff. These two colonies for all purposes use the roads passing through the exhibited area and the main zoo gate. Not only the staff and their dependents, but also friends and relatives who visit them use the entire southern road at any point of time. This unregulated movement of people is a threat not only to zoo property but also to the zoo's captives. Unless the two colonies are separated from the zoo campus, the problem will remain forever.

1.14. Layout:

There existed no written layout plan for the Assam State Zoo *cum* Botanical Garden since its inception. Therefore, enclosures for the new arrivals were constructed gradually one after another. Some of these are more or less cages and most of the enclosures are now more than 45 years of age. Some have crossed more than 50 years by now. However, major importance was given to the ecological aspect of the animals and in its accordance enclosures were located. For example, aquatic birds' enclosures were placed in the wettest area which was earlier right at the gate of the officers' colony and then it was shifted to its present location on the plain, whereas the carnivores were located on the slopes and the hilly terrain. Minor manipulation of the topography was also made in case of some enclosures. The location of the lion, tiger, rhino, sambar enclosures have been lauded by the experts. However, some of the enclosures were placed without considering the taxonomy, behaviour and theme. Without a written Layout Plan, location of enclosures was primarily done on the basis of experience and whim of the particular officer(s) posted at that particular time.

The existing Layout Plan comprises 48 enclosures (with sub-enclosures, and quarantine- enclosures it totals 60 nos.) The enclosures altogether houses 113 Species covering 895 individuals. Out of the 60 enclosures 27 are open enclosures and the remaining 33 are closed enclosures.

Some of the enclosures have been constructed recently following the expertise of the CZA and will be retained for future also. These are shown in the proposed Layout Map in 'Black' colour. The old tiger enclosure which was one of the ideal one will be retained as such with minor modification as advised by the CZA experts during their visit to the zoo. A map in scale showing the **existing enclosures** along with other

features such, road, path, power line, water supply etc. is appended in **Annexure -III**.

1.15. Description of different facilities:

Assam State Zoo is one of the oldest zoos in India. Since its inception there have been many shifts in paradigms so far as the purpose and objective of creation of zoos in the country is concerned. Assam State Zoo was also not an exception. As a result development of the zoo was not based on a predetermined plan. The function of the zoo was primarily to cater to the aspiration of the animal lovers of the Northeast region and hence the layout and collection plan was ad-hoc. Even then the zoo was successful in meeting the aspiration of the visitors since its inception.

(a). The Museum – A vast collection of priceless trophies, unique specimens, mounted skins and minor forest produce was gathered from all over the region, this museum gives a glimpse of the biological richness of the globally acclaimed biodiversity hotspot i.e. North East India.

(b). The Botanical Garden & the Forest – Established in 1982, it is a veritable botanical treasure trove and is considered one of the finest botanical garden in the region. Exquisitely landscaped, the garden together with the patch of contiguous natural forest is home to over 354 species of indigenous and 268 species of exotic plants. An Orchidarium with 44 gorgeous orchid species, a collection of medicinal plants, Palm Grove are of special interest. Several species of rare and endangered species including the insectivorous pitcher plant *Nepenthes khasiana* are also propagated here.

(c). The Herbarium Collection – Housed at the Herbarium Hall, this is a comprehensive assemblage of painstakingly collected, immaculately mounted and meticulously labeled herbarium sheets, about 2000 in number, representing 550 species of the North-East Indian flora. An invaluable source of information for the serious student and the interested amateur alike, it is constantly being updated.

(d). The upcoming Bambusetum – Ongoing is an ambitious project to set up a bambusetum having a wide collection of bamboos, with special emphasis on those of the N.E. region. This shall serve both as an invaluable germplasm bank as well

as an informative introduction to the immense potential of our priceless bamboo resources.

- (e). **Dense forest tract** – one can explore the dark woods of the forest existing within the zoo campus with winding nature trail straddling the hillocks.
- (f). **Watch tower** – Visitors can arrive at the watch-tower for a bird's eye view of the city sprawled below. Landmarks like the Saraighat bridge over the mighty Brahmaputra may also be visible from this tower.
- (g). **Rock field** – People with interest in rock climbing may avail the same at Rock Climbing Camps at the R.K. Bhuyan Memorial Rock Field.
- (h). **Children Park** – The Children Park with various playing facilities exist in the zoo campus.
- (i). **Other Facilities:** Drinking Water, Toilets, Parking place, Restaurant, Guide map, Directional and interpretative signage, publications etc. The State Government is also contemplating to establish an Ecological Museum inside the Zoo campus, however modalities and other relevant issues are yet to be finalized.

1.16. Difficulties faced in the management:

Problems are always a part of the management of a large zoo where a large number of captives of different categories are housed and their upkeep is managed. In a well wooded undulating ground location like the Assam State Zoo cum Botanical Garden the problems are varied. Most of the difficulties are addressed in individual chapters. Some of the difficulties faced by ASZBG are detailed below in short –

- (a). **Erosion:** For many years the zoo's exhibit area is subjected to significant sheet erosion. During winter months, the visitors flow increases to the maximum possible number and due to the unregulated movement of such visitors, they resort to shortcuts and don't use the road actually meant for using. This unregulated flow of visitors not only loosens the dry soil but also destroys the ground cover by trampling. As a result during the raining season rainwater runs over the incline of the ground and washes the topsoil. In some areas the erosion is so much that the root system of most of the trees is significantly exposed. Besides, because of the erosion of the topsoil the drains of the zoo have silted up which has become a recurring problem.

(b). Strom: ASZBG is in the midst of trees both natural and plantation origin. The enclosures were built in location where trees of different ages existed both inside and outside them. Assam is located in a climatic zone where thunder storms are quite common during the beginning of the monsoon season. Occasional storms are not uncommon even in the autumn season.. Incidents of wind-fallen trees are quite common during thunder storms. This causes damage to the enclosure wall, power insulators and boundary wall. Such sudden damages create big emergency problems to the management.

(c). Sudden escape of animal: This is a common problem to almost all the zoos and ASZBG is also not an exception. Several such incidents have happened in this zoo earlier. ASZBG had to deal with such sort of chaotic situation caused by tiger, bear and lion more than once. Every such case has been enquired into and in most cases negligence by the keeper and improper enclosure gates are usually the cause

(d). Inadequate fund: Fund is a constant problem for the proper maintenance of a large zoo like ASZBG. The management of the zoo demands huge fund for meeting both recurring and non-recurring items which include maintenance of zoo staff ; feed and treatment of the zoo animals ; regular maintenance of enclosures ; buildings and boundary walls ; visitors amenities ; power and water supply ; road and communication ; construction and improvement of animal enclosure ; rescue and rehabilitation of rescued animals, etc. The sources of fund are basically from state government and central government. The State government provides fund for payment of salary for the zoo staff, expenses on food and health care on animals, running cost of vehicles, maintenance and protection of the zoo, etc. The Central Zoo Authority provides fund for infrastructure development such as construction of enclosures, environment enrichment, publicity, research and conservation breeding programme, etc. But it is a fact that Assam State Zoo-cum-Botanical Garden faces tremendous problem in getting necessary fund in terms of time and amount i.e. availability of fund is both irregular and meager with special reference to recurring items.

(e). Occasional stealing incidents: As was mentioned elsewhere, ASZBG is in the midst of a thickly populated metro city. The zoo is the a forested island in the middle of a sea of vast population. Such human populace constantly has the inclination to collect natural resources, particularly the firewood, bamboo, house pole, cattle fodder etc from the zoo campus.

(f). Vandalism: Though incidence of vandalism by the visitor is of a sporadic nature however, such incidences are not uncommon particularly during the eve and beginning of the New Year. ASZBG receives the highest number of visitors over the year-end and the New Year's Day. Thousands of visitors throng the zoo and as usual due to shortage of manpower, regulation of visitors becomes a problem. Off-course, ASZBG always takes the help of police, NGOs and volunteers of scout and guides during these days.

1.17. Attempts for a new Master Plan:

Necessary steps were initiated in the past to have a scientifically prepared master plan the origin of which goes back to 1998, the year of Government notification no.FRW.25/98/6 dated 12th October'1998. In this notification 8 members were selected for preparation of a long termed Master Plan for ASZBG. Subsequently another notification, No FRW.25/98/pt/3 dated 30th June"1998 was issued notifying 13 members to initiate necessary steps for preparing a Master Plan for ASZBG. It was followed by holding of two meetings, one in July'1999 and another in April'2000. The Central Zoo Authority asked Late Pushpa Kumar, Zoo Consultant to prepare the Master Layout Plan for Assam State Zoo *cum* Botanical Garden. The Master Layout Plan prepared by him was submitted in November 2005, but was not accepted by the Central Zoo Authority (CZA). An effort in this matter was made by Shri N. Mahanta then DFO, Assam State Zoo Division and a draft plan was submitted to the CZA. However, the expert committee raised several issues pertaining to this draft Master Plan. Hence, a serious and scientific effort was made to compile and prepare a Master Plan by addressing all the issues raised by the expert committee, such as guideline for preparation of Master plan, preparation of a proper map etc. The present Master Plan will encompass comprehensive and detailed information on Assam State Zoo *cum* Botanical Garden that will provide a clear road map for next 10 years (2011-12 to 2020-21).

PART - I
CHAPTER - II

APPRIASAL OF THE PRESENT ARRANGEMENT AND CONSTRAINTS

1. Animal section:

The zoo was started with *Spotty*, the female leopard calf, as the flagship display along with her companions. This had ushered an increase in animals displayed with a concomitant though gradual increase in public interest. With the passage of time the zoo enlarged both in area and in the number of its captives and in this matter reached its glorious peak during the seventies when a large variety of exotic species such as Chimpanzees, White and Black Rhinos, Zebras, Ostriches, Giraffes, African elephants, Puma, Jaguar and Llama from S. America and Kangaroos from Australia were procured in order to cater to the demands of the ever- growing visitors from the other North-Eastern states. Though there was no written Master Plan, the display of the animals was made according to the decision of the authority whose selection of sites for the animal enclosures, reflect their depth of knowledge and experience.



With the formation of the Central Zoo Authority (CZA) and as per their mandatory instructions along with Zoo Rules, the scenario changed gradually and zoo now concentrated largely on collecting regional species. The zoo now kept the following species in captivity –

Captive stock as on 31/03/2011		
Captives	Species	Individuals
Mammal	45	518
Bird	40	270
Reptiles	28	107
Total	113	895

Detail list Appended in **Annexure – IV (A) & (B)**

1.1 Breeding in Captivity:

Assam State Zoo-cum-Botanical Garden is considered as one of the important *ex-situ* conservation centre with particular reference to rare and endangered wild fauna of the North East Bio-geographic zone. The zoo since its inception achieved remarkable success in the breeding of rare species of mammals, birds and reptiles. Hence this zoo has been entrusted to initiate firm steps to augment the conservation breeding programme by the Central Zoo Authority. However, for executing such works adequate manpower with experts are required as this activity demands tremendous work such as data handling, recording physiological and genetical behavior, etc. Hence some special posts like for instance a Biologist needs to be introduced in this zoo.

Assam State Zoo has the distinction of breeding rare and endangered species since its inception. Breeding of various species viz. Leopard Cat, Rhino, Serow, Jungle Cat, Tiger, Golden Langur, Black Buck, Himalayan Black Bear, Brow antlered deer, etc. are taking place in this zoo. Lately, the zoo has initiated steps for systematic conservation breeding programme for 3 species out of total 5 designated species suggested by Central Zoo Authority.

Regarding breeding of exotic species, breeding of Hippopotamus has been quite successful. Egg laying of Cassowary has been a regular phenomenon, but raising chicks of this species has not been successful.

The Central Zoo Authority has assigned the zoo with the responsibility for the conservation breeding of certain identified critically endangered species. The zoo shall act as the coordinating zoo for carrying out conservation breeding programme of the Rhino, Golden Langur, Serow, Golden Cat and Grey Peacock Pheasant and act as a participating zoo for the conservation breeding of Clouded leopard, Sun Bear, Binturong, Pig tailed macaque, Stump tailed macaque, Hoolock gibbon, Thamin Deer, Pygmy hog and Vultures as identified by the Central Zoo Authority. The Status of breeding of captive animals is shown in **Annexure – V**.

1.2. Successful captive breeding:

Assam State Zoo is famed for its success in breeding in captivity. Following are some of the examples of its success in captive breeding.

During 1974 the zoo had taken up the breeding of the endemic Pygmy Hog in captivity and 4 hogs were brought from Barnodi RF (upgraded to Sanctuary in 1980) and kept in specially designed enclosure away from visitors. The efforts were rewarded, as 4 piglets were born in 1976. Similarly White-winged Wood Ducks was brought to the zoo in 1970, and it bred regularly in the zoo, before succumbing to diseases. The zoo has a glorious past history with regard to the breeding in captivity of various species such as Golden Langur, Stamp Tailed Macaque, Pig tailed Macaque, Himalayan Black bear, Serow, Rhino, Tiger, Leopard Cat, Jungle Cat, Rosy Pelican (regularly) etc.

So far as the breeding of exotic species is concerned, breeding of Hippopotamus has been quite successful. Egg laying of Cassowary is a regular phenomenon, but raising chicks of this species has not been successful. However, by considering past experience of breeding success of cassowary, an old enclosure was improved and a pair of cassowary has housed in this enclosure with better enrichment and space provision. The matter is considered in the new plan and it is hoped that the zoo will be successful in future to breed this species.

Besides, the zoo administration will explore the possibility of breeding of other species of North East Bio-geographic region in future. Two locations for conservation breeding have been identified and marked in the layout plan.

1.3. Single sexed animals:

Assam State Zoo has in captivity some single sexed animals. There are basically three reasons behind the existence of single sexed captive. First is the absence of a well prepared Collection Plan, the procurement of animal to the zoo was not systematic and so single sexed animals were then procured. Single sex captive also occur when one of a captive pair dies and the thirdly the zoo has to house a single sex rescued animal. The list of single sexed animals has been given in **Annexure- VI**. Single sexed animal has become one of the major issues for Assam State Zoo cum Botanical Garden. This has special reference to exotic captives like the Giraffe, African Rhino, etc. Every effort is being made for pairing the entire existing single sexed zoo captives.

1.4. Collection plan:

Assam State Zoo was open to visitors in 1958 with 42 (22 species) animals and 236 (31 species) birds. The zoo did not have a written collection plan. This stock of captives was increased by focusing on exhibiting more species especially by increasing the spectacular eye-catching exotic variety. With the passage of time, importance shifted to indigenous species this was done by various regulations in matters pertaining to animal collection plan. The exchange of animal has been carried out by the zoo adhering to the existing rules and regulations. For several decades now, this zoo has played an important role in the rescue and rehabilitation of distressed wildlife. The healthy individuals were released in the wild while others had to be kept for long veterinary care. This has increased the number of captives beyond what was planned.

It has been already mentioned that ASZBG is the only large zoo in the Northeast and is a favourite zoo for all the people of this region. Guwahati is the gateway of all the northeast states and hence, all possible effort needs to be made so that ASZBG attracts more visitors and thus fulfills the objectives of a modern zoo. And to this, more charismatic animals, even if they be exotic ones, needs to be collected.

1.5. Conservation Breeding:

Assam State Zoo has the distinction of breeding rare and endangered species since it was established. Lately, the zoo has initiated steps for a systematic conservation breeding programme for 3 species out of the total of 5 designated species suggested by Central Zoo Authority. Accordingly, the conservation breeding enclosure for one horned rhinos has been under construction, while, plans and estimates for conservation breeding enclosures for Golden Langur and Serow have been submitted to the Central Zoo Authority for necessary scrutiny.

The Central Zoo Authority has assigned the responsibility of conservation breeding of certain identified critically endangered species to the ASZBG. The zoo shall act as the coordinating zoo for carrying out conservation breeding programme of Rhino, Golden Langur, Serow, Golden Cat and Grey Peacock Pheasant and act as a participating zoo for the conservation breeding of Clouded leopard, Sun Bear, Binturong, Pig tailed macaque, Stump tailed macaque, Hoolock Gibbon, Thamin Deer, Pygmy hog

and Vultures as identified by the Central Zoo Authority. Necessary housing facilities in off -display area shall be constructed for carrying out the conservation breeding programme of such species. Such enclosures for Golden Langur, Serow, Golden Cat and Grey Peacock Pheasant would be constructed in the area as shown in the Layout Plan Map. The conservation breeding programme shall be carried out as per the standard protocol and guidelines issued by the Central Zoo Authority in this regard. Further, the zoo is to help the other identified zoos of the country in implementing the breeding programme of critically endangered species. Any decision of the Central Zoo Authority about any animal being sent to a particular zoo for augmenting the number of founder animals for the conservation breeding programme of the species shall be binding on the ASZBG.

1.6. Rescue and Rehabilitation:

Assam State Zoo cum Botanical Garden has taken the additional responsibility of rescue and rehabilitation of distressed wild animals. It has an enviable tract record of executing rescue of a large number of distressed wild animals which includes mammals, reptiles and birds of wide array of species, details of such rescue are shown in **Annexure-VII**. The rescued wildlife is brought to the zoo for treatment and monitoring and subsequently those found fit for rehabilitation are released in its natural habitat. However, a significant number of such individuals need either prolonged treatment and care or life time care. This is a regular activity and zoo staff has developed excellent expertise on rescue and proper rehabilitation. The records on this aspect are maintained in the zoo hospital which can be evaluated and measured in order to upgrade rescue endeavour in the future. If the additional requirement of dedicated vehicle, logistics, training, etc. are furnished along with adequate staff and a proper training regimen ASZBG's rescue work will reach a new height,

In entire North East India there is only one another Rescue Centre set up by an NGO i.e. CWRC located at Panbari Kaziranga but its future cannot be said to be certain Thus the ASZBG alone would have to take the entire responsibility to rescue and care for the wildlife in the state as it was doing before the CWRC was commissioned In view of this the Central Zoo Authority also notified this zoo as identified for off display life time care facilities for leopards and black bears.

1.7. Adoption of Animals:

An animal adoption scheme has been launched in the Assam State Zoo. It is a novel way to show firm commitment to wildlife conservation by supporting the attempts of Assam State Zoo. It is a scheme wherein one can choose an animal; contribute the expenses required for its food and upkeep for a certain period of time, thereby “adopting” it. The adoption cost for a particular animal is prepared based on the diet schedule of the particular animal and the approved rate of the items procured for its feeding including a tentative amount that might be required for its regular vaccination and treatment. This scheme was launched in the year 2005 and is presently in operation.

1.7(i). The salient features of the scheme are:

- a) Animal adoption in Assam State Zoo implies bearing the expenditure only for feeding and healthcare of any animal of Assam State Zoo.
- b) Any bonafied individual/ organization can adopt an animal of Assam State Zoo.
- c) Proposal for adopting animal can be made in an “**Adoption Form**” as per the prescribed format.
- d) The Assam State Zoo authority reserves the right to accept or reject the proposal of any individual/organization for adopting an animal in the Zoo without assigning reason thereof.
- e) The adopter shall have to adopt the animal for a minimum period of one year.
- f) The adopter shall bear the entire costs for feeding the animal and health care of the animal as decided by the Zoo authority during the adoption period.
- g) The Assam State Zoo Authority will prepare the cost for adoption of a particular animal for a specific period that will not be less than one year.
- h) During the period of adoption the adopter shall have to fully co-operate with the Zoo management and act as per their guidance in the interest of management of the animal.

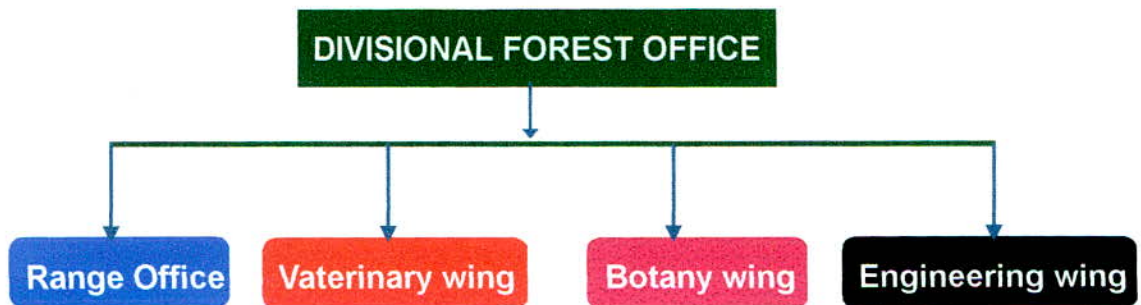
- i) The adopter shall have to contribute the amount that will be required for adopting the animal before the period of adoption.
- j) The adopter shall have to sign an “**Agreement**” as per the prescribed format with the Assam State Zoo Authority for adopting the animal. The Assam State Zoo authority reserves the right to modify/terminate the agreement without assigning any reason at any time.
- k) The adopter shall have to abide by the terms and conditions as laid down by the Assam state zoo authority time to time and law in force.
- l) The name of the adopter will be displayed with his consent in the enclosure where the adopted animal is exhibited.
- m) **Free entry pass** will be provided to the adopter and five of his family members to visit the zoo during ‘Zoo hours’ only during the period of adoption.
- n) One certificate of adoption shall also be issued to the adopter signed by the Divisional Forest Officer, Assam State Zoo Division.
- o) In case of sudden death of the animal the adopter shall have an option to adopt other animal for the remaining period after having discussion with the Assam State Zoo Authority.
- p) The amount received by the Assam State Zoo Authority on account of adoption of animal shall be deposited in the PL Account of the Divisional Forest Officer, Assam State Zoo Division and will be spent accordingly on receipt of approval of the Administrative Department.
- q) Necessary publicity materials will be prepared to give wide publicity of the scheme Animal Adoption Scheme does not only ensure involvement of common people in wildlife conservation programme but also creates awareness towards wildlife conservation apart from generating fund.

1.8. Identification of zoo captives:

It is always advisable to adopt identification system for each zoo captive, with special emphasis on mammals. Microchipping has been done in case of rhino, Serrow, Stump tailed macaque, Hoolock Gibbon, Tiger, Assamese Macaque, Golden Langur, Black Panther, Clouded Leopard and Elephant. This aspect will be looked to in the future plan.

2. Zoo Administration:

The Divisional Forest Officer, Assam State Zoo Division is the over all in-charge of the zoo. Under his administrative control, there are four distinct wings. These are –



2.1. Divisional Forest Office: The office is headed by the Divisional Forest Officer and assisted by the following categories of staff –

Sl. No.	Category of staff	Sanctioned post	Man in position
1	D.C.F.	1	1
2	A.C.F.	1	1
3	Accountant	1	1
4	Sr. Asstt.	1	1
5	Jr. Asstt.	5	5
6	Office peon	5	5
7	Dark Runner	1	1

2.2. Zoo Range office: One Forest Ranger is in-charge of the Range Office who is assisted by all categories of staff. The personnel of the Range Office are responsible for the entire activities except the works of veterinary and Botany wing. Even engineering works are executed by the Range personnel.

The staff position of the Range Office is shown below –

Sl. No.	Category of staff	Sanctioned post	Man in position
1	Forest Ranger	1	1
2	Dy. Ranger	1	1
3	Game Keeper	1	1
4	Store keeper	1	1
5	Museum Curator	1	1
6	Forester-I	6	6
7	Forest Guard	17	17
8	Driver	5	5
9	Handyman	2	2
10	Mahut	4	3
11	Head Animal Keeper	5	4
12	Animal Keeper	22	22
13	Gate Fee Collector.	3	3
14	Gate Keeper	4	2
15	Grass cutter	2	2
16	Chowkider	4	3
17	Night Chowkidar	12	8
18	Sweeper	12	4

2.3. Veterinary Wing:

The Forest Veterinary Officer with his supporting staff regularly follow all the prescribed steps for the upkeep of zoo captives, which include routine protocol for vaccination, deworming, etc. Now and then experts from college of veterinary science extend their expertise to zoo veterinary staff for dealing with problematic issues. An Animal Advisory Committee comprising representatives from veterinary Deptt. College

of veterinary science, PHE, and other line agencies has been also notified for advising on health related issues of both zoo captives and zoo keepers. Zoo hospital has optimum stock of tranquilizing items which is a must for modern zoo management.

Veterinary wing is at present working up to their ability though the resource available is not adequate. The Wing is headed by the Forest Veterinary Officer. Both the FVO and another pathologist are deputed from the Veterinary and Animal Husbandry Department of the State.

The present staff position of the wing is produced below –

Sl. No.	Category of staff	Sanctioned post	Man in position
1	Forest Veterinary Officer	1	1
2	Pathologist	1	1
3	Lab. Asstt.	1	1
4	F.V.S.F.A	1	1
5	F.V.F.A	1	1

2.4. Botany Wing:

Detail has been described about the Botanical Garden of the zoo. Systematically the garden area was divided by laying grid and demarcating on the ground to form different groves and plots for raising diverse species. The efforts made during 1983 to established the Botanical Garden one of the treasure house of all the plant species of rare, endangered, endemic etc. belonging to the Northeast Biogeographic Zone could not be continued. However, significant work done during that period could be continued in future to full fill the objectives of the garden.

The Botany Wing is headed by a botanist and other assistants. Presently the Zoo Botanist post is lying vacant due to superannuation of the Botanist The present manpower in the wing is inadequate and the wing needs more skilled personnel to maintain and improve it. The present manpower status of the wing is produced below –

Sl. No.	Category of staff	Sanctioned post	Man in position
1	Botanist	1	0
2	Botanical Asstt.	1	1
3	Herb. Asstt.	1	0
4	Garden watcher	1	1
5	Garden Supervisor	1	1
6	A.G. Supervisor	1	1
7	Head G.Watcher	1	0
8	Mali	8	3

2.5. Engineering Wing:

Zoo has an Engineering Wing which is responsible for all engineering works of the zoo. The Wing has a workshop manned by technical personnel and skilled workers headed by the in-charge who is a Bachelor in Engineering. The wing maintains various infrastructure viz. enclosures, power supply, boundary wall, water supply, etc. Regular repairing of old structures demand various machines, materials etc. which are presently available in the engineering workshop. A fair quantum of items such as electrical goods (Bulb, tube, cable, etc), chain links mess, barbed wire, steel tubes, etc. are supplied to meet such requirement. The wing personnel are primarily busy in repairing works as significant numbers of enclosures are too old. In case of inclement weather, the engineering workshop personnel are kept in alert to meet eventualities. Considering the volume of works to meet the impending load of work, the wing need to be restructured by providing both manpower and infrastructure in future. The present staff position of the wing is produced below –

Sl. No.	Category of staff	Sanctioned post	Man in position
1	Assistant Engineer	1	1
2	Jr. Engineer	1	0
3	Technical Asstt.	1	1
4	Draft Man	1	1
5	Plumber	1	1
6	Pump operator	2	1
7	Welder	1	1
8	Carpenter	1	0
9	Electric Mistry	1	0
10	Tracer	1	0

3. Veterinary Hospital:

Assam State Zoo cum Botanical Garden has a good zoo Hospital constructed within its premises during (2004-05). However, with the expansion and modernization of the zoo during the implementation of the Master Plan, additional amenities need be incorporated to make the hospital responsive to all the immediate needs of animal health care. Zoo hospital maintains stock of medicine according to the supply of syringe, tranquilizing chemicals, etc. for meeting its day to day requirements.

The zoo hospital at present has the following facilities -

- (i) X-ray room
- (ii) Operation theater
- (iii) Microscope
- (iv) Tranquilization equipments

3.1. Functioning of veterinary section:-

The Forest Veterinary Officer with his supporting staff regularly follow all the prescribed steps for the upkeep of zoo captives, which include routine protocol for vaccination, deworming, etc. Now and then experts from College of Veterinary Science extend their expertise to zoo Veterinary staff for dealing with problematic issues. The expert from college of Veterinary Science, Guwahati come to assist the Zoo Vets in special cases and these were found to be quite effective in sorting out several complicated health issues in the past. As suggested by the Evaluation Team during September'2011 the formal MOU is to be signed with the Collage of Veterinary Science for conducting health monitoring and related activity in a sustained basis. An Animal Advisory Committee comprising representatives from veterinary Deptt. College of veterinary science, PHE, and other line agencies has been also notified (**Annexure – VIII**) for advising on health related issues of both zoo captives and zoo keepers. Zoo hospital has sufficient optimum stock of tranquilizing items which is a must for modern zoo management.

The Evaluation Team had also suggested exploring the possibility of conducting major sunk of veterinary activities in a more secluded location, specially near the

Botanical Garden area, such as post mortem, quarantine, etc. to avoid possibility of emergence of health related problem in future as the present Zoo Hospital is located in administrative block. Accordingly, Zoo administration has to give appropriate emphasis on this issue in future and some mechanism such as proper post mortem house, quarantine facility for problem animal, etc. are to be established near the old building used as zoo hospital in the past.

The present 3 VHF hand-wireless sets are being provided to zoo vets for better communication for gathering immediate information and emergency action.

4. Store and Feed supply:

Food and other items required for the zoo captives are classified into 16 groups, viz. Group 'A' to 'P'. Every year open tender is floated from intending contractors/suppliers to supply the items at competitive rates. Approved contractors supply the required food items regularly. Non perishable commodities are stored separately, while perishable commodities such as fruits, vegetables, meat, beef, fishes etc. are supplied on daily basis. Zoo veterinarian and officers regularly check the supplied items for its quality and quantity. Electric weighing machine has been provided in the ration house to maintain accuracy in weight of the food items. Freezing facility is also available for storing some perishable items. All effort has been made to maintain hygienic condition in the ration house by using disinfectants and sufficient running water. The ration house is smaller than the requirement; storage capacity is not optimum and also lack modern facility. In the future a spacious and planned ration house should be constructed and should have the provisions for adequate storage for materials including long time cold storage for preservation of foods as per the exigencies of requirement.

The zoo veterinarian regularly conducts thorough checking of the food supplied in the ration house. The Director, ACF & R.O of the zoo frequently conduct checks on the supplied food commodities so as to ensure proper food and feed to zoo captives both in terms of quantity and quality. The food for carnivores i.e. meat and beef are checked in a separate house and after being satisfied on the quality then the food for the respective animal enclosures is collected by animals keepers. However, the presently used beef house is totally unhygienic, small and in bedraggled condition. Zoo hospital

keep the provision of special food supplement for lactating mother, young ones and ailing captives as well.

Every morning the ration house becomes busy with preparation of food for the captives and animal keepers collect the food. Separate containers are used to carry the prepared food. Truck and cycle rickshaw are used to transport the food items to the enclosures, which are located in different locations.

4.1. Feed store:

This feed store is administered by Range Officer, Zoo HQ Range. The old Assam type building located adjacent to the Divisional Office has been used for the purpose. One section of the building is used for collecting feed for all groups. A weighing machine has been provided and one Forester maintains the records of all daily receipt. Proper records are maintained on receipt and issues. An inspection register on quality and quantity, etc. is also maintained. The adjacent section is for preparing the feed for zoo captives. Supply of sufficient fresh water, utensils, buckets, etc and also other implements, etc. ensure functioning of this section. It is suggested that this section need building of enough space and more room for proper management of this important activity.

Although a feed store exists, the storage capacity is not optimum and also lacks modern facility. Hence, a well designed store house for storing both perishable and non-perishable commodities is to be proposed. The proposed storage facility needs to be spacious, have all weather proof environments, freezing facility and other relevant requirement.

4.2. Kitchen:

Zoo kitchen, zoo hospital, feed storage go-down, isolation unit, quarantine unit, and engineering workshop are located suitably to perform the zoo activities in an efficient way. Service roads are also proposed for all the sections of enclosures.

The Zoo kitchen is an important feature for providing proper food to Bear, Elephant, Cassowary, Hill Myna, Binturong, Slow Loris, Golden Langur, Hollock Gibbon, Hornbill, Civet etc. The present zoo kitchen is not at all suitable for catering to such need and needs to be totally rebuilt. Cooking utensils are available in just manageable quantity, Utensils need to be replaced routinely and some better quality items have to be procured in future.

4.3. Supply of food:

Feeds are supplied as per the protocol detailed below:–

- (i) The Ration House is opened early in the morning. It becomes busy from 7 am onward receiving food items from the suppliers who bring all the items under different groups, except the beef for carnivores, to the Ration House.
- (ii) The food items are received by the In-charge of the Ration House. Before receiving, the quality of all items are checked and weighed in the electronic weighing machine.
- (iii) Records of receipt and issue are entered in relevant registers.
- (iv) Quality and quantity of all items are counter checked every day by any of the officers of the Zoo viz. DFO, ACF, R.O or FVO and records the observation made. If necessary, suggestive measures pertaining to food items are also recorded.
- (v) All vegetables and fruit items are thoroughly cleaned in running water, processed and kept in separate vessels and buckets earmarked for specific animals and enclosures as per diet schedule prescribed by the zoo veterinarian.
- (vi) Animal keepers and Head animal keepers process the food items such as removal of wanted parts, cutting and sizing, etc. in a separate room. This room is always kept clean and provided with copious amount of running water.
- (vii) Nobody is allowed to enter the room for processing and arranging the food items. The footbath is provided in the entry door, dipping of foot in the solution is a must.
- (viii) The staff engaged in processing food need to maintain absolute hygiene.

- (ix) After processing the food items the animal keepers collect the vessels containing the food and take the same to the individual animal enclosure. Cycle, Thela, Vehicles are engaged to carry the vessels containing food depending on the distance to be traveled and weight of the items.
- (x) The food items are emptied on the feeding trough, plates, etc. kept in the enclosures.
- (xi) Care is taken to ensure that no wastage of food, snatching food by stray monkey, etc. take place. gets completed by 10 A.M; while feeding of carnivores viz. lion, tiger, etc. starts from 1 P.M onwards. The staff of beef house collects and weighs the beefs supplied by
- (xii) The feeding of major animals, birds etc. supplier and quality is checked by FVO or Pathologist of the Zoo.
- (xiii) The animal keepers of tiger, lion and other carnivores, collect beef as per requirement and feed the animal accordingly. Afterward, the feeding cubicles are thoroughly cleaned to maintain hygiene.
- (xiv) The foods for nocturnal species, such as loris, owls, etc. are provided in the evening by the animal keepers.
- (xv) Zoo kitchen also prepare processed food for bear, cassowary, hill myna, binturong, slow loris, golden langur, etc. Boiled rice, sweet rice, etc. are prepared in the zoo kitchen.

5. Maintenance:

5.1. Dewatering of the moats:

In the climate experienced by the Assam State Zoo, wet moat are not always preferable. Maintaining proper quality water in wet moat especially in the dry season is another burning problem. Wet moat in the enclosures of the Golden Langur, Capped Langur, Hoolock Gibbon, Gharial and Pelican become affected by profuse growth of algae and Salvinia. Removal of the polluted water and re watering the moat with fresh water is a regular necessity. Further, the dewatering of frequently polluted Hippo enclosure is a frequent activity.

5.2. Sanitation:

Zoo has always given top priority in sanitation of the enclosures for which a specific schedule is in operation. This is a regular compulsory activity to maintain cleanliness in the captive enclosures. The accumulated garbage from leftover feed, both of plant and meat origin, are collected and dumped in the dumping ground on regular basis. This dumped garbage are also regularly sanitized and burnt as and when required. The wet moats of Hippopotamus, Primates, etc. are regularly drained and re-watered to ascertain sanitation. In future there is need to systematize the entire sanitation programme by a fixed protocol by taking all aspects related to the matter into consideration.

5.3. Disposal of solid waste and liquid waste sewerage:

Huge quantum of both solid and liquid wastes is generated daily in the zoo. Liquid wastes are directed toward some of the drains which ultimately lands into municipality drainage system. However, solid waste comprising left over fodder and dung of herbivores are deposited outside the enclosure and these are in turn lifted by sweepers in tractor to dump in a suitable location in the eastern corner of the zoo campus which is earmarked for dumping. The waste is burnt at regular interval. The waste such as empty water bottles, papers, etc. are also collected and disposed off in a suitable manner. The zoo area is notified as a polythene free zone. Strict surveillance is maintained at the entry gate by screening packets the visitors bring to ensure non entry of polythene packets, by replacing with paper bags.

6. Security:

6.1. Security threat:

The approach to two staff colonies are in constant use by the relative, family and friends of the staff, causing considerable disturbance to zoo environment and the possibility of attempted mischief by someone cannot be ruled out. Hence proper arrangement is to be made to isolate both the colonies from the main zoo campus should be done at the earliest. Accordingly proposal in this regard has been submitted for the financial year 2011-12.

6.2. Security arrangement:

The Zoo's Head Quarter Range is responsible primarily for overall security matters. The Range is manned by one Range Officer, 6 Foresters, 17 Forest Guards, 7 Night Chowkidars and few fixed-pay employees. A section of AFPF personnel are also stationed in the zoo campus to assist the regular forest staff in patrolling activity.

Entire zoo boundary is walled with brick wall of 2 meter height and fortified with "y" type barbed wire fencing. However old boundary wall of few decades old are in bad shape and weak condition and hence reconstruction of the wall are to be initiated in major portion of the boundary line. This is needed to avoid sudden collapse of these portion walls and possible consequences. Reconstruction of "Y" type barbed wire fencing all along the entire boundary wall to strengthen the security status.

6.3. Gates and Barriers:

Altogether 5 gates are existing, the details of which are as follows –

Gate No.	Brief
1.	The Main gate exists on the eastern side of the R.G. Baruah Road.
2.	Main Entry Gate, the gate to the zoo exhibit area on the restaurant side.
3.	This is the entry gate of the zoo visitor, adjacent to Ticket counter.
4.	The gate on the right side of the Main Entry Gate, beside the restaurant.
5.	This gate leads to officer's colony located near the sambar enclosure (new).
6.	The entry gate existing near Thuja Garden leading to Watch Tower. This is of wooden structure, need to be provided with iron one.
7.	The entry gate to staff colony. This is to be closed in near future.

Presently no barrier exists inside the zoo campus.

7. Water and power supply

7.1. Water Supply:

Day to day smooth zoo captive management demands a huge quantum of water. Water is required to meet drinking water requirement, for cleaning of enclosures, for maintaining wet moat, for the purpose of enriching the enclosure, etc. Apart from these a considerable quantum of water is required for official purpose, for Ration House

maintenance and for the daily household requirement for staff and officers living in their respective colonies. At present major amount of water is supplied by the Public Health Engineering Department on payment basis and supplemented by a large ring well to meet crisis situations. Recently another deep tube well has been installed to revamp the water supply system particularly to meet huge water requirement for Wet Moats, for the Primates Enclosures, for supplementing the water bodies of hippopotamus and rhinos. Water supply system is maintained by laying pipes along the gradients and all enclosures are connected. Regular maintenance of such pipes is an unavoidable task performed by the Engineering Wing of the zoo. However, the old pipes need to be replaced by new ones to prevent leakage and wastage of this precious commodity. Besides the present Master Layout Plan (already examined by the expert committee) will demand augmentation of new supply line to proposed new section like the conservation breeding area, rescue site, woodland species section, etc. A hydrological survey may be considered to explore the possible to utilize the water of natural lakes of the campus for the usage of zoo in order to strengthen the increased water requirement in future.

7.2. Power Supply:

The Assam State Electricity Board is the source from which the ASZBG gets its supply of electric power. The power is supplied by maintaining a 33 KV line through only one 250 KVA transformer located on the north side of the children park, near the *Bandar Tila*. This transformer is located in an unsafe position and needs to be shifted. The power supply is by and large regular. But low voltage is a problem for the residents of the staff colony. Upgrading the entire power line to a 3 phase one is mandatory. A silent generator of considerable capacity if procured will solve the problem of occasional power failure specially in night time. An additional 250 KVA transformer will be required to maintain efficient power supply. Enclosures are also to be provided with some provision for power connection to meet emergency situation. Besides, the quantum of power is to be enhanced as more establishments are contemplated in the proposed plan.

The zoo has at present only one 4 KW gen-set for the administrative building. More eco-gens are needed for the zoo hospital and the Range Office campus for

maintaining uninterrupted electricity supply. In addition provisions for solar power for lighting in public areas and in boiling water may be explored.

8. Visitors Amenities:

The ASZBG is visited by large numbers of visitors as it is the only large zoo in the Northeast India. The number increases during the winter seasons and decrease gradually in the rainy season. The statistics of visitors for a certain period of years is appended in **Annexure - IX**. The authority provides amenities within the maximum capacity that their present resource allow. Some of these are detailed below -

(a). Drinking Water: Drinking water outlets are placed in certain locations under the consideration of visitor rush and convenience. However, most of these were installed years ago and are often unusable or have become unhygienic. There are provisions of providing aqua guard in some location which are frequently used by the visitors. Presently there is only two safe drinking-water facility. Out of the total of four water outlets in the zoo, two are absolutely beyond repair. However, with the rearrangement of the enclosure and the creation of parks under the proposed Master Plan, the entire water outlet network will have to be restructured.

(b). Toilets: The zoo's exhibit area has toilets in strategic locations. Two of such toilets are operating on 'pay and use' basis. Most of these toilets were constructed long ago and some are quite unserviceable. In the future good, hygienic toilets have to be constructed and probably toilets operating on 'pay and use' basis will be a good option. At present there are 5 toilets of varied status most of which need to be improved. Running Water for the toilets has to be addressed separately.

(c). Restaurant: A restaurant of medium capacity was constructed (2006-07) at the south side of the entry gate outside the zoo precinct's wall. The restaurant operates on a leased basis along with three Juice Corners maintained by NERAMAC. Though it does not have the no suitable area exists outside the exhibition area for a spacious restaurant. For this reason, the vendors throng beside the main gate creating a chaotic situation.

(d). Guide map: Near the entrance a guide map is put up which depicts different routes and animal enclosures by way of easy legends. The idea is to orient the visitor to the zoo at the very start of his visit. The present placement of the guide map may need to be altered considering the changes envisaged in the new Master Plan.

(e). Directional and interpretive signage: In strategic locations of the zoo directional signage are already existed. However, quality and dimension and location of this signage need to be improved so that it is more easily noticed by the visitors.

The signage provided on the enclosure is not up to the standard and the text incorporated needs to be improved. Even the signage provided on the recently built enclosures has room for future improvement.

(f). Publications etc: Assam State Zoo publishes various reports and has been doing this for decades. The publications contain very valuable information. The zoo used to publish Annual Reports regularly but now this has been discontinued. Some significant publications of the zoo are *Annual Report 2010-11*, *Inside a City Forest*, *Fauna of Assam State Zoo-cum-Botanical Garden* and *Plant Inventory of Assam State Zoo-cum-Botanical Garden*.

The basic lacunae of the zoo is that, though a number of valuable publication have appeared over the years, due to the want of a library or interpretation centre, these publications have not reached the visitors. Due to lack of a storing place, most of these publications have been misplaced.

(g). Visitors' Sheds: Visitors sheds are situated in different locations of the zoo viz. children parks, Pelican Area, Palm Grove, Botanical Garden, tiger area, lion area etc. need regular facelift and this is accorded to such sheds to make them attractive. Safe drinking water facilities are maintained in two locations and toilet facilities exist in 5 locations. The existing sitting benches are inadequate during peak hours.

(h). The Herbarium Collection – Housed at the Herbarium Hall, this collection is a comprehensive assemblage of painstakingly collected, immaculately mounted and meticulously labeled herbarium sheets. They are about 2000 in number, representing

550 species of the North-East Indian flora. An invaluable source of information for the serious student and the interested amateur alike, it is constantly being updated.

- (i). **Watch tower** – A watch tower at a strategic location in the zoo exists in the midst of the deep natural forests. The visitors can arrive at the watch-tower for a bird's aerial eye view of the Saraighat Bridge over the mighty Brahmaputra, picturesque mosaic metroscares of the Guwahati city.
- (j). **Children Park:** The zoo has at present three parks viz. Children Park near the gate with provisions for playing facilities for the children, palm grove near the rhino enclosure with sitting chairs and Thuja grove with sitting arrangements for the visitors. These parks are suitably located to give respite at proper intervals to the visitors while visiting the zoo. (shown in the existing Layout Map). The Botanical garden and watch tower on hill top are added attraction for zoo visitors. More such parks need to be created in suitable location which will not only provide resting facilities but also orient the visitor to the natural landscape of ASZBG.
- (k). **Rock Formation:** As a part of hilly terrain the zoo area comprises unique rock faces and boulders in the Rock Field area, presently named as R.K. Bhuyan memorial Rock Field. This rock field is very suitable for adventure sport like rock climbing. Assam Mountain Association often approach zoo management to accord permission for this purpose.
- (l). **The Museum:** The zoo museum boasts of a vast collection of priceless trophies, unique specimens, mounted skins and minor forest produce gathered from all over the region, which gives a glimpse of the biological richness of the globally acclaimed biodiversity hotspot i.e. North East India. Herbarium collection comprises 2000 specimens of 550 species, indeed a rare collection for the visitors having interest on floral biodiversity of the region. Though a Museum should not be a component of a zoo but with due consideration for the antique materials painstakingly collected over a period of time it should remain but, the location of the museum needs to be shifted away from the prime exhibit area.

(m). Garden: Some lawn and garden have been created close to the main gate of the zoo, Botanical garden, Tiger enclosure and rhino enclosure, Watch Tower, etc. Number of trees had been planted or protected along the road sides and many other locations. Carefully selected indigenous evergreen trees and ornamental shrubs should be planted to provide shade and greenery to the zoo. Many exotic species of plants have been planted at different times in the zoo premises and Botanical Garden. The zoo needs to be free from invasive weeds viz. Parthenium, *Lantana camara*, *Eupatorium odoratum*, *Mikania macrantha*, etc.

(n). Parking Arrangement: Assam State Zoo cum Botanical Garden has a new (2006) parking facility covering an area of about 1 ha. The parking area is fully tiled and divided into two sections viz. one for accommodating heavy vehicles such as bus, while other section is for light vehicles such as car, motor cycle, etc. The parking area is operated by zoo administration and has a lawn and toilet facilities. Drinking water is yet to be provided. CCTV should be installed in future to effectively supervise the parking area. An alternative additional site is to be explored to accommodate large number of vehicles during winter season, mainly in the month of December and January as the present parking area is not large enough to provide parking the large number of vehicles that come in that time.

(o). Ticket Counter: The ticket counter was built in 2006 near the entry gate and comprises 7 ticket counters. The counter needs to be modernized by installing machineries to monitor the day to day activities. CCTV may be also installed to monitor the activity of the counters. In the future there should be automated entry system as well.

9. Educational Awareness:

Assam State Zoo-cum-Botanical Garden has given enough priority for zoo education and awareness. A series of activities are included in this aspect viz. provision of good informative signage in front of all enclosures and in different locations, publicity materials such as brochures, book on biodiversity of the zoo campus, Annual Report, etc.

Several educational activities are undertaken regularly in the zoo to create awareness among the people more particularly among the students and children. However no well structured education plan is available. Students and children are given 50% concession of entry fee. Some of the educational activities undertaken regularly in the zoo are as follows:-

- i. Wildlife week- 1st to 7th October
- ii. Stump Tailed Macaque day – 3rd July
- iii. Earth Day- 22nd April
- iv. World environment day -5th June
- v. Vanamohatsava -1st to 7th July
- vi. International Biodiversity Day- 22nd May
- vii. Wildlife Photo exhibition
- viii. Seminars
- ix. Interaction with the students etc.

While observing the days, drawing competition, quiz competition, seminar, workshop, film show etc are organized. Local NGOs, students and children are also involved in such programme. Apart from the above time to time, teachers programme is also organized in collaboration with local NGOs.

Pamphlets, brochure, sticker, posters, page marker, booklets are prepared and distributed. Signage is also put in different enclosure and other strategic locations of the zoo about the animals, provisions of law etc. Its improvement is required.

In each enclosure, information about the animal including their biology and distribution is displayed in the form of signage to educate the visitors about the species.

There is no interpretation center as such. One conference hall is available where educational programme are organized. Whenever students come in a group and want to have an interaction proper interaction session is organized either in the conference room or in the field.

Further a photo gallery has been developed wherein different species of plants and animals including insects, Butterfly, Spiders etc are displayed.

The ASZBG plans to develop a suitable website on this zoo as well. Assam State Zoo is acting as a centre for conducting training of zoo keepers of the North East and Eastern Indian Zoos. Students of College of Veterinary Science, Khanapara, Guwahati regularly come to this zoo for their internship training. Trainers and students of different institutions of North East region also visit this zoo to learn about zoo management. The zoo management regularly organize Wildlife week, Environment Day, Earth Day, Stump Tailed macaque day, etc. in which Quiz competition, drawing competition, plantation programme, etc. are included to spread awareness on biodiversity conservation.

10. Road:

The zoo has three types of roads, (i) black-topped (ii) metal road and (iii) *kutchha* road. Following indicates the existing roads in the zoo campus:-

SI No	Name of Road	Length (km)	Condition	Width (mts)
1	Main Road (gate to BG gate, then to southern road)	1.30	Black-topped	3.0
2	Southern Road (Staff colony to main road near <i>Bandar Tila</i>)	1.20	do	do
3	Tower Road (from Tower gate to Tower)	0.50	do	do
4	Feather Road -1 (in between chowsingha & white rhino; Enc. 47-48)	0.045	do	do
5	Office Road (main road to officers colony)	0.50	do	do
6	Elephant camp to Tower	0.40	<i>kutchha</i>	do
7	Upper Lake Road(Tower to Battalion camp)	2.35	do	do
8	Upper Lake – Nursery Road	2.00	do	do
9	<i>Bandar Tila</i> Road (Main road to Southern Road)	0.075		do
10	Main Road – Hati camp Road	0.45.	<i>kutchha</i>	do
11	Deer – Park Road	0.11	Black-topped	do
12	<i>Bandar-Tila</i> – Tower-gate Road (Enc. 16 to 24)	0.27	<i>kutchha</i>	do
13	Feeder Road -2 (from shed at Thuja,to uphill - lion encl. via beef house).	0.35	<i>kutchha</i>	do
	Total	9.55		

11. Research:

Till now the research aspect in ASZBG has been insignificant. In the past, researchers of college of Veterinary Science conducted some important studies which revolved around the health aspect of zoo captives. At present a similar study is going on to monitor the health status. This too has been conducted by a researcher from the College of Veterinary Science. The matter of future research on zoo captives is abominably lacking even though this zoo is more than half a century old. The main inadequacy is in the database. Though ASZBG has gathered wonderful and valuable experience during its 54 years of performance in dealing with diverse animals, this has not been authenticated due to the lack of documentation. The zoo administration should explore avenues for conducting need based research for which assistance may be asked from Central Zoo Authority, etc.

The matter was brought to the notice of members of Animal Health Advisory Committee in July' 2011. The members, majority of which are head of different departments of College of Veterinary Science, Khanapara, also opined that their institution would be interested in this aspect.

12. Administrative Building:

The existing administrative building is an Assam type house which is 50 years old. Initially it was a small building for the use of the Divisional office and later extended at random to haphazardly accommodate the gradual increase of the working staff of the Divisional Forest Office. The building is ramshackle, outrightly infested by termite right up to its ceiling. The rooms allotted to different assistants are also small, slipshod and compact. There is hardly any scope for renovating/improving the existing building. Instead a well designed spacious building for accommodating the various needs like office rooms for the Director and assisting staff, mini conference room, library, computer room, storage, vehicle parking provision, etc. There should provision for guest room, reading room, etc. as well. The building should accommodate present strength of officers, ministerial staff as well as man power that will be required in the future for the smooth functioning of the administration.

The Botany Wing is located in an old house situated near the Botanical Garden away from the Divisional Office. The Range office lies adjacent to the Botany Wing and is also away from the Divisional Office. Botany Wing should be housed within the administrative building for effective functioning. The Range office building was also built in an unplanned way. Both these two buildings need to be rebuilt. The location of the Range office is at the corner of the exhibit area but it should perhaps be so placed that beyond its normal function, the staff can also perform the act of constant vigilance.

13. Residential colonies:

There are two separate colonies, one for the officers comprising 25 buildings of different types out of which 3 are beyond repair. The other colony is the staff colony which exists within the campus comprising 33 buildings of different types out of which 12 are tumble-down and beyond repair. The vehicles moving to the officer's colony create minimum disturbance to zoo captives as the road that leads to this colony skirts through the edge of a small portion of the main exhibit area. But the road leading to staff colony passes right through the exhibit area for a considerable distance, creating significant disturbance to zoo inmates. The isolation of human colony from the zoo is mandatory as per the guidelines of the CZA and hence these two colonies need to be excluded from the exhibit area. Hence, proposals have been presented to isolate both the campus by closing the present entry points to these colonies and opening new entry from outside the exhibit area boundary.

There is one Battalion Camp near the Upper Lake where a section of Assam Forest Battalion is sometimes stationed. The camp house is a temporary construction and has remained unused for a long period. As a result the condition of the camp is bedraggled and dilapidated. Another establishment of the zoo is the two abandoned house once used by the Plantation Range located on the southeastern part of the campus, at the boundary of the zoo inside the 45 ha area handed over to the zoo by the Guwahati East Division. These houses are also in a dilapidated condition.

Part -II

Chapter	Content	Page No.
I	Future objective including mission Statement / Theme	57-62
II	Future action plan	63-98
III	Personnel planning	99-102
IV	Disaster management	103-108
V	Contingency plan	109-117
VI	Capacity building	118-120
VII	e-Governence	121-123
VIII	Board Budget analysis for implementing the plan	124-130



PART - II
CHAPTER - I

FUTURE OBJECTIVE INCLUDING MISSION STATEMENT / THEME

1. Concept Plan:

The future objectives and activities proposed in the Master Plan is based on the Concept Plan approved by Central Zoo Authority vide letter No. F. No. 19-62/92-CZA (27) (Vol.V) (M)/333 dt.22/07/2011 (copy enclosed in **Annexure - X**)

1.1. Objectives:

Focusing mainly in **complementing** and **strengthening** the national efforts in conservation of rich biodiversity, particularly the wild fauna of the Northeast region, following objectives of the Master Plan for Assam State Zoo *cum* Botanical Garden (ASZBG) are set -

- (i) To provide opportunities for doing **scientific studies** and creation of **database** useful for both *in-situ* and *ex-situ* conservation.
- (ii) To carry out coordinated **breeding of the endangered species** of the region in *ex-situ* condition for restocking and reintroducing whenever required.
- (iii) To provide an unique opportunity to visitors for **wildlife education** utilizing the ambience of the zoo in consistence with the adequate safety and upkeep of zoo for eliciting empathy towards wild fauna.
- (iv) To provide adequate and near-natural housing for zoo captives by ensuring high standard health care and ethical treatment.
- (v) To function as a **rescue** and rehabilitation center for distressed wild fauna

1.2 Mission:

To sensitize people, in consistence with the finest upkeep of the species, through adequate visitation, recreation facilities and education in order to elicit support in conserving wild fauna and flora of the North East Bio-geographic zone; and to elevate

Assam State Zoo-cum-Botanical Garden into an ideal institution for conservation breeding of the rare, endangered and endemic species of fauna of the Region.

1.3. Vision:

This Zoo envisions creating a mechanism for enhancing expertise on excellent upkeep and ex-situ conservation of the rare and endangered fauna and flora of the region.

1.4. Theme:

Considering the unique physical feature, location and the existing infrastructure, the plan of the ASZBG adopts a “mixed theme” comprising ecological and behavioral aspects with some elements of taxonomic display of wild animal species of national importance with special emphasis on fauna of north eastern India.

1.5. Master Plan Period:- The Master Plan for Assam State Zoo-cum-Botanical Garden is for a period of 10 years i.e. from (2011-12 to 2020-21).

2. Strategy for achieving the objectives:

The objectives so delineated have been examined under SMART (Strength, Measurable, Achievable, Reasonable and Time) analysis, the details of which is shown in **Annexure-XI**. To achieve the above objectives following strategies are adopted -

2.1. Scientific study and Database:

Since, the present paradigm revolves around *ex-situ* conservation; the zoo management will give top priority on research and scientific study on captive animals and connect the same to overall conservation efforts. For that, the existing infrastructure of the zoo needs to be improved and enhanced. The zoo will immediately concentrate on the basic research and study already recorded on breeding behavior, enclosure enrichment, nutrition, health issues, etc. which will be analyzed thoroughly for deriving useful conclusions for enriching the knowledge base in a systematic manner. For this purpose institutions such as the College of Veterinary Science which is already conducting research works, Wildlife Institute of India, etc may also be involved in a bigger way.

The zoo will also delineate the research topics which are urgently required and already brought to the notice of the higher authorities and will execute the same in collaborative approach with the assistance of Central Zoo Authority, etc.

Planned conservation breeding will be initiated based on sound research base and thorough study for rehabilitation of the species in wilderness.

2.2. Conservation breeding:

Out of the total 5 designated species suggested by the CZA for conservation breeding, the zoo has initiated steps for systemic conservation breeding programme for 3 species - Rhino, Golden Langue and Serrow. Accordingly, enclosure for one horned rhinos is under construction, proposal for construction of Golden Langur breeding enclosure has been approved and step has been initiated to construct the same, while plans and estimates for conservation breeding enclosures for Serrow has been submitted to the Central Zoo Authority for necessary scrutiny. Provisions for housing facilities in off display locations have been earmarked in the Layout Plan already for Serrow, Golden cat and Grey Peacock Pheasant.

The problem in successfully bringing up the chicks of Cassowary, faced by the zoo for many years now, will be taken care of with the expertise so far gathered about the species and by constructing an appropriate enclosure which has been proposed in the approved Layout Plan of the zoo.

The zoo administration will explore the possibility of breeding of other species of North East Bio-geographic region. Two locations for conservation breeding have been identified and marked in the Layout Plan.

As per the assignment entrusted by the CZA for acting as the participating zoo for carrying out conservation breeding programme for some species mentioned in the Part – I of this Plan, necessary steps will be taken in time as per the direction of the CZA.

The zoo shall help other identified zoos of the country in implementing the breeding programme of critically endangered species. Any decision of the Central Zoo Authority about any animal being sent to a particular zoo for augmenting the number of

founder animals for the conservation breeding programme of the species shall be binding on the zoo.

2.3. Conservation Education and Awareness:

People visit this zoo mainly for recreational purpose, but in return they are enriched with knowledge of biodiversity conservation. This effort is to be strengthened further so that this institution continues to play a major role on conservation and education as well. The proposed Master Plan will strive to achieve the target of systematic display of captive fauna in their near natural habitat. The enclosures will be designed and display attractive and informative signage to create interest and enhance knowledge among the visitors. Interpretation centre, nature trails, audio-visuals, etc. will be provided to achieve the conservation education and awareness objectives. Proposal for such an interpretation centre that induces all the aspects on wildlife conservation for the benefit of visitors has already been submitted to the CZA. For this purpose, good work on conservation education programme that has been done in other good zoos and similar institutions will be studied and a suitable programme on zoo education programme for this zoo will be devised so that zoo visitors are able to grasp the message on importance of *ex-situ* conservation efforts. Additional attractive components such as, Butterfly Park, Aquarium, an Amphibian Section, etc. have also been proposed in the Master Plan to enrich the visitors' experiences to as large an extent possible.

2.4. Housing, Health Care and Environment Enrichment:

Finest up-keep of zoo captive is the top priority and the main criteria for managing this zoo this includes addressing matters related to providing safe and comfortable housing and related matters like proper health care, environmental enrichment, ethical standards and welfare. A holistic effort has to be made to maintain high standard in health and hygiene of zoo captives. The zoo veterinarians over a long period of time have developed health protocols by incorporating suggestions issued from CZA, College of Veterinary Science, etc. Zoo veterinarians and support staff are well versed with day to day monitoring requirement. The present Master Plan has proposed to revamp the existing health and housing facilities including proper isolation, observation facilities, etc.

Zoo administration has also strived to augment high quality environment enrichment which helps the zoo animals and birds to exhibit their natural behaviour to a large extent. The administration has proceeded with a motive to provide a near natural home to zoo captives on the advice of the CZA. In the future, emphasis will be given in this area. The aspect of providing quality food for the captives will be looked into adequately. Attempts will be made to modify the nutrition schedule which may require providing alternative food items instead of very high cost-food items but without compromising nutrition value. The present practice of providing food to animals, birds and reptiles needs to be reviewed and steps will be explored to change the method of providing food in order to bring out the natural behavior of zoo captives which will keep them busy and relieve them of their monotony and boredom. Further, steps are felt necessary to prevent spoilage of food due to rodents and as well as stray monkeys. It has been proposed to establish a modern slaughter house inside the campus to reduce cost of meat and also to maintain quality and hygiene.

2.5. Rescue and Rehabilitation:

ASZBG has been playing a major and important role as a rescue centre ever since it was established. Because of this expertise the CZA has notified ASZBG for off display conservation for life time care facilities of leopards and black bears. In entire North East India there is only one another Rescue Centre set up by an NGO i.e. CWRC located at Panbari Kaziranga but its future cannot be said to be certain. Thus the ASZBG alone would have to take the entire responsibility to rescue and care for the wildlife in the state as it was doing before the CWRC was commissioned

The proposed Master Plan provides enough scope for achieving objectives of scientific rescue activity and successful release of the rescued wildlife in their natural home. A site with sufficient area is earmarked for providing both temporary and permanent houses for rescued animals. The existing staff engaged for rescue has to be provided further training on this aspect. The rescue team is to be provided with dedicated vehicle, fitted with efficient communication equipments, immobilizing drugs, antidotes, modern trapping and transportation cages, etc.

2.6. Capacity building:

The zoo employees of all categories need to be induced into regular capacity building programme to sharpen their knowledge base to perform multifarious activities of zoo management in a better and professional way. The result oriented activities will be achieved by a professionally skilled manpower only, which will demand a continuous capacity building programme. Hence, human resource development will be an area of important activity during the master plan period.

PART - II

Chapter - II

FUTURE ACTION PLAN

1. Proposed Animal Collection Plan, Population Size and Justification of Keeping the Endangered Species:

1.1. Animal Collection Plan and Justifications:

The environment and location of this zoo are suitable for breeding and exhibiting Indian fauna of the tropics and sub tropics. Recognizing the importance of large zoos in providing nature education as well as their role in scientific research on different aspects of wild animals, emphasis is given on displaying fauna of the North East region in particular and the country in general. The mammalian species, such as hog badger, clouded leopards, otter, giant squirrel, different reptiles and birds of regional importance and the endemic species like pygmy hog, wild buffalo, golden langur, hoolcok gibbon etc. have been included in the collection plan. The zoo has past experience in caring and in upkeep of these animal species. This will not only play a significant role in education, collecting information on biology, behaviour, management and conservation of these endangered species in their *in-situ* habitats but will also help creating awareness among the public for their protection and conservation.

ASZBG is one of the oldest zoos of the country. As was described in the earlier Chapter, during seventies of the last century, emphasis was given for exhibiting charismatic exotic species. By now, the zoo has gathered sufficient experience and manpower to care for these animals. With the changes of the objectives of zoo in the country, exhibition of such species may not be encouraged now, yet at present the zoo has still some of these exotics species like Giraffe, white rhino, emu, macaw, and cockatoo etc. which are certainly needed for future exhibition. As per norms of the CZA the ASZBG has within its allotted area sufficient space for accommodating more such animals. For decades, procurement of exotic animals has almost ceased. As a result some of them are surviving as singled sex or loner. Therefore, in the plan, provisions

for acquiring animals are also made. ASZBG is the only large zoo in this region and such animals are quite popular among the visitors who have a desire to know and learn about such important exotic animals. For these reasons, keeping the provisions for 'loaning animal' open the zoo has proposed to acquire some exotic animals like, chimpanzee, jaguar etc. to attract more visitors which will sensitize people as a whole in order to take part in the crusade for saving our fast dwindling wildlife resource.

However, following the guidelines of the CZA, in the collection plan top priority has been given to the regional species all throughout. In proposing the collection plan emphasis has been given for keeping a viable population in captive condition considering the behaviour and biology of the species and in this regard necessary guidelines and instructions of the CZA have been adequately followed. The number of individuals along with the present sex ratio of the existing animals have been examined while proposing for procuring the required animals in the collection plan. The details of the collection plan showing the status of the existing species, new procurement, sex and number of individuals are shown in tabular format and appended in **Annexures – XII (A), (B) & (C)**. The abstract of the collection plan is furnished below –

Abstract				
Class	Species Existing	Species Proposed (Incl. Existing)	Individuals (population) Existing	Individuals (population) Proposed (Incl. Existing)
Indigenous	104	165	810	1414
Exotic	9	13	86	113
Total	113	178	896	1527

2. Layout Plan:

The Master Layout Plan for the ASZBG has been prepared according to the specifications of the CZA in prescribed scale, contour intervals and specific colour indications of the enclosures. The map has been prepared in two different sets to show clearly all the features as per the CZA's direction, - (i). map showing comprehensively

different categories of enclosures with colour, types of barriers, hedge, and location of footpath, night house etc. and other (ii) showing electricity network, water supply, drainage etc. to avoid clumsiness. The Master Layout map approved by the Central Zoo Authority is appended as **Annexure–XIII (A) & (B)**. Some of the important features of the Layout Plan are produced precisely below -

2.1. Animal Enclosure:

Consistent to the theme of the plan maximum importance have been given on ecology, behavior, habitat preferences, biological requirement, etc. of a species while selecting enclosure location. In the Layout Plan housing location, screening night house etc. has been indicated for the animals, birds and reptiles. At the same time, effort has been made to display the exhibits in a systematic order and attractive manner so that visitors are exposed to a conservation education friendly atmosphere. The proposal on enclosures has given emphasis on physical well being of the zoo animals and, to a large extent, maintaining the unique topography and natural vegetation of the area. Effort has been made so that modification of topography and vegetation need a bare minimum of change. Enclosures for herbivores, carnivores, some of the primates are provided with open air ones with dry and wet moat barriers. Chain link mesh fence, glass or wall like barrier is also to be provided in some specific cases. For new enclosures, immersion effect is also considered. As has been mentioned in the previous Chapter, most of the enclosure/cages are quite old and needs to be dismantled and redone and all elements of scientific enclosure are to be incorporated.

Few primate and herbivores enclosures and also carnivore enclosures (tiger, lion, and clouded leopard) have been provided with appropriate placement of feeding cubicles..



Primate enclosure for Hoolock gibbon, Golden Langur, Common langur and enclosures for Tiger, Lion, Rhino, aquatic birds etc. have decent space and cover for young ones. The enclosures proposed for new construction, modification and redoing are being provided with well located feeding cubicles-cum night-shelter, proper enrichment so as to commensurate with individual requirement of the species along with keeping more than the area prescribed by the CZA for each enclosure. As the design of all enclosures are to be approved by the CZA expert committee, all these aspects will be taken care of during finalization of the individual enclosure to fit with the needs of the specific captive. Considering the climatic condition of this region, galvanized chain-link mesh should be used only for such enclosure.

In the layout plan of the master plan, altogether 93 structures have been proposed which includes 75 enclosures for animal exhibits and 14 for other related structures viz. conservation breeding areas (6 nos.), site for rescued wildlife, site for excess animal, quarantine facility, beef house, fodder house, silo pit, interpretation centre, isolation ward, etc. Besides 4 sites have been earmarked as 'available' for future requirement i.e. one in the old site of the elephant enclosure, 2nd in primate section, 3rd in the Thuja area, and 4th in the Conservation Breeding area so that similar classes of species may be housed in future.

The proposed 79 numbers of animal enclosures will accommodate 180 captive species, the details of which are provided in the animal collection plan.

As a matter of fact, majority of enclosures are very old as they were constructed at least 4-5 decades ago. Further, these are found unsuitable for housing animals in a scientific manner and do not correspond to the standard of modern zoo management concept. Hence, the zoo management has no other option except to initiate drastic changes on housing facilities.

Accordingly, master plan proposes to accommodate 11 completely new enclosures for new species, 40 to be modified to a large extent for existing species and 17 to be demolished and redone. The existing 9 enclosures including two Rhino Breeding enclosures of recent origin are found still to be in better condition, will be retained as such.

2.2. Details of animal enclosures:

The location and colouration of all enclosures are clearly shown in the Layout Plan with the serial number of each enclosure. Considering the unregulated movement

Sl. No	Enc. No.	Captive	Recent / modified/Newly proposal/Redone	Area in ha.	Remarks
1	1	Golden Langur	Recent	0.218	OK
2	2	Hoolock Gibbon	Recent	0.228	OK
3	3	Common Langur	Recent	0.1754	OK
4	4	Quarantine (COC)	Proposed New	0.1871	Present Gharial enclo.
5	5	Sambar (Now black buck)	Recent	0.87	OK
6	6	Chital	Redone	0.5721 enclo.	Old Sambar
7	7	Barking Deer	Redone	0.4544 enclo.	Old Sambar
8	8	Hog deer	Redone	0.4623 enclo.	Old Sambar
9	9	Sangai	Redone	0.3696	At bird enclo. Site + hog deer site
10	10	Swamp deer	Redone	0.2085	At museum site
11	11	Capped langur	Redone	0.047	Primate site
12	12	Spectacled monkey	Redone	0.0464	Primate site
13	13	Assamese macaque	Redone	0.0395	Primate site
14	14	Crab eating macaque	Redone	0.0419	Primate site
15	15	Stump tailed macaque	Redone	0.0388	Primate site
16	16	Pigtailed macaque	Redone	0.0288	Primate site
17	17	Great pied horn bill	To be modified	0.1041	Hillock adjacent to tiger
18	18	Snake house	To be modified	0.0793	Hillock adjacent to tiger
19	19	Lesser pied horn bill	To be modified	0.0444	Hillock adjacent to tiger

Sl. No	Enc. No.	Captive	Recent / modified/Newly proposal/Redone	Area in ha.	Remarks
20	20	Amphibian	Proposed new	0.0227	-do-
21	21	Serow	To be modified	0.3298	Same location
22	22	Butterfly park	Proposed new	0.901	Opposite water pool
23	23	Mongoose	To be modified	0.0117	Thuja garden area
24	24	Available	Proposed new	0.022	Do
25	25	Pheasant	To be modified	0.0539	Do
26	26	Pangolin	To be modified	0.0308	Do
27	27	Dhole	Proposed new	0.0174	Do
28	28	Binturong	To be modified	0.0618	Do
29	29	Civet	To be modified	0.0768	Do
30	30	Vulture	To be modified	0.0687	Do
31	31	Squirrels	Proposed new	0.0804	Do
32	32	Loris	To be modified	0.0774	Do
33	33	Badger	Proposed new	0.0521	Do
34	34	Porcupine	To be modified	0.0439	Do
35	35	Golden cat	Proposed new	0.0478	Do
36	36	Fox	Proposed new	0.0536	Do
37	37	Jackal	To be modified	0.0317	Do
38	38	Wolf	Proposed new	0.0332	Do
39	39	Hyena	To be modified	0.0312	Do
40	40	Bird/Aviary	To be modified	0.6086	Do
41	41	Himalayan black bear	Recent	0.27	Same location
42	42	Bear	To be modified	0.1162	Same location
43	43	Small cats	To be modified	0.0713	Same location + new area
44	44	Clouded leopard	To be modified	0.1727	Same location
45	45	Common leopard	To be modified	0.48	Present lion enclosure

Sl. No	Enc. No.	Captive	Recent / modified/Newly proposal/Redone	Area in ha.	Remarks
46	46	Tiger	To be modified	0.75	Present Thamin encl.
47	47	Lion	To be modified	0.46	Present Nilgai encl.
48	48	Jaguar	To be modified	0.43	Present Nilgai encl.
49	49	Pygmy hog	To be modified	0.1472	Part of present Af. Rhino
50	50	Chowsingha	To be modified	0.202	Part of present Af. Rhino
51	51A	One horned Rhino (Display)	Recent	0.5659	Same location
52	51B	One horned Rhino (Breeding)	Recent	0.2828	Same location
53	51C	One horned Rhino (Breeding)	Recent	1.007	Same location
54	52	White rhino	To be modified	0.2145	Present Binturong enclosure
55	53	Nilgai	To be modified	0.32	Old rhino encl. + palm grove
56	54	Black buck	To be modified	0.3817	Old rhino encl. + palm grove
57	55	Zebra	To be modified	0.31	Present Emu encl.
58	56	Giraffe	To be modified	0.3925	Same location
59	57	Hippopotamus	To be modified	0.3782	Same location
60	58	Ostrich	Proposed new	0.1613	Vacant area
61	59	Emu	To be modified	0.1631	Old deer enclosure
62	60	Cassowary	To be modified	0.1364	Near snake house
63	61	Exotic birds	To be modified	0.0734	Do
64	62	Pelican	To be Redone	0.2722	Same location
65	63	Wild pig	To be redone	0.1021	Near Gharial encl. No-2
66	64	Wild Buffalo	To be modified	0.217	Old Gibbon encl.
67	65	Available	--	0.2215	--

Sl. No	Enc. No.	Captive	Recent / modified/Newly proposal/Redone	Area in ha.	Remarks
68	66	Chimpanzee	Proposed new	0.1542	Vacant area
69	67	Aquatic bird	Recent	0.317	Same location
70	68	Tortoise	To be modified	0.053	Mongoose area
71	69	Turtle	To be modified	0.0628	Near Mongoose area
72	70	White winged wood duck	To be redone	0.0818	Old aquatic bird encl.
73	71	Otter	To be modified	0.0743	Old Chimpanzee encl.
74	72	Lion tailed macaque	To be Redone	0.0408	Primate section
75	73	Bonnet macaque	To be redone	0.373	Do
76	74	Rhesus macaque	To be redone	0.359	Do
77	75	Aquarium	Proposed new	0.1331	Adjacent to children park
78	76	Muggor	To be modified	0.0625	Vacant area near old aq. Bird encl.
79	77	Gharial	To be modified	0.0565	Do
80	78	Lizard	To be modified	0.0364	Small island
81	79	Interpretation centre	Proposed new	0.0994	Vacant area near wall
82	80	Isolation ward	Proposed new	0.0855	Forest patch
83	81	Available	To be redone	0.621	Old elephant encl.
84	82A	Conservation breeding Serow	Proposed new	0.21	Forest patch
85	82B	Conservation breeding Golden cat	Proposed new	0.19	Forest patch
86	82C	Conservation breeding Golden langur	Proposed new	0.73	Forest patch
87	82D	Conservation breeding Grey peacock Pheasant	Proposed new	0.50	Forest patch
88	82E	Conservation breeding Available	Proposed new	0.82	Forest patch
89	83	Excess animal	Proposed new	0.8993	Forest patch
90	84	Rescue site	Proposed new	1.0	Forest patch
91	85A	Beef house	Proposed new	--	Vacant area near old elephant encl.
92	85B	Fodder house	Proposed new	--	- do -
93	85 C	Silo pit	Proposed new	--	- do -

(a). Enclosures of Recent origin to be retained:

9 Enclosures for Golden Langur, Hoolock gibbon, Common langur, Sambar, Himalayan black bear, Aquatic bird and the Great one horned rhinoceros (3 nos) are in this category. The 3 enclosures of the Great one horned rhinos have been made an integrated unit by making provision of intermixing for breeding purpose. Visitors can see the rhino only in one enclosure i.e. Rhino enclosure No. 51 A, while 51 B & 51 C will be out of bound for visitors. Some improvement work will be required for enclosure no. 51 A.



(b). Enclosures to be redone after demolishing the old structures: A total of 17 enclosures are very old and exist in an improper state, hence they are found not suitable for safe housing for zoo captives. These enclosures must be demolished and reconstructed and this will be in conformity with modern and scientific enclosure in all aspects. The enclosures for Chital, Barking deer, Hog deer, Sangai (Thamin), all the animals of primates, pelican, wild pig, white winged wood duck fall in this category.

(c). Enclosures to be modified: A total of 40 enclosures belong to this category. In fact some species, which are now housed in the zoo campus, will have to be shifted to more suitable locations for ecological and behavioural reasons. Unlike the existing pattern, all deer species are brought into one location and care has been taken to locate the enclosure considering the natural habitat condition of each species consistent to the area available. Therefore, the earlier enclosures constructed unscientifically have to go through modifications by way of construction. The enclosures for following animals are included in this category Snake house, Greater pied



hornbill, Lesser pied hornbill, Terrestrial birds, (Aviary) Serrow, Mongoose, Pheasant, Pangolin, Binturong, Civet, Vulture, Loris, Porcupine, Jackal, Hyena, Bear, Small cat, Clouded leopard, Leopard, Tiger, Lion, Jaguar, Pygmy hog, Chowsinga, Black buck, Nilgai, White rhino, Zebra, Giraffe, Hippopotamus, Emu, Cassowary, Exotic birds, Turtle, Tortoise, Otter, Maggor, Lizard, Wild buffalo and Gharial.

While some need fair extent of modification, others may require large to complete modification.

(d). New enclosures proposed: Enclosures for newly proposed species need to be *de novo* construction and in this category, 11 enclosures are proposed for the following species -

Dhole, Badger, Squirrel, Golden Cat, Fox, Wolf, Butterfly Park, Ostrich, Chimpanzee, Amphibian and Aquarium.

Apart from the above, new structures will be required for the Conservation Breeding Centre, Rescue Site, Isolation Ward, Interpretation Centre, Excess Animal, Beef House, Fodder House, Silo Pit, Administrative Building, Range Office, Storage, Zoo Kitchen, Workshop, etc.

As Assam State Zoo-cum-Botanical Garden is one of the oldest zoos in the country, majority of the enclosures and other infrastructures are also very old. The above proposed measures are suggested to meet the specifications recommended in the Recognition of Zoo Rules, 1992 and other guidelines issued by Central Zoo Authority. These are to be followed and every effort is to be ensured to provide enough space to animals to enable them to display their natural behaviour and hence emphasis will be given to construct appropriately designed enclosures and incorporating maximum environmental enrichment. This will also ensure that the zoo becomes more interesting and attractive.

(e). Enclosure, Miscellaneous: The details of the enclosures are produced in the Layout Map and in the table above. However, a short note of some of the enclosures and its necessity are mentioned below -

(f). Quarantine (Enclosure No. 4): For creating a modern quarantine house, having all the required facilities, a new proposal has been made to have it located near the

zoo hospital and on the way to the colony so that not only the Doctors but even the responsible officers can always keep a eye on it.

(g). Amphibians (Enclosure No. 20): Northeastern states are very rich in amphibian fauna, though little is known about these important classes. A large numbers of amphibian species are highly endangered and endemic to this region. To create awareness and elicit support for protection and conservation of these important classes, provisions are made to exhibit some such species in the zoo and an enclosure has been proposed near the Snake House.

(h). Butterfly Park (Enclosure No. 22): Northeast is very rich in butterfly fauna. The ASZBG is one of the examples of rich diversity. In this little insular island, in the midst of the crowded metropolis the ASZBG is remarkably rich in butterfly fauna. In its campus 227 species of five families ahs so far being identified. A check-list of butterflies in ASZBG is appended in **Annexure- XIV**. Considering these aspects and also to monitor the atmospheric health of the zoo forest and the ambience of its campus, a butterfly park is proposed to showcase butterfly diversity of both the zoo campus and of the region. This will be located on the banks of a natural water body which falls on the way to the old elephant camp site.

(i). Enclosure No. 30- Vulture: Everyone is aware about the plight of the vulture in our subcontinent. As Assam is the largest vulture bearing state, a sufficiently large enclosure is proposed in the zoo to provide possible facilities in an ideal location not primarily for conservation breeding but to know more about the species in captivity for future management of the vulture in the wild. It is proposed to make this distinct from the few vulture breeding centres that has been established in other parts of the country,

(j). Rhinoceros (Enclosure No. 51A, 51B, 51C): This zoo has already proved its expertise and knowledge in breeding rhinoceros (*Rhinoceros unicornis*) in captivity. For that reason CZA has approved ASZBG for the conservation breeding programme of rhinoceros. Building of enclosures for rhino has already commenced following the approval of the design of the enclosure by the CZA. The two existing rhino enclosures with some additional new are clubbed together into one unit with interconnecting facilities for conservation breeding



(off-display). The enclosure No. 51A is kept for display purpose to the visitors without affecting the objectives.

(k). Wild buffalo (Enclosure 64): About 90% India's wild buffalo (*Bubalis bubalis*) population is harboured in Assam. At present hardly any buffalo is found in captivity in Indian zoos. ASZBG had earlier kept buffalos for some time

for exhibition, now a proposal has been made to study the species in captivity for future *in-situ* assistance. Therefore, in the Plan it is proposed to again keep some buffalo in captivity. An enclosure earlier used for Hoolock Gibbon having almost all natural habitats attributes suitable for wild buffalo is allotted for housing this species. .

(l). Aquarium (Enclosure No. 75): A plan for establishing an aquarium in collaboration with Centre for Environment Education is also projected in the Master plan. The objective of this aquarium is to educate visitors on the diverse aquatic species of North East India and how it needs to be protected from invasive fish species. In this facility it is proposed to have at least 70% of the total species from the North Eastern region, 20% from rest of Indian including marine species and the rest will be exotic. This may be outsourced for better management. Invasive fish species

(m). Conservation breeding areas (Enclosure No. 82A to 82E): Five areas have been identified in the midst of natural forest tracts for creating infrastructure for conservation breeding programme. The area identified as 82A is for serrow, 82B for Golden cat, 82C for Golden langur, 82D for Grey peacock pheasant, while 82E is kept as available. The breeding enclosure for Golden Langur will be have a dry moat enclosure with closed structure with three sections initially for 3 pairs of Golden langur with provision of night house, feeding cubicle, water supply provision, squeeze cage, etc.

(n). Excess animal (83): As has already been described in the Chapter – I, Assam State Zoo-cum-Botanical Garden has acute problem of some excess herbivore with

special reference to Sambar, Hog deer and Chital. An off-display area is earmarked for keeping excess animals with provisions of segregation of sexes to prevent further proliferation. The enclosure will be off from display. There will be provision of salt lick, water hole, etc. as per requirement. This may also help to accustom them with the natural environment for possible future release in potential area which will solve problem of congestion and further multiplication in display enclosure. For such species supplemented food may always be required.

(o). Rescue site (84): The Assam State Zoo-cum-Botanical Garden has since its inception some 50 years ago been operating as a rescue centre and in the future it will be potentially the only rescue centre having the necessary expertise. There is an NGO run Centre for wildlife Rehabilitation and Conservation (**CWRC**) located at Panbari, Kaziranga which may not survive in the long run. So ASZBG must fortify its resource and project itself in this field with due responsibility... Hence, scientifically designed in-house rescue facilities with separate enclosures for individuals of different species are to be established. Some infrastructures are to be created for life time care for permanently injured animals. Isolation ward, treatment facility, water supply, power supply, squeeze chamber, keeper's house, etc. are to be created adjacent to the Rescue Site. Details of the nature of rescuing wildlife and the magnitude of such assignment that is being carried out by the ASZBG have been described in the Part – I of the Plan. In future the ASZBG alone would have to take the entire responsibility to rescue and care for the wildlife in the state as it was doing before the CWRC was commissioned.

(p). Beef house (85A): A well equipped beef house with modern slaughtering provisions, storage, shed for keeping cattle and chicken is also to be provided to maintain hygiene and quality of meat supplied is proposed. Provisions of power and water supply will ensure proper maintenance of this facility.

(q). Fodder house (85B): For preventing wastage and to maintain quality and also to ensure continuous supply of fodder in case of untoward incident, a fodder house is proposed with proper storage, weighing, record maintenance and quality control. Since about 45 ha area is to be brought under fodder plantation in near future, this house will

be helpful in storing fodder in an appropriate manner and also to reduce expenditure on fodder supply.

(r). Silo pit (85C): A Silo pit is also suggested to keep green nutritious fodder for making available during lean season.

(s). Isolation unit (Enc. 80): The location of the isolation is proposed at a remote area on the way to the old elephant camp. Apart from the building, the unit is to be provided with squeeze facility, power supply, water supply, etc. the unit is to accommodate all kinds of animals including birds, reptile, etc. as and when necessary. Air conditioned cubicle may be also required for treatment of animals suffering from summer stress

(t). Herbivore Safari: In the Layout Plan provision for a Deer Safari has also been made covering a big area on its eastern part inside the natural forests. It is anticipated that all rescued sympatric deer species indigenous to the region which immediately could not be released back, will be put together in the safari area in future. The population size of different deer species will be regulated considering the carrying capacity of the area. It has also been expected that these animal will be managed by bare minimum supplemented feeds.

(u). Incinerator: Regarding the present condition of the incinerator has been detailed in the Chapter-I. Necessary steps are to be taken to make it serviceable by repairing and supplying the stolen machineries.

3. Visitor's Circulation and Amenities:

3.1. Visitor's Circulation:

Considering the topography, ground situation, protection, probable vandalisms etc and primarily to establish a better location for the zoo animals, a visitor's circulation route with its attendant amenities is proposed for the zoo. The Serial number of the enclosures in fact indicates the visitor's route. Barriers and footpaths are provided considering the situation, location and probable volume of visitors so that the flow is smooth and crowding is avoided. The details of the visitor's flow is produced below -

On receiving the ticket from the counter the visitor will enter through the inner gate adjacent to the ticket counter and will first face north looking at the Golden Langur enclosure, the administrative building will be behind him on his left and Children Park on his right. The visitor will take a turn north at the tri junction and follow the footpath built along the Gibbon enclosure and Capped Langur enclosure to his left. He will be able to observe both these two primates in their enclosures from the road itself.

Just opposite the two primate enclosures and alongside and east of the road a new park is proposed. The visitor will proceed through a wide footpath constructed in between the park (to his east) and the two primate enclosure. He or she will then leave the main road turn right (i.e. east) and will view first the sambar enclosure and the path will curve south and lead him to the enclosures of, chital, barking deer, hog deer to his left and then he will arrive at the corner of the swamp deer enclosure and move west and return to the main road again. He will move south till he arrives at the tri junction from which if he moves east wards the visitor can observe the primates housed in Sl. No. 11 to 14 located on the *Bandar Tila* which will be to his right. From here the visitor will climb up southwards following another road along the enclosure Sl. No. 15 primate species is housed.

Then the visitor will move east ascending a smooth gradient along a wide footpath laid along the ridge of a small hill where on either side he will sight hornbills, snakes and amphibian species housed in Sl No. 17 to 20 and then slowly climb-down and come to a path confluence point on the main road where he can observe the Serrow from the corner of Enclosure 21. To reach this point he will be moving along the Park and he can opt to halt relax because here toilet, visitor's shed, drinking water facilities are provided. Now from here the visitor will follow another wide footpath that goes north up a hill slope along the butterfly Park to his right. He will then and make a round through the butterfly park where the path takes a curve and moves down roughly south-west taking a further curve moving west to come to the main road crossing a bridge built over the perennial stream .

The visitor will then proceed through the road on an upward incline that goes to the tower where on his right hand, on the slopes are housed mongoose, civet, binturong, dholes etc in enclosure No. 23 to 29. From this point, the visitor will climb up

southwards where the Vulture enclosure (No 30) will be to his left and then past the squirrel enclosure (No 31) to his left and the loris (No 32) to his right. From here the road will curve towards west and the run on a even plain and to the visitor will view to his right enclosure No. 33 to 39 where badger, porcupine, jackal, hyena, golden cat etc housed. He will then come to a point where there is a provision for toilet and drinking water. This road will bring the visitors to the main road following which he can climb-down through a wide footpath leading to a well designed walls in aviary along with water fall and elevated pathway with spiral steps to observe the birds (Enclosure 40).

From the Aviary the visitor can opt to go east along a plain road along the south incline face of the slope past the proposed Range Office and on this route he will be able to view bears, small cats to big cats which are systematically housed in enclosure No. 41 to 48 his tour will end in the Jaguar enclosure near the visitor's shed and drinking water point. On this route, provisions have been made for visitor's shed and drinking water for visitor-use in three different places. If the visitor is interested in botany he will be able to enter the well planned Botanical garden of the zoo from this point through the garden gate. Inside the garden different areas are connected through bridle paths and if he is interested he can explore it and then exit through the same garden gate.

Now from the Jaguar enclosure (No 48) the visitor can go southeast wards along the main road he will have pygmy hog and chowsingha enclosures on his right and will have glimpse on the rhinos that are kept in Rhino display enclosure (51A). From here the visitor will move south along the same road towards south and reach the boundary road where he can observe the white rhino. At the boundary road junction he will move east enjoy the sight of groups of black buck, nilgai and can opt to relax in the park where all visitors' amenities will be provided.

The last leg of the visitor route will be to depart from this park and move west on the southern road from the road junction on his left will be the zebra enclosure (No 55) and while he moves on this road he will be able to view all exotic species, like zebra, giraffe, hippos and ostrich which are housed in enclosure No. 55 to 58 where toilet and drinking water provisions are available. Here the visitor can exercise the option to move straight along the road upto Enclosure No 66 (Chimpanzee) and enroute

view cassowary, exotic birds, pelican, pig, buffalo and from Enclosure 66 move down south to the aquatic birds section (Enclosure No 67) and from there continue on the boundary road right upto the orientation centre and park complex near the exit. On this road the visitor will need to move to and fro and see turtle, tortoise, and then move north to see the Lion tailed macaque and other primates. He will again move south to view the white winged wood duck and move slightly west to see the otter and where the aquarium magor, gharial, lizard's enclosures are located. At the end of his tour the visitor will be able to enter the orientation centre or relax in the children park where all visitor amenities are provided. From here he can leave the exhibit area through the exit gate placed beside the main gate.

3.2. Visitors' amenities:

The existing amenities for the visitors have been described in the Part – I of the Plan detail. The zoo at present is about 54 years old. Naturally, amenities available are also at various stages of damage and decay and hence most of these require reconstruction. Nowadays various modern and sophisticated facilities are available which need to



be adopted in order to provide quality comfort to the zoo visitors. Some of these are discussed below -

(a). Toilet: The 3 numbers of existing toilets needs to be improved and 5 have been proposed in the Plan as shown in the Layout Plan. These should be constructed on priority basis during the Plan period. The existing 'use and pay' practice appears to be working, hence such type of arrangement may be considered in the future. Provision of special toilet facilities for the physically challenged is an added amenity.

(b). Visitor shelters: With the changes of the Layout Plan, more new visitors' shed will be required. The locations of the sheds are indicated in the Layout Map clearly. New

shelters will be required in the Thuja area, Palm grove, etc., as well. Some of the existing visitor's shelters have to be provided with RCC roof and renovated with ceramic flooring, putting granites slabs on sitting benches. All structures must be constructed with architectural designs with good aesthetic



look and merging colors. All surrounding area of the shelters needs to be landscaped.

(c). Drinking water: Except for the two aqua guards the other drinking water facilities provided has to be newly constructed. The location of the drinking water points are clearly marked in the Layout Map. Heavy duty water cooler and aqua guards needs to be installed in the existing drinking water points to cater to the demand of the visitors during summer. Service providers under Annual Maintenance Contract needs to be engaged for the smooth functioning of all safe drinking water points. New drinking water facilities need to be set up near the tiger enclosure, Thuja area, aquatic bird, and parking area.

(d). Directional and Enclosure signage: Signages are to be visually attractive and communicative as well as interactive exhibits which do not necessary need to be read. Agencies competent in this subject are to be consulted. If necessary, CEE and other

NGOs should also be consulted for improving the quality. In the proposed Plan, visitors' flow route is changed according to the Layout and road communication. Therefore, a lot of works are to be redone for placing the signage.



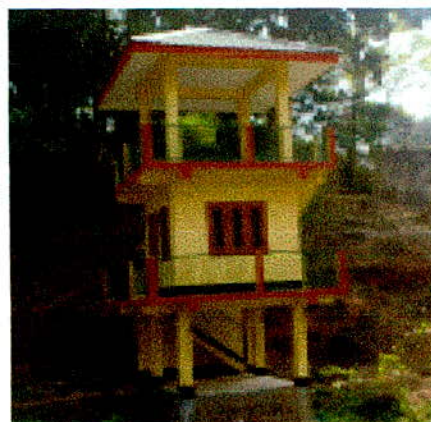
(e). Guide Map: The location of the existing guide map needs to be shifted to the tri-junction point near the Golden Langur enclosure. As the entry of visitors has been altered, this location will be ideal so that visitors just entering into the zoo may look at the map. The quality of the map and its size should be



appropriate showing different routes and animal enclosures indicated by easy legends so that it becomes easily visitors for the visitors to understand the location of various places. Alongside the guide map, there should be 'do's' and 'don's' both in Assamese and English language so that visitors become aware of these at the start of their visitation.

(f). Watch tower: The road to the watch tower is already proposed to be widened. Though visitors may get a picturesque mosaic view of the Guwahati city, yet control of visitors to and in and around the forested area may create unwanted problems. The visit to the tower may be restricted unless adequate control measure can be arranged.

(g). Children Park: Besides the existing three park facilities, another two have been proposed in the Plan; - one Children Park in between the deer and gibbon enclosures where creation facilities for the children along with water fountain, sitting arrangement, drinking water, toilets, sheds etc. should be provided. Another in between the birds, serrow and butterfly park (Enc. No. 21, 22 and 23) beside the main road is proposed. Except playing facilities all others, as mentioned above will be available in this park..



(h). Rock Formation: Improving the R.K. Bhuyan Memorial Rock Field is not directly related to zoo objectives, but this may be utilize for adventure sport and in consultation with Assam Mountaineering Association improved in order to generate revenue.

(i). Garden: The planting of ornamental evergreen trees, ornamental shrubs and other such plants planted earlier should now be restricted outside the natural forest area. No exotic plants should be planted in or around the enclosure of any indigenous species. Invasive plant species like - *Parthenium*, *Lantana camara*, *Eupatorium odoratum*, *Mikania macrantha*, etc. should be weeded from time to time.

(j). Botanical names of all trees with common name and local name species within the zoo are already displayed on trees standing along foot paths and roads and in Botanical Garden. This needs further improvement.

(k). Nature trails: The richness of the natural forests that exist in the zoo campus has been elaborately discussed in Part – I of the Plan. This unique wilderness in the heart of a city may be benignly used by opening few natural trails, which will enhance the education programme.

(l). Restaurant/ Kiosks: It has been mentioned in Part – I that the restaurant now available at the gate does not have the capacity to accommodate capably the zoo visitors and there is no scope to increase its capacity. Beside, thronging of vendors at the main zoo gate is also a potential problem. Therefore, in future this issue may be discussed with the Guwahati Metropolitan Development Authority to help creating a situation which may be better for both the zoo and the city traffic. No more shop of any kind should be allowed to open up in the area in future. The number of Juice Kiosks may also increase in future.

(n). Ticket counter: The 7 ticket counters now available may be adequately serves its purpose for a few more years. But it needs to be modernized by installing computers, and CCTV etc. to monitor the day to day activities along with installation of automated entry system as well. A cloak room along with the counter may be arranged which will help visitors in a big way.

(o). Parking complex:

The existing capacity of the parking becomes insufficient during the peak December visitor rush and it effects traffic movement in R G Baruah Road. Because of this another site for parking must be explored. More drinking water facilities, driver's retiring room, adequate light and announcing system etc. needs to be provided in the parking complex. To keep the vehicles safe from the car lifters or burglars, CCTV may also be installed in the future.



(p) Visitors' cab: Till it was functioning the two existing battery run small vehicles had a benign effect on the

environment and on the zoo captives. Such vehicle can be procured or could be a component under PPP programme. This will help the disabled and senior citizens in future during their zoo visit.

(q). Wheel chairs & perambulators: Sufficient number of wheel chairs and perambulators are needed for the physically challenged and small children respectively. Ramps are to be provided near many enclosures for the smooth movement of wheel chairs.

(r). Souvenir shop: A Souvenir shop is to be opened for selling local artifact, souvenir, T-Shirts etc. imprinted with conservation message. Various handouts can be developed with respect to birds, amphibians, reptiles, wetland ecosystem, butterflies and flora of Assam State Zoo.

(s). Other educational tools and technique: In matter of education there should be one specially designed programme for school and college groups, which will help them to understand curriculum-related concepts viz. Wildlife Week, Stump tailed Macaque day, Earth Day, World Wetland Day, World Environment Day, Van Mahostava, etc. In this context there should be an outreach programme viz. School visits, training programme, special conservation programmes, workshop, seminars, quiz competition, drawing, essay and debate competition etc.

(t) The zoo in collaboration with CEE and WII can organize a suitable module on zoo education and interpretation for school and college students for middle level zoo personnel, zoo volunteers, teachers, NGOs.

A well equipped library is to be established. Good quality journals, relating to conservation breeding animals, have to be procured or subscribed on a regular basis. All the publications relating to ASZBG needs to be kept separately for reference. New books and journals should be purchased from time to time and kept separately for reference.

Assam State Zoo-cum-Botanical Garden is a large zoo with a vast area. There should be adequate visitor amenities so as to make the visit pleasant, less tiring and memorable. Quite a large number of people come to Assam State Zoo every year,

details of which are shown in **Annexures - IX**. The following amenities are proposed to be developed:-

(u). Orientation/Interpretation centre: It is proposed to construct a double storied building on the south western corner of the exhibit area behind the children park as shown in the Layout Plan (Encl. 79). The ground floor will be used as interpretation cum orientation centre where the visitors will get first-hand information regarding the zoo. The 1st floor may be used as an auditorium where the visitors will be shown short films on history, uniqueness of the zoo and interesting exhibits of the zoo.



(v). First aid booth: The zoo needs a First-Aid booth near the main gate equipped with all the necessary medicines, materials etc.

so that initial treatment can be provided to any visitor if the need arises.

(w). Parking Arrangement: The existing parking facilities were made recently in a planned manner. However, certain facility like drinking water has to be provided. CCTV may also be installed in future to keep effectively monitor the parked vehicles. In future an alternative additional site will be explored to accommodate the large number of vehicles that arrive during the winter visitor rush season, mainly in the month of December. Also a Visitor Driver's Shed could be proposed.

4. Water Supply:

The present layout of the water supply network has to be removed phase wise as most of the installation was unplanned and made on *ad-hoc* basis. The present total supply of water of 2, 82,000 litre (1, 92,000 From Deep well + 90,000 liter from PHE) has to be increased to at least 5, 00,000. There is need to construct four large overhead tanks for meeting the water requirement in all the areas satisfactorily including in quarantine, isolation unit, Conservation Breeding area, rescue site, etc. Two deep bore well are to be dug on the west or the southern plain area after studying the feasibility.

On completion, these two will be fitted with the supply system and pumps to augmentation water supply system in case of exigencies

The supply of potable water in the Guwahati City is insufficient for the common citizen. The two deep bore wells that exist now along with the two more wells proposed may not make ASZBG water self-sufficient in future. Water for all purposes will in future be insufficient hence, a proposal has been made to use the water of the Upper Lake, located on the north eastern corner of the zoo. The water from the lake will be lifted and filtered in the hill top (as shown in the Layout Plan) and then connected with the present reservoirs. The possibility of using the water of the lower lake may also be explored in future. If the plan succeeds, the supply from the PHE may be stopped in future. The details of the proposed water supply and distribution has been elaborately depicted in the Layout Map.

It is proposed to establish a **chlorination plant** to strengthen the quality of water supply system. This new chlorination plant would be helpful to provide safe drinking water to visitors in the gate-complex area, etc. where drinking water points are available. Further this new chlorination plant would provide drinking water to staff colonies, zoo hospital, quarantine, feed receiving centre and conservation breeding centre.

5. Electric Supply:

The transformer located near the *Bandar Tila* will be installed at the point near the southeastern corner of the Restaurant inside the gate. The existing 250 KVA transformer is not sufficient to take the electricity load for the entire zoo. There is a problem of low voltage and there is no uninterrupted power supply for smooth functioning of different electrical equipment. Another 250 KVA transformer is to be installed which would be able to cater the future electricity need of the ASZBG. Most of the electricity supply line would be laid underground and wherever needed AB cables would be provided. This is needed for the safety of the visitors as well as captive animals of the zoo but also to avoid frequent damage of the line due to wind fallen trees.

The existing 4 KW gen-set used for the administrative building needs to be replaced by eco-gens-set for zoo hospital, Range Office campus for managing uninterrupted electricity supply in case of power failure. The use of solar light in strategic locations of the zoo has to be explored and for boiling water for reptile house during winter.

6. Solid and Liquid Waste Disposal:

The present practice of burning the biodegradable waste is discouraged. Recycling and composting should be considered in future. Necessary steps needs to be taken during the period of the implementation of the Plan. The present practice of draining the liquid waste to the municipality drain needs to be stopped. In the proposed Plan two sewerage treatment plants, at the ends of two drainage trenches, on southwest and northwest corner have been proposed to treat the liquid wastes before draining it out into the municipality drains. The present ban on the use of *polythene and poly packs inside the zoo* should be continued strictly.

For dumping the left over bones for carnivore's feed near the incinerator a vehicle is used. For that a dedicated vehicle is proposed to be procure for transportation of left-over bones from carnivore enclosures to the bone pit, from where the bone contractor would lift the left-over bones at regular intervals.

7. Roads/Path:

Detail of the existing network of roads in ASZBG has been provided in the Part – I, Chapter-II indicating that it was not properly designed. In the Plan few new roads have been proposed. This will be required because new areas would need to be accessed due to the proposed expansion of the present set of



enclosures and construction of new ones. Besides some of the existing roads needs to be improved for executing various works smoothly.

Following new construction and improvement need to be made during the Plan period –

7.1. Improvement:

SI No	Name of road	Length (km)	Condition	Width (mts)
1	Main Road (gate to BG gate , then to southern road)	1.30	Black -topped	3.0
2	Southern Road (Staff colony to main road near <i>Bandar Tila</i>)	1.20	do	do
3	Tower Road (from Tower gate to Tower)	0.50	do	do
4	Feather Road -1 (in between chowsingha & white rhino; Enc. 47-48)	0.045	do	do
5	Office Road (main road to officers colony)	0.50	do	do
6	Elephant camp to Tower	0.40	<i>Kutch</i> a	do
7	Upper Lake Road (Tower to Battalion camp)	2.35	do	do
8	Upper Lake – Nursery Road	2.00	do	do
9	<i>Bandar Tila</i> Road (Main road to Southern Road)	0.075		do
10	Main Road – Hati camp Road	0.45.	<i>Kutch</i> a	do
11	Deer – Park Road	0.11	Black-topped	do
12	<i>Bandar-Tila</i> – Tower-gate Road (Enc. 16 to 24)	0.27	<i>Kutch</i> a	do
13	Feeder Road -2 (from shed at Thuja, to uphill - lion encl. via beef house.	0.35	do	do
	Total	9.55		

The service roads that are to be constructed for the purpose of various services to the enclosures and their captives is not proposed and for time being kept aside. These will be done when enclosures will be designed. Apart from these, existing 2.0km flat brick soling needs to be maintained and another 2.50km *kutch*a patrolling path which exists inside the Botanical Garden and its adjacent forest tracts, must be transformed to brick-soling.

7.2. New construction: Following four roads are proposed for new construction during the Plan period -

SI No	Name of road	Length (km)	Condition	Works to be done
	New Construction			
1	Extension Road (Tower road to Main Road; Enc. 30/31 to 40)	0.328	Half newrest <i>Kutch</i>	Black-topped of width 3.0mt
2	Boundary Road (Pelican Enc. to Exit gate)	0.48	<i>New</i>	do
3	Colony Exit Road	0.0525	<i>New</i>	Black-topped of width 3.5mt
4	Snake House Road	0.19	<i>New</i>	Tiled road of with 2.5mt

The visitors' viewpoints, in the case of some of the enclosures, are provided out of the road where tiled footpath is to be constructed. This aspect needs to be covered while designing the enclosure.. Hence is not included here. Another 4.0km flat brick soling patrolling path will be constructed connecting different groves located in the Botanical Garden. This will help not only easy visitation of interested botany students but also the staff to do patrolling duty.

8. Residential colony:

The officer's colony located at the northwestern corner is isolated from the exhibit area and connected with the municipal road leading to the GS Road and the entry of vehicle etc. will be restricted by installing a gate near the COC enclosure (Enc. No 4). Similarly, the subordinate staff colony will be connected to the Municipal road, this provision is already there. The entry of vehicle etc. from this colony will be restricted by erecting a gate at the present boundary wall of the colony. In both the colonies where there are 25 and 33 numbers of buildings respectively, out of which 3 and 12 are beyond repair. The buildings beyond repair will be newly constructed as per the category of staff approved by the Department.

9. Gates and Barriers:

9.1. Improvement/renovation:

The location of the 5 existing gates erected on the zoo will remain almost same.

However there require some alteration -

- (a). The Gate No. 1, the Main Gate on the R.G. Baruah Road will remain as it is.
- (b). Gate No. 2, the Main Entry gate, will also remain as it is.
- (c). Gate No.3, i.e. near the ticket counter, will be used as the entry gate by the visitors.
- (d). The Gate No. 4 located on the south side of the Main Entry Gate (Gate No.2), near the restaurant, will be connected with the boundary road and will be used as the exit gate by visitors.
- (e). Through Gate No. 5, only zoo personnel residing in the officers' colony should be allowed entry and there should be no provision for entry of vehicles.
- (f). Gate No. 6, i.e. the gate near the existing thuja garden on the Tower road should be shifted on the same road to the place near the proposed vulture enclosure (Encl. No. 31) and this will restrict the movement of visitors to the Watch Tower. The old wooden gate should be rebuilt.
- (g). The Gate No. 7, located on the entry to the staff colony, will be constructed in a manner similar to the Gate No. 3 so that vehicle movement can be stopped.

9.2. New gates:

Two new gates are proposed in the Plan. These are – a new gate, both for the use of vehicles and people, should be constructed on the boundary near the officer's colony which will connect the municipal road and the new road to be constructed from the officer's colony.

Another gate should be erected at the middle of the staff colony. This gate was in existence and later brick walled and closed. It should be re-opened.

10. Administrative Building:

It is proposed to construct a two storied spacious administrative building in the same location, as has been shown in the Layout Plan. All the Wings of the zoo, except the Range Office, such as, office rooms for Director and assisting staff, mini conference room, library, computer room, storage, provision for vehicle parking n, etc will be accommodated in the building.

There should be a provision for guest room, reading room, etc. as well. The building should accommodate present strength of officers, ministerial staff and also accommodate the future provision for expanded man power.



Botany Wing will also come under this building and the old Botany House may be used as a camp house for the patrolling staff which will lend extra protection to the rhino enclosure. It has been proposed that the Range Office should be newly constructed beside the Main road, near the existing bear enclosure (Encl. 42) which is almost in the centre of the exhibit area (shown in the Layout Map). The office will be a two storied building with provision of open space on the 1st floor along with the Range Officer's chamber. This will help not only to keep constant vigil over the entire area, particularly the tiger enclosure, where there have been instances of occurrence of few grievous accidents, but will also be an extra help to the monitoring staff who will, with a centrally placed Range Office, be able to keep in touch with RO. while engaged in their day to day diverse engagement.

The Feed Store, Ration House, Kitchen, cold storage etc. will be followed by the Engineer's chamber on the northern part of the building with the Engineering yard constructed on the extreme.

Behind the building, along the boundary wall, an Assam type building to accommodate peon, chowkidar etc. may be constructed

11. Veterinary Section:

11.1. Veterinary Hospital:

The present zoo veterinary hospital is not spacious and there is little scope for its expansion. If the ASZBG is further expanded according to the Plan, then in order to render better and timely health management, more resources and modern equipments, tools for the hospital will have to be secured. The Evaluation Team had also suggested shifting the hospital to some other location. In future, the authority should explore the possibility and take necessary action. The present hospital building, which was constructed few years ago, may be used as a part of the Administrative Building.



Following are some of the equipments that needs to be procured for the Zoo Hospital -

1. Digital Camera/Handy cam
2. Egg Incubator
3. Metal detector
4. Digital thermometer
5. Laser Thermometer
6. Cryo can
7. Hot air oven
8. P.H. Meter Digital
9. Haemoglotinometer
10. Robust mechanical weighing machine.
11. Air cooler

11.2. Reference Library:

The zoo should have a separate library of its own. It should be a reference library with latest publications containing papers on treatment of different diseases. The library should be equipped with two computers with printers and two laptops with internet

facilities for storing of valuable data of zoo and for day to day office work and thus a database can be created.

11.3. Assistance from specialist:

In future the authority should take help from the Animal Advisory Committee and this Committee needs to be harnessed properly by making it active. Further Suggestions of the Evaluation Team and the steps for formal signing of MOU with the College of Veterinary Science for conducting health monitoring and related activity in a sustained basis should be completed in time.

12. Store & Feed supply section:

The receipt and distribution of feeds are looked after by the Range Office, Zoo HQ Range. The existing Store and Feed Supply Section is been housed in an old Assam type building located adjacent to the Divisional Office. This is small and in a bedraggled state. In the Plan it is proposed to house it under the new administrative building.

13. Sanitation section

For cleaning the feeding cubicle etc. jet sprayer machine needs to be procured. The sanitation work outside the enclosures viz. maintenance of toilets, drinking water points, sweeping of main roads and the visitors' path, cleaning of lawns etc. may be outsourced.

14. Flora and Fauna:

14.1. Flora:

(a). Natural forests: A detailed description of the flora of the zoo campus has been produced in Part – I of the Plan. The zoo is the catchment of few perennial streams. Moreover, this catchment is one of the only one left out of the relic forest hillocks of the city. Hence it has a crucial role to play in recharging the ground water cycle of the city in future. Therefore no disturbances of any kind should be caused to the natural forest patches of the zoo. The forest should be left with the nature so that

biological successions remain unabated and the ecosystems functions in its natural way. Not even the dead, dying, diseased or wind-fallen trees including any sort of cultural operation and removal of any forest produces should be allowed to be done in this forest.

The blanks or naturally open up area inside the forests should be used for restocking by planting sympatric indigenous mixed plant species in order to avoid soil degradation and proliferation of invasive weeds.

- (b). Forest in the exhibit area:** Adequate screening has been provided between two enclosures. Most of these screens are filled with naturally grown plants. While designing an enclosure, these plants should be properly appraised and meticulously retained in a manner that the living condition of the captives is not affected. To cover the screening area and give it a natural look, planting of certain species is to be done which has to be selected in consistence with both the enclosure and the captive housed in it. Planting of trees inside the enclosure may also be taken up even before the enclosure work is started. This is immediately feasible as the locations of the enclosures have already been finalized. The species selected for this purpose need to be site and the captive specific. In a phased manner, exotic species in the area should be eradicated keeping one or two individuals plants/ trees for each species.
- (c). Landscaping:** The scenery of the ASZBG as seen in a broad view should resemble a natural scenery with few old stands as top canopy and interspersed with middle lower canopy trees and the ground should be covered by closed canopied plants. The space outside the enclosures and the screening area should be thus landscaped. They are to be executed as per the ground situations. Some of the ground cover species may be like – *Ciffea bengalensis*, *Tabberna monatan corpnaria*, *Duranta repens*, *Dodonia viscose*, *Inga dulcis*, *Hibiscus rosachinesis*, *Clerodendron inerme* etc.
- (d). Botanical garden:** Details have been described about the Botanical Garden. The grids that were laid on the ground earlier should immediately be re-established

using GPS and a proper map needs to be prepared showing all the individual groups. The original concept of creating groves of endemic, endangered plant species of the Northeast Biogeography zone has to be revived.

(e). The 45 ha. Land: It has been discussed in the Part I of the Plan how it was handed over to the zoo administration. Once it was taken up by the Kamrup East Division for plantation and some works had also been done here by the Botanical Garden Range of that Division. The soil condition of the area has deteriorated due to prolonged exposure. Though some of the zoos of the country have taken up fodder plantations of their own to feed their zoo captives, the same idea perhaps will not be pertinent for the Assam State Zoo. Because, first - the present forest in the zoo is the only forested area except the tiny forest blocks on the top of the Saraniya Hill (Gandhi Mandap) and Gitanagar hill top; second – this zoo forest has a critical role to play in recharging the ground water table of Guwahati City which has depleted abnormally; third – the soil in the area has already been exhausted and recurring harvest and plantation for fodder may further deplete the soil.

Therefore, the area should be covered by plantation with adequate spacing so as to create a mixed plantation of sympatric species with adequate spacing so that in future natural woodland having all layers of a forest emerges.

(f). Wall screen: The boundary wall erected on the south, from near the Pelican enclosure to the Interpretation Centre (Encl. No. 62 to 79) is at very close proximity to the enclosures. In this site, already bamboo was planted but it is not adequate. There should be a thick wall-like bamboo hedge which can cover the entire wall keeping it out of site of the visitors. *Bambusa multiplex* may be a suitable species for planting. Besides, this type of bamboo hedge may be created wherever such situation prevails.

(g). Nursery: To carryout the above plantation works, obviously a good nursery should be created in advance. The present nursery site near the Lower Lake at the southeastern corner may be utilized. For successful implementation of the objectives,

selection of species for various plantations will be very important criteria. The Botany Wing will carry out all these activities in future.

(h). Identification of plant species: The ongoing identification of plant species and its documentation should be continued systematically. Such work is a continuous process and this should be done routine-wise. All the plant species found in the zoo, both in exhibit and of-exhibit areas should be identified and a herbarium database should be created in the zoo with appropriate supported text against each species. For this purpose recourse may be taken from, Guwahati University, BSI etc.

14.2. Fauna:

There have been suggestions from experts that free ranging animals comprising 15 species of mammals, [the list and description of which are elaborately made in the Part – I of the Plan,] should not be allowed to enter into the exhibit area and come into indirect contact with the zoo captives. It has been mentioned earlier that amidst the free ranging wildlife, some are ones who have escaped from the enclosure at different times in the past. These animals visit the exhibit area and sometimes supplement their diet from the food supplied to the captives. If the entry of such free ranging animals is restricted, they will need to subsist entirely on the natural food available in the botanical garden and the natural forest. Already there are cases of straying of these animals to areas beyond ASZBG boundary through broken boundary wall which has in most of the cases, resulted in death.

A viable and well thought out plan to deal with these animals should be evolved and such plan should be formulated after meticulous study supported by authentic data. Till that is done for the present, the movement of these free ranging mammals should not be confined outside the exhibit area.

15. Problem faced:

The difficulties and the problems faced by the management have been enunciated in the Part – I of the Plan, most of which are not in the hands of the ASZBG authority and cannot be eliminated by it. However, attempts are made to address these as follows –

(a). Erosion: The root cause of erosion in the zoo is the unregulated movement of the visitors in paths other than the one made for them and this has been discussed elsewhere. In the proposed plan, this has been adequately taken care of by providing well placed footpaths for visiting any enclosure where the movement of visitors will be restricted by the thick layer of hedge beside the path on one side and increasing the ground cover by planting shrubs. Again, indigenous middle and lower canopied tree species should be selected for planting to manipulate the canopy without affecting the enclosure and its captives. The zoo should take up timely action for creating sufficient nursery stock phase wise, selecting appropriate species suitable for such purpose.

(b). Storm: Thunderstorm is a natural calamity where we have no hand to regulate or minimize. However, while designing an enclosure the site should be thoroughly studied so that trees in or near the vicinity of the enclosure may have less chances of causing damages if its branches break or is uprooted by wind. For various reasons, the zoo should have underground cable system for electric power supply so that damage of insulators doesn't occur during storm. This will protect the power supply.

The situation in the ASZBG is such that, the problem of storm uprooting trees which damage the enclosures, , boundary-wall, power insulator etc., cannot be avoided. Therefore, a team to deal with the situation after the storm should always be ready during storm season. Necessary resources, such as power-chain saw, man-power etc. should be provided.

(c). Sudden escape of animal: It is expected that in the matter of construction of the new enclosures, which will be approved by the zoo experts of the country, the scope of animal escape from the enclosure will be specially looked into. There should perhaps be a doubled door system in the enclosures of the difficult animals so that precaution can be taken to stop the animal from escaping. Besides, most of the incidences of escape take place due to the negligence or over confidence of the keeper. The keeper should be sensitized in this aspect and be trained accordingly to handle such animals.

- (d). Inadequate fund:** In most cases inefficiency in management lies primarily in the inadequate and erratic release of funds. Almost all the problems of a zoo are unscheduled by nature. The Central share of expenditure should be sufficiently increased. In some selected area of activities, Zoo management should explore the possibility of greater cooperation and financial assistance from the corporate sector, PSUs, NGOs and individuals and the existing Zoo Society should play a more proactive role in this sphere. The Zoo management should make an effort to make the animal adoption scheme a popular one.
- (e). Occasional stealing incidents:** The threat for pilferage of forest produce, particularly fodder, firewood, and small timbers may become real in the near future as the zoo is besieged by people of different economic status. Immediate repairing of boundary wall and regular patrolling by the staff may be able to stop such incidents both in and outside the exhibit area. The activation of the battalion camp and the camp at the 45 ha area will help in doing this.
- (f). Vandalism:** Adequate engagement of staff in the exhibit area and special engagement of extra personnel in winter during peak visitor rush days may help in controlling vandalism. The present action of recourse from the NGOs should be made procedural with a specific protocol.
- (g). Control of Pollution:** As mentioned earlier, the zoo campus has now become entirely insular in midst of a rapidly expanding crowded urban settlement. Sound pollution may have negligible effect on the zoo captives however; there is hardly any scope for the zoo authority to take measure for control of carbon related pollution. The construction of the scientifically designed enclosures and the laying of the footpath and adequately designed ramification of drains in the Plan, will minimize the pollution created by the surface runoff.

16. Rescue and Rehabilitation:

Details of the nature of rescuing wildlife and the magnitude of such assignment that is being carried out by the ASZBG have been described in the Part – I of the Plan. In the future it is uncertain whether the Centre for wildlife Rehabilitation and Conservation (CWRC) located at Panbari, Kaziranga in collaboration with NGO will survive. In future

the ASZBG alone would have to take the entire responsibility to rescue and care for the wildlife in the state as it was doing before the CWRC was commissioned. ASZBG has over the years evolved significant knowledge and expertise in matters of rescue and rehabilitation of wildlife by the dint of its splendid activities in its long past.

There should be a well constituted Rescue Team with adequate manpower, who will be trained properly in this regard and resources like dedicated vehicle, fitted with efficient communication equipments, immobilizing drugs, antidotes, modern trapping and transportation cages, etc. to deal with the impending emergencies should be provided. In the Master Plan a separate location, with sufficient space, has been earmarked (Encl. No. 84) in the off-display area.

PART- II

CHAPTER - III

PERSONNEL PLANNING

1.1 Proposed cadre strength:

The proposed plan emphasize the importance of maintaining the skilled, trained and well experienced field staff who are the backbone of the entire administration. Over a period of more than 50 years, the animal keepers, head animal keepers, etc. who perform day to day animal care duty, have gained enormous skill and ability because of their constant and direct contact with daily upkeep of zoo captives and also because of the training imparted to them.

It is observed that except some complicated issues, this work force can be easily depended upon to provide some monitoring activity and motivational mechanism are in operation. Regular association with animals making the lives of animal keepers, etc. more intimate and this gives them a unique feeling similar to what one has towards ones family.

The permanent staff has been allotted with specific job based upon their ability, attitude and interest. Based on some issues, sometimes new assignment is also allotted to them to improve their work performance. Many of them have developed specialized skills and expertise in certain fields for which they have to be retained for longer periods. Promotional opportunity for field staff is very scanty, which need urgent attention to improve work performance and career advancement while serving in the zoo. There is no motivating factor or mechanism to boost their moral in long run. This frustrates them for which their output diminishes as they become older. Proposed cadre strength is as follows -

Suggested staffing pattern

SI No.	Category	No. of sanctioned post	No. of post proposed
A. ADMINISTRATION AND EXECUTIVES			
1	Director	-	1
2	DCF(DFO) / Curator	1	1
3	ACF	1	2
4	Education officer	-	1
3	Forest Range Officer	1	2
4	Deputy Ranger	1	2
5	Game Keeper	1	1
6	Forester	6	10
7	Forest Guard	17	24
8	Garden watcher	1	1
B. VETERINARY SECTION			
9	Forest Veterinary Officer	1	1
10	Pathologist	1	1
11	Forest Veterinary Senior Field Assistant	1	1
12	Forest Veterinary Field Assistant	1	1
13	Laboratory Assistant	1	1
C. ENGINEERING SECTION			
14	Asstt. Executive Engineer	-	1
15	Assistant Engineer	1	1
16	Junior Engineer	1	1
17	Technical Assistant	1	1
18	Draftsman	1	2
19	Tracer	1	1
20	Plumber	1	1
21	Pump Operator	2	2
22	Welder	1	1
23	Carpenter	1	1
24	Electric Mistry	1	1
D. BOTANICAL SECTION			
25	Botanist	1	1
26	Botanical Assistant	1	1
27	Herbarium Assistant	1	1
28	Garden Supervisor	1	1
29	Assistant Garden Supervisor	1	1
30	Mali	8	8

Sl No.	Category	No. of sanctioned post	No. of post proposed
E. ANIMAL SECTION			
31	Biologist	-	1
32	Asstt. Biologist	-	1
33	Head Game watcher	1	1
34	Head Animal Keeper	5	10
35	Animal Keeper	22	40
36	Mahut	4	4
37	Store Keeper	1	1
38	Grass cutter	2	2
39	Sweeper	12	20
F. MINISTERIAL SECTION/OFFICE ASSISTANTS			
40	Accountant	1	1
41	Senior Assistant	1	1
42	Junior Assistant	5	5
43	Office peon	5	5
44	Dak Runner	1	1
G. ZOO EDUCATION SECTION			
45	Museum Curator	1	1
H. FRONT OFFICE SECTION			
46	Gate Fee Collector	3	5
47	Gate Keeper	4	6
I. VEHICLE SECTION			
48	Driver	5	7
49	Handyman	2	2
J. SECURITY SECTION			
50	Night Chowkidar	3	10
51	Chowkidar	12	15
TOTAL SANCTIONED STRENGTH		148	215

For those staff who work on fixed pay or are casual workers some incentive should be introduced. At present there is no Biologist working in the zoo. It is proposed that one post of Biologist and one post of Education Officers should be created in the Assam State Zoo-cum-Botanical Garden.

1.2 Staff recruitment:

The vacancies in various cadres of the zoo and those new posts that are proposed should be filled up through promotion or through recruitment. In the zoo the arduous nature of work and specialized skill involved in various category of such work need to be considered as an essential service. The State Govt. may be requested to do the needful for filling up such posts. In the future some jobs may be out-sourced by the zoo management.

1.3. Management of Cadre and Mode of Deployment:

A proposal will be submitted to create or re-designate the post of curator as prescribed in the CZA guideline. Similar proposal may be placed for creation of post of Asstt. Executive Engineer, Education Officer, Biologist, etc. However, such proposals will be as per existing rules and regulation pertaining to service conditions.

1.4. Outsourcing:

It is felt necessary that certain works are to be executed by outsourcing to service providers, private agencies, etc. who have the desired expertise, skill and trained manpower. This would enhance the capability of the zoo management. Outsourcing of sanitation outside the enclosure area, parking area etc. may be considered. Outsourcing of the souvenir shop and outsourcing the maintenance of electricity, lawns, gardens, toilets etc. may also be considered.

PART - II
CHAPTER - IV
DISASTER MANAGEMENT

1. Anticipated Disasters:

Both natural and manmade disasters need to be tackled expeditiously so as to minimize response time with least possible damage to people, animals and properties. The anticipated natural disaster includes fire, storm, earthquake, heat wave, cold wave etc. The anticipated man-made disaster includes fire incidence, shelter collapse, food poisoning, civil disturbance, etc.

1.1. Fire:

Incidence of fire is not so probable within the animal facility or other places within the zoo premises, but cannot be ruled out. Fire incidence inside natural forests within the ASZBG can be tackled by deploying the existing staff in security as well as animal sections. In case the fire is detected within the animal facility, then attempt would be directed for immediate shifting of the animals to a safer zone. The staff would utilize discretionary judgment on the spot to minimize response mechanism. Fire extinguishers in the administrative office and zoo hospital are to be kept ready for such eventuality. The electricity circuit breakers need to be turned off in case the fire is due to breakdown of electricity supply line. The electrician of the zoo needs to be pressed into action immediately.

1.2. Natural causes:

The Assam State Zoo-cum-Botanical Garden is vulnerable to storms, heavy wind, because wind fallen trees create problem. To combat such situation the zoo has already procured two power chain saws to remove uprooted trees from the main and feeder routes. A 200 KVA generator needs to be linked with electrical cables for supply of electricity and running electrical pump sets. The overhead electricity supply is always vulnerable to heavy winds and torrential rains due to presence of dense vegetation.

Water tankers, vehicles with POL, stored food grains, search lights, generators with POL etc. are kept ready to meet the exigencies.

1.3. Earthquake:

Since, the North East zone is sensitive to earthquake some degree of preparedness needs to be ensured to mitigate disaster due to earthquake. The essential equipments required during earthquake are gas cutter, earth moving equipment, helmet, protective gloves, shovel etc.

1.4. Heat wave:

Although the zoo animals are not very vulnerable to heat waves during summer months, the contingency measures should include utilizing the existing water tanker with spraying facility, hand sprayers, providing straw thatching, coolers, ice blocks, anti-stress medicine etc. Elaborate summer arrangement is to be ensured well ahead of onset of summer. At present special seasonal foods are being provided to animals to reduce dehydration during summer months.

1.5. Cold waves:

Winter is not so severe in Assam State Zoo campus, excepting few days in winter when cold is felt to be somewhat higher side. Hence the plan may include providing protective netlon coverings around bird enclosures, electric bulb in bird and snake enclosures, infrared lamps in Reptile enclosure. Provision of special seasonal foods may be required for animals as nutritional supplements. Solar heating in the Reptile house can be explored.

1.6. Law and Order Breakdown:

Possibility of law and order breaks down is also apprehended. If such situation arises, the zoo authority is to ensure immediate measures to control it, for which it is necessary to adopt following measures –

- (i) Close coordination with Gitanagar Police Station
- (ii) Strengthening of existing security system by supplementing with private security arrangement.

(iii) Provision of alarm system, CCTV camera on vantage points, etc.

(iv) VHF networking system, which exists at present.

1.7. Feed supply:

As the feed supply is in contract basis, disruption in feed supply to some extent cannot be ruled out. In case of beef supply for carnivores, the same is brought from slaughter houses existing in the Assam Meghalaya border. Hence, the beef supply may be affected to a large extent. Considering this one slaughter house is to be set up in the earmarked area of the zoo. In order to meet the exigencies, it is proposed to set up facility to keep livestock at least for a week. One large deep freezer with back-up generator facility needs to be installed for meeting the exigencies. During strikes or agitation by workers and other staff, alternate arrangement for carrying out routine emergency zoo works is to be ensured through service providers. At present the dry food is kept stored for few weeks in advance.

1.8. Requirement of Tools:

Some of the basic preparedness includes keeping essential equipments and materials viz. vehicle with POL, portable generators, chain saws, gasoline, freshwater, adequate supply of food stuff, poles, trap cages, nets, ropes, public address system, VHF communication system, rubber boots, protective gloves, helmets, shovels, pick axe, tranquilizing gun with drugs, welding machine with sufficient welding rods, goggles, etc. Trained and motivated staffs are to be kept in readiness round the clock to deal with problems in anticipating weather condition. The zoo will be closed for the visitors during the disaster period.

1.9. Linkages with others

The linkages of the zoo management with other line departments and agencies for managing the disasters viz. the police, district administration, Assam Disaster Management cell, fire brigade, credible NGOs, hospitals and other experts will be of definite help during emergency and disaster periods.

1.10. Line of Command:

In order to facilitate rescue and rehabilitation activities during disasters, there should be proper line of command. The role of Director, ACF, Zoo Veterinarians, Range officers, etc. are clearly defined so that in the event of absence of any such officer, proper line of command would be maintained, the proposed pattern would be as follows:

(a). Team Leader:

- He will be one who is responsible for imparting training to people in the different protective actions before actual emergency occurs.
- He has to make decisions on protective actions, operations and expenditures.
- Identifying the people and assigning tasks to them
- Deciding and implementing protective actions so that the consequences of the disaster are minimized.
- Allowing the use of internal resources of the zoo whenever it is required to do.
- Arranging necessary logistics
- Arranging the finance for implementing the plan
- Summon resources and personal during exigencies

(b). Emergency coordinator/Assistant Conservator of Forests:

- The main responsibility of the Emergency coordinator will be to maintain a current disaster management plan and testing it on regular basis.
- He will further ensure that all the staffs of the zoo are well trained in dealing exigencies and coordinating the functioning of all the members in crisis management.
- Further he would ensure that all the vital records are identified and protected at the time of any disaster.
- Coordinating the functioning of different staffs that are involved in crisis management
- Organising and maintaining control room with adequate communication facilities
- Implementing decisions and directives from the In-charge of the zoo/ Divisional Forest Officer.

(c). RANGE OFFICER:

- He will be responsible for making arrangement for logistics, emergency housing and feeding for personnel in emergency operations.
- Making provisions for food and water requirements of zoo animals
- Supervision of conditions of enclosures and other structures, facilities on regular basis for taking protective actions before an actual emergency occurs.
- Mobilizing resources and personnel
- Ensuring that stranded zoo visitors are taken safely to the designated shelter/ evacuation area.
- Helping in proper movement of people and vehicle.

(d). ASSISTANT ENGINEER:

- He would be responsible for supervision of conditions of enclosures and other structures, facilities on regular basis for taking protective actions before an actual emergency occurs.
- Ensuring that the electricity points are shut down during emergencies as per necessity.
- Providing all available engineering impute during emergencies
- Keeping the trapping cage, squeeze cage, rope, peddles, Spade, axe, machine saw and other such articles etc in readiness.

(e). FOREST VETERINARY OFFICER AND PATHOLOGIST:

- They will be responsible for keeping tranquilizing equipments, accessories and drugs, net in readiness.
- All other accessories such as stretcher, medicines etc including anti-venom and anti Rabis drugs etc are readily available.

- Keeping ambulance ready
- Keeping all his assistants ready
- Keeping records of the animals including the animal history sheet and treatment sheet
- Taking prophylactic measures against the diseases of the animals
- Examining the fecal samples of the animal

1.11. Training and Capacity building:

Officers and staff at grass root level need to be imported with proper training to work efficiently during disasters. Capacity building would enhance the ability and motivation level of staff to combat disasters.

1.12. Mock drills:

In order to enhance the capability of the staff, they are to be exposed to mock drills from time to time so that they would develop appropriate knowledge and skill to face various disasters in time. They are to be provided with appropriate equipments and trained manpower

PART- II

CHAPTER - V

CONTINGENCY PLAN

1. Wild Animal Rescued:

Rescue of wild animals is an aspect addressed under Para 2.5 of Chapter I of the Part – II of the Plan. To accommodate the increased number of rescued wild animals and birds including leopards, python, deer, bears, monkeys, proper facilities are required. A lot of wild animals are rescued from in and around Guwahati. The rescued animals include displaced, stray, orphaned and injured animals. Although there is a designated rescue and rehabilitation centre in the State, yet those wild animals rescued in and around Guwahati, need to be accommodated in the campus of Assam State Zoo-cum-Botanical Garden. Quite a large number of rescued individuals have been rehabilitated in Assam State Zoo campus. Rescued animals are usually released in the wild after necessary treatment. After keeping them for some time in quarantine if those animals are found physically fit and suitable for rehabilitation in the wild, this is done. If the rescued animal requires prolonged or life time care, then it would be housed in quarantine area for a specific period and after that kept in proper and specific enclosure.

The common rescued animals include monkeys (rhesus macaques), Himalayan black bear, Civet, Indian pangolin, spotted deer, leopard, barn owl, snakes etc. Even a severally injured tiger in Orang National Park has been undergoing prolonged treatment in isolation unit. Most of the rescued animals are problematic animals viz. bear, and rhesus macaque. Two elephant calves kept in the Assam State Zoo campus need constant life time care as well. Rescued leopard cubs have been successfully hand reared in Assam State Zoo. The following actions need to be initiated for handling the rescued animals:

1.1. Trap cages:

In order to capture problematic animals viz. monkeys, bears, leopards etc. sufficient number of trap cages for different species are to be kept ready in the zoo at any point of time. Trap cages for leopard and deer are also crucial. People for Animal and other voluntary organizations are often involved in rescuing wild animals for which trap cages are to be kept ready which would also serve the purpose of temporary housing of the rescued/captured animals.

1.2. Vehicles:

Although at present, one Bolero Invader vehicle is used in the zoo for attending animal rescue operations, a dedicated specialized rescue vehicle fitted with movable search light, siren system and VHF facility is needed. The vehicle must be capable enough to accommodate a minimum six persons (Rescue team members) and the back side trolley must be able to accommodate large size cages. The vehicle needs to have some permanent equipments viz. ropes, tackles, ladder, cutting equipments etc. for handling and transportation of the animals.

1.3. Tranquilizing equipment and chemicals:

These are available in zoo hospital and need to be used as per requirement.

2. Escape of animals from enclosures:

At present Assam State Zoo has 2mt high Cement Concrete wall fitted with 'Y' shaped barbed wire fence around entire zoo area. Therefore there is not much chance for the captive animals of the zoo to escape outside the zoo premises. However, some of the old portion of the boundary wall needs to be replaced with new walls. The zoo management staff do mandatory checking of all enclosure fence, walls etc. before they leave. Utmost care is being given for safety of the public inside the zoo during zoo hours. The night security staffs always remains vigilant and conduct routine checking of all enclosures during night hours and early morning to prevent any escape of captive animals.

Escape of zoo animals is sudden and creates emergency situations that need to be tackled immediately. Assam State Zoo-cum-Botanical Garden has experienced a few dreadful animal escaping incidences in the past. These unwanted experiences has taught the administration to analyze the whole gamut of issues and have subsequently formulated several effective strategies and steps:-

- (i) Provision of double barrier mechanism around all the cubicles/night shelters of carnivores. The second layer of barrier is an assurance against all possible scope of escape.
- (ii) A measure is in operation that is while feeding the carnivores by animal keeper, the Head Animal Keeper and one Forest Guard or Forster is to be present in the enclosure so as to monitor that activity and oversee that no door remains unlocked during the feeding and after. The same practice is followed during treatment as well.
- (iii) At evening, the in-charge for monitoring the activity is to report regarding locking of enclosures door, etc. to the control room which is recorded in proper register to be checked by Range Officer, ACF or Director.
- (iv) Range Officer/ACF is to check the enclosures as often as possible.
- (v) The Night Chowkidars are to check the doors and locks of all enclosure to ensure locking of doors, which is regularly verified or inspected by zoo officials on daily basis.

If the situation arises during zoo hours when visitors are inside the zoo campus, the immediate job is to cordon off the area and to evaluate the situation immediately. Then steps are taken to alert all staff including security. The team of zoo staff is engaged immediately to capture the escaped animal either through trapping or through tranquilization. For this two sets of the tranquilization equipments are to be kept ready, one each with FVO and pathologist, supported by R.O. Head Quarter. Besides tranquilization equipment, other protection weapons viz. DBBL gun, etc. are to be kept in readiness. All responsible staff of the zoo must keep a handset, wireless and mobile phone ready. In case or emergency the police, fire brigade, ambulance are to be contacted over telephone and the required telephone numbers should be displayed at the zoo hospital, Administrative building, security and Range office. One vehicle along

with driver is to be kept ready to meet emergencies. The trap cages with its lock & key are to be kept ready with the designated officers.

2.1. Forewarning people & staff about emergencies:

In emergency situations viz. escape of large cats, fire, law & order situation etc. there is need for a proper evacuation mechanism in the zoo. For this the Assam State Zoo-cum-Botanical Garden has to arrange for an alarm system and public address system in the administrative building. Fixed station and walkie talkie (Radio communication) are available in the zoo. The vehicle mounted radio communication system is to be made available for spreading information. The following additional safety measures are to be initiated to prevent escape of animals from enclosures:-

- (i) Escape drills are conducted periodically among zoo staff to keep them more vigilant and well groomed.
- (ii) Periodical trimming of trees is required to be carried out both inside and outside enclosure close to fence so as to avoid drooping branches which may serve as an escape route for capture animals viz. carnivores, primates and reptiles.
- (iii) Moat water level is being maintained within the safety limit so that the captive animals who are good at swimming cannot cross the barriers.
- (iv) Repair and maintenance of doors, windows and annual painting of the chain link mesh fence is being done to prevent rusting.
- (v) The animal keepers and their co-worker are sensitized during training and other interaction to prevent and deal with the issue of animal escape.
- (vi) The stand-off barrier and enclosures are meticulously designed so as to maintain the safety of visitors.

2.2. For detailing of Animal escape:

Captive animals	Minimum requirement	Highly recommended but not required	What A.S.Z.B.G.has
Large carnivores	Transport crates, squeeze cage, tranquilization guns, equipments, blow dart, equipments, snare, nets, pole, syringes	Spare transport crates with wheels	Transport crates, squeeze cage, tranquilization guns and equipments,, blow dart, equipment
Small Carnivores	Transport creates, small squeeze cage, tranquilization guns, equipments, blow dart, equipments, snare, nets gloves	Spare transport crates with wheels	Transport crates, tranquilization guns and equipments, blow dart, equipments, blow dart, equipments
Hoofed animals	Transport creates, tranquilization guns, and equipments, blow dart, equipments, nets	Custom designed squeeze cages transportation crates for various hoofed animals as per CZA guidelines	Tranquilization guns and equipments, blow dart equipments
Birds	Nets, gloves, towels, pole, syringe	Appropriate crates	A few cages
Reptiles	Nets, gloves, snares, plastic shield, plastic tubes, snake tong, snake, hook, bags	Squeeze care	Bags, snares, snake hook

2.3. Use of tranquilization gun and techniques of chemical restraint:

Tranquilization is now considered an integral technique to capture problematic wild animals and zoo animals in distress so as to give them specific treatment. This can be an effective method for population control viz. Translocation, reintroduction hormonal implant and sterilization or for undertaking research studies viz. Radio-collaring, Radio telemetry, satellite telemetry. This is a very skilled and specialized activity as one has to know about immobilization system, the drugs, darts, use of tranquilizing and radio collaring equipment etc. Various capture techniques should be imparted to staff and

practiced by a specific group within the zoo. Although this facility already exists in Assam State Zoo-cum-Botanical Garden, but this needs to be upgraded.

2.4 Quick response unit:

In order to tackle the problem of escape of animals from enclosures, one quick response unit comprising of ACF, Range Officer, the concerned animal keeper is to be constituted. Necessary trap cages, tranquilization equipments and drugs are kept ready to trap the escaped animal. Simultaneously evacuation mechanism of visitors is actuated.

3. Free living Monkey & stray dog menace:

3.1. Monkey menace: The population of free ranging rhesus macaque has gone up rapidly due to uncontrolled breeding inside the zoo. The rhesus macaques are being considered as pest and are frequently attacking visitors to snatch away eatables. They have proliferated over the years. Monkeys are potential carrier of many dreaded diseases which are affecting the captive animals of the zoo. They pose a great threat to visitors as well as to the captive animals of the zoo. Some visitors feed the monkeys for which they become addicted to snatching and resort to occasional biting.

The following measures are required for controlling monkey menace:-

- Visitors are sensitized not to feed the monkeys.
- Herbivores are to be feed inside feeding stalls.
- Rhesus macaques are to be captured and transported to far off jungles.
- Measures such as vasectomy and tubectomy for captured monkeys as a population control measure with the cooperation of veterinary department are required.

3.2. Control of stray dogs:

Stray dog incidence is not a big problem in Assam State Zoo-cum-Botanical Garden, though few incidence of stray dog sneaking into the zoo is recorded. The staff colonies also lure the stray dogs who find it beneficial to stray inside. Dogs are also attracted towards bone pits where left over bones are being dumped. The stray dogs are potential threats to visitors and captive herbivores. Deer and antelopes are quite vulnerable to stray dog attack.

It is proposed to continue capture of stray dogs by trapping and tranquilization and releasing them in far off places either as such or after sterilization.

For controlling the dog menace within the zoo the following measures are required to be undertaken:-

- The possible breaches in boundary wall are being checked periodically.
- The security staff keeps a strict vigil on entry of stray dogs through main gate and drainage trenches.
- Dog capture drive is being undertaken periodically with the help of zoo staff, and members of People for Animal.
- All zoo staff and registered guides are being sensitized to drive away the stray dogs from zoo premises.
- During routine inspection whenever any breach in wire mesh is being noticed the same is being closed immediately.

Recommendation- Vasectomy & Tubectomy of captured stray dogs need to be performed within one Km. radius of the zoo boundary.

4. Arrangement of food in case of strike (non supply by contractors):

Storing of different feed items to tide over contingency situations such as :- period of strike by staff, Bandhs called by various organization, non supply of the feed by contractors, natural calamities etc. need to be apprehended and considered much ahead of such happening. All dry feed are to be kept ready in well maintained storage facilities at least for one month. Similarly perishable food items viz. fruits and green items are to be procured and stored departmentally for at least three days without banking upon the feed contractor. Deep freezing facilities is to be installed to store perishable food items including beef, meat, chicken and eggs at least for a week. Day old chick, white mice etc. are to be kept ready at least for a week. Identification of such service providers should be done.

5. Snake bite:

Assam State Zoo-cum-Botanical Garden campus also houses a large number of various snakes. There are free living poisonous snakes viz. cobra, krait, etc. in plenty

inside the zoo campus. Moreover many poisonous snakes viz. cobra, monocellate cobra, Binocellate cobra, Banded krait are being exhibited in Snake House. The animal keepers who are working in the Snake House are vulnerable to snake bite. It is mandatory to keep sufficient doses of anti-venom serum in the zoo hospital to meet any emergency situation. Well maintained first-aid boxes are being kept ready at zoo veterinary hospital, Reptile House, Range Office and administration building. The zoo keepers are being trained by zoo vets for first aid measures to be taken immediately in case of snake bite. Tetanus and anti-venom injections are to be kept ready for emergency uses in the zoo hospital. Occasionally captive animals may also suffer from snake bite for which immediate treatment is needed.

6. Visitors getting injured/visitors falling inside enclosure & First-Aid facility:

6-7 lacks of visitors come every year to Assam State Zoo-cum Botanical Garden. In case of some accident, like visitor falling inside the enclosure, monkey attack, snake bite or any sort of injury, the zoo must be equipped with first-aid kits at various points viz. children park, main gate, zoo hospital, administrative office, reptile house, Range Office, etc. Certain emergency rescue equipments viz. ladders, rope, etc. are to be kept ready. In case some visitors falls into wet or dry moat, ladder and rope are to be made available in administrative office to be used for rescuing. The zoo staff and security personnel are kept vigilant to meet such untoward incidence in the zoo. Proper stand off barriers could be erected to stop visitors from falling into any enclosure moat. Proper do's and don'ts signage are to be fixed in important zones to remind and warn the visitors. The visitors mostly receive minor injury which can be treated at the zoo hospital. However in case of serious injury, arrangement is to be made for taking the injured visitors to the nearest good hospital by the vehicles made available in the zoo. First-Aid facilities are available in the zoo hospital for minor injuries.

7. Fighting among animals:

Infighting among males is noticed during rutting season of deer and antelopes. Similarly fighting is also noticed among carnivores, primates, etc. In case of infighting of carnivores measures are taken to drive them back to their night shelter to avoid injury. Animal Keepers can usually settle such infighting with the help of rods to separate

the fighting animals. Occasional fighting occurs between mating pairs of carnivores for which their attitude and mating behavior, acceptability of the partner etc needs to be watched carefully before allowing them to actually start mating. Preferably zoo vets are to be kept as standby with drugs and tranquilization equipments near kraal where mating of tiger, lion or leopards are allowed.

8. Epidemics:

Outbreak of communicable diseases viz. Anthrax, Foot & mouth disease, Haemorrhagic septicemia etc. pose serious threat to captive animals in the zoo. The stray dogs and pet cats are also potential sources of diseases viz. Ehrlichiosis, Feline-Pan-Leucopenia for which a vaccination protocol is being taken up in the zoo. In order to prevent infection sourced from fodder grass which are brought from outside, steps are required to establish a captive fodder farm in the zoo for sustainable supply of quality fodder for zoo herbivores. The captive slaughter house in the zoo is to be established to ensure proper check up of quality meat. The zoo vets meticulously do the checking of the beef and meat to prevent spread of any diseases to zoo animals.

9. Breakdown of power supply:

In case of breakdown of power supply, a 200 KVA power supply is to be set up for supply of water through pump sets. Sufficient fuel is to be kept ready at any point of time to run all generators and pump sets in the Zoo. The gate complex is to be provided with dedicated eco-gen sets. Gen sets are provided in administrative office and ration house. Inverter has been provided to the Range Office and this is needed for the zoo hospital, museum, ticket booking counter as backup power supply provisions. Solar street lights may be fixed at entry points, etc. And solar power for heating in the reptile house can be explored.

PART- II
CHAPTER - VI

CAPACITY BUILDING

The improvement in work performance in zoo largely depends on the ability and motivation level of all employees mainly the keepers and other field staff. They need to be provided with the latest knowledge and skill of zoo upkeep through a proper training module. The training of zoo keepers and management is a continuous process, which cannot be given a back seat. The process of learning will enhance management capability. Training is to be organized at a pre-service stage to orient and prepare a prospective professional for performing technical and administrative tasks. Such pre-service training should be followed by in-service training which serves as a tool for continuous education and this will ensure the sustenance of professional capability.

1.1 In house Training

The advance in zoo management technique is to be imported to field staff through training this will enhance their knowledge. Training is indispensable at all levels and necessarily involves a wide range of training interests. It can be on the job training or a formal course-oriented training or study tour oriented



training. It helps in bringing management capability to a higher level. It may be reiterated that all the trained staff in forestry and wildlife management with some specialization on allied wildlife conservation & biodiversity management should be posted to zoo on a priority basis. All the zoo staff must be aware of the latest trends in zoo management techniques.

1.2. On the Job training:

- (a) Collection of biological material & their interpretation:** The zoo staff especially those who are working in the Veterinary wing must be trained to collect biological material and to examine and interpret it when required.
- (b) Postmortem of wild animal carcasses and other wildlife health care:** Zoo management are occasionally confronted with specific problems such as sudden break out of any epidemics viz. Anthrax, Tuberculosis, foot & mouth diseases, Rinderpest etc. The local disease investigation unit of State Veterinary Department needs to be involved to deal with such situation. Therefore the zoo staff should be involved in cooperative effort taken by local veterinarian in postmortem, collection of samples of vital organs for histo-pathological examinations, their preservation and dispatch, signs & symptoms of common wildlife diseases, external indicators of health to be used for gross periodic health assessment. This sort of training should be repeated at regular intervals to make the practice more perfect.
- (c) Use of computers internet and related accessories:** A few staff may be trained to handle computer internet and such accessories. Knowledge on G.I.S. technique & remote sensing is very essential in today's world and is a very handy management tool. Various field data can be analyzed, stored and retrieved giving management an updated status.
- (d) Formal training courses:** The officers need to attend various training programme organized by CZA from time to time including the training for zoo veterinarians. Training is being organized for zoo keepers funded by CZA at Assam State Zoo-cum-Botanical Garden.

1.3. To Encourage specializations:

The zoo veterinarians are highly skilled professionals so far as tranquilization technique is concerned. Their service is requisitioned now and then to solve problem of rescuing elephant, tigers, etc. and also for rhino translocation works. They are well equipped to handle all aspects of tranquilization activity.

The zoo staff, both at the field level and official level, are being sent to various training courses in the country for specialization in the field of animal health care, zoo keeping, environmental enrichment, zoo education and interpretation, conservation breeding programme etc.

1.4. Annual rewards:

In recognition of commendable performance in the field of zoo keeping, rearing of orphaned, incapacitated and injured/sick animals, in gardening, in matters of security, maintenance etc. the dedicated staff should be rewarded on the eve of Wildlife Week, Birth Day of animals, Stump tailed macaque day, etc. The best maintained enclosures should be given an annual award by the Zoo Society.

1.5. Recreation/Relaxation:

In order to inculcate a feeling of togetherness and homeliness, a cultural centre with facilities for an auditorium and indoor games may be set up to encourage the zoo personnel to express their inherent hidden talent. All the subordinate staff and zoo officials must have a family bonding to take the zoo to new height. The zoo management should take all compassionate measures to bring a feeling of brotherhood so as to create a congenial atmosphere in the zoo campus.

1.6. Training abroad:

The Zoo Director, ACF, R.O, Engineer and Zoo Veterinary Officers needs to attend specialized training courses abroad so as to gain up to-date knowledge relevant in field matters applicable for ASZBG.

1.7 Plan to upgrade skills of zoo staff:

It is necessary to train the existing staff to upgrade their skills in various aspect of Zoo Management from time to time. This will help the management for smoothly running the ASZBG.

1.8. Interaction with other zoos- Regional co-operation:

It is desirable to establish regional cooperation and have interaction with other nearby zoos for the planned conservation breeding of endangered species.

PART - II

CHAPTER-VII

e-GOVERNANCE

1.1 Local area networking:

Use of modern technology now has become a necessity for any form of integrated and better administration. The activities related to a zoo are of an emergency nature where timely action, accuracy, transparency etc. are the root for successful governance. Therefore, it has become essential to also propose e-Governance in ASZBG in the Plan. The entire e-Governance plan will be initiated in a phase-wise manner and it will be completed in a fixed period of time.

The different Wings and sub-Wings of the ASZBG administration will come under one e-network so that, from any Wing the data may be procured at any time. For that LAN (Local Area Network) system will be adequate. The main Server will be placed in the Divisional Forest Office and network will connect the wings through different clients.

A LAN with 15 clients are proposed and in the initial phase it will be installed in the Zoo Veterinary office, Store Receipt and Issue Sub-Wing, Range Office along with Assistant Conservator's chamber. In the subsequent phases, Vehicle Parking Wing, Ticket counter, Engineering and Botany wing will come under it. The Server will be installed in the Director's chamber.

With the installation of the LAN, the receipt and issue of feed etc, its store status, Vety. medicine stock, daily use of medicines, etc. could be immediately monitored by the Director or by any other clients. The management will always be in the know of the actual situation of all the Wings of ASZBG by sitting in his chamber. The day to day stock of various items supplied by the suppliers and processed by the Store Section can regularly be monitored from any of the client. Official correspondence will be prompt and easy and disposal of official matters will be timely as it will be accessible from any client.

It has been already proposed that, the Ticket counter and the Vehicle parking will be equipped with CCTV. These CCTV will be connected with the LAN and could be monitored and immediate action taken whenever necessary from the Director's office. In future if more CCTVs are installed in some strategic locations, then these could also be connected with the LAN for taking timely measures whenever required.

1.2. GIS Mapping

Using the GPS and satellite imagery the following maps have been prepared for Assam State Zoo-cum-Botanical Garden:-

- (1) Location and access of Assam State Zoo-cum-Botanical Garden.
- (2) Topography of the zoo area.
- (3) Vegetation type of Assam State Zoo-cum-Botanical Garden.
- (4) Location of wetlands in Assam State Zoo-cum-Botanical Garden.
- (5) Key areas of conservation importance in Assam State Zoo-cum-Botanical Garden.
- (6) Management plan showing proposed facilities in Assam State Zoo-cum-Botanical Garden.

All the enclosures, infrastructures, internal roads etc. have been mapped with the help of GPS. Map with the electric power supply lines, water supply system, drainage system, etc. has also been prepared.

1.3. CCTV's

It is proposed to fix CCTV cameras in Entry gate, booking counters, ration house, beef house, carnivore's enclosures, various strategic location, etc. for necessary surveillance during various periods of the day.

1.4. Wireless Network

The wireless network system has been strengthened inside the Zoo for better communication. There are one VHF towers, Two controlled fixed sets one at R.O's office and another one at Main Gate. Further there are ten hand sets for better communication among zoo staff and officers. There is battery backup system with chargers for effective communication.

1.5. Main Gate entry

At present there are 7 ticket booking counters in the gate complex. However there is need for automatic ticket checking system using swiping of the bar-coded tickets at the electronic gates, which is proposed in this plan. Once the bar-coded system is introduced, scope of possible pilferage attempt will be eliminated.

1.6. Animal History

The existing maintenance of animal history records is obsolete and out-dated. Although many information including stud book, animal health care, inventory etc. have been computerized yet there is need for further up-gradation in view of many advance record keeping and information sharing system. However in the mean time, Assam State Zoo has been submitting all the details on zoo captives to International Species Information System (ISIS), U.S.A through ARKS- Animal Record Keeping System. The Central Zoo Authority is joining the ZIMS (Zoological Information Management System) being coordinated by International Species Information System (ISIS), U.S.A. The ZIMS is a comprehensive software, consisting of the following, in addition to other features. ARKS- Animal Record Keeping System, Med ARKS- Medical Animal Record Keeping System and SPARKS- Single Population Animal Records System. This would help exchange of information about Zoo activities and Animal Status and animal exchange programme.

1.7 World Association of Zoos & Aquarium (WAZA)

World Association of Zoos and Aquarium (WAZA) is a very prestigious World Association responsible for strict implementation of world zoo conservation strategy. Each member of WAZA need to aspire for the highest standard Welfare for the animals in its care. An effort is to be made to make Assam State Zoo-cum-Botanical Garden as a member of this Association in near future.

1.8. Web site & e-mail:

Assam State Zoo cum Botanical Garden has taken steps to hoist a website www.assamstatezoo.com for information sharing.

The e-mail IDs are dfo.assamzoo@gmail.com & assamstatezoo@yahoo.com

PART- II

CHAPTER - VIII

BROAD BUDGET ANALYSIS FOR IMPLEMENTING THE PLAN

1. Construction and Development (Non-Recurring) and Recuring:

Sl No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)										Total	Remarks (Source of funding)		
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th				
A)	NON-RECURRING															
I)	Construction of Enclosure	1) Golden Langur Conservation Breeding enclo.	55												55	CZA already provided fund
		2) Serow Conservation Breeding enclo.		35											35	Govt.
		3) Rescue site		50	50	50									150	Govt.
		Nilgai		30											30	Govt.
		Black Buck		30											30	Govt.
		Snake House		20	20										40	Govt.
		Thamin		25											25	Govt.
		Mongoose		10											10	Govt.
		Tiger		25	20										45	Govt.
		Pheasant		20											20	Govt.
		Binturong enclo.		15											15	Govt.
		Civet		18											18	Govt.
		Slow Loris		18											18	Govt.
		Porcupine		12											12	Govt.
		Jackal		25											25	Govt.
		Hyena		25											25	Govt.
		Chowsingha		18											18	Govt.
		Ghrial			20										20	Govt.
		Muggor			20										20	Govt.
		Great Pied horn bill				25									25	Govt.
		Lesser Pied Horn bill				25									25	Govt.
		Emu				18									18	Govt.
		Cassowary				18									18	Govt.
		Excess animal					28								28	Govt.
		Isolation					15								15	Govt.
		Vulture					15								15	Govt.
		Squirrel					18								18	Govt.

SI No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)										Total	Remarks (Source of funding)		
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th				
		Golden Cat (Display)					25							25	Govt.	
		Golden Cat (C.B. enclo)						15	15					30	Govt.	
		Aquarium					25	25						50	Govt.	
		Swamp deer						28						28	Govt.	
		Pelican						15						15	Govt.	
		Wild pig						25						25	Govt.	
		Exotic Bird						30						30	Govt.	
		Tortoise							22					22	Govt.	
		Lizard							18					18	Govt.	
		Buffalo							22					22	Govt.	
		Otter							25					25	Govt.	
		Fox								22				22	Govt.	
		Jaguar								20	15			35	Govt.	
		Turtle								18				18	Govt.	
		White Winged Wood Duck									30			30	Govt.	
		Lion tailed macaque								22				22	Govt.	
		Crab eating monkey								25				25	Govt.	
		Butterfly park								40	30	30		100	Govt.	
		Wolf									20			20	Govt.	
		Budgiger									20			20	Govt.	
		Dhole									20			20	Govt.	
		Chimpanzee									20	15		35	Govt.	
		Ostrich										22		22	Govt.	
		Zebra										30		30	Govt.	
		Amphibian										20		20	Govt.	
II)	Improvement of existing enclo.	Repairing of old enclo.	20	10	10	12	15	10	15	10	10	15		127	Govt./ PSU	
		Hog deer		25											25	Govt.
		Chital		25											25	Govt.
		Barking deer		25											25	Govt.
		Serow enclo.			25										25	Govt.
		Aviary			30	25									55	Govt.
		Assamese macaque			25										25	Govt.
		Stump tailed macaque			25										25	Govt.
		Capped langur			25										25	Govt.
		Rhesues macaque			22										22	Govt.
		Pig tailed macaque			25										25	Govt.
		Bonnet macaque			25										25	Govt.
		Lion			20	20									40	Govt.

Sl No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)										Total	Remarks (Source of funding)			
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th					
		Hippopotamus			25										25	Govt.	
		Paintings of encls.			8	5	7	8	8	8	8	10			62	Govt./PSU/ Corporate	
		Small cat				20									20	Govt.	
		Leopard				22									22	Govt.	
		Spectacle monkey				22									22	Govt.	
		Pangolin				10									10	Govt.	
		Pygmy hog				30									30	Govt.	
		White rhino				20									20	Govt.	
		Clouded leopard								15					15	Govt.	
		Giraffe									20				20	Govt.	
		Bear-2										32			32	Govt.	
III)	Development of infrastructure	Const. of Boundary wall around zoo (1000 mtrs)	47												47	CZA has already provided fund	
		Const. of wall to isolate staff colony (340 mtrs)	16													16	CZA has already provided fund
		Drainage facility	5		8		10		8	10						41	Govt.
		Barbed wire fence above boundary wall	3													3	Govt.
		Improvement of existing low transmi- ssion line	8													8	State Govt. has already provided fund
		Ration house, kitchen		20												20	Govt.
		Painting of building		5												5	Govt.
		Maintenance of parking area and garden		8												8	PSU
		e-Governance		4												4	Govt.
		Develompent of road		10	20	15	12	8	15	20	10	15				125	Govt.
		Black topping of existing road		7												7	Govt.
		Purchase of new vehicle		7	8		10		10							35	Govt.
		Equipments for contingency		3	3											6	Govt.
		Renovation of old boundary wall		25	20	15				18	15	15				108	Govt.
		Improvement of water supply		18			15									33	Govt.

SI No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)										Total	Remarks (Source of funding)		
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th				
		Staff quarter		15	15	18	20	20	20						108	Govt.
		Office building			40	50	50	40	40	50	50	55			375	Govt.
		Engineering workshop			15										15	Govt.
		Drinking water facility for staff colony			5										5	Govt.
		Impro. of storage facility/Procurement of tools, deep freezer (feed supply, disaster management)			15										15	Govt.
		Estt. of chlorination plant			2										2	Govt.
		Improvement of waste disposal			7										7	Govt.
		Beef house				7									7	Govt.
		Silo pit				5									5	Govt.
		Fodder house				5									5	Govt.
		Quarantine				30									30	Govt.
		Improvement of building				10	10								20	Govt.
		Staff amenities					10	6	12						28	Govt.
		Improvement of entry gate					10								10	Govt./PSU/ Corporate
IV)	Development of Visitors facilities	Drinking water facility	4		5		5		6		6				26	Govt./PSU/ Corporate
		Signage development	1	1	1		1	1		1	2	2			10	Corporate/PSU
		Publicity materials	1	1	1	1	3	5	5	5	5	5			32	Govt./ Corporate
		Development of Children park			10										10	Govt./ Corporate
		Interpretation centre	20	30	50	50	50	50							250	Govt./ Corporate
		Toilet facilities			5			7							12	Govt./PSU/ Corporate
		Visitors shed			5	2	2								9	Govt./PSU/ Corporate
		Close circuit TV			10										10	Govt.
		Development of park/ garden			20		5	5	5	5	8	10	10		68	Govt./PSU/ Corporate
		Installation of automated entry system				20	20								40	Govt.

SI No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)										Total	Remarks (Source of funding)	
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th			
		Development of visitors facilities			8	5		5	5			8	8	39	Govt./PSU/ Corporate
		Improvement of footpath			5	6	7	7	8			10	10	53	Govt.
V)	Miscellaneous	Exchange of animal	4	5	4	4	6	8	8	8	10	10	67	Govt.	
		Vety. Equipment	2	3	3	3	4	4	5	5	5	5	39	Govt.	
		Storm water drainage mechanism		20									20	Govt.	
		Improvement of incinerator		5									5	Govt.	
		Development of transmission line		10									10	Govt.	
		Sanitation equipment & weed control		5									5	Govt.	
		Training & workshop	3	2	5	3	5	5	5	5	5	5	38	Govt.	
		Plantation		7	2.5	1.5	1						12	Govt.	
		Enrichment		4	2	4	7	8	5	5	5	8	48	Govt.	
		Avenue planting			2								2	Govt.	
		Wet land develop				5	7	5					17	Govt.	
		Weed control		2	2	3	3	3	4	4	4	5	30	Govt.	
		Biodiversity conservation				3	3	5	3	3			17	Govt.	
		Underground electrical cable laying				25							25	Govt.	
		Hydrological study & rain water harvesting						15					15	Govt.	
		Upgradation of zoo hospital							25	25			50	Govt.	
		Improve of garbage disposal system								15			15	Govt.	
		Obtaining exotic animal (Chimpanzee)									40		40	Govt.	
		Obtaining exotic animal(Ostrich,Zebra)										40	40	Govt.	

SI No	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)										Total	Remarks (Source of funding)
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th		
B)	RECURRING	Cost of feed and fodder supplies, zoo kitchen, feed store, POL for zoo vehicles	300	300	300	300	300	325	325	325	325	325	3125	Govt.
		Maintenance of zoo hospital, cost of medicine, vaccines, liming, sanitation etc.	25	25	25	25	25	30	30	30	30	30	275	Govt.
		Maintenance of Animal enclosures, water supply, electricity, lawn & gardens, internal roads, drainage system security, buildings, ticketing system, signages, office including AMC, visitor facilities, parking etc.	140	140	140	140	140	145	145	145	145	145	1425	Govt.
		Wages and allowances	60	60	60	60	60	70	70	70	70	70	650	Govt.
		Brochures, Annual reports, Schemes and Plans, preparation of maps using GIS technology	5	5	5	5	5	7	7	7	7	7	60	Govt.
		Logistics: Uniform, Torch light, search light, electrical items, repairing item, etc.	20	20	20	20	20	23	23	23	23	23	215	Govt.
		Total =	736	1279	1212.5	1170	972	956	899	992	948	967	10131	Govt.

2. Abstract:

Year	Fund required (Rs. In lacs)		Total Amount (Rs. in Lakh)
	Non Recurring	Recurring	
2011-12	186	550	736
2012-13	729	550	1279
2013-14	662.5	550	1212.5
2014-15	620	550	1170
2015-16	422	550	972
2016-17	356	600	956
2017-18	299	600	899
2018-19	392	600	992
2019-20	348	600	948
2020-21	367	600	967
Total =	4381	5750	10131

Part -III

Chapter	Content	Page No.
I	MANAGEMENT PLAN (BUDGET)	131-147

PART - III

Chapter - I

MANAGEMENT PLAN (BUDGET)

1) Introduction:- Assam State Zoo-cum-Botanical Garden is a very old zoo with more than 54 years of its existence and accordingly majority of infrastructures including enclosures and buildings are also very old, about 40-50 years old. The majority of enclosures constructed earlier do not fit into the criteria correspond to guidelines issued by the Central Zoo Authority and some of the enclosures even become crowded with individuals.

In the Master Plan altogether 93 structures have been proposed which include 75 enclosures for animal exhibits and 18 for other related structures. In the management plan period (2011-12 to 2015-16), it will be strived to achieve at least 40 nos. of well designed, safe and suitable housing facilities for zoo animals by new construction/ modification/redone, etc. Apart from these, separate structures such as conservation breeding facility, supporting facilities of zoo management such as modern zoo kitchen, road, visitors amenities, etc will be also targeted to bring the ASZBG as one of the most scientifically managed zoo or ex-situ conservation centre in the country.

Initial few years of the master plan period i.e. the current management plan period will demand for considerably large funding requirement so as to bring the ASZBG management as per the guidelines of the Central Zoo Authority through speedy implementation of the works.

The chapter VIII of Part- II on Budget analysis comprises major aspects of the current chapter in which activities proposed to be carried out are shown financial year wise and related fund requirement. The proposed activities in the Management Plan are prioritized by considering various factors viz. present ground situation and status of animal enclosures, over all condition of captive animals and actual requirement pertaining to their physical and behavioural needs, level of urgency, ethical and aesthetic aspects to be accommodated , objectives and conservation breeding programme desired to be achieved, etc. The financial requirement for each item of work has been assessed

as per the present and future trend in cost of construction and same has been assessed after discussion with Engineering wing.

Time frame: Although the current Master Plan is for 10 years i.e. w.e.f. 2011-12 to 2020-21, this management plan endeavours to detail out activities to be taken up for the initial 5 years only i.e. 2011-12 to 2015-16.

Revenue collected: The average revenue, presently collected from entry fees and related aspects by Assam State Zoo cum Botanical Garden, is about Rs. 67 lakhs and it is expected that there will be relatively moderate increase in year wise revenue generation in future as well, if the present rate of visitor's entry fees remains same. It is felt that the present rates of entry fee, etc. are too low and hence deserve enhancement. Perhaps barring student's entry fee, fees for all other items i.e. entry fees for general visitors, camera fee, etc. may be considered for enhancement by the Government. The zoo authority may submit proposal accordingly. If agreed to such proposal, the revenue generation may likely to go beyond Rs. 1 crore annually. The proposal for provision of utilization of a portion of revenue earned by the zoo may be vigorously pursued. ~~The role of Zoo Society may be widen in this aspect for which similar kind of provision is~~ existing in some other zoos such as Nandankanan Zoological Park and this may be considered for adoption. Apart from this some more avenues of revenue generation in future are to be explored and in this the campus of Assam State Zoo cum Botanical Garden has great potentialities. Without compromising basic objectives, possibility of revenue earning from nature trails, adventure sports, Botanical garden, Herbivore safari, etc. may be thought over and planned accordingly.

Funding expected and procedure to be adopted:- The State Government has been providing significant quantum of fund for development of Assam State Zoo cum Botanical Garden in a sustained basis. Every year, the fund for salary requirement of staff, recurring cost on various items viz. feed and health care of zoo animals, maintenance of enclosures, building, rent and taxes, power and water supply, protection, etc. becomes several crores and this has been borne entirely by the state government. Apart from these, fund for maintenance of roads, visitors amenities, vehicles, rescue and rehabilitation, boundary walls, etc. are also regularly provided by the State Government. It is expected that State Government will continue to provide such support for all the time to come. The zoo management will submit detailed plan and estimate of proposed

work much ahead of time for necessary approval and making budget provisions for such works to facilitate sanction of fund in time. The sources within State Government such as CAMPA scheme, Finance Commission award etc. may be explored to accommodate such proposals as there exists significant fund to implement similar activities.

Further, it is acknowledged that the Central Zoo Authority has been continuously providing sufficient fund towards infrastructural development of Assam State Zoo cum Botanical Garden since long back and it is expected that same trend will be sustained in future as well. Every year plan and estimates for some new constructions will be submitted to Central Zoo Authority as well for their necessary scrutiny and consideration for financial assistance. However, such proposal will be routed through proper channel only and state government will decide on the proposals for future course of action.

Besides, the existing scheme i.e. Animal Adoption Scheme will be made more popular and attractive for wider participation of people and organization in adopting zoo animals. Suitable campaign will be launched among expected donors such as PSUs (OIL, IOC, ONGC, etc.), Banks, corporate sectors, etc. to elicit their support in ex-situ conservation measures. Assam State Zoo cum Botanical Garden received fair degree of response on this aspect in recent past and it is expected that if vigorous effort is made receipt of a better degree of cooperation from these entities will be not an impossible task.

The Zoo Director will initiate necessary steps at the very outset of every financial year for preparation of plan and estimate of proposed work. The location for proposed work will be verified with staff of engineering wing, design for construction is to be ascertained by incorporating the physical and psychological needs of the captive animals and also by considering aesthetic and topographic aspects, as well. It will be followed by preparation of estimates and plan, to be submitted to the Chief Wildlife Warden, Assam for necessary scrutiny and suggestion. Then the proposal will be forwarded to higher authority for necessary approval and making budget provision. Once the fund is allotted for proposed works, the existing mechanism i.e. committee on construction for necessary scrutiny of tender papers submitted by intending contractor in case of tender system of work and continuous monitoring will be in operation and continuous field verification of the work by Asstt. Engineer of the zoo will be also maintained. If necessary

departmental execution of some highly technical work may also be considered. The Zoo Director and the Chief Wildlife Warden may also evolve other mechanism of execution of works and monitoring purpose. Range Officer, Zoo Head Quarter will be the main executing unit for executing such allotted work and necessary account submission.

2. Animal collection: From the animal collection plan it is seen that during the master plan period 21 new species of mammals, 15 new species of reptiles and 27 species of birds of indigenous and 3 new species of exotic mammals and 1 new species of exotic bird will be added to existing stock through vigorous animal exchange programme. Even for exotic species, necessity of procuring some exotic on payment basis may arise, as well. Accordingly the current master plan will strive to acquire following species for coming 5 years.

2011-12 : Common langur, Jackal, Golden pheasant, Sloth Bear, Ring necked pheasant, Golden pheasant, Bonnet macaque, Stripped hyena, Mute swan, chowsinga, etc.

2012-13 : Pygmy hog, Terrestrial birds, Pheasant, Binturong, Leaf monkey, Serrow, Clouded leopard, etc.

2013-14 : Muggar, Assamese macaque, Pig tailed macaque, etc.

2014-15 : Great pied hornbill, Aquatic birds, Pangolin, Exotic birds, Golden cats Spactacle monkey, etc.

2015-16 : Squirrel, Lion, Swamp deer, Wild pig, Exotic bird, etc.

3) Animal Enclosure: Two new enclosures for two new species i.e. squirrel and Golden cat, one aquarium and 24 enclosures (modified enclosure/new enclosure for existing species/species existed earlier or for species which are in the process of acquiring) and 12 enclosures to be reconstructed after dismantling the old and out dated ones are targeted to be achieve in this management plan period. Apart from these some other related structures such as Isolation ward, conservation breeding facilities for serow and golden langur, enclosure for excess animals, rescue facility, beef house, fodder house, etc. are to be also established.

Year	Enclosure targeted	Other related infrastructure to be established
2011-12	-	Conservation breeding facilities for golden langur and serow, interpretation centre.
2012-13	Snake, Tiger, Mongoose, Pheasant, Binturong, Loris, Porcupine, Jackal, Hyena, Pygmy Hog, Chowsinga, Nilgai, Blackbuck, Chital, Barking Deer, Hog Deer, Sangai (Thamin) & Civet.	Rescue facility.
2013-14	Lion, Hippo, Muggor, Gharial, Capped Langur, Assamese Macaque, Stump Tailed Macaque, Serow, Bonnet Macaque, Rhesus Macaque, Pig tailed macaque, Aviary.	
2014-15	Great Pied Hornbill, Lesser Pied Hornbill, Pangolin, Small Cats, Common Leopard, White Rhino, Emu, Cassowary, Spectacle Monkey, Pygmy Hog.	Beef house, Fodder house, silo pit, quarantine
2015-16	Squirrel, Golden Cat, Vulture	Aquarium, Isolation ward, Facility/ Enclosure for excess animals, Golden cat, Conservation Breeding enclosure.

Further, every year repairing and painting of existing enclosures housing captives and continuous environmental enrichment of each housing facility will be required which are shown in details separately.

4) Visitors amenities:- The management plan for the period 2011-12 to 2015-16 will emphasize sufficient amenities for the benefit of the visitors which will enrich their knowledge on bio-diversity conservation, the brief of which are as follows –

Year	Visitors amenities and related infrastructures targeted
2011-12	Drinking water facilities at locations shown at layout map, signage and publicity materials, improvement of existing children park, interpretation centre
2012-13	Signage and publicity, improvement of parking area, construction of two modern toilets at two new parks, new visitors shed at Hatitilla, and palm grove, development of new park at palm grove.
2013-14	Signage and publicity, visitors shed improvement at children park and near pelican enclosure, automated entry system, visitors facilities.
2014-15	Signage and publicity, Development of park near museum, visitors facilities (cab, perambulator, wheel chairs, etc.)
2015-16	Signage and publicity, improvement of entry gate, development of garden at Botanical garden, development of footpath, etc.

Item wise and year wise approximate expenditure involved are shown separately.

5) Water supply:- In future, required quantum of water will be more as new enclosures, rescue sites, etc will be coming up and accordingly water supply is to be revamped.

Year	Works to be executed
2012-13	Improvement of water supply system in new enclosure, rescue site, Conservation breeding facility. Works include laying of new pipe line, installation of deep tube well and storage facility, etc.
2013-14	Water supply to staff colony, Chlorination plant. All quarters of staff colony will be connected with running water, storage facility. The supply of quality water to all zoo inhabitant through clorination plant is to be ensured.
2015-16	Improvement of existing water supply system. The old pipelines to be replaced with new, water pump is to be improved and storage capacity is to be enhanced.

6) Power Supply : Following improvement on power supply situation have been targeted to achieve for smooth zoo administration during this management plan period:

Year	Works to be executed
2011-12	Improvement of existing low transmission line
2012-13	Development of transmission line.

7) Solid and liquid Waste disposal: The management plan will also initiate steps to achieve significant upgradation on solid and liquid waste disposal and accordingly following activities are proposed :

Year	Works to be executed
2011-12	Improvement of Incinerator, improvement of drainage facility
2013-14	Development of drainage system
2015-16	Improvement of drainage system.

8) Roads/Path:

Following new construction and improvement need to be made during the Plan period –

Improvement:

SI No	Name of road	Length (km)
1	Main Road (gate to BG gate , then to southern road)	1.30
2	Southern Road (Staff colony to main road near <i>Bandar Tila</i>)	1.20
3	Tower Road (from Tower gate to Tower)	0.50
4	Feather Road-1 (in between chowsingha & white rhino; Enc. 47-48)	0.045
5	Office Road (main road to officers colony)	0.50

6	Elephant camp to Tower	0.40
7	Upper Lake Road (Tower to Battalion camp)	2.35
8	Upper Lake – Nursery Road	2.00
9	<i>Bandar Tila</i> Road (Main road to Southern Road)	0.075
10	Main Road – Hati camp Road	0.45
11	Deer – Park Road	0.11
12	<i>Bandar-Tila</i> – Tower-gate Road (Enc. 16 to 24)	0.27
13	Feeder Road -2 (from shed at Thuja, to uphill - lion encl. via beef house.	0.35

The service roads that are to be constructed for the purpose of various services to the enclosures and their captives is not proposed and for time being kept aside. These will be done when enclosures will be designed. Apart from these, existing 2.0km flat brick soling needs to be maintained and another 2.50km *kutch*a patrolling path which exists inside the Botanical Garden and its adjacent forest tracts, must be transformed to brick-soling.

New construction: Following four roads are proposed for new construction during the Plan period -

SI No	Name of road	Length (km)
	New Construction	
1	Extension Road (Tower road to Main Road; Enc. 30/31 to 40)	0.328
2	Boundary Road (Pelican Enc. to Exit gate)	0.48
3	Colony Exit Road	0.0525
4	Snake House Road	0.19

Year	Works to be executed
2012-13	Development of Road and footpath, Black topping of existing road
2013-14	Development of Road and footpath
2014-15	Development of Road
2015-16	Development of Road

9) Residential Colony:

Both the residential colonies existing inside the zoo campus will be separated from the main campus with additional boundary walls, connected road and gates for the greater interest of the zoo administration. Apart from this, construction of new houses and repair as well as renovation of old staff quarters are also suggested in the plan. Accordingly, this management plan period has targeted to achieve following activities:

Year	Works to be executed
2011-12	Const. of wall to isolate staff colony (340 mtr),
2012-13	Staff quarter
2013-14	Staff quarter
2014-15	Staff quarter
2015-16	Staff quarter

10) Security/Gates/Barrier:

In order to strengthen the security scenario of the zoo, the boundary wall of the very old constructed and presently in bad shape need to be reconstructed. In addition the Y shaped barbed wire provision is to be provided and existing entry gate is to be improved upon. Following works are targeted to be achieve within the Management plan period:

Year	Works to be executed
2011-12	Construction of Boundary Wall around zoo (1000 mtr), Barbed wire fence above boundary wall
2012-13	Renovation of old boundary wall
2013-14	Renovation of old boundary wall
2014-15	Renovation of old boundary wall
2015-16	Improvement of entry gate

11) Building: It is proposed to construct a two storied spacious administrative building in the same location, in which all the Wings of the zoo, except the Range Office, such as, office rooms for Director and assisting staff, mini conference room, library, computer room, storage, provision for vehicle parking n, etc will be accommodated. It has been proposed that the Range Office should be newly constructed beside the Main road, near the existing bear enclosure. Engineering workshop is to be also improved during the period of this management plan.

Year	Works to be executed
2012-13	Painting and face lifting of existing buildings
2013-14	Office building, Engineering workshop
2014-15	Building improvement, Office building
2015-16	Building improvement

12) Veterinary Hospital: Digital Camera/Handy cam, Egg Incubator, Metal detector, Digital thermometer, Laser Thermometer, Cryo can, Hot air oven, P.H. Meter Digital, Haemoglotinometer, Robust mechanical weighing machine, Air cooler, etc. are to be procured over a short period of time to make the zoo hospital a well equipped one and accordingly following are targeted during the plan period:

Year	Works to be executed
2011-12	Veterinary equipments , reference books, etc.
2012-13	Veterinary equipments , reference books, etc.
2013-14	Veterinary equipments , reference books, etc.
2014-15	Veterinary equipments , reference books, etc.
2015-16	Veterinary equipments , reference books, etc.

13) Store and Feed supply: Construction of a modern and spacious kitchen, improvement of ration house and storage facility are to be provided to strengthen the feed supply system and accordingly following have been targeted:

Year	Works to be executed
2012-13	Construction of zoo kitchen and improvement of ration house
2013-14	Improvement of storage facility

14) Sanitation: For cleaning the feeding cubicle etc. jet sprayer machine needs to be procured.

Year	Works to be executed
2012-13	Sanitation equipment and weed control
2013-14	Weed control
2014-15	Weed control
2015-16	Weed control

15) Flora and Fauna: Plantation of fodder and fruit trees in an area of 45 ha, avenue plantation, Biodiversity conservation, wetland development, etc. are some of the important activities targeted during the plan period.

Year	Works to be executed
2012-13	Fodder plantation (45 ha) Adv. Work, creation & 1 st maintenance
2013-14	Avenue planting, Fodder plantation (45 ha) 2 nd maintenance
2014-15	Biodiversity conservation, Fodder plantation (45 ha) 3 rd maintenance, Wet land development
2015-16	Biodiversity conservation, Fodder plantation (45 ha) 4 th maintenance, Wet land development

16) Management of specific problem: Some specific problem such as storm water management needs to be tackled in a priority basis as this problem create tremendous problem in a regular basis.

Year	Works to be executed
2012-13	Storm water drainage mechanism

17) Rescue & Rehabilitation: Separate Rescue site has been earmarked in the Master Lay out plan as this has to take care of large number of rescued animals in regular basis. A significant number of such rescued individuals infact require life time care. Accordingly, the plan suggests to develop the rescue site into well established rescue facility in the earmarked area at an earliest, which will also have good isolation ward as well.

Year	Works to be executed
2012-13	Construction of Rescue site.
2015-16	Isolation ward.

18) Disaster management: As outlined in the relevant chapter, the disaster management initiative calls for procuring several items to meet apprehended disaster well in advance and the management plan seeks to acquire tools, generator, etc. accordingly.

Year	Works to be executed
2013-14	Procurement of tools, Deep Freezer, Generator, etc.

19) Contingency plan: The Master plan provides for meeting various contingencies, for which dedicated vehicle, other equipments such as trap cages, etc. will be required and accordingly fund provision is to be made.

Year	Works to be executed
2012-13	Procurement of vehicle, equipments for contingency
2013-14	Procurement of vehicle, equipments for contingency
2014-15	Procurement of vehicle.

20) Capacity building: Regular training, workshops, etc. on zoo management and provision of staff amenities are included for improving capacity building of the zoo staff and accordingly plan will strive to achieve the following :

Year	Works to be executed
2012-13	Training for staff
2013-14	Organization of workshop on zoo management
2014-15	Training for staff, other capacity building measures
2015-16	Provision for staff amenities, training

21) e-Governance: In order to improve work performance, LAN, GIS mapping, CCTV, etc. are suggested in the plan:

Year	Works to be executed
2012-13	LAN, CCTV

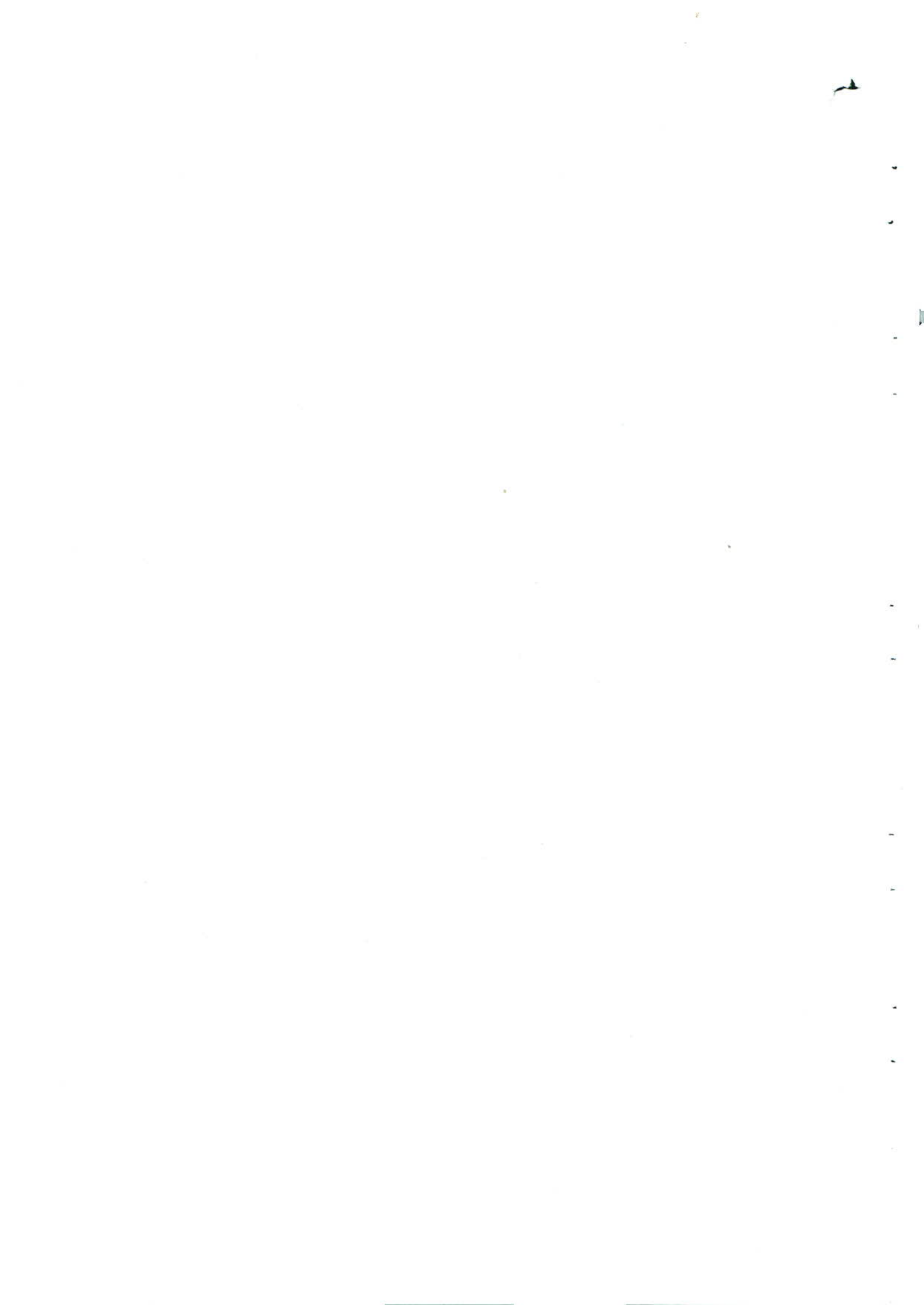
BUDGET FOR MANAGEMENT PLAN

Sl No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)						Remarks (Source of fund)	
			1 st	2 nd	3 rd	4 th	5 th	Total		
I)	Construction of Enclosure	Golden Langur Conservation Breeding enclo.	55						55	CZA already provided fund
		Serow Conservation Breeding enclo.		35					35	Govt.
		Rescue site		50	50	50			150	Govt.
		Nilgai		30					30	Govt.
		Black Buck		30					30	Govt.
		Snake House		20	20				40	Govt.
		Thamin		25					25	Govt.
		Mongoose		10					10	Govt.
		Tiger		25	20				45	Govt.
		Pheasant		20					20	Govt.
		Binturong enclo.		15					15	Govt.
		Civet		18					18	Govt.
		Slow Loris		18					18	Govt.
		Porcupine		12					12	Govt.
		Jackal		25					25	Govt.
		Hyena		25					25	Govt.
		Chowsingha		18					18	Govt.
		Gharial				20			20	Govt.
		Muggor				20			20	Govt.
		Great Pied horn bill					25		25	Govt.
		Lesser Pied Horn bill					25		25	Govt.
		Emu					18		18	Govt.
		Cassowary					18		18	Govt.
		Excess animal						28	28	Govt.
		Isolation						15	15	Govt.
		Vulture						15	15	Govt.
		Squirrel						18	18	Govt.
Golden Cat (Display)						25	25	Govt.		
Golden Cat (C.B. enclo)						15	30	Govt.		
Aquarium						25	25	Govt.		
II)	Improvement of existing enclo.	Repairing of old enclo.	20	10	10	12	15	67	Govt./ PSU	
		Hog deer		25				25	Govt.	
		Chital		25				25	Govt.	
		Barking deer		25				25	Govt.	
		Serow enclo.			25			25	Govt.	

SI No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)					Remarks (Source of fund)	
			1 st	2 nd	3 rd	4 th	5 th		Total
		Aviary			30	25		55	Govt.
		Assamese macaque			25			25	Govt.
		Stump tailed macaque			25			25	Govt.
		Capped langur			25			25	Govt.
		Rhesues macaque			22			22	Govt.
		Pig tailed macaque			25			25	Govt.
		Bonnet macaque			25			25	Govt.
		Lion			20	20		40	Govt.
		Hippopotamus			25			25	Govt.
		Paintings of encllo.			8	5	7	20	Govt./PSU/ Corporate
		Small cat				20		20	Govt.
		Leopard				22		22	Govt.
		Spectacle monkey				22		22	Govt.
		Pangolin				10		10	Govt.
		Pygmy hog				30		30	Govt.
		White rhino				20		20	Govt.
III)	Development of infrastructure	Const. of Boundary wall around zoo (1000mtrs)	47					47	CZA has already provided fund
		Const. of wall to isolate staff colony (340 mtrs)	16					16	CZA has already provided fund
		Drainage facility	5		8		10	23	Govt.
		Barbed wire fence above boundary wall	3					3	Govt.
		Improvement of existing low transmission line	8					8	State Govt. has already provided fund
		Ration house, kitchen		20				20	Govt.
		Painting of building		5				5	Govt.
		Maintenance of parking area & garden		8				8	PSU
		e-Governance		4				4	Govt.
		Develompent of road		10	20	15	12	57	Govt.
		Black topping of existing road		7				7	Govt.
		Purchase of new vehicle		7	8		10	25	Govt.

SI No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)					Remarks (Source of fund)	
			1 st	2 nd	3 rd	4 th	5 th		Total
		Equipments for contingency		3	3			6	Govt.
		Renovation of old boundary wall		25	20	15		60	Govt.
		Improvement of water supply		18			15	33	Govt.
		Staff quarter		15	15	18	20	68	Govt.
		Office building			40	50	50	140	Govt.
		Engineering workshop			15			15	Govt.
		Drinking water facility for staff colony			5			5	Govt.
		Improvement of storage facility/ Procurement of tools, deep freezer (feed supply, disaster management)			15			15	Govt.
		Estt. of chloration plant			2			2	Govt.
		Improvement of waste disposal			7			7	Govt.
		Beef house				7		7	Govt.
		Silo pit				5		5	Govt.
		Fodder house				5		5	Govt.
		Quarantine				30		30	Govt.
		Improvement of building				10	10	20	Govt.
		Staff amenities					10	10	Govt.
		Improvement of entry gate					10	10	Govt./PSU/ Corporate
IV)	Development of Visitors facilities	Drinking water facility	4		5		5	14	Govt./PSU/ Corporate
		Signage development	1	1	1		1	4	Corporate/ PSU
		Publicity materials	1	1	1	1	3	7	Govt./ Corporate
		Development of Children park		10				10	Govt./ Corporate
		Interpretation centre	20	30	50	50	50	200	Govt./ Corporate

SI No.	Particulars	Item of works	Year wise financial requirement (Rs. In Lakhs)					Total	Remarks (Source of fund)
			1 st	2 nd	3 rd	4 th	5 th		
		Toilet facilities		5			7	12	Govt./PSU/ Corporate
		Visitors shed		5	2	2		9	Govt./PSU/ Corporate
		Close circuit TV		10				10	Govt.
		Development of park/garden		20		5	5	30	Govt./PSU/ Corporate
		Installation of automated entry system			20	20		40	Govt.
		Development of visitors facilities			8	5		13	Govt./PSU/ Corporate
		Improvement of footpath			5	6	7	18	Govt.
V)	Miscellaneous	Exchange of animal	4	5	4	4	6	23	Govt.
		Vety. Equipment	2	3	3	3	4	15	Govt.
		Storm water drainage mechanism		20				20	Govt.
		Improvement of incinerator		5				5	Govt.
		Development of transmission line		10				10	Govt.
		Sanitation equipment & weed control		5				5	Govt.
		Training & workshop		3	2	5	3	13	Govt.
		Plantation		7	2.5	1.5	1	12	Govt.
		Enrichment		4	2	4	7	17	Govt.
		Avenue planting			2			2	Govt.
		Wet land development				5	7	12	Govt.
		Weed control		2	2	3	3	10	Govt.
		Biodiversity conservation				3	3	6	Govt.
		Underground electrical cable laying				25		25	Govt.
		Total =	186	729	662.5	620	422	2619	



ANNEXURES

Content	No.
ANNEXURES	I to XV



ANNEXURE

Annexure	Content
<i>I</i>	Flora of the Assam State Zoo cum Botanical Garden
<i>II A</i>	Fauna of the Assam State Zoo cum Botanical Garden
<i>II (B)</i>	Check-list of the Birds of ASZBG campus
<i>II (C)</i>	Check-list of the Reptiles of ASZBG campus
<i>II (D)</i>	Check-list of the Amphibians of ASZBG campus
<i>III</i>	Existing Layout map of ASZBG
<i>IV (A)</i>	Animal Inventory (2010-11)
<i>IV (B)</i>	Stock position of Birds, mammals and reptiles, 2010-11
<i>V</i>	Breeding of Zoo Captives
<i>VI</i>	Single sexed animal available in Assam State Zoo, as on 31/03/2011
<i>VII</i>	Rescue of wild animals & birds by Assam State Zoo (2010-11)
<i>VIII</i>	Health Advisory Committee
<i>IX</i>	Details of visitors & revenue collected during the last 10 years
<i>IX (A)</i>	Entry fee etc.
<i>X</i>	Concept Plan
<i>XI</i>	SMART (Strength, Measurable, Achievable, Reasonable and Time) on OBJECTIVES:
<i>XII (A)</i>	Proposed Collection Plan (Animal)
<i>XII (B)</i>	Bird Collection Plan
<i>XII (C)</i>	Abstract of collection plan
<i>XIII (A)</i>	Master Layout Plan of ASZBG
<i>XIII (B)</i>	Layout map showing electric line, water supply and distribution line, drainage, vision shed, primary water point, toilet etc.
<i>XIV</i>	Check-list for the Butterflies of ASZBG campus
<i>XV</i>	Suggested staffing pattern



Annexure- I
Flora of the Assam State Zoo cum Botanical Garden

A. TREES

Sl. No.	Botanical Name	Common Name
1.	<i>Acronychia laurifolia</i> Bl.	Bel.
2.	<i>Aegle marmelos</i> Corr.	Kodalkonia.
3.	<i>Alangium chinense</i> (Lour) Harms.	Moj.
4.	<i>Albizzia lucidior</i> Nielson. (<i>Albizzia lucida</i> Benth.)	Chamkoroi, Hiharu.
5.	<i>Albizzia odoratissima</i> Benth.	Chotiana, Devil's tree.
6.	<i>Alstonia scholaris</i> Brown.	Kadam
7.	<i>Anthocephalus chinensis</i> A. Rich. (<i>A. cadamba</i> Miq.)	Paniheloch.
8.	<i>Antidesma bunius</i> Spreng.	Chham-Chholja.
9.	<i>Aporosa oblonga</i> Muell	Garokhuta.
10.	<i>Aporosa octandra</i> (Buch-Ham) Vickery. (<i>A. roxburghii</i> Baill)	
11.	<i>Artocarpus chama</i> Buch-Ham (<i>A. chaplasi</i> Roxb.)	Chamkothal, Sam
12.	<i>Artocarpus integrifolia</i> Linn.	Kathal, Jack-fruit.
13.	<i>Bauhinia purpurea</i> Linn.	Kanchan, Kurial
14.	<i>Bombax ceiba</i> L. (<i>Salmalia malabarica</i> Scott)	Himolu, Silk cotton
15.	<i>Bridelia retusa</i> Spreng.	Kuhir.
16.	<i>Careya arborea</i> Roxb.	Kumbhi.
17.	<i>Carallia lucida</i> (Roxb.) Merr.	Mahithekera.
18.	<i>Callicarpa arborea</i> Roxb.	Maskoita, Machpeluka.
19.	<i>Casearia glomerata</i> Roxb.	Telbhuruki.
20.	<i>Casearia kurzii</i> C.B. Clarke.	Dieng-soh-Mera.
21.	<i>Cassia fistula</i> Linn.	Sonaru. (FIG.1)
22.	<i>Celtis tumorensis</i> Span. (<i>C. cinnamomea</i> Lindl.)	Mauhita.
23.	<i>Cordia dichotoma</i> Forst.	Ghapakhara, Boal.
24.	<i>Craeteva nurvala</i> Forst.	Barun.
25.	<i>Croton oblongifolius</i> Roxb.	Makhunda.
26.	<i>Cycas pectinata</i> Griffith.	Thaljimura.
27.	<i>Dalbergia assamica</i> Benth.	Medelua, Mouhita.
28.	<i>Derris robusta</i> Benth.	Kothiakoroi.
29.	<i>Dillenia indica</i> Linn.	Outenga.
30.	<i>Dillenia pentagyna</i> Roxb.	Ogochi, Oua
31.	<i>Dillenia scabrella</i> Roxb.	Banji-Ou.
32.	<i>Diospyros variegata</i> Kurz.	Koliori.
33.	<i>Dysoxylum binectariferum</i> Hk.f. et Bedd.	Bandardima.
34.	<i>Ehretia acuminata</i> Br.	Gual.
35.	<i>Emblica officinalis</i> Gaertn	Amlokhi.
36.	<i>Engelhardtia spicata</i> Blume.	Lewa.
37.	<i>Erythrina stricta</i> Roxb.	Madar.
38.	<i>Eugenia balsamea</i> Wright.	Godhajam, Thoiranguni.
39.	<i>Eugenia formosa</i> Wall.	Lohajam.
40.	<i>Eugenia cymosa</i> Lamk.	Panijam.
41.	<i>Fernandoa adenophylla</i> St. (<i>Haplophragma adenophyllum</i> P. Dop.)	Dhopaparuli.
42.	<i>Ficus bengalensis</i> Linn.	Bot, Banyan tree.
43.	<i>Ficus benjamina</i> Linn.	Joribor, Jori.
44.	<i>Ficus elastica</i> Roxb.	Athabor, India rubber tree.
45.	<i>Ficus hispida</i> Linn.	Dimoru
46.	<i>Ficus infectoria</i> Roxb.	Tengabor.
47.	<i>Ficus religiosa</i> Linn.	Ahot, Pippala.

48. *Ficus rumphii* Bl.
49. *Firmiana colorata* (Roxb) Br.
50. *Flacourtia jangomus* Raeuch.
(*Flacourtia cataphracta* Roxb.)
51. *Garcinia cowa* Roxb.
52. *Garuga pinnata* Roxb.
53. *Glochidion lanceolareum* Dalz.
54. *Glochidion sphaerogynum* Kurz.
55. *Gmelina arborea* Linn.
56. *Grewia rothii* D. C.
57. *Haldina cordifolia* (Roxb.) Ridsale.
58. *Heteropanax fragrans* Seem.
59. *Holarrhena antidysenterica* Wall.
60. *Hymenodictyon excelsum* Wall.
61. *Kydia calycina* Roxb.
62. *Lagerstroemia parviflora* Roxb.
63. *Lagerstroemia speciosa* Pers.
64. *Lannea grandis* A. Rich.
65. *Litsaea polyantha* Juss.
66. *L. sebifera* Pers.
67. *Macaranga indica* Wright.
68. *Mallotus ferrugineus* (*M. albus* Muell.)
69. *M. Philippinensis* Muell & Arg.
70. *Melia azedarach* Linn.
71. *Mangifera indica* Linn.
72. *Micromelum minutum* W. & A (*M. pubescens* Bl.)
73. *Oroxylum indicum* Vent.
74. *Persea bombycina* Kost. (*Machilus bombycina* King)
75. *Phoenix sylvestris* Royle.
76. *Premna latifolia* Roxb.
77. *P. racemosa* Wall.
78. *Protium serratum* Engler.
79. *Pterospermum lanceaefolium* Roxb.
80. *Sapium baccatum* Roxb.
81. *Schima wallichii* Choisy.
82. *Semecarpus anacardium* Linn. f.
83. *Sterculia villosa* Roxb.
84. *Streblus asper* Lour.
85. *Syzygium cumini* (L) Skeels.
86. *S. syzygioides* (Miq.) Merrill & Perry.
87. *Tamarindus indica* Linn.
88. *Terminalia belerica* Roxb.
89. *T. chebula* Retz.
90. *Toona ciliata* Roem.
91. *Trewia nudiflora* Linn.
92. *Vitex canescens* Kurz.
93. *V. peduncularis* Wall.
94. *Wrightia arborea* Mabbarley. (*W. tomentosa* R. & S.)
95. *Xantakis assamica* Van Royen.
(*Sideroxylon assamicum* Clarke)
96. *Xylosma controversum* Closs. –
97. *Zanthoxy leemrhetsa* D.C.
98. *Zizyphus mauritiana* Lamk.
- Pakori.
Kath udal.
Poniyal.
- Kuji thekera.
Rohimala, Thotmela.
Armlochan.
Bol jagru.
Gamari.
Phakdima.
Tarakchopa.
Kecheru.
Dudh khori.
Bhurkhundi, Panikadam.
Pichhola.
Sida.
Ajhar.
Jiya
Hoalu, Muga.
Baghnala.
Jaglo.
Larubandha.
Jarath, Lochan.
Ghoranim.
Am, Mango tree.
Chagladi.
Bhatghila.
Chom.
Khejur, Date palm.
Gonaru.
Dieng-thalapa.
Mirtenga.
Bonbogori, Matanahar.
Gonaru.
Makrisal, Naga-bhe.
Bhela. Marking nut.
Udal.
Saura, Khorua.
Kalajam.
Khudjam.
Teteli.
Bhomora.
Silikha.
Poma.
Bhelkor, Kenlo.
Paspotia, Teta.
Ahui, Sila.
Horu dudhkhori.
Banbokul.
- Bajranali, Rajarmani.
Bogori.

B. SHRUBS

Sl. No.	Botanical Name	Common Name
1.	<i>Antidesma acidum</i> Retz. (<i>A. diandrum</i> Roth.)	Abu tenga, Nekhon tenga.
2.	<i>Ardisia humilis</i> Vahl.	Chauldhowa.
3.	<i>Bridelia montana</i> Willd.	Latakuhir, Gayo.
4.	<i>B. stipularis</i> Bl.	Mouhilika.
5.	<i>Caesalpinia cuculata</i> Roxb. (<i>Mezoneurum cuculatum</i> W. & A.)	Ghila kata.
6.	<i>Capparis olacifolia</i> Hk. f. & Th.	Kota-har.
7.	<i>Catunaregam spinosa</i> Tiruv.	Moin.
8.	<i>Cassia alata</i> Linn.	Khorpat. Daudpata.
9.	<i>C. hirsuta</i> Linn.	Bonmedelua.
10.	<i>C. occidentalis</i> Linn.	Hat thenga.
11.	<i>Cassia tora</i> Linn.	Daridiga.
12.	<i>Clerodendron infortunatum</i> Gaertn.	Bhet tita.
13.	<i>C. serratum</i> Spreng.	Nangalbhangha.
14.	<i>C. nutans</i> Wall.	Iklabir, Uthero.
15.	<i>C. siphonanthus</i> Br.	Akalbih.
16.	<i>C. squamatum</i> Vahl.	Dhapatita.
17.	<i>Combretum roxburghii</i> Spreng. (<i>C. decandrum</i> Roxb.)	Latachali.
18.	<i>Corchorus acutangularis</i> Lamk	-
19.	<i>Crotalaria calycina</i> Schum.	-
20.	<i>C. pallida</i> Ait. (<i>C. mucronata</i> Desv.)	-
21.	<i>C. prostrata</i> Roxb.	-
22.	<i>Croton caudatus</i> Geisel.	Ghahe lewa.
23.	<i>C. bonplandianum</i> Baill. (<i>C. sparciflorus</i> Morung.)	Patagutia.
24.	<i>Dalbergia stipulacea</i> Roxb.	Datbijli.
25.	<i>D. rimosa</i> Roxb.	Kata-ghoh.
26.	<i>Datura fastuosa</i> Linn.	Dhatura.
27.	<i>Dendrophoe falcata</i> (Linn.) Ettin.	Lakhmala, Bajrengi.
28.	<i>Desmodium cephalotes</i> Wall.	Makhloti.
29.	<i>Desmodium gangeticum</i> D. C.	Salpan.
30.	<i>Desmodium pulchelum</i> Benth.	Takamala.
31.	<i>D. velutinum</i> D. C.	Gach-bioni-haputa.
32.	<i>D. motorium</i> Merrill	Bonchandal, Telegraph plant.
33.	<i>D. triquetrum</i> D. C.	Ulucha.
34.	<i>Dischidia bengalensis</i> Coleb.	-
35.	<i>Epiphyllum triangularis</i> .	-
36.	<i>Fagerlindia fasciculata</i> Tiruveng. (<i>Randia fasciculata</i> D. C.)	Horu moin.
37.	<i>Glycosmis rigida</i> Merril. (<i>Glycosmis pentaphylla</i> Corr.)	Tultha poka.
38.	<i>Grewia macrophylla</i> D. Don. -	
39.	<i>G. serrulata</i> D. C. -	
40.	<i>Hedyotis scandens</i> Roxb.	Bhedeli lota.
41.	<i>Holmskioldia sanguinea</i> Retz.	Monukata phul, Lady's umbrella.
42.	<i>Jatropha gossypifolia</i> Linn.	Bhot-era.
43.	<i>Lantana aculeata</i> Linn.	Smasanphul.
44.	<i>Litsea salicifolia</i> Roxb.	Dighloti.
45.	<i>Macrosolen cochinchinensis</i> (Lour.) Van tiegh	Raghumala.
46.	<i>Maesa indica</i> Wall.	Sesu.
47.	<i>M. manipurensis</i> Mey.	Machpora.
48.	<i>Melastoma malabathricum</i> L.	Phutuka.
49.	<i>Meyna spinosa</i> Link.	Bormoin.
50.	<i>Mimosa rubicaulis</i> Lamk. (<i>M. himalayana</i> Gamble.)	Kuchia kata, Kauri kata.
51.	<i>Moghania stricta</i> Roxb. -	

52. *M. strobilifera* Roxb.
53. *Morus indica* Linn.
54. *Murraya koenigii* Spreng.
55. *Mussaenda roxburghii* Hk. f.
56. *Pandanus furcatus* Roxb.
57. *Paveta crassicaulis* Bremik. (*P. indica* Linn.)
58. *Phyllanthus sikkimensis* Muell & Arg.
(*P. hamiltonianus* Muell)
59. *Phlogacanthus thyrsoformis* Mabberley.
60. *Premna pinguis* Clarke.
61. *Prismatomeris tentrandrs* Schum. –
62. *Psychotria monticola* Kurz.
63. *Rauwolfia serpentina* Benth.
64. *Ricinus communis* Linn.
65. *Sarcochlamys pulcherrima* Gaud.
66. *Scurrula parasitica* Linn.
67. *Sida acuta* Byrn.
68. *Sida rhombifolia* Linn.
69. *S. cordata* Borssum. (*S. veronicifolia* Lamk.)
70. *Solanum indicum* Linn.
71. *Solanum viarum* Dunal. (*S. khasianum* Clarke)
72. *Solanum torvum* Swartz.
73. *S. verbascifolium* Linn.
74. *Stachytarpheta indica* Vahl.
75. *Tabernaemontana divaricata*.
76. *Tephrosia purpurea* Pers.
77. *Tephrosia candida* D. C.
78. *Urena lobata* Linn.
79. *Viscum monoicum* Roxb.
80. *Vitex negundo* Linn.
81. *Zizyphus oenopliida* Mill.

- Makhioti.
Nuni.
Narasingha.
Sonarupa.
Keteki.
Sam supar.
Moira tikoni.
- Titaphul.
Phonri khindow.
- Sarpagandha, Arachantita.
Era goch.
Mesaki.
Raghumala.
Haru baryal.
Hon baryal, Bariala.
Baryal.
Tit bhakuri.
Kantikari.
Bon bengena. Bhot bengena.
Ahom bhola.
Balikuta.
Kothona phul.
Bon nil.
Boga medelua.
Agra, Chokamara.
Raghumala.
Pochutia.
Jungali bogori.

C. HERBS

- | Sl. No. | Botanical Name |
|---------|--|
| 1. | <i>Abutilon indicum</i> G. Don. |
| 2. | <i>Acalypha indica</i> Linn. |
| 3. | <i>Achyranthus aspera</i> Linn. |
| 4. | <i>Ageratum conyzoides</i> Linn. |
| 5. | <i>Alpinia calcarata</i> Rosc. |
| 6. | <i>Alpinia nigra</i> Burt. (<i>A. allughas</i> Rosce.) |
| 7. | <i>Alternanthera sessilis</i> (L) Br. |
| 8. | <i>Alysicarpus vaginalis</i> (L) W. C. – |
| 9. | <i>Amaranthus viridis</i> Linn. (<i>A. gracilis</i> Desv. f.) |
| 10. | <i>Ammania peploides</i> Spreng. – |
| 11. | <i>Amorphophalus campanulatus</i> (Roxb.) Bl. |
| 12. | <i>Anisomeles indica</i> (L) Kuntz. – |
| 13. | <i>Argemone mexicana</i> Linn. |
| 14. | <i>Arundinella bengalensis</i> Druce. – |
| 15. | <i>Bambusa arundinacea</i> Willd. |
| 16. | <i>B. tulda</i> Roxb. |
| 17. | <i>B. pseudopallida</i> . |
| 18. | <i>Blumea lacera</i> D. C. |
| 19. | <i>B. lacera</i> Var. <i>blumei</i> D. C. (<i>B. laciniata</i> D. C.) – |
| 20. | <i>Boerhavia diffusa</i> Linn. |
| 21. | <i>Brachiaria distachya</i> Stapf. – |
| 22. | <i>Capillipedium assimile</i> Steud. & A. Camus. – |

- | Common Name |
|---------------------|
| Jhapa. |
| Muktajori. |
| Bon-sath. Ulti-hot. |
| Gahori-bon. |
| Tara. |
| Tara. |
| Nethengia. |
| Khutura. |
| Ol kachu. |
| Kuhum kata. |
| Kotoha bah. |
| Jati bah. |
| Sarubijuli bah. |
| Kukurhuta. |
| Punarnava. |

23.	<i>Carex indica</i> Linn.	Harkata bon.
24.	<i>Carex rostrata</i> .	Hagal ghah.
25.	<i>Centela asiatica</i> Linn.	Bor manimuni.
26.	<i>Centipeda orbicularis</i> Lour.	Hachuti bon.
27.	<i>Chenopodium album</i> Linn.	Bhetua sak.
28.	<i>Chrysopogon aciculatus</i> Trin.	Bonguti.
29.	<i>Cleome viscosa</i> Linn.	Bon behar. Hurhuria.
30.	<i>Cleome burmanii</i> . –	
31.	<i>Chromolaena odorata</i> King & Robin. (<i>Eupatorium odoratum</i> Linn.)	Jarmoni.
32.	<i>Commelina diffusa</i> Burm. f.	Kana himalu.
33.	<i>Costus speciosus</i> Sm.	Jam-lakhuti, Debir-tokan.
34.	<i>Crinum amoenum</i> Roxb.	Go-nohur
35.	<i>Cyathula prostrata</i> Blume. –	
36.	<i>Cynodon dactylon</i> Pers.	Dubari bon.
37.	<i>Cyperus compressus</i> Linn. –	
38.	<i>Cyperus diffusus</i> Vahl.	Koya bon.
39.	<i>C. digitatus</i> Roxb. –	
40.	<i>C. iria</i> Linn.	Murphula bon.
41.	<i>C. kyllingia</i> Endl. – do –	
42.	<i>C. sesquiflorus</i> Koyama. –	
43.	<i>C. stramentita</i> . –	
44.	<i>C. undulata</i> R. Br. (<i>C. kurzii</i> C. B. Cl.) –	
45.	<i>Dactyloctenium aegyptium</i> Beauv.	Chota ghah.
46.	<i>Desmodium griffithianum</i> Benth. –	
47.	<i>Digitaria longiflora</i> Pers. –	
48.	<i>D. setigera</i> Roth. –	
49.	<i>Dryamaria cordata</i> Willd.	Thunthuni.
50.	<i>Echinochloa colonum</i> Linn. –	
51.	<i>Eclipta prostrata</i> Linn. (<i>Eclipta alba</i> Hassk.) –	
52.	<i>Elephantopus scaber</i> Linn.	Hastipadi.
53.	<i>Eleusine indica</i> Gaertn.	Bobocha bon.
54.	<i>Emilia sonchifolia</i> D. C. –	
55.	<i>Eragrostis nutans</i> Nees. –	
56.	<i>Eragrostis tenella</i> Racu. et Schl. –	
57.	<i>Eragrostis uniolooides</i> Nees. –	
58.	<i>Eriocaulon alpastre</i> Hk. f. & Th. –	
59.	<i>Euphorbia hirta</i> Linn.	Dudhi bon.
60.	<i>Evolvulus numularius</i> Linn.	Nakphul.
61.	<i>Exacum teres</i> Wall. –	
62.	<i>Fimbristylis dichotoma</i> (L.) Vahl. –	
63.	<i>Fimbristylis ovata</i> Kern. –	
64.	<i>Flemingia procumbens</i> Roxb. (<i>F. vestita</i> Benth).	Soh-phlong.
65.	<i>Floscopa scandens</i> Lour. –	
66.	<i>Globa multiflora</i> Wall. –	
67.	<i>Gnaphalium purpureum</i> Linn. –	
68.	<i>Hackelochloa granularis</i> (L.) Kuntz. –	
69.	<i>Hedyotis verticillata</i> Kamk. (<i>H. hispida</i> Retz). –	
70.	<i>Homalomena aromatica</i> .	Gonchana.
71.	<i>Hydrocotyle sibthorpioides</i> Lamk. (<i>H. rotundifolia</i> Roxb.)	Saru manimuni.
72.	<i>Hygroryza aristata</i> Ness.	Dalghah.
73.	<i>Hymenachne assamica</i> Benth.	Dhuridal.
74.	<i>Hypericum japonicum</i> Thunb. –	
75.	<i>Impatiens jurpia</i> Hk. f. & Th.	Dam-deuka.
76.	<i>Imperata cylindrica</i> (L.) Beauv.	Ulukher.

77.	<i>Ischaemum hirtum</i> Hack. –	
78.	<i>Knoxia corymbosa</i> Willd.	Lang haik.
79.	<i>Lasia spinosa</i> .	Chengmoi.
80.	<i>Leea crispa</i> Willd.	Kauri thengia. Bon chalta.
81.	<i>Laggera pterodonta</i> (D. C) Benth. –	
82.	<i>Leersia hexandra</i> Sw. –	
83.	<i>Leonurus sibiricus</i> Linn.	Ranga doron.
84.	<i>Lepidagathis rigida</i> Dalz. –	
85.	<i>Leucus indica</i> R. Br. (<i>Leucus linifolia</i> Spreng.)	Doron.
86.	<i>Limnophilla repens</i> Benth. (<i>L. sessilis</i> (Benth) Fisc.) –	
87.	<i>Lindernia anagalis</i> (Burm.f.) Pennel. –	
88.	<i>L. crustacea</i> (L) Muell. –	
89.	<i>Lobelia alsenoides</i> Lamk. –	
90.	<i>Microstegium petiolare</i> (Hack.) Bor –	
91.	<i>Mimosa pudica</i> Linn.	Adar malati. Lajuki bon.
92.	<i>Mariscus compectus</i> (Retz.) Druce. –	
93.	<i>Murdania alata</i> (Vahl.) Brenun. –	
94.	<i>M. nudiflora</i> (L) Brenun. –	
95.	<i>Nelsonia canescens</i> Spreng. –	
96.	<i>Neyraudia reynaudiana</i> (Kunth.) Keng. –	
97.	<i>Nicotiana plumbaginifolia</i> Viv.	Bon dhopat, Ululai.
98.	<i>Ocimum basilicum</i> Linn.	Bon tulasi.
99.	<i>Oldenlandia corymbosa</i> Willd.	Sarpajibha.
100.	<i>O. nudicaulis</i> Roth. –	
101.	<i>Oplismenus burmanii</i> Beauv. –	
102.	<i>Oryza officinalis</i> Wall.	Uridhan.
103.	<i>Panicum humidorum</i> Ham. –	
104.	<i>P. motalum</i> Retz. (<i>P. montanum</i> . Roxb.) –	
105.	<i>P. triperon</i> Schult. –	
106.	<i>Panicum walens</i> Murr. –	
107.	<i>Paspalum orbiculare</i> Forst. –	
108.	<i>Peliosanthus teeta</i> Ander. –	
109.	<i>Pennisetum polystachyum</i> Schult. –	
110.	<i>Persicaria barbata</i> (L) Hara.	Behu.
111.	<i>P. chinensis</i> (L) Gross. –	
112.	<i>Phalaris arundinacea</i> Linn.	Jatlar.
113.	<i>Phyllanthus urinaria</i> Linn. –	
114.	<i>Phyllanthus virgatus</i> Forst. (<i>P. simplex</i> Retz.)	Bon babori.
115.	<i>Physalis minima</i> Linn. –	
116.	<i>Pistia stratiotes</i> Linn.	Bor puni.
117.	<i>Polygala glomerata</i> Lour. –	
118.	<i>P. sibirica</i> Linn. –	
119.	<i>Polygonum hydropiper</i> Linn.	Behu.
120.	<i>Pouzolzia zeylancia</i> (W) Benn. –	
121.	<i>Pogonatherum rufobarbatum</i> Griff. –	
122.	<i>Ranunculus sceleratus</i> Linn.	Beng pata.
123.	<i>Rotala rotundifolia</i> (D. Don) Kolhne. –	
124.	<i>Rumex maritimus</i> Linn	Bon palong.
125.	<i>Rungia repens</i> Nees. –	
126.	<i>Rorippa indica</i> (L) D. C. (<i>Nasturtium indicum</i> D. C.) –	
127.	<i>Solanum nigrum</i> Linn.	Pitkachu.
128.	<i>Vernonia cinerea</i> Less. –	
129.	<i>V. saligna</i> D. C. –	

A. (I) TREES

Sl. No.	Botanical Name	Common Name
1.	<i>Acacia auriculaeformis</i> A. Cunn.	Akasmoni, Australian acacia.
2.	<i>A. Catechu</i> Willd.	Khaira.
3.	<i>A. polyacantha</i> Willd. (<i>A. suma</i> Kurz.)	Hamidh, Sankanta.
4.	<i>Adenanthera pavonina</i> Linn.	Kuchandana.
5.	<i>Acrocarpus fraxinifolius</i> Wight.	Mandhani.
6.	<i>Ailanthus excelsa</i> Roxb.	Tree of heaven, Saragphula.
7.	<i>A. integrifolia</i> Lamk. (<i>A. grandis</i> Prain.)	Borpat.
8.	<i>Albizzia falcataria</i> Forberg. (<i>A. moluccana</i> Miq.) –	
9.	<i>A. procera</i> Benth.	Koroi.
10.	<i>Alseodaphne owdenii</i> Parker.	Jatisundi.
11.	<i>Anacardium occidentale</i> Linn.	Cashew-nut.
12.	<i>Anona squamosa</i> Linn.	Custard-apple.
13.	<i>Antidesma ghesambilla</i> Gaertn.	Heloch.
14.	<i>Averrhoa carambola</i> Linn.	Kordoi.
15.	<i>Aquilaria malaccensis</i> Lamk. (<i>A. agallocha</i> Roxb.)	Sasi. Agar.
16.	<i>Azadiracta indica</i> A. Juss.	Nim. Mahanim.
17.	<i>Baccauria sapida</i> (Roxb.) Muell.	Leteku.
18.	<i>Bauhinia malabarica</i> Roxb.	Tenga kotra.
19.	<i>Barringtonia acutangula</i> Gaertn.	Hijal, Hidal.
20.	<i>Bischofia javanica</i> Bl.	Uriam.
21.	<i>Bombax insigne</i> Wall.	Bumboil.
22.	<i>Bixa orellana</i> Wall.	Hatranga.
23.	<i>Butea monosperma</i> Taub. (<i>B. frondosa</i> Roxb.)	Palas.
24.	<i>Callistemon linearis</i> D. C.	Bottle brush.
25.	<i>Canarium bengalense</i> Roxb.	Dhuna.
26.	<i>C. strictum</i> Roxb. (<i>C. resiniferum</i> Brace.)	Dhuna.
27.	<i>Cascabela thevetia</i> Lippold. (<i>Thevetia neriifolia</i> Juss.)	Yellow oleander.
28.	<i>Cassia javanica</i> .	Malayan Cassia.
29.	<i>C. roxburghii</i> D. C. (<i>C. marginata</i> Roxb.)	Vakai.
30.	<i>C. nodosa</i> Ham.	Radhachura, Bandarlati
31.	<i>C. siamea</i> Lamk.	Mirjari.
32.	<i>Chrysophyllum lanceolatum</i> D. C. (<i>C. roxburghii</i> G. Don.)	Bon pitha.
33.	<i>Chisocheton paniculatus</i> Hiern.	Rata.
34.	<i>Ceiba pentandra</i> .	White silk cotton.
35.	<i>Chickrasia tabularis</i> Juss.	Bogi poma.
36.	<i>Cinnamomum camphora</i> F. Nees.	Karpur.
37.	<i>Citrus grandis</i> Osbeck. (<i>C. decumana</i> Linn.)	Robab tenga.
38.	<i>C. aurantium</i> Linn.	Kamala tenga.
39.	<i>Crescentia cujete</i> Linn.	Bilatibel.
40.	<i>Dalbergia dalbergioides</i> .	Andaman redwood.
41.	<i>Dalbergia sissoo</i> Roxb.	Sisu.
42.	<i>Dalbergia latifolia</i> .	Rose wood.
43.	<i>Delonix regia</i> Rafin. (<i>Poinciana regia</i> Bojr.)	Krishna chura.
44.	<i>Derris indica</i> Linn. (<i>Pongamia pinnata</i> Vent.)	Korach.
45.	<i>Dipterocarpus retusus</i> Bl. (<i>D. macrocarpus</i> Gaertn.)	Holong.
46.	<i>D. turbinatus</i> Gaertn.	Garjan.
47.	<i>Drypetes roxburghii</i> Hurusowa. (<i>Putranjiva roxburghii</i> Wall.)	Putrajibi, Putranjiva.
48.	<i>Elaeocarpus floribundus</i> Bl.	Jalpai.
49.	<i>E. sphaericus</i> K. Schum. (<i>E. ganitrus</i> Roxb.)	Rudraksha.
50.	<i>Enterolobium timbouva</i> . –	
51.	<i>Samanea saman</i> Merill. (<i>Enterolobium saman</i> Prain.)	Rain tree, Macca teteli.
52.	<i>Eucalyptus tereticornis</i> Sm.	Reg gum.

D. CLIMBERS & TWINERS

Sl. No.	Botanical Name	Common Name
1.	<i>Abrus precatorius</i> Linn.	Ratimoni, Raturmoni.
2.	<i>Ampelocissus barbata</i> Planch. (<i>Vitis barbata</i> Wall.) –	
3.	<i>Atylosia goensis</i> Dalz. (<i>A. barbata</i> Baker) –	
4.	<i>A. crassa</i> Prain. –	
5.	<i>A. elongata</i> Benth. –	
6.	<i>A. scarabaeoides</i> Benth. –	
7.	<i>Butea parviflora</i> Roxb.	Sal lata
8.	<i>Cissampelos pariera</i> Linn.	Tuprilata.
9.	<i>Cissus quadrangula</i> Linn. (<i>Vitis quadrangularis</i> Wall.)	Harjora.
10.	<i>Dioscorea hamiltonii</i> Hk. f. –	
11.	<i>Entada phaseoloides</i> (L) Merr. (<i>E. scandens</i> Benth.)	Ghila lata.
12.	<i>Gymnopetalum cochinchinense</i> Kurz.	Koabhatari.
13.	<i>Hoya parasitica</i> Wall.	Waxflower.
14.	<i>Ichnocarpus frutescens</i> Br.	Lamkendol.
15.	<i>Ipomea aquatica</i> .	Kalmou.
16.	<i>Ipomea hirta</i> (L) Merr. –	
17.	<i>Ipomea pestigrades</i> Linn. –	
18.	<i>Ipomea pileata</i> Roxb. –	
19.	<i>Ipomea undulata</i> (L) Hall. f. –	
20.	<i>Merremia vitifolia</i> Hall. f.	Digilewa.
21.	<i>Mikania micrantha</i> H.B.K.	Chauni lata.
22.	<i>Milletia pachycarpa</i> Benth.	Bakal bih.
23.	<i>Myriopteron extensum</i> (Wt.) K. Schum.	Chhagal singa lata.
24.	<i>Passiflora foetida</i> Linn.	Passion flower.
25.	<i>Pothos cathcartii</i> Schott.	Hati dhekia.
26.	<i>Piper falconeri</i> C.D.C.	Bon pan.
27.	<i>Poederia scandens</i> Linn.	Bhedai lata.
28.	<i>Schefflera venulosa</i> Ham.	Jakhumi lata.
29.	<i>Smilax ovalifolia</i> Roxb. (<i>S. macrophylla</i> Roxb.)	Bagh achora.
30.	<i>Stephania japonica</i> (Thumb.) Hiers. –	
31.	<i>S. elegans</i> HK. f. & Th. –	
32.	<i>Thunbergia alata</i> Boj. –	
33.	<i>T. grandiflora</i> Roxb.	Kukuha lata.
34.	<i>Tetrastigma bracteolatum</i> Planch. – (<i>Vitis bracteolata</i> Wall.)	

E. EPIPHYTES

Sl. No.	Botanical Name	Common Name
1.	<i>Aerides odoratum</i> Lour	Bhatou phul.
2.	<i>Bulbophyllum careyanum</i> . –	
3.	<i>Cymbidium aloifolium</i> Roxb. –	
4.	<i>Pholidota imbricata</i> Lour. –	
5.	<i>Vanda teres</i> Roxb.	Phechupul.

F. PTERIDOPHYTES

Sl. No.	Botanical Name	Common Name
1.	<i>Adiantum caudatum</i> Linn.	Mayur singa.
2.	<i>A. philippense</i> Linn.	Maiden hair fern.
3.	<i>Drynaria quercifolia</i> .	Garunda pakhi.
4.	<i>Hemionites aurifolia</i> (Burm.) Moore. –	
5.	<i>Pyrrosia lanceolata</i> (L) Farwell. –	
6.	<i>Pteris cretica</i> Linn. –	
7.	<i>P. biaurita</i> . –	

E. CLIMBERS AND CREEPERS ETC.

Sl. No.	Botanical Name	Common Name
1.	<i>Antigonon leptopus</i> Hk. f. & Th.	Coral creeper.
2.	<i>Asparagus racemosus</i> Willd.	Satamul.
3.	<i>Bignonia magnifica</i> .	Garlic scented Bignonia.
4.	<i>Clitoria ternatea</i> Linn.	Aparajita.
5.	<i>Entada scandens</i> Benth.	Ghila lata.
6.	<i>Gynura procumbens</i> Merrill.	Passion vine.
7.	<i>Ipomoea cairica</i> Sweet. (<i>I. palmata</i> Forst.)	Railway creeper
8.	<i>Nepenthes khasiana</i> Hk. f.	Pitcher plant.
9.	<i>Rhaphidophora aurea</i> Furtado.	Money plant.
10.	<i>Vernonia scandens</i> D. C.	Weeping croton.

F. CANES

Sl. No.	Botanical Name	Common Name
1.	<i>Calamus erectus</i> Roxb.	Raidang.
2.	<i>C. Tenuis</i> Roxb.	Jati bat.
3.	<i>Daemonorops jenkensianus</i> Mart.	Souka.

G. BAMBOOS

Sl. No.	Botanical Name	Common Name
1.	<i>Bambusa assamica</i> .	Saru bijuli.
2.	<i>Bambusa burmanica</i> .	Konkoid.
3.	<i>Bambusa multiplex</i> .	Fencing.
4.	<i>Bambusa nutans</i> .	Makal.
5.	<i>Bambusa pallida</i> .	Bijuli.
6.	<i>Bambusa polymorpha</i> .	Betua.
7.	<i>Bambusa teres</i> .	Barua.
8.	<i>Bambusa ventricosa</i> f. Wamini.	Pitcher bamboo.
9.	<i>Bambusa vulgaris</i> Schrader.	Golden bamboo.
10.	<i>B. balcooa</i> Roxb.	Bhaluka.
11.	<i>B. ventricosa</i> .	Pitcher bamboo.
12.	<i>Dendrocalamus giganteus</i> .	Barbhaluka.
13.	<i>Dendrocalamus strictus</i> Nees.	Male bamboo.

H. ORCHID

Sl. No.	Botanical Name	Common Name
1.	<i>A. multiflorum</i> Roxb.	
2.	<i>A. williamsii</i> Warm.	
3.	<i>Acampe papillosa</i> (Lindl.) Hochr.	
4.	<i>A. rigida</i> P. F. Hunt.	
5.	<i>Acanthophippium sylhetense</i> Lindl.	
6.	<i>Arundina graminifolia</i> (D. Don) Hochr.	
7.	<i>Bulbophyllum careyanum</i> Spreng.	
8.	<i>Coelogyne barbata</i> Griff.	
9.	<i>Coelogyne cornea</i> .	
10.	<i>Coelogyne prolifera</i> Lindl. (<i>C. flavida</i> Wall.)	
11.	<i>C. munronianum</i> K & P.	
12.	<i>C. longifolium</i> D. Don.	
13.	<i>C. dasyflora</i> .	
14.	<i>Dendrobium lindleyi</i> Steud.	
15.	<i>Dendrobium anceps</i> .	
16.	<i>D. fimbriatum</i> Hk. f.	
17.	<i>D. lituiflorum</i> Lindl.	
18.	<i>D. aphyllum</i> (Roxb.) Lindl.	
19.	<i>D. moschatum</i> Swartz.	

20. *Jasminum laurifolium* Roxb.
21. *Jatropha podagrica* Hook.
22. *Manihot esculenta* Crantze.
23. *Mirabilis jalapa* Linn.
24. *Muehlenbeckia platyclada* Meisen.
25. *Murraya paniculata* Jack.
26. *Nerium indicum* Mill.
27. *Pandanus latifolia*.
28. *Punica granatum* Linn.
29. *Quisqualis indica* Linn.
30. *Rauwolfia tetraphylla*.
31. *Tecoma stans*.
32. *Yucca gloriosa* Linn.

- Gutimali.
Gout plant.
Simal alu.
Godhuli gopal.
Cocoloba.
Kamini kusum.
Karabi.
Johapat.
Dalim.
Rangoon creeper.
Sarpagandha.
Tecoma.
Adam's needle.

C. HERBS

Sl. No. Botanical Name

1. *Agave americana* Linn.
2. *A. angustifolia*.
3. *A. sisalana*.
4. *A. veracruze*.
5. *Agloanema commutatum*.
6. *Alocasia indica* Scott.
7. *Brachiaria mutica* Stapf.
8. *Canna indica* Linn.
9. *Crinum moorei*.
10. *Crinum asiaticum*.
11. *Cuffea bengalensis*.
12. *Cyperus alternifolius*.
13. *Chlorophytum bichetii* St.
14. *C. comosum*.
15. *Dieffenbechia picta*.
16. *Calathea ornata*.
17. *C. lietzei*.
18. *Haemanthus multiflorus*.
19. *Musa sapientum*.
20. *M. velutina* - do -
21. *Plumbago indica* Linn. (*P. rosea* Linn.)
22. *Sansevieria zeylanica*.
23. *S. cylindrica*.
24. *S. trifasciata*.
25. *Setcreasea pallida*.
26. *Tradescantia zebrina*.
27. *T. albiflora*

Common Name

- American aloe.
Dagger plant.
Sisal hemp.
Agave.
Aglaonema.
Mankachu.
Para grass.
Parijat.
Monsoon lily.
Sukdarshan.
Cuffea.
Umbrella grass.
Bernard's lily.
Spider plant.
Dumbcane.
Calathea.
Calathea.
Football lily.
Wild banana.

Rakta chita.
Bow-string hemp.
Ife hemp.
Snake plant.
Purple heart.
Wandering jew.
Spiderwort.

D. CACTI AND SUCCULENTS

Sl. No. Botanical Name

1. *Chamecereus* Sp. -
2. *Euphorbia neriifolia* Linn.
3. *E. tirucalli*.
4. *E. lactea* -
5. *E. lactea-cristata* -
6. *Euphorbia* Sp. -
7. *Opuntia dillenii*.
8. *O. phaseacantha* -
9. *O. ficus-indica* -
10. *Trichocereus candicans* -

Common Name

- Hiju.
Milk hedge.

Nagphona.

53.	<i>E. globulus</i> Labill.	Blue gum.
54.	<i>E. citriodora</i> .	Lemon-scented, Eucalyptus.
55.	<i>Ficus bengalensis</i> Linn.	Banyan tree, Bot.
56.	<i>F. semicordata</i> Buch-Ham. (<i>F. cunia</i> Ham.)	Kongrou.
57.	<i>F. elastica</i> Roxb.	Athabor.
58.	<i>Garcinia cowa</i> Roxb.	Kuji-thekera.
59.	<i>G. pedunculata</i> Roxb.	Bor-thekera.
60.	<i>Gliricidia sepium</i> Steu.	Madera.
61.	<i>Grevillea robusta</i> A. Cunn.	Silver oak.
62.	<i>Jacaranda ovalifolia</i> .	Jacaranda.
63.	<i>Leucena leucocephala</i> .	Subabul.
64.	<i>Litchi chinensis</i> Sonn. (<i>Nephelium litchi</i> Camb.)	Lichu.
65.	<i>Lagerstroemia indica</i> Linn.	Parul, Bilati ajar.
66.	<i>Madhuca longifolia</i> McBride. (<i>Bassia latifolia</i> Linn.)	Mahuwa.
67.	<i>Mangifera sylvatica</i> Roxb.	Bon-am.
68.	<i>Maniltoa polyandra</i> Harms. (<i>Cynometra polyandra</i> Roxb.)	Ping.
69.	<i>Mansonia dipikii</i> .	Jatibadam.
70.	<i>Manilkara hexandra</i> (Roxb.) Dubard. -	
71.	<i>Mesua ferrea</i> Linn.	Nahar.
72.	<i>Melia azedarach</i> Linn.	Ghoranim.
73.	<i>Michelia champaca</i> Linn.	Tita chopra.
74.	<i>M. oblonga</i> Wall.	Phul chopra, Bor-chopra.
75.	<i>M. montana</i> Dandy.	Panchopra.
76.	<i>Magnolia insignis</i> Wall. (<i>Manglietia insignis</i> Bl.)	Phulchopra.
77.	<i>Magnolia hodgsonii</i> Keng. (<i>Talauma hodgsonii</i> Hk. f. & Th.)	Barhamthuri.
78.	<i>M. bailonii</i> Pierre. (<i>Talauma phellocarpa</i> King.)	Khorikasopa.
79.	<i>Mimusops elengi</i> Roxb.	Bakul.
80.	<i>Morus macroura</i> Miq. (<i>M. laevigata</i> Wall.)	Bola.
81.	<i>Moringa oleifera</i> Lamk.	Sajina.
82.	<i>Nyctanthes arbor-tristis</i> Linn.	Sewali.
83.	<i>Palaquium polyanthum</i> Benth.	Kurta.
84.	<i>Pithecolobium dulce</i> .	Madras thorn.
85.	<i>Peltophorum pterocarpum</i> Backer. (<i>P. ferrugineum</i> Benth.)	Copperpod, Tamsira.
86.	<i>Persea bombycina</i> Kost. (<i>Machilus bombycina</i> King.)	Som
87.	<i>Phoebe goalparensis</i> Hutch.	Bonsom.
88.	<i>Polyalthia longifolia</i> Benth. & Hk. f.	Debdaru.
89.	<i>P. pendula</i> .	Pendulum tree.
90.	<i>Psidium guyava</i> Linn.	Madhuriam.
91.	<i>Pterospermum lanceaefolium</i> Roxb.	Bon bogori.
92.	<i>P. acerifolium</i> Willd.	Hatipoila.
93.	<i>Pterygota alata</i> R. Br. (<i>Sterculia alata</i> Roxb.)	Paharibadam.
94.	<i>Ravenala madagascariensis</i> .	Traveller's tree
95.	<i>Saraca indica</i> Linn.	Ashok.
96.	<i>Salix babylonica</i> Linn.	Weeping willow.
97.	<i>Shorea robusta</i> Gaertn.	Sal.
98.	<i>Spathodea campanulata</i> Beauv.	Fountain tree.
99.	<i>Spondius pinnata</i> (L. f.) Kurz.	Amora.
100.	<i>Swietenia macrophylla</i> D. C.	Mahagony.
101.	<i>S. mahagoni</i> . - do -	
102.	<i>Santalum album</i> Linn.	Chandan.
103.	<i>Syzygium jambos</i> Alston. (<i>Eugenia jambos</i> Linn.)	Boga jamuk, Bogi jam.
104.	<i>Tectona grandis</i> Linn.	Segun. Teak.
105.	<i>Terminalia chebula</i> Retz.	Silikha.

106.	<i>T. arjuna</i> W. & A.	Arjun.
107.	<i>T. alata</i> Heyne. (<i>T. tomentosa</i> W. & A.)	Chein.
108.	<i>T. myriocarpa</i> Heurek & Muell.	Holokh.
109.	<i>Trewia nudiflora</i> Linn.	Bhelkor.
110.	<i>Tetrameles nudiflora</i> R. Br.	Bheleu.
111.	<i>Wendlandia glabrata</i> D. C.	Kakoi-chera.

II. CONIFERS

Sl. No.	Botanical Name	Common Name
1.	<i>Agathis robusta</i> .	Kauri pine.
2.	<i>Araucaria cookii</i> .	Araucaria.
3.	<i>A. bidwilli</i> .	Monkey puzzle.
4.	<i>Cupressus torulosa</i> D. Don.	Cypress.
5.	<i>C. arizonica</i> . - do -	
6.	<i>Juniperus</i> sp. J	uniper.
7.	<i>Pinus khasya</i> Royle.	Pine tree.
8.	<i>P. patula</i> . - do -	
9.	<i>P. roxburghii</i> . - do -	
10.	<i>Podocarpus neriifolia</i> D. Don.	Jinari.

III. PALMS

Sl. No.	Botanical Name	Common Name
1.	<i>Areca catechu</i> Linn.	Tamol.
2.	<i>A. lutescens</i> Bory.	Momai tamol.
3.	<i>Caryota urens</i> .	Chau.
4.	<i>C. mithis</i> . -	
5.	<i>Cocos nucifera</i> .	Narikal.
6.	<i>Corypha</i> Sp. -	
7.	<i>Hyphaene thebaica</i> .	Doum palm.
8.	<i>Licuala peltata</i> .	Jengu.
9.	<i>Livistona chinensis</i> .	Cabbage palm.
10.	<i>L. jenkinsiana</i> .	Tokou.
11.	<i>Oreodoxa regia</i> .	Bottle palm.
12.	<i>Pinanga gracilis</i> .	Geruka tamol.

B. SHRUBS

Sl. No.	Botanical Name	Common Name
1.	<i>Acacia farnesiana</i> Willd.	Taruakadam.
2.	<i>A. arabica</i> Willd.	Babul.
3.	<i>Acalypha hispida</i> .	Cat's tail flower.
4.	<i>Allamanda neriifolia</i> Hook.	Latakarabi.
5.	<i>Allamanda cathartica</i> Linn. - do -	
6.	<i>Billbergia iridifolia</i> . -	
7.	<i>Bougainvillea spectabilis</i> .	Kakot phul.
8.	<i>Citrus lemon</i> Burm. f. (<i>C. medica</i> Linn.)	Jora tenga.
9.	<i>Coffea arabica</i> Linn.	Coffee plant.
10.	<i>Clerodendron colebrookianum</i> Walp.	Nephafu
11.	<i>Croton</i> Sp.	Patabahar.
12.	<i>Dracaena spicata</i> Roxb.	Harisankar.
13.	<i>D. fragrans</i> . -	
14.	<i>D. sanderiana</i> .	Ribbon plant.
15.	<i>Gardenia coronaria</i> Ham.	Gandharaj.
16.	<i>Gossypium herbaceum</i> Linn.	Kopah.
17.	<i>Hibiscus rosa-sinensis</i> Linn.	Jaba.
18.	<i>H. mutabilis</i> Linn.	Sthalpadma.
19.	<i>Ixora coccinea</i> .	Rangan.

20. *Flickingeria macrei* Bennet. (*D. macrei* Lindl.)
21. *Eria acervata* Lindl.
22. *E. stricta* Lindl.
23. *Epidendrum radicans*.
24. *Gastrochilus dasypogon* (J. J. Sue) O. K.
25. *P. venustum*.
26. *Papilionanthe teres* (Roxb.) Schl.
27. *P. tankervilleae* (Ait.) Bl.
28. *Pholidota imbricata* Lindl.
29. *P. articulata* Lindl.
30. *Rhyncostylis retusa* Bl.
31. *Saccolobium trichomum* Reichb. f.
32. *Vanda teres* Roxb.
33. *Vanilla pilifera* Hary.

I. PTERIDOPHYTES

Sl. No.	Botanical Name	Common Name
1.	<i>Angiopteris evecta</i> .	-
2.	<i>Gymnogramme pulchellus</i> .	Silver fern.
3.	<i>Nephrolepis cordifolia</i> .	-
4.	<i>Nephrolepis duffii</i> .	-
5.	<i>N. exaltata</i> .	Ladder fern.
6.	<i>Pteris cretica</i> Linn. (variegated.)	-
7.	<i>Stenocleanea palustre</i> .	Dhekia lata.

Annexure- II A
Fauna of the Assam State Zoo cum Botanical Garden

CHECK-LIST OF THE MAMMALS OF ASZBG CAMPUS

Family	Common Name	Scientific Name	Family	Common Name	Scientific Name
Manidae	Chinese Pangolin	<i>Manis pentadactyla</i>	Soricidae	Grey Musk Shrew	<i>Suncus murinus</i>
Pteropodidae	Indian Flying Fox	<i>Pteropus gigante</i>			
	Short-nosed Bat	<i>Cyanopterus sphinx</i>	Rhinolophidae	Horseshoe Bat	<i>Rhinolophus sp.</i>
Cercopithecidae	Rhesus Macaque	<i>Macaca mulatta</i>	Vespertilionidae	Pipistrelle Bat	<i>Pipistrellus sp.</i>
	Capped Langur	<i>Trachypithecus pileatus</i>		Yellow House Bat	<i>Scotophilus sp.</i>
Canidae	Jackal	<i>Canis aureus</i>	Viverridae	Common Palm Civet	<i>Paradoxurus hermaphroditus</i>
Mustelidae	Hog Badger	<i>Artonyx collaris</i>		Small Indian Civet	<i>Viverricula indica</i>
	Smooth - Coated Otter	<i>Lutrogale perspicillata</i>		Large Indian Civet	<i>Viverra zibetha</i>
Herpestidae	Small Indian Mongoose	<i>Herpestes javanicus</i>	Cervidae	Sambar	<i>Cervus unicolor</i>
Felidae	Leopard	<i>Panthera pardus</i>		Indian Muntjac	<i>Muntiacus muntjak</i>
	Jungle Cat	<i>Felis chaus</i>	Bovidae	Serow	<i>Naemorhedus sumatrensis</i>
	Leopard Cat	<i>Felis bengalensis</i>	Muridae	House Mouse	<i>Mus musculus</i>
Sciuridae	Hoarybellied Squirrel	<i>Callosciurus pygerythrus</i>		Bandicoot Rat	<i>Bandicota sp.</i>
Hystriidae	Crestless Porcupine	<i>Hystrix brachyura</i>		Long-tailed Tree Mouse	<i>Vandeleuria oleracea</i>
Leporidae	Indian Hare	<i>Lepus nigricollis</i>			

(Source: *Inside a City Forest*)

Annexure- II B

CHECK-LIST OF THE BIRDS OF ASZBG CAMPUS

FAMILY	Common Name	Scientific Name	FAMILY	Common Name	Scientific Name
PHALACROCORACIDAE	Great Cormorant	<i>Phalacrocorax carbo</i>	RALLIDAE	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>
	Little Cormorant	<i>Phalacrocorax niger</i>		Watercock	<i>Gallicrex cinerea</i>
ARDEIDAE	Great Egret	<i>Ardea alba</i>		Little Crake	<i>Porzana sp</i>
	Little Egret	<i>Egretta garzetta</i>		Purple Swampphen	<i>Porphyrio porphyrio</i>
	Cattle Egret	<i>Bubulcus ibis</i>	CHARADRIIDAE	Red-wattled Lapwing	<i>Vanellus indicus</i>
	Intermediate Egret	<i>Egretta intermedia</i>	SCOLOPACIDAE	Common Sandpiper	<i>Tringa hypoleucos</i>
	Pond Heron	<i>Ardeola grayii</i>		Green Sandpiper	<i>Tringa ochropus</i>
	Night Heron	<i>Nycticorax nycticorax</i>	COLUMBIDAE	Eurasian Collared Dove	<i>Streptopelia decaocto</i>
	Little Green Heron	<i>Ardeola striatus</i>		Pompadour Green Pigeon	<i>Treron pompadora</i>
CICONIIDAE	Greater Adjutant Stork	<i>Leptoptilos dubius</i>		Yellow-footed Green Pigeon	<i>T. phoenicoptera</i>
	Lesser Adjutant Stork	<i>L. javanicus</i>		Green Imperial Pigeon	<i>Ducula aenea</i>
	Asian Openbill	<i>Anastomus oscitans</i>		Emerald Dove	<i>Chalcophaps indica</i>
ANATIDAE	Lesser Whistling Duck	<i>Dendrocygna javanica</i>		Blue Rock Pigeon	<i>Columba livia</i>
	Jerdon's Baza	<i>Aviceda jerdoni</i>		Spotted Dove	<i>Streptopelia chinensis</i>
ACCIPITRIDAE	Crested Goshawk	<i>Accipiter trivirgatus</i>	Thick-billed Green Pigeon	<i>T. curvirostra</i>	
	White-rumped Vulture	<i>Gyps bengalensis</i>	PSITTACIDAE	Rose-ringed Parakeet	<i>Psittacula krameri</i>
	Cinereous Vulture	<i>Aegypius monachus</i>		Red-breasted Parakeet	<i>Psittacula alexandri</i>
	Black-eared Kite	<i>M.m. linetaus</i>	CUCULIDAE	Common Hawk Cuckoo	<i>Cuculus varius</i>
	Crested Serpent Eagle	<i>Spilornis cheela</i>		Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>
	Changeable Hawk Eagle	<i>Spizaetus cirrhatus</i>		Asian Koel	<i>Eudynamis scolopacea</i>
	Booted Eagle	<i>Hieraetus pennatus</i>		Indian Cuckoo	<i>Cuculus micropterus</i>
	Common Buzzard	<i>Buteo buteo</i>		Pied Cuckoo	<i>Clamator jacobinus</i>
	Shikra	<i>Accipiter badius</i>		Large Green-billed Malkoha	<i>Rhopodytes tristis</i>
	Common Kestrel	<i>Falco tinnunculus</i>		Greater Coucal	<i>Centropus sinensis</i>
	Long-billed Vulture	<i>Gyps indicus</i>		Lesser Coucal	<i>Centropus toulou</i>
	Black Kite	<i>Milvus migrans govinda</i>		Barn Owl	<i>Tyto alba</i>
	Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>			Barred Owlet
			Oriental Scops Owl		<i>Otus sunia</i>

	Steppe Eagle	<i>Aquila nipalensis</i>	STRIGIDAE	Spotted Owlet	<i>Athene brama</i>
FALCONIDAE	Amur Falcon	<i>Falco amurensis</i>		Brown Hawk Owl	<i>Ninox scutulata</i>
	Peregrine Falcon	<i>Falco peregrinus calidus</i>		Brown Fish Owl	<i>Ketupa zeylonensis</i>
	Common Kestrel	<i>Falco tinnunculus</i>	CAPRIMULGIDAE	Common Indian Nightjar	<i>Caprimulgus asiaticus</i>
PHASIANIDAE	Peafowl	<i>Pavo cristatus</i>			
	Red Jungle Fowl	<i>Gallus gallus</i>			
	Black Partridge	<i>Francolinus francolinus</i>			
APODIDAE	Asian Palm Swift	<i>Cypselurus parvus</i>		Chestnut-tailed Starling	<i>Sturnus malabaricus</i>
	House swift	<i>Apus affinis</i>		Asian Pied Starling	<i>S. contra</i>
	Himalayan Swiftlet	<i>Collocalia brevirostris</i>	STURNIDAE	Common Myna	<i>Acridotheres tristis</i>
	Alpine Swift	<i>Tachymarptis melba</i>		Jungle Myna	<i>A. fuscus</i>
ALCEDINIDAE	White-throated Kingfisher	<i>Halcyon smyrnensis</i>		White-vented Myna	<i>A. cinereus</i>
	Common Kingfisher	<i>Alcedo atthis</i>		Hill Myna	<i>Gracula religiosa</i>
	Lesser Pied Kingfisher	<i>Ceryle rudis</i>			
MEROPIIDAE	Green Bee-eater	<i>Merops orientalis</i>	CORVIDAE	Rufous Tree-pie	<i>Dendrocitta vagabunda</i>
	Blue-bearded Bee-eater	<i>Nyctornis atheroni</i>		House Crow	<i>Corvus splendens</i>
	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>		Large-billed Crow	<i>C. macrorhynchos</i>
	Blue-tailed Bee-eater	<i>Merops philippinus</i>			
CORACIDAE	Indian Roller	<i>Coracias bengalensis</i>		Large Cuckoo-shrike	<i>Coracina novaehollandiae</i>
UPUPIDAE	Common Hoopoe	<i>Upupa epops</i>	CAMPEPHAGIDAE	Scarlet Minivet	<i>P. flammeus</i>
CAPITONIDAE	Blue-throated Barbet	<i>Megalaima asiatica</i>		Small Minivet	<i>P. cinnamomeus</i>
	Lineated Barbet	<i>M. lineata</i>		Rosy Minivet	<i>P. roseus</i>
	Coppersmith Barbet	<i>M. haemacephala</i>		Long-tailed Minivet	<i>P. ethologus</i>
	Large Green Barbet	<i>M. zeylanica</i>		Common Wood Shrike	<i>Tephrodornis pondicerianus</i>
PICIDAE	Rufous Woodpecker	<i>Micropternus brachyurus</i>		Large Wood Shrike	<i>Tephrodornis gularis</i>
	Black-rumped Flameback	<i>Dinopium bengalense</i>	IRENIDAE	Blackwinged Cuckoo Shrike	<i>Coracina melanoschistos</i>
	Grey-capped Pygmy	<i>Dendrocopus canicapillus</i>		Common Iora	<i>Aegithia tiphia</i>
	Fulvous-breasted Pied Woodpecker	<i>Picoides macei</i>		Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>
HIRUNDINIDAE	Striated Swallow	<i>Hirundo striolata</i>		Blue-winged Leafbird	<i>C. cochinchinensis</i>
	Common Swallow	<i>Hirundo rustica</i>	PYCNONOTIDAE	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>
LANIIDAE	Brown Shrike	<i>Lanius cristatus</i>		Black-crested Yellow Bulbul	<i>P. melanicterus flaviventris</i>
	Grey-backed	<i>L. tephronotus</i>		Red-vented Bulbul	<i>P. cafer</i>
				White-throated Bulbul	<i>Alophoixes flaveolus</i>

			MUSCICAPIDAE		
ORIOLODAE	Golden Oriole	<i>Oriolus oriolus</i>	Timalinae	Jungle Babbler	<i>Turdoides striatus</i>
	Black-hooded Oriole	<i>O.xanthornus</i>		Puff-throated Babbler	<i>Pellorneum ruficeps</i>
	Maroon Oriole	<i>O. trailii</i>		Striped Tit-Babbler	<i>Macronus gularis</i>
DICRURIDAE	Black Drongo	<i>Dicrurus adsimilis</i>		Spot-throated Babbler	<i>Pellorneum albiventris</i>
	Ashy Drongo	<i>D.leucophaeus</i>	Abbot's Babbler	<i>Malacocincla abbotti</i>	
	Crow-billed Drongo	<i>D.annectans</i>	Muscicapinae	Grey-headed Canary Flycatcher	<i>Calcinicapa ceylonensis</i>
	Bronzed Drongo	<i>D.aeneus</i>		Paradise Flycatcher	<i>Terpsiphone paradisi</i>
	Spangled Drongo	<i>D.hottentotus</i>		Red-throated Flycatcher	<i>Ficedula parva</i>
	White-bellied Drongo	<i>D.caerulescens</i>		Small Niltava	<i>Niltava macgregoriae</i>
	Lesser Racket-tailed Drongo	<i>D.remifer</i>		Black-naped Blue Monarch	<i>Hypothymis azurea</i>
	Greater Racket-tailed Drongo	<i>D.paradisens</i>		Little Pied Flycatcher	<i>Ficedula westermanii</i>
MUSCICAPIDAE				PLOCEIDAE	
SYLVINAE	Brownish-flanked Bush Warbler	<i>Cettia fortipes</i>		Passerinae	House Sparrow
	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Eurasian Tree Sparrow		<i>P.montanus</i>
	Common Tailorbird	<i>Orthotomus sutorius</i>	Estrildinae	Baya Weaver	<i>Ploceus philippinus</i>
	Dusky Leaf Warbler	<i>Phylloscopus fuscatus</i>		Scaly-breasted Munia	<i>Lonchura punctulata</i>
	Greenish Leaf Warbler	<i>P.trochiloides</i>		Black-headed Munia	<i>Lonchura malaca</i>
	Hume's Leaf Warbler	<i>P.humei</i>			
	Tickell's Leaf Warbler	<i>P.affinis</i>			
	Ashy-throated Warbler	<i>P.maculipennis</i>			
	White-spectacled Warbler	<i>Siecerus affinis</i>			
	Grey-headed Warbler	<i>Siecerus xanthoschistos</i>			
TURDINAE	Oriental Magpie-Robin	<i>Copsychus saularis</i>			
	White-rumped Shama	<i>C.malabaricus</i>			
	Daurian Redstart	<i>Phoenicurus aureus</i>			
	Common Stonechat	<i>Saxicola torquata</i>			
	Blue Rock Thrush	<i>Monticola solitarius</i>			
	Orange-headed Ground Thrush	<i>Zoothera citrina</i>			
	Blue Whistling Thrush	<i>Myophonus caeruleus</i>			
PARIDAE	Great Tit	<i>Parus major</i>			

MOTACILLI DAE	Olive-backed Pipit	<i>Anthus hodgsonii</i>
	Paddyfield Pipit	<i>Anthus hodgsonii</i>
	Forest Wagtail	<i>Motacilla indica</i>
	Yellow Wagtail	<i>M. flava</i>
	Citrine Wagtail	<i>M. citreola</i>
	Indian Pied Wagtail	<i>M. alba</i>
	Grey Wagtail	<i>M. cinerea</i>
DICAETIDAE	Thick-billed Flowerpecker	<i>Dicaeum agile</i>
	Fire-breasted Flowerpecker	<i>D. ignipectus</i>
	Scarlet-backed Flowerpecker	<i>D. cruentatum</i>
NECTARINI DAE	Purple sunbird	<i>Nectarinia asiatica</i>
	Crimson Sunbird	<i>Aethopyga siparaja</i>
ZOSTEROP IDAE	Oriental White- Eye	<i>Zosterops palpebrosa</i>

(Source: *Inside a City Forest*)

Annexure- II C

CHECK-LIST OF THE REPTILES OF ASZBG CAMPUS

Family	Common Name	Scientific Name	Family	Common Name	Scientific Name
TESTUDINES			SERPENTES		
Trionychidae	Peacock Softshell	<i>Aspideretes hurum</i>	Typhlopidae	Brahminy Blind Snake	<i>Ramphotyphlops brahminus</i>
	Ganges Softshell	<i>Aspideretes gangeticus</i>	Boidae	Indian Rock Python	<i>Python molurus bivittatus</i>
	Chitra Turtle	<i>Chitra indica</i>	Colubridae	Mock Viper	<i>Psammodynastes pulverulentus</i>
	Indian Flap-shell Turtle	<i>Lissemys punctata</i>		Buff-striped Keelback	<i>Amphiesma stolata</i>
Bataguridae	Spotted Black Terrapin	<i>Geoclemys hamiltonii</i>		Painted Bronzeback Snake	<i>Dendralaphis pictus</i>
	Roofed Terrapin	<i>Kachuga tecta</i>		Eastern Cat Snake	<i>Boiga gokool</i>
	Malayan Box Turtle	<i>Cuora ambionensis</i>		Green Vine Snake	<i>Ahaentulla prasina</i>
Testudinidae	Elongated Tortoise	<i>Indotestudo elongata</i>		Golden Tree Snake	<i>Chrysopelea ornata</i>
SQUAMATA SAURIA				Smooth Water Snake	<i>Enhydryis enhydryis</i>
Gekkonidae	Asian House Gecko	<i>Hemidactylus frenatus</i>		Common Wolf Snake	<i>Lycodon aulicus</i>
	Karen's Gecko	<i>Hemidactylus karenorum</i>		Red-necked Keelback	<i>Rhabdophis subminiatus</i>
	Brook's Gecko	<i>Hemidactylus brooki</i>		Indian Rat Snake	<i>Ptyas mucosa</i>
	Flat-tailed Gecko	<i>Cosymbotus platyrus</i>	Copper-headed Trinket	<i>Coelognathus radiatus</i>	
	Tokay Gecko	<i>Gekko gekko</i>	Checked Keelback	<i>Xenochropis piscator</i>	
	Assamese Day Gecko	<i>Cnemaspis assamensis</i>	Yellow-speckled Keelback	<i>Xenochropis flavipunctatum</i>	
	Khasi Hills Bent-toed Gecko	<i>Cyrtodactylus khasiensis</i>	Elapidae	Banded Krait	<i>Bungarus fasciatus</i>
Agamidae	Indian Garden Lizard	<i>Calotes versicolor</i>		Monocled Cobra	<i>Naja kaouthia</i>
	Green Fan-throated Lizard	<i>Ptyctolaemus gularis</i>	Viperidae	White-lipped Pit Viper	<i>Trimeresurus albolabris</i>
Varanidae	Common Indian Monitor	<i>Varanus bengalensis</i>		Russell's Viper (?)	<i>Daboia russelii</i>
	Water Monitor	<i>Varanus flavator</i>			
Scincidae	Many-lined Grass Skink	<i>Mabuya multifasciata</i>			
	Little Grass Skink	<i>Mabuya macularia</i>			
	White-spotted Supple Skink	<i>Lygosoma albopunctata</i>			
	Riverside Skink	<i>Sphenomorphus maculatus</i>			

(Source: Inside a City Forest)

Annexure- II D

CHECK-LIST OF THE AMPHIBIANS OF ASZBG CAMPUS

Family	Common Name	Scientific Name
Megophryidae	Red-eyed Short-legged Frog	<i>Leptobrachium smithi</i>
Bufo	Common Indian Toad	<i>Bufo melanostictus</i>
Microhylidae	Ornate Microhylid	<i>Microhyla ornata</i>
Rhacophoridae	East Asian Tree Frog	<i>Polypedates leucomystax</i>
Raniidae	Skittering Frog	<i>Lophlyctis cyanophlyctis</i>
	Indian Cricket Frog	<i>Fejervarya limnocharis</i>
	Indian Bull Frog	<i>Hoplobatrachus tigerinus</i>
	Jerdon's Bull Frog	<i>Hoplobatrachus crassus</i>
	Tyler's Frog	<i>Rana tyleri</i>
	Long-tongued Frog	<i>Rana leptoglossa</i>
	Plain Oriental Stream Frog	<i>Rana alticola</i>

(Source: Inside a City Forest)



*ENDANGERED SPECIES			Opening Stock				DURING THE YEAR 2010-2011												Closing Stock			
SI No	ANIMAL NAME	Scientific name	(as on 1/4/2010)				Births			Acquisitions			Disposals			Deaths			(as on 31/3/2011)			
			M	F	U	T	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	T
25	TIGER BENGAL	Panthera tigris	5	3	0	8	0	0	3							2	0	0	3	3	3	9
26	CAPPED LANGUR	Presbytis pileatus	1	0	0	1													1	0	0	1
27	PANGOLIN CHINESE	Manis pentadactyla	1	0	3	4													1	2	1	4
28	BEAR HIMALAYAN BLACK	Ursus thibetanus	4	6	2	12													4	6	2	12
29	CAT JUNGLE	Felis chaus	4	7	3	14									1	1	0	3	6	3	12	
30	CIVET COMMON PALM	Paradoxurus hermaphroditus	2	6	5	13												2	6	5	13	
31	CIVET HIMALAYN PALM/MASKED	Paguma larvata	1	0	0	1												1	0	0	1	
32	CIVET INDIAN SMALL	Viverricula indica	2	1	1	4									1	0	0	1	1	1	3	
33	CIVET INDIAN LARGE	Viverra zibetha	0	0	0	0			0	0	1							0	0	1	1	
34	MACAQUE ASSAMESE	Macaca assamensis	2	0	0	2												2	0	0	2	
35	MACAQUE BONNET	Macaca radiata	1	0	0	1									1	0	0	0	0	0	0	
36	MACAQUE PIG TAILED	Macaca nemestrina	2	1	0	3												2	1	0	3	
37	MACAQUE STUMP TAILED	Macaca speciosa	7	3	0	10												7	3	0	10	
38	MACAQUE RHESUS	Macaca mulatta	3	2	0	5												3	2	0	5	
39	OTTER CLAWLESS	Amblonyx cinereus	1	0	0	1												1	0	0	1	
40	SMALL INDIAN MONGOOSE	Herpestes javanicus	1	1	7	9												1	1	7	9	
41	JACKAL	Canis Aureus	1	0	0	1												1	0	0	1	
42	PORCUPINE BRUSH TAILED/BENGAL	Atherurus macrourus assamensis	2	1	0	3												2	1	0	3	
43	COMMON LANGUR	Presbytis entellus	0	1	0	1												0	1	0	1	
	TOTAL MAMMAL (33 Nos Species)		100	68	45	213	2	2	7	1	3	4	3	1	0	12	9	0	90	80	37	207
	REPTILE																					
44	MARSH CROCODILE	Crocodylus palustris	0	1	0	1												0	1	0	1	
45	GHARIAL	Gavialis gangeticus	1	0	1	2												1	0	1	2	
46	PYTHON BURMESE ROCK	Python molurus bivittatus	0	0	7	7							0	0	3			0	0	4	4	
47	TURTLE INDIAN PEACOCK SOFTSHELL	Trionyx hurum	0	0	3	3			0	0	2							0	0	5	5	
48	TURTLE INDIAN SOFT SHELLED	Nilssonia gangeticus	0	0	18	18			0	0	2							0	0	20	20	
49	TURTLE INDIAN TENT	Kachuga tecta tecta	0	0	2	2			0	0	1							0	0	3	3	
50	TERRAPIN SPOTTED BLACK	Geoclemys hamiltonii	0	0	3	3			0	0	3							0	0	6	6	
51	SNAKE-RAT	Ptyas mucosus	0	0	5	5												0	0	5	5	

SI No	ANIMAL NAME	Scientific name	Opening Stock				DURING THE YEAR 2010-2011												Closing Stock			
			(as on 1/4/2010)				Births			Acquisitions			Disposals			Deaths			(as on 31/3/2011)			
			M	F	U	T	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	T
52	COBRA MONOCELLATE	Naja cauthia	0	0	5	5												0	0	5	5	
53	COBRA BLACK	Naja oxiana	0	0	2	2												0	0	2	2	
54	COBRA ACCELLATE	Naja naja	0	0	5	5												0	0	5	5	
55	RED NECKED KEEL BACK	Rhabdophis subminatus	0	0	2	2												0	0	2	2	
	*ENDANGERED SPECIES																					
56	RIVER TERRAPIN	Batagur baska	0	0	1	1												0	0	1	1	
57	INDIAN FLAP SHELL TURTLE	Lissemys punctata	0	1	1	2												0	1	1	2	
58	ASSAM ROOFED TURTLE	Pangshura sylhetensis	0	1	0	1				2	0	1						2	1	1	4	
	TOTAL REPTILE (15 Nos Species)		1	3	55	59	0	0	0	2	0	9	0	0	3	0	0	3	3	61	67	
	TOTAL BIRDS (10 Nos Species)		4	4	56	64	0	0	0	0	0	3	0	0	0	4	1	1	2	4	55	61
	TOTAL MAMMALS (33 Nos Species)		101	67	45	213	2	2	7	1	3	4	3	1	0	12	9	0	90	80	37	207
	TOTAL REPTILES (15 Nos Species)		1	3	55	59	0	0	0	2	0	9	0	0	3	0	0	0	3	3	61	67
	TOTAL ANIMALS (58 Nos Species)		106	74	156	336	2	2	7	3	3	16	3	1	3	16	10	1	95	87	153	335
	*Animals listed under schedule I and II of wildlife (protection) act 1972																					
	OTHER SPECIES																					
	BIRD																					
59	SULPHUR CRESTED COCKATOO	Cacatua geterita gaterita	0	1	0	1												0	1	0	1	
60	BUDGERIGAR	Melopsittacus undulatus	0	0	72	72												0	0	72	72	
61	DOUBLE WATTLED CASSOWARY	Casuaris casuaris	1	1	0	2												1	1	0	2	
62	BLUE AND YELLOW MACAW	Ara ararauna	1	0	0	1												1	0	0	1	
63	BLACK HEADED IBIS	Threskiornis melanocephalus	0	0	4	4												0	0	4	4	
64	WATERHEN WHITEBREASTED	Amaurornis phoenicurus	0	0	4	4				0	0	1						0	0	5	5	
65	CATTLE EGRET	Bubulcus ibis	0	0	4	4												0	0	4	4	
66	GREATER ADJUTANT STORK	Leptoptilos dubius	0	0	3	3												0	0	3	3	
67	LESSER ADJUTANT STORK	Leptoptilos javanicus	0	0	1	1												0	0	1	1	
68	KINGFISHER WHITE-THROATED	Halcyon smyrnensis	1	1	0	2												1	1	0	2	
69	LARGE CORMORANT	Phalacrocorax niger	0	0	2	2												0	0	2	2	

SI No	ANIMAL NAME	Scientific name	Opening Stock (as on 1/4/2010)				DURING THE YEAR 2010-2011												Closing Stock (as on 31/3/2011)				
			M	F	U	T	Births			Acquisitons			Disposals			Deaths			M	F	U	T	
							M	F	U	M	F	U	M	F	U	M	F	U					
70	PARAKEET ALEXANDRINE	Psittacula eupatria	1	1	1	3														1	1	1	3
71	PARAKEET PLUM-HEADED	Psittacula cyanocephala	0	1	0	1														0	1	0	1
72	PARAKEET ROSE-RINGED	Psittacula krameri	1	2	20	23														1	2	20	23
73	PELICAN GREAT WHITE	Psittacula onocrotalus	7	3	23	33	0	0	7											0	0	40	40
74	PELICAN SPOT BILLED	Pelecanus philippensis	1	1	0	2														1	1	0	2
75	PURPLE SWAMP HEN	Porphyrio porphyrio	3	6	2	11														3	6	2	11
76	INDIAN CUCKOO	Eudynamys scolopacea	0	6	0	6														0	6	0	6
77	SILVER PHEASANT	Lophura-mycthemera	1	2	0	3									1	0	0			0	2	0	2
78	FAN TAIL PIGEON		0	0	1	1														0	0	1	1
79	NIGHT HERON	Nycticorax nycticorax	0	0	1	1														0	0	1	1
80	WHISTLING TEAL LESSER	Dendrocygna javanic	0	0	5	5														0	0	5	5
81	BARN OWL	Tyto alba	0	0	2	2									0	1	0			0	0	1	1
82	COCKATIEL	Nymphicus hollandicus	0	3	1	4														0	3	1	4
83	SLATY HEADED PARAKEET	Psittacula himalayana	0	0	4	4														0	0	4	4
84	JERDON'S BAZA	Aviceda jerdoni	0	0	2	2									0	1	0			0	0	1	1
85	JUNGLE OWLET	Glaucidium radiatum	0	0	2	2				0	0	2			0	0	3			0	0	1	1
86	RED JUNGLE FOWL	Gallus gallus	1	2	0	3														1	2	0	3
87	EMU	Dromaius novaehollandae	1	1	0	2														1	1	0	2
88	SPOTTED DOVE	Streptopelia chinensis	0	0	0	0				0	0	1								0	0	1	1
	TOTAL BIRD (30 Nos Species)		19	31	154	204	0	0	7	0	0	4	0	0	0	1	2	3	11	28	170	209	
	MAMMAL																						
89	GIRAFFE	Giraffa camelopardalis	0	1	0	1														0	1	0	1
90	HIPPOTAMUS	Hippopotamus amphibius	3	2	1	6									1	0	0			2	3	0	5
91	RHINO AFRICAN WHITE	Ceratotherium simum	1	0	0	1														1	0	0	1
92	LION (HYBRID)	Panthera leo	2	5	0	7														2	5	0	7
93	DEER BARKING	Muntiacus muntjac	14	11	15	40	0	0	1	0	0	1								20	15	7	42
94	DEER HOG	Axis porcinus	6	10	6	22														6	10	6	22
95	DEER SAMBAR	Cervus unicolor	28	61	64	153	0	0	9						1	1	0			52	70	38	160
96	DEER SPOTTED	Cervus axis	24	24	14	62									1	1	0			30	20	10	60

Annexure – IV (B)

Stock position of Birds, mammals and reptiles 2010-11

Items	Numbers of species	Population
1. Mammals		
A. Schedule I & II	33	207
B. Other Indigenous	8	296
C. Exotic	3	8
D. Hybrid	1	7
Total:-	45	518
2. Birds		
A. Schedule I & II	10	61
B. Other	22	88
C. Exotic	8	121
Total:-	40	270
3. Reptiles:-		
A. Schedule I & II	15	67
B. Other	13	40
C.	Nil	Nil
Total:-	28	107
Grand Total:-	113	895

Annexure – V

Breeding of Zoo Captives

Detail birth of animals of Assam state Zoo w.e.f 01/01/2011 to 19/04/2011

Sl. No.	Name of Species	Date of birth	Sex	Nos. of Animal	Remarks
1	Leopard cat	16/02/2010	U	3	2 nos. still birth
2	Black buck	09/03/2010	U	1	
3	Black buck	18/03/2010	F	1	Died on 18/04/2010
4	Black buck	24/03/2010	M	1	Died on 03/04/2010
5	Serow	04/06/2010	M	1	
6	Jungle cat	01/06/2010	U	2	Eaten by mother
7	R.B.T	07/06/2010	M	1	Died on 09/06/2010
8	Leopard cat	11/06/2010	U	3	2nos. still birth
9	Golden Langur	30/06/2010	F	1	Died on 06/08/2010
10	Leopard cat	21/07/2010	U	2	Exhibited
11	Leopard cat	05/08/2010	U	2	Died on 10/08/2010
12	Common Leopard	12/08/2010	U	1	Died on 12/08/2010
13	Nilgai	29/08/2010	F	1	Exhibited
14	Black buck	17/09/2010	M	1	Exhibited
15	Leopard cat	18/09/2010	U	2	Exhibited
16	Nilgai	24/09/2010	U	1	Exhibited
17	Black buck	27/09/2010	U	1	Exhibited
18	R.B.T	29/10/2010	M-2, F-1	3	Exhibited
19	Pelican	16/11/2010	U	1	Exhibited
20	Pelican	30/11/2010	U	1	Exhibited
21	Pelican	04/12/2010	U	3	One chick died on 19/12/2010
22	Pelican	24/12/2011	U	3	One chick died on 21/02/2011
23	Lion	01/01/2011	U	1	Exhibited
24	Leopard cat	02/03/2011	U	3	One no died on 03/03/2011
25	Black buck	30/03/2011	U	1	Exhibited

Total Numbers of New Born :- 41 Nos.

Total Numbers of infant death :- 9 Nos.

Total Numbers of still born :- 4 Nos.

List of endangered species bred during the last 3 years

<u>2008-2009</u>	<ul style="list-style-type: none"> i) Golden Langur ii) Royal Bengal Tiger iii) Jungle cat iv) Common Leopard v) Himalayan Black Bear vi) Slow Loris vii) Common palm civet
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<u>2009-2010</u>	<ul style="list-style-type: none"> i) Leopard cat ii) Jungle cat iii) Peaf owl iv) Jungle cat v) Jungle cat vi) Black buck vii) Royal Bengal Tiger
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<u>2010-2011</u>	<ul style="list-style-type: none"> i) Black buck ii) Leopard Cat iii) Deer, brow Antlered iv) Royal Bengal Tiger v) Serow vi) Jungle cat vii) Golden Langur viii) Common leopard
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Breeding captive during last 5 calendar years:

Year	Mammals		Birds		Reptiles		Total	
	Species	Population	Species	Population	Species	Population	Species	Population
2006	12 nos.	58 nos.	2 nos.	4 nos.	Nil	Nil	14 nos.	62 nos.
2007	9 nos.	38 nos.	2 nos.	2 nos.	2 nos.	6 nos.	13 nos.	46 nos.
2008	6 nos.	14 nos.	Nil	Nil	Nil	Nil	6 nos.	14 nos.
2009	8 nos.	32 nos.	2 nos.	4 nos.	Nil	Nil	10 nos.	36 nos.
2010	8 nos.	22 nos.	Nii	Nil	Nil	Nil	8 nos.	22 nos.

Annexure – VI

**SINGLE SEXED ANIMAL AVAILABLE IN ASSAM STATE ZOO
AS ON 31/3/2011**

Sl.No	Species	Sex	Schedule
	MAMMAL		
1	Binturong(<i>Ursus arctos</i>)	M	I
2	Lion tailed Macaque(<i>Macaca silenus</i>)	F	I
3	Capped langur(M	I
4	Himalayan Palm civet(<i>Paguma larvata</i>)	U/S	II
5	Assamese macaque(<i>Macaca assamensis</i>)	M	II
6	Himalayan crestless porcupine(<i>Hystrix hodgsonii</i>)	M	II
7	Giraffe(<i>Gifaffa camelopardalis</i>)	F	Exotic
8	African White Rhino(<i>Caratotherium simum</i>)	M	Exotic
	BIRDS		
14/1	Great Pied Hornbill(<i>Buceros bicornis</i>)	M	I
15/2	Kaleej pheasant	U/S	I
16/3	Eagle steppe (<i>Aquila nipalensis</i>)	U/S	IV
17/4	Lesser adjutant stork(<i>Leptoptilos javanicus</i>)	U/S	IV
18/5	Alexendrine Parakeet(<i>Psitacula eupatria</i>)	U/S	IV
19/6	Plum headed Parakeet (<i>Psitacula cyanocephala</i>)	F	IV
20/7	Night Heron	U/S	
21/8	Sulphur crested cockatoo(<i>Cacatua geterita gaterita</i>)	F	Exotic
	REPTILE		
26/1	Marsh Crocodile(<i>Crocodylus palustris</i>)	F	I
27/2	Indian peacock softshell turtle(<i>Trionyx hurum</i>)	U/S	I
28/3	Large Bengal Monitor Lizard(<i>Varanus bengalensis</i>)	U/S	II
29/4	Blotched pit vipar snake(<i>Trimeresurus monticola</i>)	M	II
30/5	Copper Head Trinket(<i>Elaphe radiata</i>)	U/S	IV
31/6	Gecko	U/S	IV

Annexure-VII

Rescue of wild animals & birds by Assam State Zoo (2010-11)

Sl. No.	Name of species	Sex	Date of rescue	Place of rescue	Present condition
1	Whistling teal	U	1/4/2010	Nalbari	Released on 7/4/10 in forest area
2	Python	U	3/4/2010	Hangrabari, Ghy-6	Released on 7/4/10 in forest area
3	Jungle owlet (4 nos)	U	4/4/2010	Dharamtul	All died
4	Python	U	5/4/2010	Rangia Beat office	Released on 7/4/10 in forest area
5	Binocled Cobra	U	5/4/2010	Rangia Beat office	Exhibited
6	Python	U	6/4/2010	Krishnanagar, Ghy-5	Released on 7/4/10 in forest area
7	Barking deer	M	6/4/2010	Noonmati, Ghy.	Exhibited
8	Barn owl	U	6/4/2010	Ulubari	Release in forest area on 9/4/2010
9	Barn owl	U	6/4/2010	Uzanbazar	Died on 8/4/10
10	Hedge hog	U	9/3/2010	CWRC, Kaziranga	Died on 8/4/2010
11	Rh. Macaque	F	8/4/2010	Maligaon	Died on 14/4/2010
12	Barn Owl	U	9/4/2010	Bamunimaidan	Released in forest area on 11/4/2010
13	Barn Owl	U	12/4/2010	Bhangagarh	Released in forest area on 13/4/2010
14	Common leopard	F	15/4/2010	Chandrapur	Released on 16/04/2010 in forest area
15	H G Vulture	U	15/4/2010	Rani	Exhibited
16	Slow Loris	M	17/4/2010	Khanapara	Exhibited
17	Barking deer	M	18/4/2010	Panbazar	Exhibited
18	Python	U	18/4/2010	Bhangagarh	Released on 31/7/2010 in forest area
19	Python	U	19/4/2010	Amingaon	Released on 31/7/2010 in forest area
20	Rat Snake	U	19/4/2010	Ganeshguri	Release in forest area on 30/4/2010
21	Jungle cat (3 nos)	U	20/4/2010	Panikhaity	All died on 3/5/2010
22	Barn owl	U	20/4/2010	Panbazar	Released in forest area on 28/4/2010
23	Python	U	22/4/2010	Ambikanagar	Released in forest area on 31/7/2010
24	Rat snake	U	22/4/2010	Kahilipara	Released in forest area on 28/4/2010
25	H.G. vulture	U	22/4/2010	R.O. Palashbari	Released in forest area on 28/4/2010
26	Python	U	22/4/2010	Dispur	Released on 31/7/2010 in forest area
27	Copper headed trinket	U	23/4/2010	Bharalumukh	Released in forest area on 23/4/2010
28	Rose Rang Parakeet (3 nos)	U	25/4/2010	Khanapara	Released in forest area on 5/5/2010
29	Barn owl	U	26/4/2010	Chandrapur	Released in forest area on 27/4/2010
30	Slow Loris	U	25/4/2010	Garbhanga	Exhibited
31	Jungle Owl	U	27/4/2010	Panjabari	Released in forest area on 1/5/2010

32	Barn Owl	U	29/4/2010	Ambikagiri Nagar	Released in forest area on 29/4/2010
33	Barking Deer	F	29/4/2010	Jalah N.K. division	Died on 30/4/2010
34	Python	U	29/4/2010	Ulubari	Released on 31/7/2010 in forest area
35	Python	U	30/4/2010	Gorchuk	Released on 31/7/2010 at Forest area
36	C.P. Civet	M	30/4/2010	Chandmari	Released in forest area on 31/4/2010
37	Barn Owl	U	30/4/2010	Kharupetia	Released in forest area on 31/7/2010
38	Barking Deer	M	30/4/2010	Noonmati	Died on 1/5/2010
39	Barking Deer	M	1/5/2010	Kharghuli	Exhibited
40	Jungle cat	U	3/5/2010	R.O. Sila Range	Died on 8/5/2010
41	Hoolock Gibbon	M	3/5/2010	Meghalaya	Exhibited
42	Copper Headed trinket	U	8/5/2010	Tezpur	Released in forest area on 9/5/2010
43	Barn Owl	U	9/5/2010	Bharalumukh	Died on 10/5/2010
44	Barn Owl	U	10/5/10	Bishnupath, Zoo Road	Exhibited
45	Spotted Dove	U	11/5/10	Sangita Goswami, PFA	Exhibited
46	Python	U	11/5/10	Jonali Path, RGB Road, Ghy.	Released on 31/7/10, in forest area
47	Indian Flap shell Turtle	M	12/5/10	Hajo	Exhibited
48	Assam Roof turtle	U	11/5/10	Hajo	Exhibited
49	Barn Owl	U	14/5/10	Ujanbazar	Released on 19/5/2010 in Zoo Forest area
50	Cattle egret (15 nos)	U	14/5/10	Maligaon	Released on 2/8/2010 in Zoo Forest (Pelican enclosure)
51	Night Heron (2 nos)	U	15/5/10	Azara	Released on 2/8/2010 in Zoo forest area
52	Hill Myna	U	15/5/10	Azara	Released on 18/5/2010 in Zoo forest area
53	Lesser Adjutant stork	U	15/5/10	Jalukbari	Released on 20/8/2010 in forest area
54	Jungle owlet	U	16/5/10	Noonmati	Died on 14/5/10
55	Common palm civet	F	16/5/10	Japorigog	Died on 19/5/10
56	Barn Owl	U	15/5/10	Kamalpur	Released on 4/6/2010 in Zoo forest area
57	Barn Owl	U	19/5/2010	Kamalpur	Released on 4/6/2010 in Zoo forest area
58	Barking Deer	M	19/5/10	RO Palashbari	Released on 4/6/2010 in Zoo forest area
59	Barking Deer	M	22/5/10	Hajo	Released on 23/5/2010 in Zoo forest area
60	Cattle egret chicks (5 nos)	U	26/5/10	Ujanbazar (PFA)	Released on 01/6/2010 in Zoo forest area
61	Monocled cobra	U	3/6/10	Bamunimaidan	Exhibited
62	Small Indian Civet cat (2 nos)	U	6/6/10	R.O Hatigaon	One died on 11/8/10 One released on 3/9/10
63	Kali Pheasant	M	7/6/10	Amingaon	Died on 15/6/10
64	Small Indian Civet	U	9/6/10	Hatigaon	Released on 39/10 at Zoo Forest area
65	Barn Owl	U	12/6/10	Ananda Nagar, Ghy	Released on 18/7/10 at Zoo Forest area

66	Barn Owl	U	14/6/10	Harumataria, Ghy	Released on 18/7/10 at Zoo Forest area
67	Barking Deer	F	17/6/10	Kharghuli, Ghy	Released at Zoo Forest area on 17/6/10
68	Python	U	18/6/10	Pandu	Released on 31/7/10 in forest area
69	Common Palm Civet	U	20/6/10	Zoo campus	Died on 22/6/10
70	Small Indian Mongoose	F	23/6/10	Survery, Ghy	Exhibited
71	Slow lories	M	30/6/10	Karbianglong	Exhibited
72	HG Vulture (carcass)	U	1/7/10	Jalukbari	
73	Rhesus macaque	M	2/7/10	Santipur, Ghy	Died on 3/7/10
74	King fisher	U	2/7/10	Jyotinagar	Died on 2/7/10
75	King fisher	U	3/7/10	Jyotinagar	Released on 4/7/10 in forest area
76	Leopard cat	M	6/7/10	Zoo campus	Released on 7/7/10 in forest area
77	Flap shell turtle	U	8/7/10	Panbajar, Ghy	Exhibited
78	Python (8 nos)	U	9/7/10	North Guwahati	Release 7 nos in forest area on 31/7/10 & one no died
79	Common wolf snake	U	10/7/10	Gandhibasti	Released on 31/7/10 in forest area
80	Cattle egret	U	14/7/10	PFA , Ghy	Released on 2/8/10 in forest area
81	Black soft shell turtle	U	14/7/10	Bhetapara, Ghy	Exhibited
82	Black soft shell turtle	U	17/7/10	Jalukbari	Exhibited
83	Rat Snake	U	17/7/10	Jotiya, Ghy	Released on 31/7/10 in forest area
84	Pangolin	U	21/7/10	Jorabat	Died on 31/7/10
85	Rat snake	U	24/7/10	Dwarkanagar, Ghy	Released on 31/7/10 in forest area
86	Black soft shell turtle	U	26/7/10	Khanapara	Exhibited
87	Python	U	28/7/10	Narangi	Released on 6/8/10 in forest area
88	Barn owl	U	30/7/10	Joorani Path, Ghy	Released on 6/8/10 in forest area
89	Common palm civet (carcass)	U	1/8/10	PFA, Guwahati	
90	Python	U	2/8/10	Maligaon	Released on 12/10/2010 in forest area
91	C.P Civet	F	8/4/10	Nagaon	Exhibited
92	Cormorant	U	4/8/10	Dighalipukhuri, Ghy	Released on 7/8/10 in forest area
93	Python	U	9/8/10	Sonaighuli	Released on 12/10/2010 in forest area
94	Python	U	10/8/10	Chenchari	Released on 12/10/10 in forest area
95	Cattle Egret	U	12/8/10	PFA, Guwahati	Died on 12/8/10
96	Barn Owl	U	17/8/10	Panbazar	Released on 26/8/10 in forest area
97	Python	U	19/8/10	Adabari	Released on 12/10/10 in forest area
98	Rhesus macaque	M	19/8/10	Bamunimaidan	Died on 20/8/10
99	White breasted king fisher	U	25/8/10	PFA, Guwahati	Exhibited
100	Copper headed trinket	U	26/8/10	Basistha	Exhibited
101	Barking Deer	F	26/8/10	Kharghuli	Exhibited
102	Copper headed trinket	U	27/8/10	Kumarpara	Exhibited
103	Python	U	29/8/10	Krishna Nagar	Released on 12/10/10 in forest area

104	S.I. Civet (Carcass)	M	29/8/10	Panjabari	
105	Python	U	31/8/10	Panjabari	Released on 12/10/10 in forest area
106	Python	U	1/9/10	Amingaon	Released on 12/10/10 in forest area
107	Leopard cat	U	3/9/10	Hengrabari	Exhibited
108	Python	U	3/9/10	Barbari, VIP Road	Released on 12/10/10 in forest area
109	Leopard cat	M	4/9/10	Kharghuli	Died on 4/9/10
110	Python	U	4/9/10	North Guwahati	Released on 12/10/10 in forest area
111	Leopard cat	F	4/9/10	Rani	Released on 09/10/10 in forest area
112	Jungle owlet	U	5/9/10	PFA, Ghy	Died on 13/9/10
113	Peacock soft shell turtle	U	7/9/10	Silpukhuri	Exhibited
114	Python	U	7/9/10	Maligaon	Released on 12/10/10 in forest area
115	Python	U	8/9/10	Jonali RGB Road	Released on 12/10/10 in forest area
116	Python	U	9/9/10	Kenduguri path	Released on 12/10/10 in forest area
117	Green cat snake	U	13/9/10	Noonmati Sector	Exhibited
118	Python	U	13/9/10	Machkhowa	Released on 12/10/10 in forest area
119	Barking deer	F	24/9/10	Amchang WLS	Released on 4/10/10 in forest area
120	Turtle (Dura kacho)	U	26/9/10	Birkuchi	Exhibited
121	Python	U	28/9/10	Bonda	Released on 12/10/10 in forest area
122	Purple moorhen	U	28/9/10	Satgaon	Released on 30/9/10 in forest area
123	Python	U	29/9/10	Satgaon	Released on 12/10/10 in forest area
124	Indian Rat snake	U	29/9/10	Kalimati	Exhibited
125	Barking deer	M	29/9/10	Noonmati	Released on 3/10/10 in forest area
126	Python	U	29/9/10	Gitanagar, Ghy	Released on 12/10/10 in forest area
127	Python	U	30/9/10	Gitanagar, Ghy	Released on 12/10/10 in forest area
128	Spotted linsang	U	1/10/10	Basistha	Identified on 16/5/11
129	Indian Soft shell turtle	U	30/9/10	Marigaon	Exhibited
130	Python	U	2/10/10	Lokhora	Exhibited
131	Pond Heron	U	2/10/10	PFA, Guwahati	Released in forest area
132	Large Indian Civet	U	3/10/10	Jayanagar	Exhibited
133	Indian Soft shell turtle	U	5/10/10	Beltola Tiniali	Exhibited
134	Pariah kite	U	8/10/10	Paltanbazar PS	Released on 9/11/10 in forest area
135	Cormorant	U	10/10/10	PFA, Ghy	Released on 18/10/10 in forest area
136	Barking deer	F	10/10/10	Jyotinagar	Died on 12/10/2010
137	Rose Rink Parakeet	M	11/10/10	Nabagraha	Released on 15/10/10 in forest area
138	Rhesus macaque (2 nos)	F	11/10/10	Silpukhuri	Died on 15/10/10
139	Python	U	12/10/10	Rupnagar	Released on 17/12/10 in forest area
140	Black kite	U	14/10/10	Khanapara	Released on 17/12/10 in forest area

141	Python	U	16/10/10	Khanapara	Released on 17/12/10 in forest area
142	Python	U	18/10/10	Rajgarh	Released on 17/12/10 in forest area
143	Python	U	18/10/10	Rajgarh	Released on 17/12/10 in forest area
144	Monocled cobra	U	18/10/10	Azra	Released on 17/12/10 in forest area
145	Black Kite	U	24/10/10	Borjhar	Released on 30/10/10 in forest area
146	Python	U	26/10/10	Panikhaiti	Released on 17/12/10 in forest area
147	Red snake	U	30/10/10	PFA, Ghy	Released on 31/10/10 in forest area
148	Jungle owlet	U	2/11/10	PFA, Ghy	Released on 3/11/10 in forest area
149	Python	U	2/11/10	Chandmari	Released on 17/12/10 in forest area
150	Barking deer	M	5/11/10	Sixmile	Released on 17/12/10 in forest area
151	Copper headed trinket	U	11/11/10	Zoo Road	Exhibited
152	Barn owl (3 nos)	U	15/11/10	South Sarania	All Died on 15/11/10
153	Python	U	17/11/2010	Gitanagar	Released on 17/12/10 in forest area
154	C.P. civet	U	17/11/10	Khanapara	Died on 17/11/10
155	Python	U	20/11/10	Lokhara	Released on 17/12/10 in forest area
156	Python	U	23/11/10	Narangi	Released on 17/12/10 in forest area
157	Python	U	26/11/10	Sookuchi	Released on 17/12/10 in forest area
158	Rat snake	U	26/11/10	Hatigaon	Exhibited
159	Python	U	27/11/10	Changchari	Released on 17/12/10 in forest area
160	Hog deer	F	22/11/10	Udalguri	Exhibited
161	Common leopard (cub)	U	27/11/10	Maligaon	Died 10/12/10
162	Wolf snake	U	27/11/10	Gitanagar	Released on 8/11/10 in forest area
163	Spotted dove (2 nos)	U	29/11/10	PFA, Ghy	Released on 5/12/10 in forest area
164	Blue throated barbed	U	2/12/10	Dispur	Released on 3/12/10 in forest area
165	Parakeet	U	4/12/10	PFA , Ghy	Released on 17/12/10 in forest area
166	Assam roof turtle	U	7/12/10	Japorigog	Exhibited
167	Barn owl	U	9/12/10	Zoo Road	Released on 9/12/10 in forest area
168	White breasted king fisher	U	11/12/10	RGB Road, Ghy	Died on 13/12/10
169	Barking deer	U	16/12/10	Udalguri	Exhibited
170	Barn owl	U	17/12/10	Jayanagar	Died on 18/12/10
171	C.P. Civet	U	18/12/10	Japorigog	Released on 1/2/11 in forest area
172	Serow	F	19/12/10	N.C. Hlld	Died on 20/12/10
173	Serow	F	23/12/10	Gitanagar	Exhibited
174	Barn Owl (Carcass)	U	24/12/10	Garchuk	
175	Python	U	26/12/10	North Guwhati	Exhibited
176	Dove	U	28/12/10	PFA, Ghy	Released on 2/2/11 in forest area
177	Barn owl chick	U	8/1/11	Ganesh Mandir	Died on 9/1/11

178	Barn Owl	U	8/1/11	Bhangagarh	Died on 18/1/11
179	Barn owl	U	9/1/11	PFA, Ghy	Released on 12/1/11 in forest area
180	Hog deer	F	13/1/11	Lakhimpur	Exhibited
181	Barking deer (Carcass)	F	15/1/11	Basistha	
182	Barking deer (Carcass)	M	15/1/11	Narangi	
183	H.G. Vulture	U	19/1/11	Rani	Died on 17/2/11
184	Copper headed trinket	U	19/1/11	Kamakhya	Died on 22/1/11
185	Python	U	21/1/11	Jalukbari	Exhibited
186	Python	U	21/1/11	Zoo campus	Exhibited
187	Jungle owlet	U	21/1/11	Bharalumukh	Released on 23/1/11 in forest area
188	Lesser adjutant stork	U	22/1/11	Hajo	Died 23/1/11
189	Barn owl	U	23/1/11	Fatasil Ambari	Released on 25/1/11 in forest area
190	Python	U	23/1/11	Mongaldoi	Exhibited
191	Barbet	U	24/1/11	Ulubari	Released on 25/1/11 in forest area
192	Leopard cat	M	26/1/11	Amchang WLS	Died on 27/1/11
193	S.I. Civet cat	M	26/1/11	Dispur	Died on 26/1/11
194	Python	U	26/1/11	Noonmati	Exhibited
195	Barn owl	U	27/1/11	Bhangagarh	Released on 27/1/11 in forest area
196	Clouded leopard	M	27/1/11	Mongaldoi N.K.Divn	Died on 14/2/11
197	Barking deer	F	29/1/11	Beltola	Exhibited
198	Barn owl	U	29/1/11	Narangi	Released on 02/02/11 in forest area
199	Jungle owlet	U	2/2/11	PFA, Ghy	Died on 8/2/11
200	Clouded leopard	M	2/2/11	Mongaldoi N.K.Divn	Died on 17/2/11
201	C.P. Civet	M	4/2/11	Bhetapara	Exhibited
202	Barn Owl	U	4/2/11	Sixmile	Released on 10/12/11 in forest area
203	Rhesus macaque	F	7/2/11	Narikal Bari, Ghy-24	Died on 22/2/11
204	Barn owl	U	8/2/11	RBI Panbazar	Released on 15/2/11 in forest area
205	Python	U	8/2/11	Pandu	Exhibited
206	Rhesus macaque	F	11/2/11	PFA, Ghy	Died on 13/2/11
207	Barn owl	U	12/2/11	Rehabari	Released on 16/2/11 in forest area
208	Golden Langur	F	13/2/11	Umamanda temple	Exhibited
209	Rh. Macaque	M	13/2/11	Nabagraha	Exhibited
210	Barn owl	U	15/2/11	Hengrabari	Died on 20/2/11
211	Barn owl	U	16/2/11	PFA, Ghy	Died on 20/2/11
212	Barking deer	U	18/2/11	Udalguri	Exhibited
213	Hog Deer	F	25/2/11	Bejera	Died on 25/02/11
214	Barking deer (Carcass)	F	28/2/11	Hailakandi	
215	Budjarigor (3 nos)	U	6/3/11	Hatigaon	Exhibited
216	Jungle owlet	U	7/3/11	Pubsarania	Released on 14/3/11 in forest area
217	Barking deer (cub)	U	7/3/11	Noonmati	Died on 11/3/11
218	Pariah kite	U	7/3/11	Guwahati Club	Exhibited
219	Copper headed trinket	U	8/3/11	Jyotinagar	Released on 8/3/11 in forest area
220	Barn Owl (2 nos)	U	9/3/11	Sila Range	Died on 20/3/11

221	Copper headed trinket	U	11/3/11	Fatasil	Released on 11/3/11 in forest area
222	C.P Civet	U	11/3/11	Santipur	Died on 16/3/11
223	Budjarigor (4 nos)	U	13/3/2011	Rukminigaon	Died on 19/3/2011
224	C.P Civet	U	22/3/2011	Maligaon	Escaped from enclosure on 25/3/2011
225	Barn owl	U	23/3/2011	Zoo campus	Released on 25/3/11 in forest area
226	Barn owl	U	25/3/2011	Silpukhuri	Released on 28/3/11 in forest area
227	Rock python	U	25/3/2011	Lalmati	Exhibited
228	Rat snake (2 nos)	U	25/3/2011	Kahilipara	Exhibited
229	Copper headed trinket	U	29/3/2011	Amingaon	Exhibited
230	Barking deer	F	30/3/2011	Noonmati	Died on 30/3/2011

Rescue animal of Assam State Zoo (2003-04)

Species	Male	Female	Unsexed	Total
Mammals	20	14	6	40
Birds	1	2	16	17
Reptiles	2	2	29	33
Grand Total =				90

Rescue animal of Assam State Zoo (2004-05)

Species	Male	Female	Unsexed	Total
Mammals	43	22	8	73
Birds	4	5	41	50
Reptiles	0	0	38	38
Grand Total =				161

Rescue animal of Assam State Zoo (2005-06)

Species	Male	Female	Unsexed	Total
Mammals	24	17	5	46
Birds	0	0	43	43
Reptiles	1	2	42	45
Grand Total =				134 Nos.

Rescue animal of Assam State Zoo (2006-07)

Species	Male	Female	Unsexed	Total
Mammals	38	41	4	83
Birds	1	5	79	85
Reptiles	0	0	70	70
Grand Total =				238 Nos.

Rescue animal of Assam State Zoo (2007-08)

Species	Male	Female	Unsexed	Total
Mammals	33	42	5	80
Birds	2	1	75	78
Reptiles	0	0	72	72
Grand Total =				230 Nos.

Rescue animal of Assam State Zoo (2008-09)

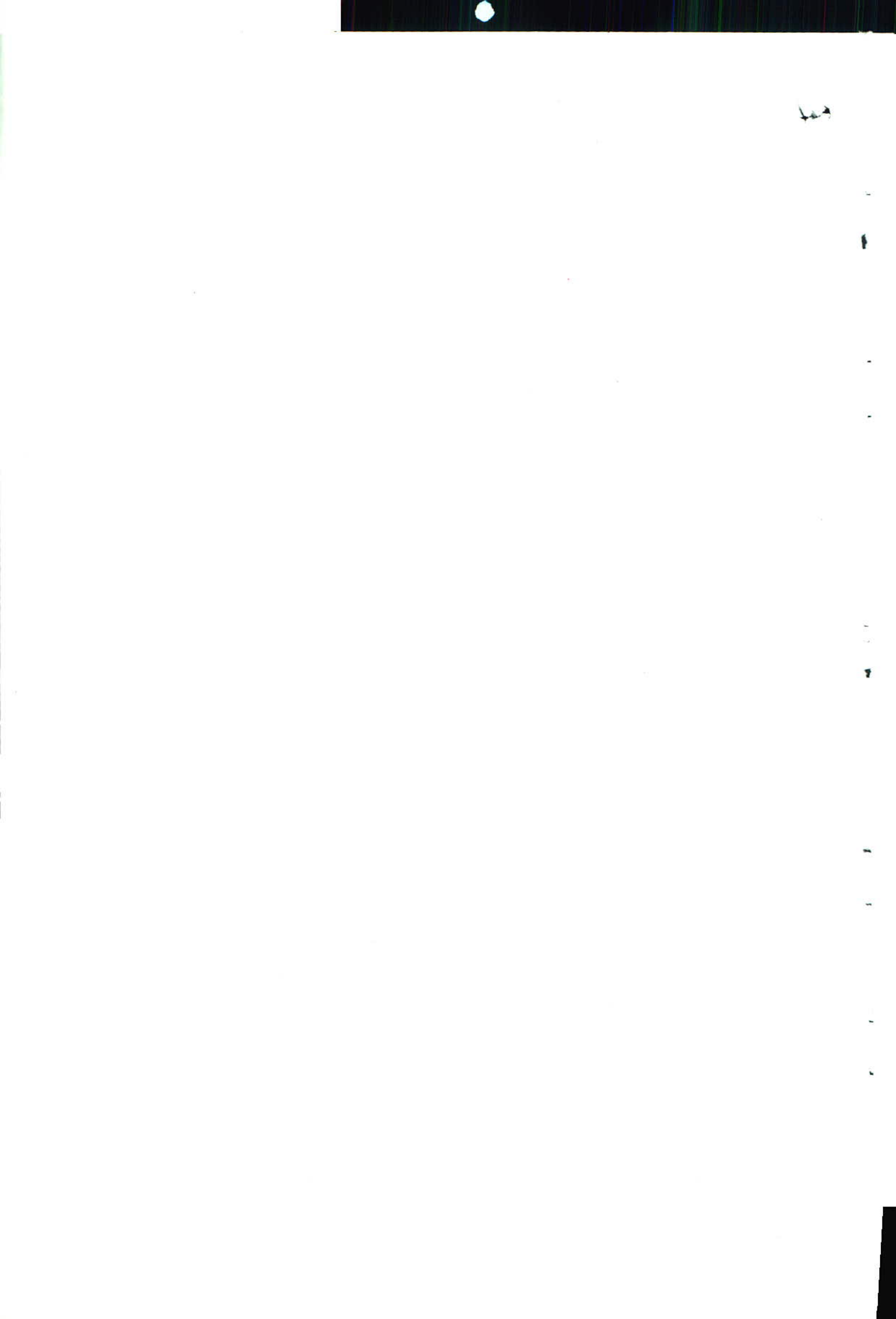
Species	Male	Female	Unsexed	Total
Mammals	36	28	9	73
Birds	2	1	123	126
Reptiles	0	0	77	77
Grand Total =				276 Nos.

Rescue animal of Assam State Zoo (2009-10)

Species	Male	Female	Unsexed	Total
Mammals	36	38	6	80
Birds	1	2	90	93
Reptiles	0	0	82	82
Grand Total =				255 Nos.

Rescue animal of Assam State Zoo (2010-11)

Species	Male	Female	Unsexed	Total
Mammals	34	26	13	73
Birds	1	1	107	109
Reptiles	0	0	95	95
Grand Total =				277 Nos.



Annexure- VIII
GOVERNMENT OF ASSAM
ENVIRONMENT AND FORESTS DEPARTMENT
DISPUR, GUWAHATI

ORDER BY THE GOVERNOR
NOTIFICATION

Dated Dispur, the 14th June, 2011

No.FRW.31/1999/P1/126 The Governor of Assam is pleased to constitute a Health Advisory Committee for monitoring of Animal Health in Assam State Zoo, Guwahati with the following members with immediate effect:-

- | | | | |
|----|--|---|------------------|
| 1. | The Principal Chief Conservator of Forest Wildlife, Assam, Basistha, Guwahati -29 | - | Chairman. |
| 2. | Dean, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati - 22 | - | Member |
| 3. | Director, Animal Husbandry & Veterinary Department of Assam, Chenikuthi, Guwahati-3. | - | Member |
| 4. | Professor & Head, Department of Veterinary, Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati -22 | - | Member |
| 5. | Professor & Head, Department of Pathology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati -22 | - | Member |
| 6. | Chief Engineer, Public Health Engineering Department, Assam, Hengrabari, Guwahati - 6. | - | Member |
| 7. | Professor & Head, Department of Nutrition, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati -22 | - | Member |
| 8. | The Veterinary Officer, Assam State Zoo Division, Guwahati - 5 | - | Member |
| 9. | The Divisional Forest Officer Assam State Zoo Division, Guwahati - 5 | - | Member Secretary |

Sd/- (S. Prasad, IAS) *
Principal Secretary to the Government of Assam,
Environment and Forests Department,
Dispur, Guwahati - 6.

Memo. No.FRW.31/1999/P1/126 -A,
Copy to:-

Dated Dispur, the 14th June, 2011

1. The Principal Chief Conservator of Forests, & Head of Forests Force, Assam, Rehabari, Guwahati - 8.
2. The Principal Chief Conservator of Forests (Wildlife), Assam, Basistha, Guwahati - 29.
3. All members of the Committee.
4. The Member Secretary, Central Zoo Authority, Bikaner House, Annexe - VI, Shahajhan Road, New Delhi - 110011.
5. Member concerned for favour of information.
6. The Director, Assam Government Press, Bamunimaidan, Guwahati - 21 with a request to publish the notification in the next issue of the Assam Gazette urgently and furnish a copies to this Department..

By order etc.,

Indir Singh
14/06/2011
Deputy Secretary to the Government of Assam,
Environment and Forests Department,
Dispur, Guwahati - 6

1



Annexure – IX

Details of visitors and revenue collected during the last 10 years

Year	No of Tourists			Revenue from tourist	Total Revenue from all sources
	Indian	Foreigner	Total		
2001-02	490487 Nos.	-	490487 Nos.	24,58,927.00	26,69,653.00
2002-03	486546 "	-	486546 "	24,43,712.00	25,25,397.00
2003-04	444925 "	121 Nos.	445046 "	47,80,155.00	49,36,460.00
2004-05	400520 "	89 "	400609 "	42,95,230.00	45,08,036.00
2005-06	460181 "	143 "	460324 "	49,28,060.00	51,27,856.00
2006-07	430342 "	122 "	430464 "	47,33,835.00	48,97,712.00
2007-08	434695 "	101 "	434796 "	48,27,987.00	49,19,187.00
2008-09	524598 "	166 "	524764 "	54,12,795.00	56,80,944.00
2009- 10	574056 "	138 "	574194 "	58,78,200.00	65,66,765.00
2010-11	606154 "	186 "	606340 "	54,56,045.00	66,93,716.00

Annexure – IX (a)

Entry fee, etc.

Sl No	Fee and charges	Rate		Up to	Up to
		Indian	Foreigner		
1	ENTRY FEE				
	a) Adult per person per day	Rs. 10/-	Rs. 50/-		
	b) Children, per child per day	Rs.5/-	Rs.25/-		
	c) Student (concession)	Rs.5/-	Rs.15/-		
2	PHOTOGRAPHY				
	Photography per day by an amateur Photographer				
	a) Per still camera without telelense	Rs.10/-	Rs.20/-		
	b) Per still camera with extra telelense	Rs.50/-	Rs.150/-		
	c) Per movie camera (8mm)	Rs.100/-	Rs.200/-		
	d) Per movie camera (16mm)	Rs.300/-	Rs.500/-		
	e) Per Video Camera (Home)	Rs.100/-	Rs.200/-		
	Photography per day by an professional Photographer				
	a) Per still camera	Rs.200/-	Rs.400/-		
	b) Per movie camera (8 mm & 16mm)	Rs.2000/-	Rs.4000/-		
	b) Per movie camera (35 mm)	Rs.2000/-	Rs.4000/-		
	e) Per Video Camera	Rs.1000/-	Rs.2000/-		
3	PARKING FEE			For 5 hours or more	Up to and less than 5 hours
	a) Light vehicle like Car/Jeep			Rs.100/-	Rs.50/-
	b) Mini Bus			Rs.250/-	Rs.125/-
	c) Bus			Rs.250/-	Rs.125/-
	d) By cycle			Rs.5/-	-
	e) Scooter/Motor Cycle			Rs.25/-	Rs.15/-

Annexure – X

Concept Plan: The future objectives and activities proposed is based on the Concept Plan approved by Central Zoo Authority vide their letter No. F. No. 19-62/92-CZA(27) (Vol.V) (M)/333 dt.22/07/2011.

Sl. No.		
1	Name of the Zoo	Assam State Zoo-cum-Botanical Garden, Guwahati, Assam
2	Category of the zoo	Large
3	Area of the zoo	175.00 hectares
4	Objective	(i) Conservation breeding of One horned rhinoceros, Golden langur, Serrow, Golden cat, Grey peacock Pheasant and other endangered species of N.E. Area. (ii) Conservation education and awareness (iii) Research for conservation of wildlife (iv) Rescue and rehabilitation
5	Theme of display	(I) Mixed theme comprising ecological and behavioral aspects with some elements of taxonomic display of wild animal species of national importance with special emphasis on fauna of north eastern India. (ii) Off-display conservation breeding centres for one horned rhinoceros, Golden langur, Serrow, Golden cat and Grey peacock pheasant. (iii) Off-display Rescue Centre for Leopards and Himalayan black bear.
6	Animal Collection Plan	Tiger, Leopard, Clouded leopard, Golden cat, Golden langur, Hoolock gibbon, Sun bear, Pig tailed monkey, Stump tailed monkey, one horned Rhinoceros, Elephant, Serrow, Thamin deer, Grey peacock pheasant, Vulture, etc.
7	Master (Layout) Plan	To be prepared accordingly
8	Manpower	(I) CF/DCF level full time officer-in-charge as Director (ii) DCF/ACF level full time Curator (animals) – 1 no. (iii) Vet. Officers -2 nos. (iv) Education officer – 1 no. (v) Biologist – 1 no (vi) Support staff as per needs
9		Special efforts to be made to conserve the unique flora existing at the zoo and educate the public.

Annexure - XI

SMART (Strength, Measurable, Achievable, Reasonable and Time) on OBJECTIVES:

Scientific study and Database:

- (1) Assam State Zoo cum Botanical Garden with its more than 5 decades of existence gathered huge experience on captive management of wild animals and recorded significant quantum of database in terms of animal health and nutrition, breeding behavior, disease management, etc. the college of veterinary science, situated near to the zoo campus also conducted several studies on health issues of wild animals in the zoo, which can be a very strong foundation for further scientific study to be applied in ground situation.
- (2) The data and study so far conducted can be assessed and measured to create a solid foundation for future in depth research and to create strong database. Future study on peculiar health problem of captive animals management, improved nutrition, breeding in captivity, enrichment, etc. can be very useful to sort out several problems related to wild life management.
- (3) With the proper training of existing staff to record day to day behavior of captive animals and also with provision of engagement of Biologist, as suggested in the plan and also by the research scholars of college of veterinary science, Khanapara, the objective of extensive study and creating reliable database can be achieved.
- (4) The objective so set is quite reasonable in the background of past and present record of research and studies conducted by research scholars of College of Veterinary Science, Khanapara with the assistance from Assam State Zoo authority in terms of sharing information.
- (5) It can be assumed that within the Master Plan period, the Assam State Zoo cum Botanical Garden will be able to consolidate its strength on creation of this database through scientific study in a sustained basis.

Conservation breeding:

- 1) Assam State Zoo cum Botanical Garden has been succeeding in a continuous basis in regard to breeding of rare and endangered wild animals since its

inception. Breeding of rare species viz. Rhino, Golden langur, Thamin, Royal Bengal Tiger, White winged wood duck, Small cats, Stamp tailed macaque, Himalayan black bear, etc. have taken place because of excellent housing, nutrition, health care, etc. fulfilling the requirements of the species.

- 2) The experience gathered on this aspect can be assessed and measured for using it in future conservation breeding programme. The zoo campus has sufficient natural forest tract to accommodate sufficient infrastructure such as enclosure with natural elements suitable for targeted species.
- 3) The objectives of conservation breeding can be achieved in the above fact and the expertise gained so far will be helpful to augment the breeding programme in a vigorous way. The proposed new post of biologist, etc. will able to conduct the programme in a scientific and systematic manner.
- 4) The objective is a reasonable one as Assam State Zoo cum Botanical Garden has established its credential on successful breeding of very rare species and it has already initiated action on conservation breeding activities related to rhino, golden langur and serrow.
- 5) It is hoped that during the present Master Plan period Assam State Zoo cum Botanical Garden will able to achieve the target pertaining to conservation breeding on rhinos, golden langur and serrow with rising of sufficient young population, proper infrastructure, visual records, etc. on these three species and considerable progress on conservation breeding programme on grey peacock pheasant and golden cat in terms of creation of foundation animals, breeding facilities, etc.

Conservation Education and Awareness:

- 1) Assam State Zoo cum Botanical Garden with its rich natural environment and large number of animal housing facilities have been providing excellent scope for spreading wildlife education. The zoo has played tremendous role of spreading mass awareness on conservation education by displaying wild animals in a natural environment and showcasing their behavior. Since about 7 lakhs visitors come to the zoo every year, they are directly exposed to the message on importance of wildlife conservation. The publicity materials and organization of various special programs such as wildlife week, environment

day, etc. has helped in spreading the message of conservation education and awareness.

- 2) The strategy of the zoo management is such that visitors are exposed to wide array of facilities which directly provide opportunity on wild education in an interesting way. While proper upkeep and safety animals are the main emphasis, the education and awareness have been also given enough importance.
- 3) Already conducted different educational programme such as wildlife week, environment day, earth day, etc. have achieved this objective to a large extent. Many more interesting similar programme and activities will augment the conservation education and awareness in a bigger way.
- 4) The proposed new programme such as zoo school, interpretation facilities, etc. will help the management to make further progress in objective of wildlife education.
- 5) The plan period of master plan will definitely able to evolve more avenues on this aspect.

Housing, Health Care and Environment Enrichment:

- 1) Assam State Zoo cum Botanical Garden has about 60 enclosures, few of which are scientifically designed meeting the physical and psychological needs of the captive animals. Through out its existence, ASZBG could able to achieve significant experiences and knowledge on appropriate housing and, health care and environmental enrichment of enclosure for providing a near natural habitat for the zoo inmates. Because of the success on this front the zoo could able to succeed breeding of many species and maintaining proper health of zoo captives. The zoo hospital is a modern one with provision of various facilities to meet the health requirement of the animals. There are two well experienced veterinarians with supporting staff attending the health aspects of the zoo animals. Further, the engineer of the zoo is also a well experienced in zoo enclosure designing and construction.
- 2) The Master plan has proposed to have altogether 79 enclosures including 11 existing, 12 newly proposed, 39 to be modified and 18 to be redone ones. These housing facilities will be of scientifically design, open type having large space, provided with proper night shelters, appropriate environmental

enrichment and other latest elements of zoo enclosures which will ensure suitable and comfortable housing for the zoo animals.

- 3) As the zoo has already taken steps to modernize the existing enclosures and also initiated to prepare design on better enclosures, the objective of housing and, health care and environmental enrichment of enclosure is achievable .
- 4) The objective is reasonable on the backdrop of the fact that the zoo has its own record of long existence with successful zoo management. The experience and knowledge so achieved will be helpful to achieve the objective in which continuous training of the staff will be of helpful in realizing the objective.
- 5) The plan period will able to achieve the objective of appropriate housing which will ensure comfort, safety and near natural environment to the species listed in the collection plan.

Annexure - XII (A)
Proposed Collection Plan (Animal)

	MAMMALS			Present Species					Proposed collection					Animals to be acquired or removed					Remarks				
	No	Species	Scientific name	M	F	US	C	Total	M	F	US	C	Total	M	F	US	C	Total					
	1	Binturong	<i>Arctictis binturong</i>	1				1	2	1			3	1	1			2	To be acquired by Exchange programme				
	2	Black buck	<i>Antelope cervicapra</i>	4	3		2	9	4	3		2	9						To be acquired by Exchange programme				
	3	Capped Langur	<i>Presbytis pileatus</i>	1				1	3	5			8	2	5			7	To be acquired by Exchange programme				
	4	Chinese Pangolin	<i>Mainis pentadactyla</i>	1	2	1		4					4						To be acquired by Exchange programme				
Sch- I	5	Clouded Leopard	<i>Neofelis nebulosa</i>					0	2	3			5	2	3			5	To be acquired by Exchange programme				
	6	Crab-eating Macaque	<i>Macaca irus umbrosa</i>					0	1	2			3	1	2			3	To be acquired by Exchange programme				
	7	Fishing Cat	<i>Felis viverrina</i>		1			1	1				2	1				1	To be acquired by Exchange programme				
	8	Four-horned antelope	<i>Tetracerus quadricornis</i>					0	2	4			6	2	4			6	To be acquired by Exchange programme				
	9	Giant squirrel	<i>Ratufa macroura</i>					0	1	2			3	1	2			3	To be acquired by Exchange programme				
	10	Golden Cat	<i>Felis temmincki</i>					0	1	2			3	1	2			3	To be acquired by Exchange programme				
	11	Golden Langur	<i>Presbytis geei</i>	5	2			7	5	10			15		8			8	From rescued individual				
	12	Hog Badger	<i>Arctictis binturong</i>						1	2			3	1	2			3	To be acquired by Exchange programme				
	13	Hoolock Gibbon	<i>Hylobates Hoolock</i>	2	2			4	3	3			6	1	1			2	By breeding from existing population				
	14	Indian Lion	<i>Panthera leo persica</i>	2	5			7	2	5			7										
	15	Indian Rhinoceros	<i>Rhinoceros unicornis</i>	3	2			5	5	5			10	2	3			5	From rescued individual				
	16	Leaf Monkey	<i>Presbytis phayarei</i>					0	1	2			3	1	2			3	To be acquired by Exchange programme/From rescued individual				
	17	Spectacled d Macaque						0	1	2			3	1	2			3	To be acquired by Exchange programme				
	18	Leopard	<i>Panthera pardus</i>	11	4			15	4	4			8	4	4			8	To be removed				
	19	Leopard Cat	<i>Felis bengalensis</i>	10	8	8		26	10	8	8		26										
	20	Black Panther	<i>Panthera pardus</i>	1	1			2	1	1			2										
	21	Lion-tailed Macaque	<i>Macaca silenus</i>		1			1	1	1			2										
	22	Loris	<i>Loris tardigradus</i>	9	2			11	5	6			11	4	4			8	To be acquired by Exchange programme				
	23	Otter	<i>Aonyx cinerea</i>	1				1	2	2			4	1	2			3	To be acquired by Exchange programme				
	24	Pygmy Hog	<i>Sus salvantus</i>					0	2	4			6	2	4			6	Pygmy Hog Breeding Centre, Guwahati				
	25	Serow	<i>Capricornis sumatraensis</i>	2	2		1	5	2	4		1	7		2			2	To be acquired by Exchange programme				
	26	Sloth Bear	<i>Melursus ursinus</i>					0	1	2			3	1	2			3	To be acquired by Exchange programme				
	27	Swamp Deer	<i>Cervus duvauceli</i>					0	2	4			6	2	4			6	From rescued individual/To be acquired by Exchange programme				
	28	Thamin	<i>Cervus eldi</i>	7	9	4		20					20										
	29	Tiger	<i>Panthera tigris</i>	2	4		3	9	2	4		3	9										
	30	Wild Buffalo	<i>Babalis bubalis</i>					0	1	2			3	1	2			3	From rescued individual				
				Total =				62	48	13	6	129	68	93					200	32	61		93

REPTILES																			
Snake																			
No	Common English Name	Scientific Name	M	F	US	C	Total	M	F	US	C	Total	M	F	US	C	Total		
61	Indian Rat Snake	<i>Ptyas mucosa</i>			5		5					5							
62	Royal snake	<i>Spalerosophis diadema</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
63	Copperheaded Trinket Snake	<i>Coelognathus radiatus</i>			5		5					5							
64	Red Necked Keelback	<i>Rhabdophis subminiatus</i>			2		2					2							
65	Banded Kukri Snake	<i>Oligodon albocinctus</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
66	Common Vine Snake	<i>Ahaetulla nasuta</i>			2		2					2							
67	Bronzeback Tree Snake	<i>Dendrelaphis pictus</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
68	Ornate flying Snake	<i>Chrysopelta ornata</i>			5		5					5							
69	Eastern Cat Snake	<i>Boiga gokool</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
70	Assamese Cat Snake	<i>Boiga quincunciata</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
71	Russel's Boa	<i>Eryx conicus</i>			7		7					7							
72	Eryx Sand Boa	<i>Gongylophis conicus</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
73	Red Sand Boa	<i>Eryx johnii</i>			9		9					9							
74	Common Water Snake	<i>Xenochrophis piscator</i>					0	1	1			2	1	1				2	To be acquired by Exchange programme
Se II PtlI	75	Burmese Python			4		4					4							
Se I	76	Snake Trinket			4		4					4							
	77	Cobra acellate			5		5					5							
Se II PtlI	78	Cobra Black			2		2					2							
Se II PtlI	79	Monocled Cobra			5		5					5							
	80	Banded Krait					0	1	1			2	1	1				2	To be acquired by Exchange programme
	81	King Cobra					0	1	1			2	1	1				2	To be acquired by Exchange programme
	82	Checkered keelback snake																	
		<i>Henochropsis piscator</i>			3		3					3							
		Total			58		58	9	9			76							
Lizards																			
	83	Monitor Lizard			1		0	1	1	1		3	1	1				2	To be acquired by Exchange programme
	84	Common Garden Lizard					0	1	1			2	1	1				2	To be acquired by Exchange programme
	85	Tokay Gecko					0	1	1			2	1	1				2	To be acquired by Exchange programme
		Total =			1			3	3			7							

**Annexure- XII (B)
Bird Collection Plan**

Sl. No.	Species	Existing					Proposed Collection			Animals to be acquired or removed					Remarks
		M	F	US	C	Total	M	F	Total	M	F	US	C	Total	
1	Buz			3		3	2	4	6	1	2			3	To be acquired by Exchange programme
2	Peacock	1	3			4	1	4	5		1			1	By breeding from existing population
3	Barn owl			2		2			2						
4	Jungle owlet			1		1	1	1	3	1	1			2	To be acquired by Exchange programme
5	Brown fish Owl			12		12			12						
6	Indian Cuckoo			4		4			4						
7	WBW Hen			5		5			5						
8	Red Jungle Fowl	1	2			3	2	4	6	1	2			3	By breeding from existing population
9	Silver Dorik		2			2	1		3	1				1	To be acquired by Exchange programme
10	Kalis Pheasant		1			1	2	3	5	2	2			4	To be acquired by Exchange programme
11	Slaty Headed Parakeet			4		4			4						
12	Parakeet Rose Ringed			23		23			23						
13	Parakeet Plum Headed		1			1	2	4	6	2	3			5	To be acquired by Exchange programme
14	Alz.Parakeet	1	1	1		3			3						
15	Myna			17		17			17						
16	P. Kite			16		16			16						
17	Eagle			2		2			2						
18	G. Hornbill		1			1	1	3	4	1	2			3	To be acquired by Exchange programme
19	Oriental Pied Hornbill			2		2	1	3	4	1	2			3	To be acquired by Exchange programme
20	White Ibis			4		4	1	1	6	1	1			2	By breeding from existing population
21	Greater Adj. Stork			3		3	2	2	7	2	2			4	To be acquired by Exchange programme
22	Lesser Adjutant Stork			1		1	2	2	5	2	2			4	To be acquired by Exchange programme
23	Pelican Great White	7	3	30		40			40						
24	Peican Spot Billed	1	1			2	2	3	7	2	3			5	By breeding from existing population
25	Cattle Egret			4		4			4						
26	Large Cormorant			2		2	1	1	4	1	1			2	To be acquired by Exchange programme
27	Purple Swamp Hen	3	6	2		11			11						
28	K. Fisger White Throated	1	1			2	3	5	8	2	4			6	To be acquired by Exchange programme
29	Moorhen			2		2	1	2	5	1	2			3	To be acquired by Exchange programme
30	Whistling Teal Lesser			5		5			5						
31	Night Heron			1		1	2	2	5	2	2			4	To be acquired by Exchange programme
32	Fan Tail Pigeon			1		1	1	1	3	1	1			2	To be acquired by Exchange programme
33	Spotted Dove			1		1	2	2	5	2	2			4	To be acquired by Exchange programme
34	Himalavn Griffon			5		5	2	3	10	2	3			5	To be acquired by Exchange programme
35	Cinerosus Vultures			1		1	4	5	10	4	5			9	To be acquired by Exchange programme
36	Jerdons Baza			1		1	1	1	3	1	1			2	To be acquired by Exchange programme
	Total	15	22	155		192	37	56	268	33	44			77	

Proposed Indigenous New

Sl. No.	Species	Aquatic Bird					Proposed Collection			Animals to be acquired or removed					Remarks	
		M	F	US	C	Total	M	F	Total	M	F	US	C	Total		
1	Ducks						25	50	75	25	50				75	To be acquired by Exchange programme/From rescued individual
2	Jacanas						5	10	15	5	10				15	To be acquired by Exchange programme/From rescued individual
3	Moorhens						4	8	12	4	8				12	To be acquired by Exchange programme/From rescued individual
4	Gees						4	8	12	4	8				12	To be acquired by Exchange programme/From rescued individual
5	Egrets						20	40	60	20	40				60	To be acquired by Exchange programme/From rescued individual
6	Hérons						5	10	15	5	10				15	To be acquired by Exchange programme/From rescued individual
7	Coot						5	10	15	5	10				15	To be acquired by Exchange programme/From rescued individual
8	Lapwings						4	8	12	4	8				12	To be acquired by Exchange programme
9	Sandpipers						8	16	24	8	16				24	To be acquired by Exchange programme
10	Ibis						6	12	18	6	12				18	To be acquired by Exchange programme
11	Kingfishers						10	20	30	10	20				30	To be acquired by Exchange programme/From rescued individual
12	Storks						15	30	45	15	30				45	To be acquired by Exchange programme/From rescued individual
	Total								333						333	

Proposed Indigenous New

Sl. No.	Species	Terrestrial					Proposed Collection			Animals to be acquired or removed					Remarks	
		M	F	US	C	Total	M	F	Total	M	F	US	C	Total		
13	Muniya						10	20	30	10	20				30	To be acquired by Exchange programme
14	Rithead Hornbills						3	6	9	3	6				9	To be acquired by Exchange programme
15	Bulbuls						4	8	12	4	8				12	To be acquired by Exchange programme
16	Mynas						10	20	30	10	20				30	To be acquired by Exchange programme
17	Drongos						5	10	15	5	10				15	To be acquired by Exchange programme
18	Grey Peacock Pheasants						5	10	15	5	10				15	To be acquired by Exchange programme
19	Baya								30						30	To be acquired by Exchange programme
20	Swamp Francolin								10						10	To be acquired by Exchange programme

21	Doves									20					20	To be acquired by Exchange programme
22	Pigeons									10					10	To be acquired by Exchange programme
23	Barbets									10					10	To be acquired by Exchange programme
24	Minivet									10					10	To be acquired by Exchange programme
25	Oriole									10					10	To be acquired by Exchange programme
26	Demoiselle Crane						1	2		3					3	To be acquired by Exchange programme
27	Sarus Crane						1	2		3					3	To be acquired by Exchange programme
	Total						39	78		217					217	

Sl. No.	Species	Exotics (Existing & proposed new)				Proposed Collection			Animals to be acquired or removed					Remarks		
		M	F	US	C	Total	M	F	Total	M	F	US	C		Total	
1	Mekao			1		1	1	1	3	1	1				2	To be procured
2	Budgerigar			72		72			72							To be procured
3	Kakatowa			1		1	1	2	3	1	1				2	To be procured
4	China Murgi			1		1	1	1	2	1	1				2	To be procured
5	Cassowary	1	1			2				1	2				3	To be procured/To be acquired by Exchange programme
6	Emu	1	2			3									1	To be procured/To be acquired by Exchange programme
7	Cockatiel						2	2	4	2	2				4	To be procured
	Total	2	3	75		80	8	10	93						14	

Annexure- XII (C)

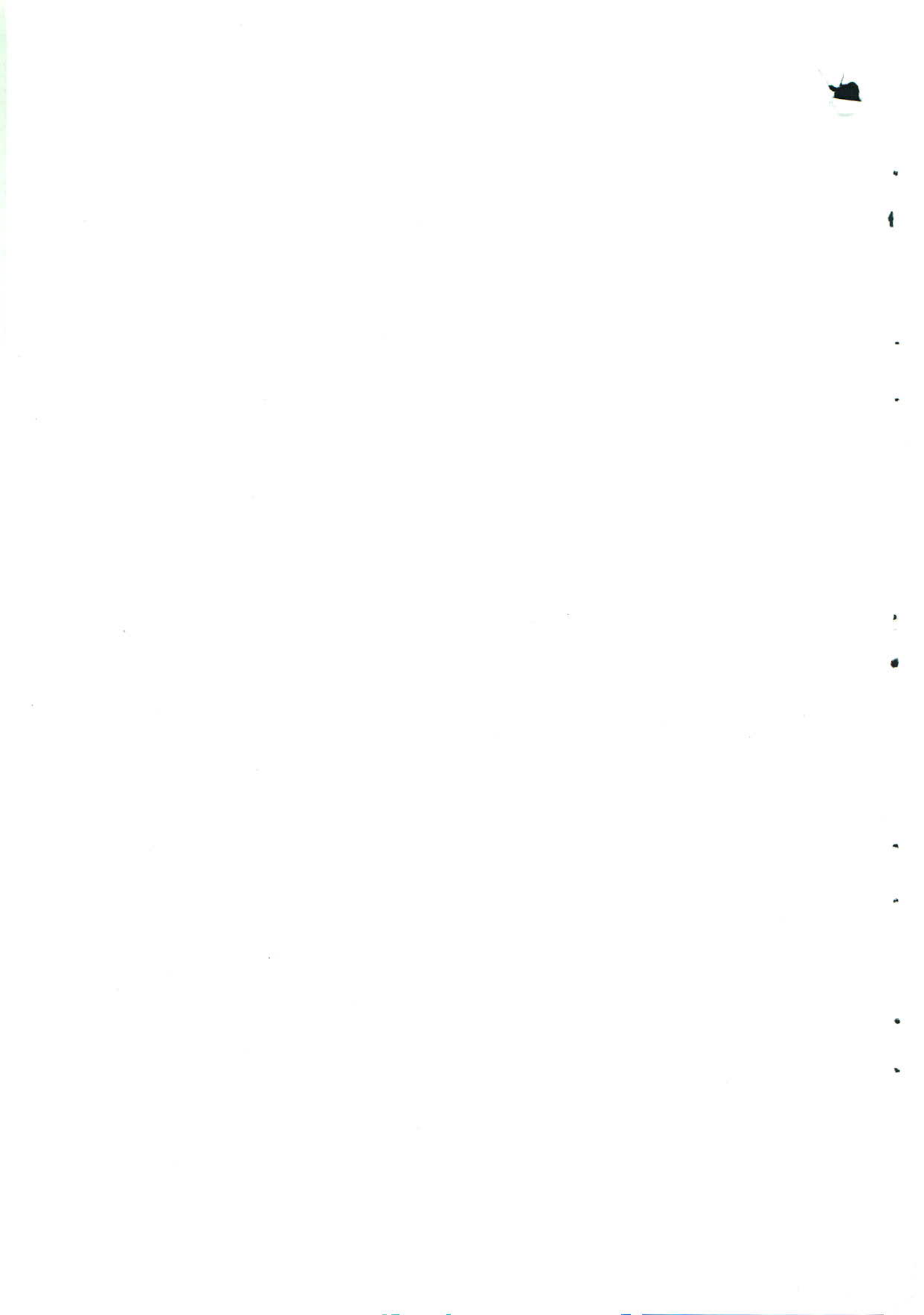
Abstract of collection plan																	
Mammals						Reptiles						Birds					
Existing		Total proposed		Total		Existing		Proposed		Total		Existing		Proposed		Total	
Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.
39	506	21	79	60	445	29	112	15	46	44	158	36	192	25	619	61	811

Exotic																	
Mammals						Reptiles						Birds					
Existing		Total proposed		Total		Existing		Proposed		Total		Existing		Proposed		Total	
Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.	Sps	Indiv.
3	7	3	13	6	20	-	-	-	-	-	-	6	79	1	4	7	93

Abstract (After deduction of Existing excess animal)				
	Species		Individuals	
	Existing	Proposed (Incl. Existing)	Existing	Proposed (Incl. Existing)
Indigenous	104	165	810	1414
Exotic	9	13	86	113
Total	113	178	896	1527

2







ANNEXURE - XIV
CHECK-LIST FOR THE BUTTERFLIES OF ASZBG CAMPUS

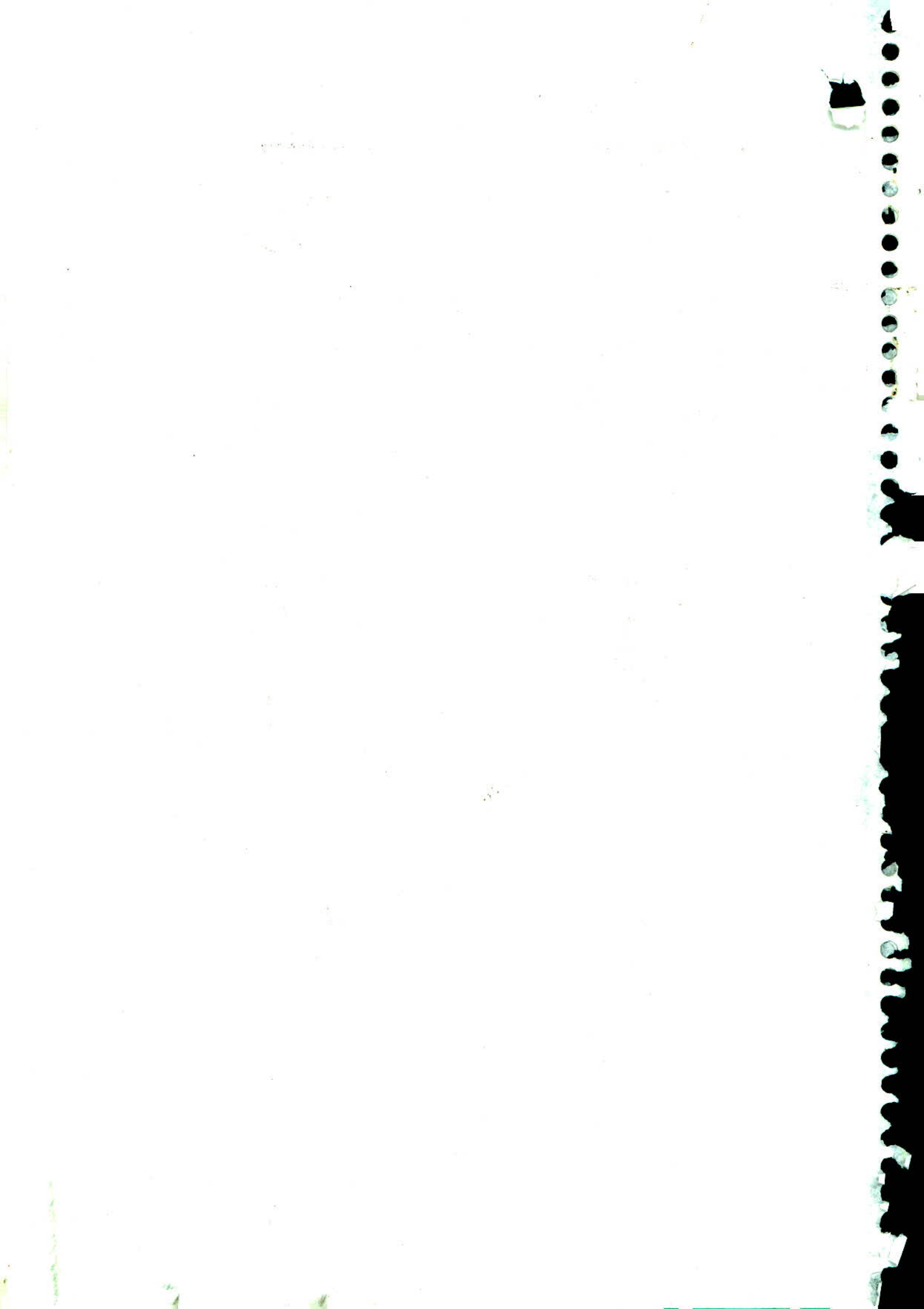
Family	Common Name	Scientific Name	Family	Common Name	Scientific Name
HESPERIIDAE			PIERIDAE		
Coeliadinae	Common Awl	<i>Hasora badra</i>	Pierinae	Psyche	<i>Leptosia mina</i>
	Common Banded Awl	<i>Hasora alexis</i>		Indian Cabbage White	<i>Pieris canidia</i>
	Brown Awl	<i>Badamia exclamatoris</i>		Large Cabbage White	<i>P.brassicae</i>
Pyrginae	Small Common Flat	<i>Surangesa dasahara</i>		Common Gull	<i>Cepora nerissa</i>
	Common Spotted Flat	<i>Celaenorhinus leucocerca</i>		Lesser Gull	<i>Cepora nadina</i>
	Fulvous Pied Flat	<i>Coladenia dan</i>		Common Wanderer	<i>Pareronia valeria</i>
	Water Snow Flat	<i>Tagaides litigiosa</i>		Yellow Orangetip	<i>Ixias pyrene</i>
	Dusky Yellowbreast Flat	<i>Daimio phisara</i>		Great Orangetip	<i>Hebomoia glaucippe</i>
	Black Angle			Chocolate Albatross	<i>Appias lycida</i>
	Golden Angle	<i>Caprona ransonnetti</i>		Plain Puffin	<i>Appias indra</i>
Hesperiinae	Indian Skipper	<i>Spialia galba</i>		Spot Puffin	<i>Appias lalage</i>
	Chestnut Bob	<i>Iambrix salsala</i>		Yellow Jezebel	<i>Delias agastina</i>
	Chocolate Demon	<i>Ancistroides nigrata</i>		Redbase Jezebel	<i>D. Aglaia</i>
	Grass Demon	<i>Udaspes folus</i>	Common Jezebel	<i>D.eucharis</i>	
	Spotted Demon	<i>Notocrypta fiesthameli</i>	Coliadinae	Common Emigrant	<i>Catopsila Pomona</i>
	Restricted Demon	<i>N. curvifasciata</i>		Mottled Emigrant	<i>C.pyranthe</i>
	Indian Dart	<i>Potanthus pseudomaesa</i>		Common Grass Yellow	<i>Eurema hecabe</i>
	Common Redeye	<i>Matapa aria</i>		Small Grass Yellow	<i>Eurema brigitta</i>
	Giant Redeye	<i>Gangara thyrsis</i>		One-spot Grass Yellow	<i>Eurema andersonii</i>
	Wax Dart	<i>Cupitha purreea</i>		Three-spot Grass Yellow	<i>Eurema blenda</i>
	Tree Flitter	<i>Hyarotis adrastus</i>		Chocolate Grass Yellow	<i>Eurema sari</i>
Tiger Hopper	<i>Ochus subvittatus</i>	LYCAENIDAE			
PAPILIONIDAE				Miletinae	Forest Pierrot
Papilioninae	Common Bluebottle	<i>Graphium sarpedon</i>	Curetinae	Angled Sunbeam	<i>Curetis dentate</i>
	Glassy Bluebottle	<i>Graphium cloanthus</i>	Theclinae	Common Acacia Blue	<i>Surendra quercetorum</i>
	Tailed Jay	<i>G.agammemnon</i>		Common Silverline	<i>Spindasis vulcanus</i>
	Common Jay	<i>G.doson</i>		Common Tinsel	<i>Catapaclima elegans</i>
	Common Rose	<i>Pachliopta aristolochiae</i>		Common Leaf Blue	<i>Amblypodia anita</i>
	Crimson Rose	<i>P.hector</i>		Large Oakblue	<i>Arhopala</i>
	Common	<i>Troides helena</i>			

Annexure- XV

Suggested staffing pattern

SI No.	Category	No. of sanctioned post	No. of post proposed
A. ADMINISTRATION AND EXECUTIVES			
1	Director	-	1
2	DCF(DFO) / Curator	1	1
3	ACF	2	2
4	Education officer	-	1
3	Forest Range Officer	1	2
4	Deputy Ranger	1	2
5	Game Keeper	1	1
6	Forester	6	10
7	Forest Guard	17	24
8	Game watcher	1	1
B. VETERINARY SECTION			
9	Forest Veterinary Officer	1	1
10	Pathologist	1	1
11	Forest Veterinary Senior Field Assistant	1	1
12	Forest Veterinary Field Assistant	1	1
13	Laboratory Assistant	1	1
C. ENGINEERING SECTION			
	Asstt. Executive Engineer	-	1
14	Assistant Engineer	1	1
15	Junior Engineer	1	1
16	Technical Assistant	1	1
17	Draftsman	1	2
18	Tracer	1	1
19	Plumber	1	1
20	Pump Operator	2	2
21	Welder	1	1
22	Carpenter	1	1
23	Electric Mistry	1	1
D. BOTANICAL SECTION			
24	Botanist	1	1
25	Botanical Assistant	1	1
26	Herbarium Assistant	1	1
27	Garden Supervisor	1	1
28	Assistant ^v Supervisor Garden	1	1
29	Mali	8	8

E. ANIMAL SECTION			
	Biologist	-	1
	Asstt. Biologist	-	1
30	Head Game watcher	1	1
31	Head Animal Keeper	5	10
32	Animal Keeper	22	40
33	Mahut	4	4
34	Store Keeper	1	1
35	Grass cutter	2	2
36	Sweeper	12	20
F. MINISTERIAL SECTION/OFFICE ASSISTANTS			
37	Accountant	1	1
38	Senior Assistant	1	1
39	Junior Assistant	5	5
40	Office peon	5	5
41	Dak Runner	1	1
G. ZOO EDUCATION SECTION			
42	Museum Curator	1	1
H. FRONT OFFICE SECTION			
43	Gate Fee Collector	3	5
44	Gate Keeper	4	6
I. VEHICLE SECTION			
45	Driver	5	7
46	Handyman	2	2
J. SECURITY SECTION			
47	Night Chowkidar	11	15
48	Chowkidar	3	5
TOTAL SANCTIONED STRENGTH		148	210



Our mission

To sensitize people, in consistence with the finest upkeep of the species, through adequate visitation, recreation facilities and education in order to elicit support in conserving wild fauna and flora of the North East Bio-geographic zone; and to elevate Assam State Zoo-cum-Botanical Garden into an ideal institution for conservation breeding of the rare, endangered and endemic species of fauna of the region.

Our vision

This Zoo envisions creating a mechanism for enhancing expertise on excellent upkeep and ex-situ conservation of the rare and endangered fauna and flora of the region.