PILIKULA BIOLOGICAL PARK

Master Plan 2009 - 2019

DR. SHIVARAM KARANTH

PILIKULA NISARGA DHAMA SOCIETY ®

MANGALORE, KARNATAKA

Certificate

Master Plan for the long term development of Dr. Shivaram Karanth Pilikula Biological Park, Mangalore (2009-2019) is prepared by me with the assistance of

1. Dr. S.A. Hussain, Ecologist and Ornithologist.
2. Sir Jerald Vikram Lobo, Scientific Officer
3. Sir Civilson Roshan Menezes, Assistant Curator
4. Dr. M Jayaram Shetty, Veterinary Officer

(H.J. Bhandary)
Director
Dr. Shivaram Karanth
Pilikula Biological Park
Mangalore

Master Plan of Pilikula Biological Park, Mangalore for 2009-2019 is approved in the 74th Meeting of the Technical Committee held on 22nd May, 2015 subject to the condition that the responsibility of mobilizing the financial resources for implementation of the Master plan will be sole responsibility of the Dr. Shivaram Karanth Pilikula Nisarga Dhama Society, Mangalore, Karnataka / Forest Department, Government of Karnataka.

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

Preface

Our endeavor to propagate the awareness on the Bio-diversity of Western Ghats, motivated us to develop the Pilikula Nisarga Dhama Project. Pilikula Biological Park is one of the major components of larger project of Pilikula Nisarga Dhama. Western Ghats is a house of large number of endemic species of flora and fauna and it is one of the 34 global Bio-diversity hot spots. The richness of fauna and flora of Western Ghats is not only to be protected but also our next generation should be made aware of the richness of these natural assets. It is painful to note that quite number of endemic species of flora and fauna are at the verge of extinction due to various reasons. Unless the people voluntarily take up the cause on conservation, it will not be possible to protect and conserve this natural wealth of Bio-diversity, despite numerous legislations and legal regulations.

Pilikula Biological Park is a show case of mini Western Ghats. We put our efforts for the ex-situ conservation of flora and fauna of Western Ghats by organizing number of awareness programmes for the public, students and teachers and also motivate people to protect the various species of flora and fauna at the earnable route. This is a long journey to achieve the desired result but we feel it is possible.

Since its inception, we have witnessed a marked attitudinal change in the minds of people and the steady progress in activities at Pilikula can be majorly attributed to the positive response of the people. With the support of people we are developing Pilikula Biological Park as a model project through the society called Pilikula Nisarga Dhama.

(J.R. Lobo)
Executive Director
Pilikula Nisarga Dhama
Mangalore

Acknowledgment

Dr. Shivaram Karanth Pilikula Biological Park is a major component of Pilikula Nisarga Dhama Society ® which is a mega tourist destination in Coastal Karnataka. Conservation and showcasing the rich fauna and flora of the Western Ghats region are the main objectives.

Pilikula Biological Park is making headway in this direction by developing fast since its inception on 12.01.2001.

A long term Master plan for the development of the park is proposed for the next 10 years i.e. 2009 – 2019. However effort will be made to complete the major works within next four years.

Park is being developed with the help of donors, sponsors like institutions, corporate sectors and individuals of this locality. So far contribution from the Government is minimal.

I owe a great debt to Late Sri Pushpa Kumar I.F.S., P.C.C.F. (Retd.), A.P., who guided us in the initial stage of development of the park.

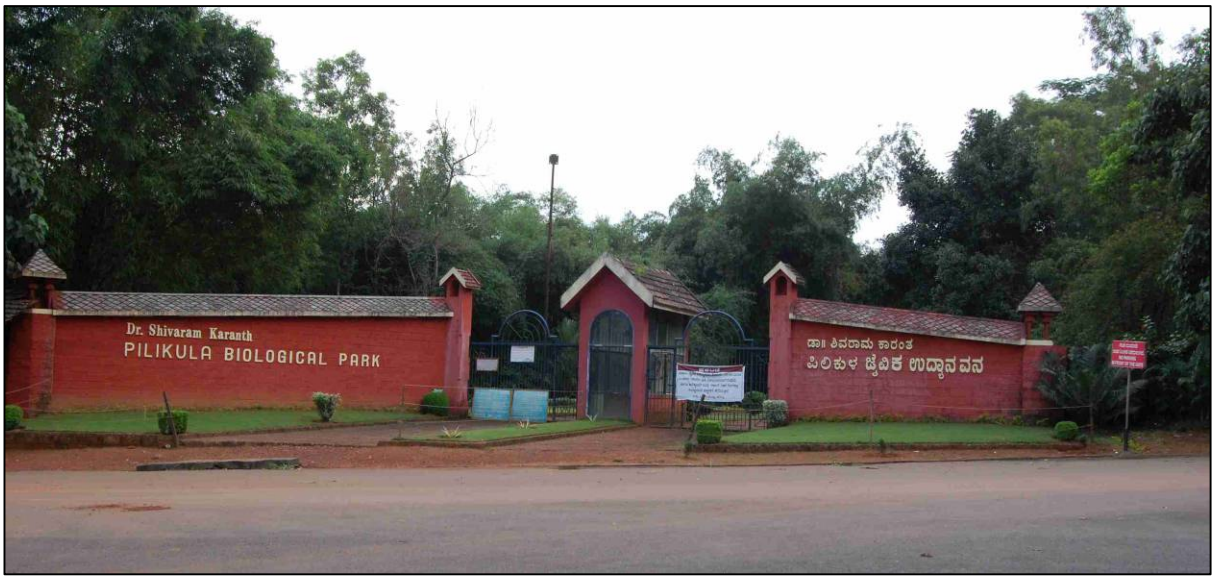
Deputy Commissioner of D.K. district and Executive Director of Pilikula Nisarga Dhama Society® are providing all support for the development of the park.

Dr. M Jayaram Shetty, Veterinary Officer, Sri Jerald Vikram Lobo, Scientific Officer and Sri Civilson Roshan Menezes, Assistant Curator have assisted me in preparing the master plan.

I am indebted to Dr. S.A.Hussain, Ecologist and noted ornithologist who has helped us by giving lot of inputs for the preparation of this Master Plan.

(**H. J. Bhandary)**
Director,
Dr. Shivaram Karanth
Pilikula Biological Park
Mangalore

Contents



Entrance Gate of Dr. Shivaram Karanth Pilikula Biological Park

Part – I

Chapter - I

Introduction:

Concept of Biological Parks all over the world has undergone vast changes since the inception of original zoo concept. What started as a repository for animals, reptiles and such other creatures for posterity and education for general populace has rapidly evolved into a more comprehensive look at the entire biodiversity in its totality with additional emphasis on research, education and conservation. The old concept of narrow cages to house these living creatures has given way to a more pragmatic in situ habitat oriented approach where real life conditions with adequate natural space are created to house each species according to its natural requirement. Specialization has crept into zoo concept with emphasis on day and night safaris, thematic showcasing such as tropical forest species, canopy dwellers, nocturnal animal enclosures, desert flora & fauna, estuaries and marine biodiversity and ultimately a more serious conservation oriented research as an outsourcing from these Parks.

In keeping with the current trend in biological parks, and with additional involvement of multivariate concept of social, cultural, historic, ethnic and scientific elements, the Pilikula Nisarga Dhama is being promoted as a reflection and representation of rich heritage of coastal Karnataka including its adjacent hinterland encompassing the Western Ghats biosphere.

Within the conceptual framework of Pilikula Nisarga Dhama, the role of proposed Pilikula Biological Park is placed in an unique position to showcase the rich biodiversity of coastal Karnataka which also includes the Western Ghats,= one of the best biodiversity hot spots of the world.

Biodiversity of Coastal Karnataka:

Peninsular India is considered to be true home of the Indian fauna and the Western Ghats in particular are renowned for their faunistic richness and endemism. Many species however are now vulnerable or much endangered.

Over 117 species belonging to 21 genera of amphibians are recorded in the forests and coastal areas of this region, of which about 76% are endemic to the region. Out of total 207 Indian amphibians nearly 60% (125 species) are confined to Western Ghats. Further, out of these 125, about 93 species are strictly endemic to Western Ghats.

A large variety of insects including some of the spectacular butterflies and moths occur in the dense evergreen highland and lowland forests. It is estimated that India has over 1400 species of butterfly species of which Coastal Karnataka and the Western Ghats harbour nearly 320 species including 37 endemics and 23 others shared with Sri Lanka. The area is host a large variety of freshwater mollusca, some of which are specific to the region.

The fish fauna of both fresh-water in montane and lowland river streams and water bodies are very many and varied in this region. The Fisheries College, Mangalore has conducted surveys on the hill stream and freshwater fishes of the district and now have several ongoing projects on important fishes such as the Mahseer.

Dense forests of the region are the home of the King Cobra and Rock Python apart from other smaller reptiles. Many species of tortoises, including the endemic cane turtle and terrapin are also found in the Western Ghats. The Flying lizard (*Draco dussumieri*) is frequently seen in the secondary as well as primary forests.

The flagship species of the tropical forest birds which are either endemic to the southern WG or have a patchy distribution of small populations, are represented here by Great Hornbill (*Buceros bicornis*), Nilgiri Wood Pigeon (*Columba elphinstonii*), Bluewinged Parakeet (*Psittacula columboides*), Greyheaded Bulbul (*Pycnontus priocephalus*), Southern Tree Pie (*Dendrocitta leucogastra*), Whitebellied Blue flycatcher (*Muscicapa pallipes*) and Nilgiri Flycatcher (*Muscicapa albicaudata*). Most of these species are confined to western slopes of Western Ghats as well as some areas of lowland forests of coastal plains. Some other species such as Black Eagle (*Ictninaetus malayensis*) and Ceylon Frogmouth (*Batrachostomus moniliger*) may also occur.

Typical forest species like Racket-tailed drongo, Brown Hawk Owl, Malabar Whistling Thrush, Emerald Dove, Bluewinged Parakeet, Blossom headed Parakeet, Grey-headed Bulbul, Yellowbrowed Bulbul, Grey Jungle Fowl and many others are frequently seen in and around riverine and lowland forests of area.

The forests of the area have large herbivores such as Gaur, Spotted deer, Sambar, Barking deer etc. Among the primates the Slender Loris and the Lion Tailed Macaque - one of the most endangered primates are found in the upper reaches evergreen forests. Of the two species of Pangolin in India, the Indian Pangolin is restricted to peninsular India. Tiger, Leopard, Jungle Cat, Leopard Cat and Fishing Cat, Rusty spotted cat, Malabar Civet, Small Indian Civet, Palm Civet and two species of Mongoose and the Wild dog represent carnivores. Two species of large squirrels, the Malabar Giant squirrel and Flying squirrel are found are found in the slope forests of Agumbe & Someshwara.

Number of Genera and Species and endemic mammals:

Mammal groups	Genera	Species	Endemic
Primates (Monkeys)	3	5	2
Large Carnivores (Tiger & Leopard)	1	2	-
Small Carnivores (Felids) (Small wild cats)	1	4	-
Small Carnivores (other)	4	7	2
Canids (Dog family)	3	3	-
Mustelids (Otters)	2	3	-
Rodents (Rats & squirrels)	5	5	-
Cervids (Deers)	4	4	-
Other species	5	5	-
Total	**28**	**38**	**4**

Mangalore, Dakshina Kannada– An ecological perspective:

Ecologically speaking Mangalore perhaps occupies a unique position in the bio-geographical realm of the western peninsular coast of India. Its location seems to be like a connecting link between the biological entity of the moist deciduous lateritic Konkan coastal zone stretching roughly from Bombay southwards and the rich and dense tropical wet-evergreen regime ranging from Kanyakumari northwards, along the Malabar coast.

The city as it stands now, is like an island encircled by two rivers, the Gurupura and the Nethravati, both originating in the Western Ghats. Perching on a series of low flat topped hillocks interspersed by numerous fertile mini valleys and marshlands, mangroves and sandy beaches, it presents a mosaic of habitats rich in biodiversity. To a causal eye this bustling modern city gives the first impression of being one large coconut grove with scattered glimpses of a concrete civilization. Chaotic as it may seem, it also tucks in its soft underbelly, pockets of micro and micro-ecosystems vibrant with species of plants, birds, reptiles, mammals and other terrestrial & marine vertebrates and invertebrates still holding on against all odds.

Undivided Dakshina Kannada (12°27' -13°58' N and 74°35' - 75°40’ E) includes Dakshina Kannada and Udupi district, is located in the West Coast of Peninsular South India. Its total area spreads over 8,441 sq.km. with a coastal zone of 130 km. There are over twenty rivers flowing west of the Western Ghats.

Bioclimate:

Dakshina Kannada environs experience the maximum rainfall recorded in the entire stretch of the WG range. Thus Agumbe, which is located at the western boundary of the district, receives mean annual rainfall of 7460 mm concentrated over a period of 128 days. The absolute maximum for Agumbe has been recorded as 12,918 mm in 1946. Surprisingly the elevation at Agumbe is only 645 m comparing to the Nilgiris (1500-2500 m), which receives average rainfall of 6300 mm. Precipitation is about 4000 mm near the coast which increases steadily eastwards until reaching a maximum of 7500 mm in 40 km.

The general climate is hot and humid with heavy rainfall during the south-west monsoon months (June-September), which is heralded by massive cloud formations and heavy thunder showers accompanied by gale force winds. Rainfall ranges from 1778 mm to 6350 mm (highest recorded was 12,918 mm in 1946). The average seasonal rainfall is about 3000 mm. winter months are cooler with mists at nights on hill slopes.

Zoogeography :

The districts of Dakshin Kannada and Udupi together have an estimated 518,000 ha (61.39%) under forest cover and is characterised by a rich diversity of flora and fauna. Five major types of forests exist in the districts. There are two wildlife sanctuaries, Mookambika and Someshawara as well as parts of Kudremukh National Park. Over 400 species of medicinal, about 180 species of edible plants and several species of indigenous orchids have been found so far in the Western Ghats which have a total area of 4600 ha within the district boundary.

One of the special characters of the area is the existence from time immemorial of Sacred Groves, which were protected forests by local traditions.

Undivided Dakshina Kannada District	Geographical Area (sq.km.)	Forest Area (sq.km.)					
		Reserved	Protected	Un-protected	Private	Total	Percent
Dakshina Kannada and Udupi	8441	2121.43	1563.62	1408.64	88.61	5182	61.39

The District hosts 38 species of mammals belonging to 28 Genera. Four species are endemic to WG; these are the Lion Tailed Macaque (rare and endangered), the Malabar Civet and the Brown Palm Civet. These are the Flagship species of the region.

The Coastal region of Karnataka is perhaps the most productive and least overexploited region with large tracts of pristine forests, well wooded areas and unspoilt shoreline in the peninsula. The region perhaps has the largest combination of plantations, agri-floriculture, fishery and other economic produces. The tracts of dense montane, slope, lowland forests; secondary scrub and woodlands as well as the mangroves of the coastline are endowed with a rich biodiversity of plants, insects, invertebrates, fishes and animals, most of which are economically important.

Dakshina Kannada and Udupi District – Facts at a Glance: (Table – 1)

Undivided Dakshina Kannada District within the state of Karnataka has a compact geographical area of 844100 ha. Nestled between the Arabian Sea on the west and lofty Western Ghats on the east it is a rich kaleidoscope of culture, tradition, natural beauty and biodiversity. Twenty two perennial rivers and streams water the extensive rice fields in the valley. The Southern part of the district is covered by vast stretches of rubber plantations. The district enjoys a pre-eminent position in the development indices of Karnataka State. It boasts of a high literacy rate and is the home to educational and professional institutes of acknowledge distinction. Dakshina Kannada district was declared as district with 100% literacy. Five natural banks originated in Dakshina Kannada District. Also referred to as the 'cradle of Banking' the District boasts of being home to visionaries and scholars. Its also well known for horticulture, agriculture and farming of Paddy, coconut, areca nut, cashew, cocoa, rubber etc. Industries like Tile manufacturing, cashew processing, fertilizer, fishing etc.

Table-01: Dakshina Kannada and Udupi District – Facts at a Glance

Description	Dakshina Kannada and Udupi
Area	8441 sq.km.
Population	2.0 million approx
Important Cities and Towns	Mangalore, Udupi, Manipal, Kundapura, Karkala, Bantwal, Belthangady, Puttur, Sullia
Languages	Tulu, Kannada, Konkani, English.
Religion	Hiduism, Christianity, Islam and Jainism

Population Density	340 per Sq.Km. approximately
Best time to visit	October to April
Rainy Season	June to September – 250cm to 500cm
Coast Line	145 Kms
Airport	Mangalore – Bajpe Airport
Trees	Rosewood, Wild Jack, Hopea spp. Terminalia Zylia, Mango ,Jack, Teak, Sandal wood, Cashew, etc.
Flowers	Jasmine, Rose and Wild flowers
Agricultural and Horticulture Products.	Paddy, Areca, Coconut, Cashew, Banana, Vanilla, Pineapple, Rubber, Cocoa.
Major Industries	Tile, Cashew, Fish, Sugar, Food Processing, Coconut oil, Rice, Rigid PVC Pipes, Interlock Pavers, Petroleum oil refineries, fertilizers industries, Hydro power plants, thermal power plants etc.

Vernacular Architecture:

The vernacular architecture of the region is a distinctive response to the climate of the social hierarchy. The *Guthu* house or manor house is a statement of grandeur and authority which is directly reflected in the monumental scale of the building and its rich architectural features. The architectural vocabulary is characterized of laterite masonary walls, sloping Mangalore tile roofs. "Tulu" is the major spoken language in this region.

Traditional Art and Craft:

Traditional occupation such as pottery, weaving, stone carving, blacksmithy, cane and bamboo craft, bee keeping etc form the part of socio economic fabric of the region.

Performing Arts:

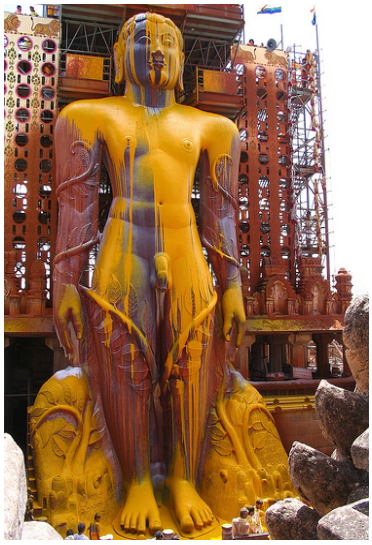
Yakshagana a form of dance theatre forms part of the performing arts heritage of the state of Karnataka. The plays are based on a mixture of dance, drama and song. The art form assumes a distinctive visual presence because of the colourful masks used for each character.

Special Events:

During the months of November to March, special cultural events take place. These are well worth attending. Some of these are: *Kambala* (Buffalo race), Fish hunting, Fire festival, *Darshana* (Mass possession), *Kola* (Spirit Worship), *Naja Pooja* (Serpent Worship), *Masthakabhisheka* of Bahubali (Takes place once in 12 years), *Pariyaya* of the Udupi Mutt (takes place once in two years), Car festivals etc.

Kola (Spirit Workship)

Naga Pooja (Serpent Worship)



Masthakabhisheka

Traditional Sport:

The contest of buffaloes in the form of a race in muddy waters is called *Kambala*. Coastal Karnataka is the home of the true athletic buffalo. The *Kambala* races are held from December to March. The popularity of the kambala has increased over the years. Modern *kambalas* are professionally organized events attracting close to 20000 spectators with as many as 130 pairs of specially trained buffaloes participating. Other sports practiced in the region are *Kesarugadde ota* (wetland race), *hagga jaggata* (tug of war) and *tappangai ata.*

Cuisine:

The cuisine of Dakshina Kannada makes use of coconut, spices and forms part of the traditional legacy of the region. Blessed with a coastal countryside, it is rich in natural sea

food – fish, prawns and crab and coconut and jackfruit. The souring agents are tamarind, *triphal* (a berry akin to gooseberry), kokum and raw mangoes.

Rice is the staple cereal. Some of the non-vegetarian dishes include prawns, chicken and crabs.

Religious Festivals:

Celebrations such as *Bhootaradhane* (worship of spirits) and *Nagaradhane* (serpent worship) form the part of the culture.

Tourism in Karnataka: (Map 06 – 08):

Dakshina Kannada with Mangalore as the district headquarters has several locations of tourist interest comprising of places of scenic beauty, religious interest and heritage sites.

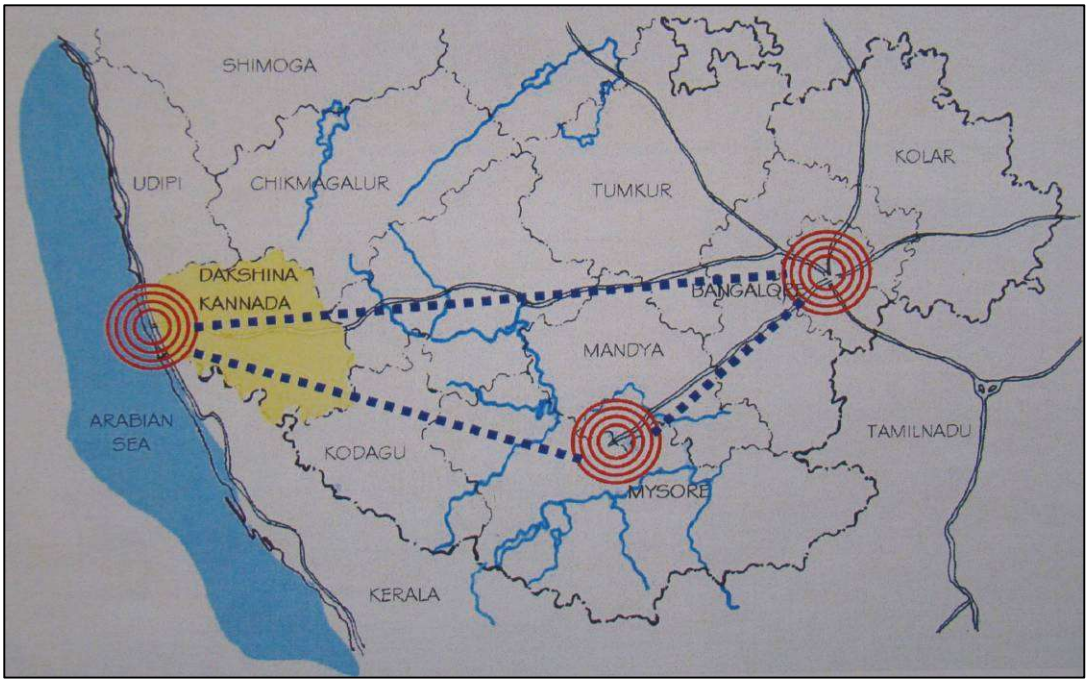
Tourism in Karnataka may be broadly classified as:

a) Religious Tourism –Udupi, Kollur, Dharmasthala, Mantralaya, Moodibidri Karkala, Ullala, Mysore, Talacauvery,

b) Heritage Tourism – Mysore, Hampi, Belur, Hallebedu, Aihole, Badami, Pattadakkal, Bijapur.

c) Nature Tourism – Kudremukh National Park, Someshwara, Malpe, Otlinana, Mysore, Coorg, Jog falls, Bandipur, Nagarhole, Shivasamudra, Nandi Hills, , Dandeli Nature Park.

Map-06: Various Tourism Places of Karnataka



Map-07: Showing the Major Tourist Nodes of Karnataka.

Map-08: Tourism Inflow along the Western Ghats Coast Line.

Places	January		February		March		April		May	
	Indian	Foreign	Indian	Foreign	Indian	Foreign	Indian	Foreign	Indian	Foreign
Bijapur	81690	515	63176	681	NA	NA	51689	220	85939	40
Belur	96000	2000	60000	3000	70000	1500	100000	1500	55000	1000
Bagalkot	143757	4360	75580	4516	46882	2986	53307	811	60822	622
Chitradurga	37560	87	21275	83	21290	71	20296	49	23248	10
Chikkamagalur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gadag	45332	NA	39505	NA	47171	NA	58415	NA	80800	575
Hampi	136636	5606	68651	5168	108942	2982	87497	1342	NA	NA
Halebidu	92000	3200	62000	3250	63000	2050	60000	1750	80000	1800
Jog Falls	40995	129	NA	NA	23735	175	30330	88	32604	34
Mandya	63309	3536	41403	3628	39869	2508	57218	1437	NA	NA
Mysore	253528	208	NA	NA	144642	128	187278	205	331381	170
Mangalore	245150	48	225570	56	20515	186	250194	42	271904	36
Pattadakal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Raichur	2066	NA	2308	NA	1837	NA	2111	NA	2221	1
Shravanabelagola	8131	231	5595	214	4237	58	NA	NA	NA	NA
Shimoga	17000	52	16960	52	15500	62	NA	NA	NA	NA
Tumkur	NA	NA	90000	NA	140000	NA	115000	NA	NA	NA
Udupi	8024	189	NA	NA	6096	190	9553	109	11158	106

Table-02: Destination Specific Month-wise Tourist Visits for 2008 in Karnataka

Religious Tourism in Dakshina Kannada:

- South Karnataka has a culture of its own which has developed over the centuries. Hinduism is the faith of the vast majority. Temples in Dharmastala, Subramanya, Udupi, Kollur attracts lot of devotionals from all over India.
- Jainism found refuge here centuries ago and their presence is evident in small pockets near Karkala.
- Muslim conquests in later years brought in the Muslim faith. Muslim culture is woven into fabric of society in various places. With the advent of the Portuguese and years later the Basel Mission, the Christian faith established itself in and around Mangalore.
- In interior areas, one comes across spirit worship, mass possession and similar forms of worship during certain seasons.

Nature Tourism:

The picturesque beauty of the Western Ghats together with the beaches along the coastal belt of the Dakshina Kannada District such as Ullal, Panambur, Tannirbhavi, Maravanthe, Surathakal hold great potential for Nature tourism.

It can be emphatically stated that Mangalore with its strategic location acts as the tourism gateway to coastal Karnataka.

1.1 History of the Zoo

Pilikula Nisarga Dhama Society ®:

Pilikula Nisarga Dhama (Pilikula) is a major eco-education and tourism development project promoted by the District Administration of Dakshina Kannada in the beautiful city of Mangalore in Karnataka State, India.

Pilikula is an integrated theme park with a wide variety of features; Pilikula has many attractions of cultural and scientific interest. Pilikula extends over an area of 375 acres along the banks of Gurupura River.

Pilikula presently includes a Biological Park, Arboretum, Regional Science Centre, Boating Club, Water Amusement Park and Golf Course. Other features which are currently being developed include a Heritage Village, an Ayurveda Health Therapy Centre; Tourist Cottages are being constructed as a joint venture with Jungle Lodges.

Pilikula probably the first project of its kind in India, it is inspired by the concept of providing a wholesome experience of the native natural and cultural heritage of the region along with all modern recreational facilities.

It is also an attempt to showcase the rich native heritage and coastal culture of the people of Dakshina Kannada district. In short, Pilikula is one-stop education and recreation destination in India - a must visit place for all visitors to this part of the world.

Pilikula is a registered society, registered on 23.04.1997 under the Karnataka Societies Registration Act 1960 (Sl. No. 17 of Karnataka Act 1960). It consists of a General body with the Dakshina Kannada District in-charge Minister as ex-officio President.

General Assembly Members of Pilikula Nisarga Dhama Society ® is as follows:

- Hon. Minister, District in-charge
  Government of Karnataka
  Mangalore.
- Member of Parliament
  Dakshina Kannada
- Member of Parliament,
  Udupi.
- Members of Legislative Council
  Dakshina Kannada
- Mayor
  Mangalore City Corporation
  Mangalore.
- Commissioner
  Mangalore Urban Development Authority
  Mangalore
- President
  Zilla Panchayath D.K.
  Mangalore.
- President
  Taluk Panchayath Samithi
  Mangalore.
- President
  Moodushedde Village Panchayath
  Mangalore
- Chairman
  Canara Chamber of Commerce & Industries
  Mangalore.

- President
  Mangalore Stock Exchange
  Mangalore.

- Chairman
  BASF Group in India and Head
  BASF South Asia.

- And all the Members of Governing Council.

Governing Council Members of Pilikula Nisarga Dhama Society ® is as Follows:

- Deputy Commissioner and District Magistrate
  Dakshina Kannada (Karnataka)
  Mangalore.

- Chief Executive Officer
  D.K.Zilla Panchayath
  Mangalore.

- Superintendent of Police
  D.K. District
  Mangalore.

- Deputy Conservator of Forests (Territorial)
  Mangalore Division
  Mangalore.

- Deputy Conservator of Forests
  Kudremukh Wildlife Division
  Karkala.

- Deputy Conservator of Forests
  Social Forestry Division
  Mangalore.

- Director
  N.I.T.K.
  Mangalore.

- Vice-Chancellor
  Mangalore University
  Mangalagangothri
  Mangalore.

- Vice-Chancellor
  Karnataka Open University
  Manasagangothri
  Mysore.

- Dean, College of Fisheries
  Karnataka Animal & Fisheries Science University
  Mangalore.

- Dr. S.A. Hussain
  Ecologist
  Karkala.

- Chief Engineer
  MESCOM
  Mangalore.

- Deputy Director
  Horticulture
  Mangalore.

- Superintending Engineer
  P.W.D. Mangalore Circle
  Mangalore.

- Commissioner
  Mangalore City Corporation
  Mangalore.

- Commissioner
  Mangalore Urban Development Authority
  Mangalore.
- Deputy Director
  Fisheries
  Mangalore.

- Assistant Director of Tourism
  Mangalore.

- Dr.Chandrashekar Chowta
  "Samridhi", Meenja Village,
  Kasaragod, Kerala.

- Sri. N.G.Mohan
  Proprietor
  M/S Beta Agencies & Projects Pvt., Ltd.
  Mangalore.

- Sri. H.J.Bhandary
  Director,
  Dr.Shivaram Karanth, Pilikula Biological Park,
  Mangalore.

- Dr.K.V.Rao
  Secretary
  District Council for Science & Technology,
  Mangalore.

- Sri.J.R.Lobo
  Executive Director
  Pilikula Nisarga Dhama Society
  Mangalore.

Pilikula Biological Park:

Pilikula the name derived from the local tulu language 'Pili' means Tiger and 'Kula' means pond. It is said that in the past years Tigers were extensively found in this locality. The Tigers used to drink water from a huge pond found in the area hence the name "Pilikula". The natural tiger caves still exist in the locality **(Fig.01)**

Fig.-01: Natural Tiger Cave in Pilikula Biological Park.

Pilikula Biological Park is a major component of Pilikula Nisarga Dhama. Kadri deer park and mini zoo was closed as per the order of Central Zoo Authority and animals from defunct zoo were shifted to Pilikula. Pilikula Biological Park was planned with the valuable guidance of Sri Puspha Kumar IFS (Retd.) the then PCCF of Andra Pradesh.

Pilikula Biological Park was inaugurated on 12.01.2001 by the Hon'ble Chief Minister of Karnataka. The park has since been recognized by the Central Zoo Authority vide letter No. 23-3/97-CZA(5) dated 12.8.1999 and the layout plan approved by the Central Zoo Authority vide letter No.F.No.23-1/97-CZA(N) dated 4.6.2002. Master plan for the year 2001-2010 was prepared with the help of M.K.Appayya, IFS (Retd.) and B.G.Mugadur, IFS (Retd.). Zoo is run by the Pilikula Nisarga Dhama Society®. Maintenance of the zoo including development of infrastructure, feeding, health care of the animals are done by the Society with the help of donation from institutions, corporate sectors and individuals. There is very little contribution from the Government sector. Recently the Central Zoo Authority has funded for the construction of a Veterinary hospital complex. Pilikula Biological Park was renamed after Dr. Shivaram Karanth, Jnana Peetha Awardee. He was a great writer and environmentalist of the coastal Karnataka. Pilikula Nisarga Dhama Society was established in April 1997. The Society comprises elected representatives and heads of important public institutions and is presided by the district in-charge minister. The Governing Council comprises of key Officers of various Government departments and is headed by the Deputy Commissioner of Dakshina Kannada District.

The Advisory Board of Pilikula Biological Park is as follows:

Chairperson	Deputy Commissioner, Dakshina Kannada District Mangalore.
Co-Chairperson	Deputy Conservator of Forests Mangalore.
Member Secretary	Director Dr. Shivaram Karanth, Pilikula Biological Park Mangalore.
Members	Executive Director Pilikula Nisarga Dhama Mangalore.
	Dr. S.A. Hussain Ecologist, Karkala. Dr. N.A. Madyastha Retd. Principal of Proonaprajna Collegs Ornithologist, Udupi.
	Mr. Romulus Whitaker Herpetologist, Chennai, Tamilnadu.
	Dr. Ganapathy Bhat Managing Director Mangala Hospital Kadri.
	Deputy Director Animal Husbandry Mangalore.
	Deputy Conservator of Forests, Kudermukh Wildlife Division Karkala.
	Sri N.G. Mohan, Social Worker Mangalore.
	Sri Charls Paul Animal Care Trust Mangalore.

1.2 Vision of the Zoo:

To develop a zoo of international standards in the Western Ghats region for in-situ and ex-situ conservation of Western Ghats species.

1.3 Mission of the Zoo:

To promote the conservation of fauna of Western Ghats region through education, scientific research, captive breeding and establishment of rescue centre.

1.4 Strategy of the Zoo:

The novel concept of the Pilikula Biological Park is to run a zoo by a registered society with generous financial help from philanthropist, corporate bodies, institutions, general public, grants from government and income generated by the entry fee and rent from other facilities.

1.5 Objective:

- Showcase the rich fauna and flora of the Western Ghats.
- Conservation and breeding of endangered species found in Western Ghats region for display, exchange, breeding loans and rehabilitation to the wild in keeping with the National Policy and guidelines from time to time.
- Promote awareness among the public in general and students in particular on the need to protect and conserve wildlife and its habitat.
- Encourage research and scientific studies useful for zoo and wildlife management.
- To function as a rescue centre for wild animals posing danger to the humans, wild animals entering into human habitation, orphaned and injured animals in this region.
- Recreation for the purpose of providing wholesome, healthy educational activity by utilizing the natural features.

1.6 Topography, Hydrology and Drainage:

Pilikula Biological Park extending over an area of nearly 82 hectares is located on land which is undulating along the periphery to the south and gentle slope in the rest of the area. The northern and eastern fringes of the site characterized by steep slopes and dense vegetation. Surface drainage is in the form of street drainage along natural slopes which reach natural swales draining surface run-off into Pilikula Lake and Gurupur river. A natural surface drainage channel traverses the site in west-east direction which directs surface run-off into the lake. The park is situated between 12°55'57'' latitude and 74°53'98'' longitude. It is 90 meters above mean sea level. Surface drainage is in the form of street drainage along natural slopes which reach natural swales draining surface run-off into Pilikula Lake

and Gurupur River. A natural surface drainage channel traverses the site in West-East direction which directs surface run-off into the lake.

1.7 Geology and Soil: (Map 09 – 12)

The underlying geological formation is of archaic origin and consists of metamorphic schist and crystalline gneiss with granite and quartzes out corps. The principle rock in the ghat range is gneiss with instructions of granite and quartizite rocks. A peculiar feature about this gneiss is its readiness to decompose into reddish flesphatic clay, which is deep and supports valuable evergreen and semi-evergreen forests. Such soil is also rich in humus. Exposure by removal of tree cover, removal of humus and leaf litter for manure, frequent fires and heavy rainfall result in the formation of the hard brittle substance known as laterite found extensively all over the plains. The weathering process is accompanied by a ferruginous infiltration with chemical changes in the iron constituents. Generally, laterite rock becomes apparent on hot, open and exposed localities, whereas on the moist cool slopes with northerly aspect, gneissic soil or red loan is more common. Laterice is final stage of a very complete weathering and red loam is characteristic of an inter-mediate stage. In the latter, aluminium is present in the form of silicate, while in the former it is in the form of hydroxide.

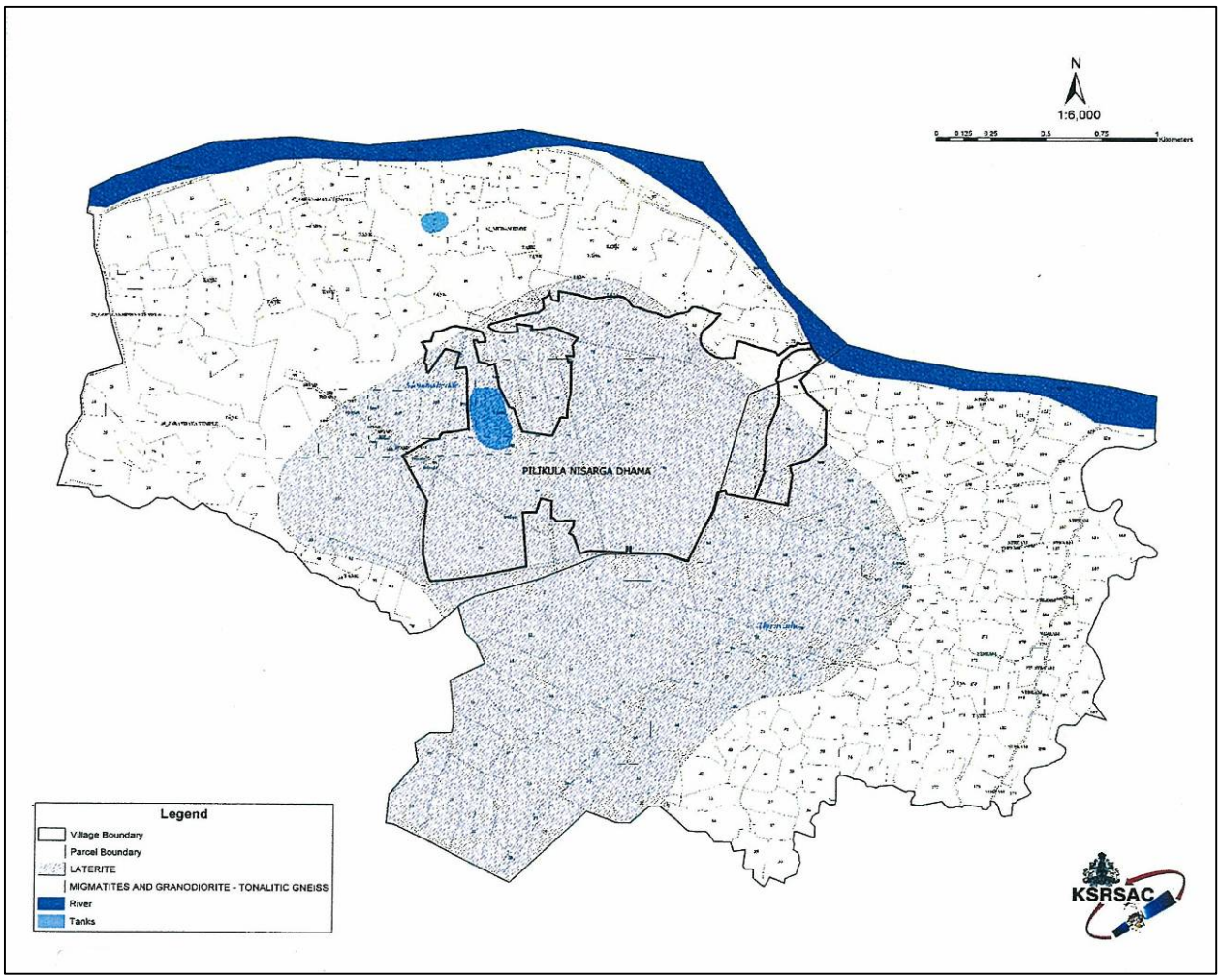
The soils contain adequate nitrogen, iron and (in afforested regions) organic materials and are deficient in available phosphoric acid, lime and magnesia. The soil conditions are very variable with regard to quality, depth and consistency. In the plains towards the coast, the rock is decidedly lateiritic in fully exposed localities, denuded of protective vegetation. Exposed fully to erosive action, it becomes inimical to most form of vegetation except grass and scrub growth. Surface disintegration of a mechanical nature becomes rapid and loose gravel is conveyed down to lower levels by the run-off water. The lower level thus becomes a mixture of clay, sand and coarser gravel. In the neighborhood of habitation, the forest soils are impoverished by removal of leaf litter as manure and due to frequent fires. This reduces the fertility and crop bearing value of the soil. Changes in soil condition have a bearing on the distribution of forest typed and the importance of maintaining adequate soil cover by vegetation to prevent laterisation needs no emphasis.

pH: The pH of the soil is acidic and total soluble salt content is normal.

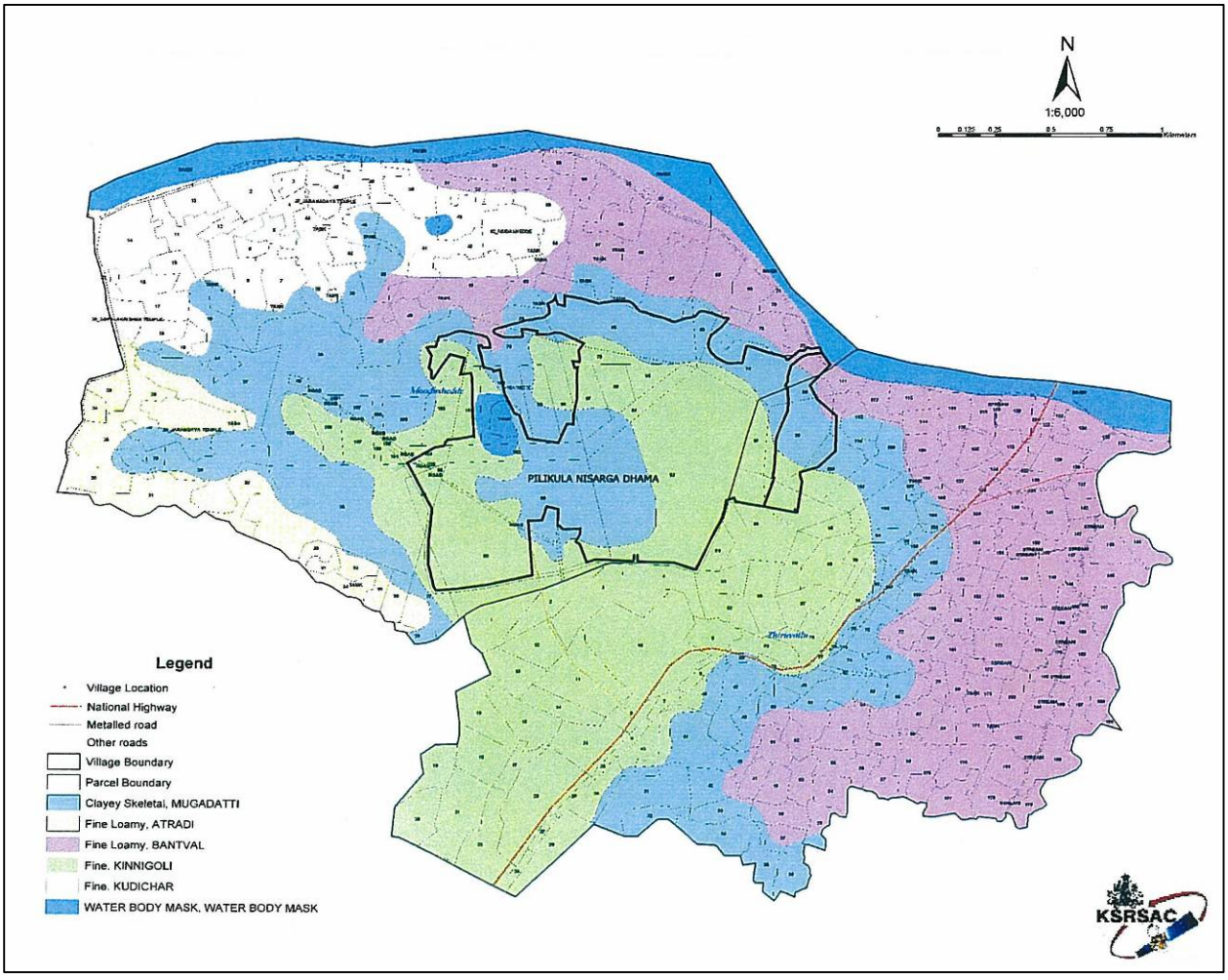
Nitrogen: The nitrogen content is high.

Available P_2O_5: Medium.

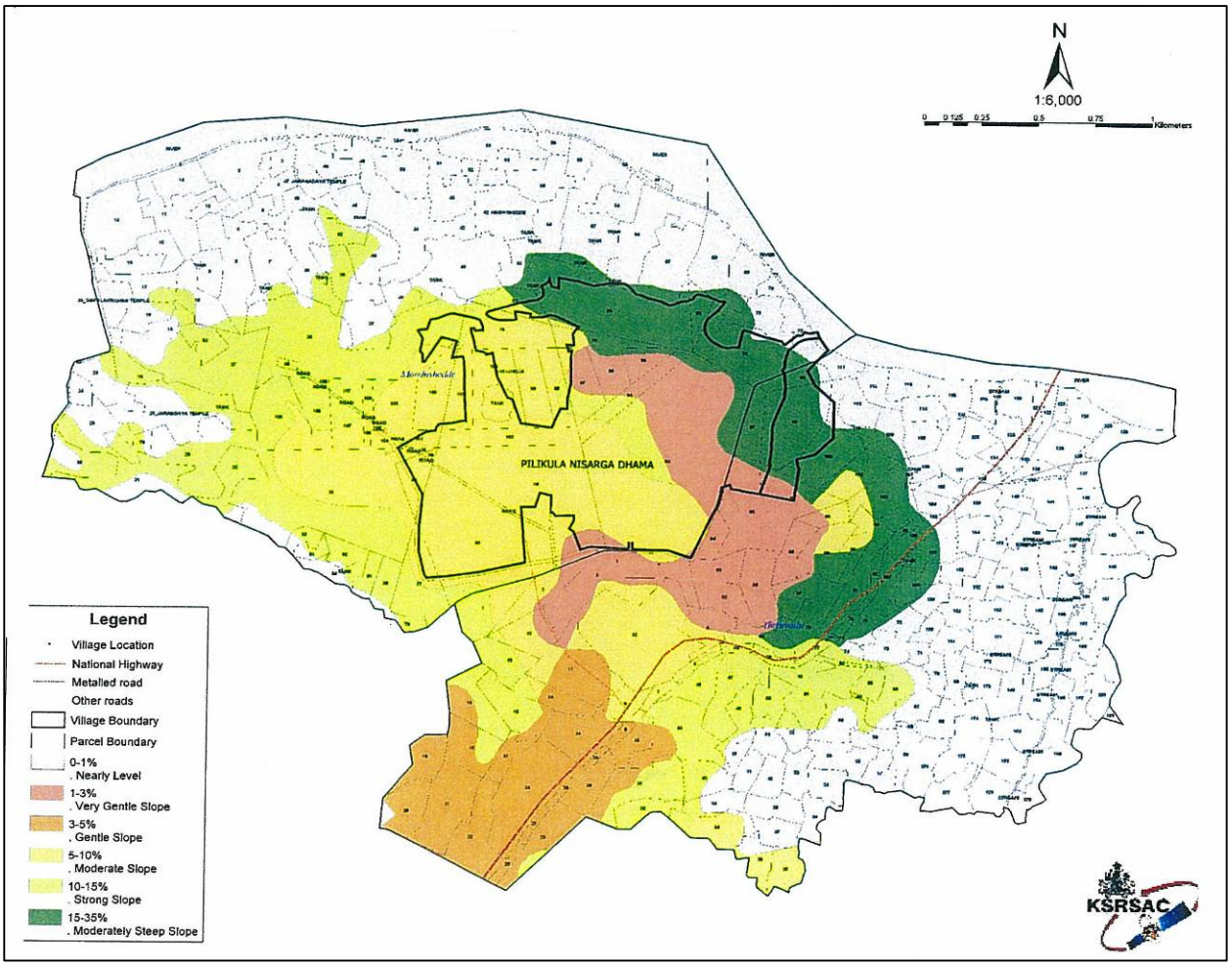
Available K_2O: Medium.



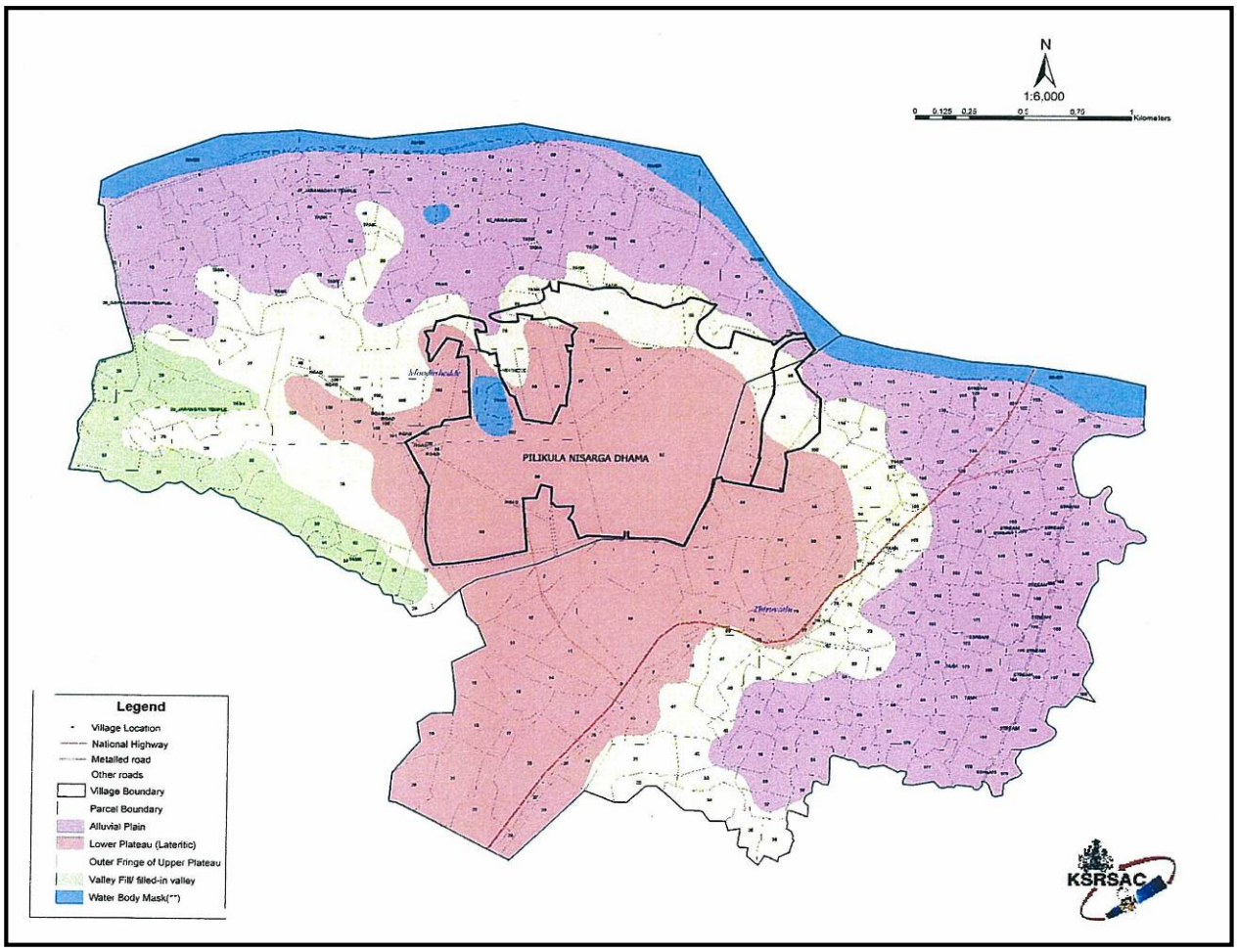
Map-09: Geology of Pilikula Biological Park
(Moodushedde and Thiruvail Village) Mangalore Taluk, Dakshina Karnnada.



Map-10: Soil Texture Series of Pilikula Biological Park (Moodushedde and Thiruvail Village) Mangalore Taluk, Dakshina Karnnada.



Map-11: Slope map of Pilikula Biological Park (Moodushedde and Thiruvail Village) Mangalore Taluk, Dakshina Karnnada.



Map-12: Geo-Morphological Map of Pilikula Biological Park (Moodushedde and Thiruvail Village) Mangalore Taluk, Dakshina Karnnada

1.8 Flora and Fauna in Zoo Premises:

Pilikula Biological Park is a home to a diverse variety of free ranging flora and fauna. Diverse variety of invertebrates, amphibians, birds, reptiles and mammals have been recorded in zoo premises. Diverse varieties of floral species of Western Ghats region are also seen in the zoo premises.

1.9 Climate:

Pilikula being situated between the Western Ghats and the Arabian Sea, has a humid equable climate throughout the year. The interior areas are quite sultry and hot during summer, the coastal regions being less intense due to proximity to the sea. Both diurnal and annual temperatures rarely exceed the limits of 27°C and 35° C near the coast. But wider temperature ranges are usual away from the sea and nearer hill. During the monsoon months, the temperature is greatly reduced by the almost total absence of sunshine.

The humidity at the foot of ghats is generally high touching saturation during southwest monsoon. The plains are considerably drier. The dry season extends from February to late may and is marked by forest fires. A ground mist or heavy dew is however not an uncommon feature is the sub-ghats region from November to February.

1.10 Rainfall:

The southwest monsoon, which brings the bulk of the total rainfall, commences normally about the first week of June. Breaks in the monsoon are not infrequent. A few thundershowers precede the monsoon in April and May. The heaviest rainfall in the year occurs normally in July. The northeast monsoon brings some rain in October and November. The precipitation is higher in the ghats than towards the plains.

The recorded annual rainfall over the tract varies normally from 3500 mm to 4500 mm. Rainfall is uniform throughout, July being the peak month. Rainfall is negligible from December to April. The average rainy days vary from 100 to 160 days.

1.11 Season:

Three seasons are experienced in Mangalore –

- Monsoon – The Monsoons brings heavy rainfall from June to September
- Winter – winter season are from October to January
- Summer – Summer begins from the month of February to March

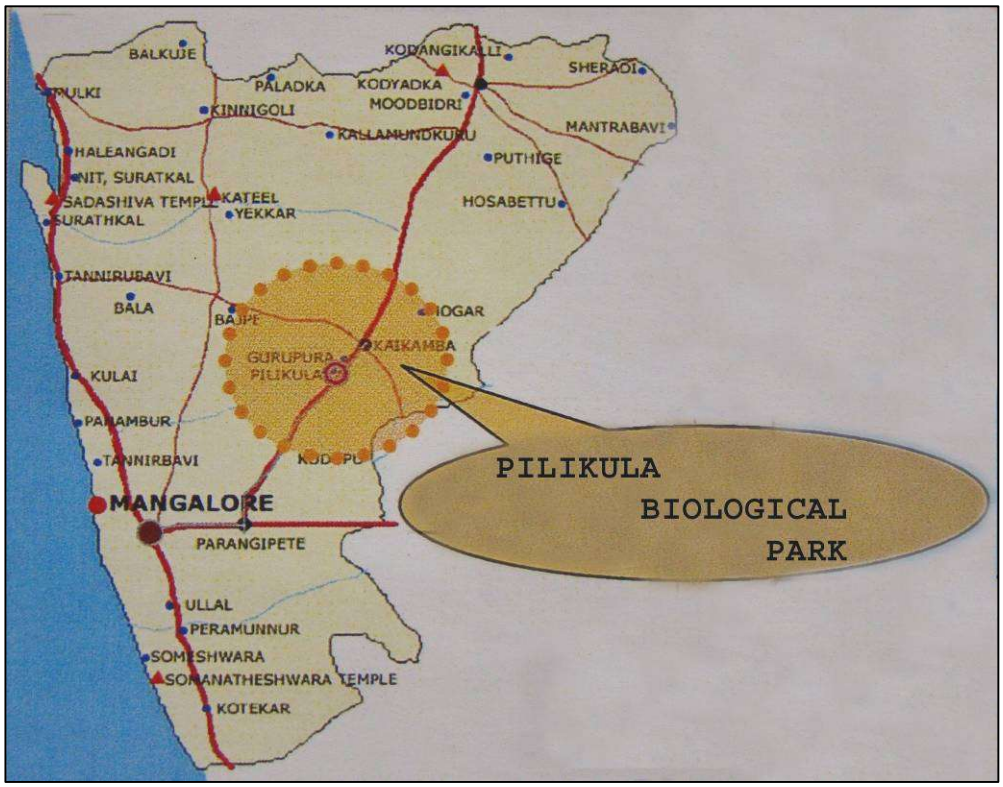
1.12 Location and Approach: (Map 01 – 05)

Pilikula Biological Park is located at about 10 Kms. from Mangalore in the undivided Dakshin Kannada which includes Udupi district of Karnataka. Pilikula Biological Park can be accessed from Mangalore through NH-13 on the Mangalore Vamanjoor route at Moodushedde village and Thiruvailu village in Dakshina Kannada District.

Mangalore is the nearest district headquarters and it is well connected with other cities by Air, Rail and Seaport. The port not only handles cargo, but also is increasingly becoming a cruise destination for foreign liners. The functioning of the Konkan Railway has immensely increased the commercial importance of Mangalore and its expansion as an urban agglomeration, with increasing migration from different parts of the country. The city is connected by the road through National Highway (NH-17 and 13 and State Highway 48 which traverse through it.

Map-01: Showing Karnataka State in India

Map-02: Showing Mangalore in Karnataka



Map-03: Showing Pilikula in Mangalore

Map-04: Dakshina Kannada District

Map-05: Showing the Location and Approach to Pilikula

1.13 Legal Status:

Pilikula Nisarga Dhama comprises nearly 375 acres of land on the bank of Gurupura river. 150 acres of land is earmarked for the development of Pilikula Biological Park. Land is an assessed wasteland belongs to Revenue department. Portion of the land was encroached by more than 175 families and remaining barren land was afforested by Karnataka forest dept. Encroachers were evicted and rehabilitated outside the Nisarga Dhama by District administration and land was handed over to Pilikula Nisarga Dhama Society by Government vide letter no. G.O. No.RD.LGA dated 18.01.2006.

1.14 Source of Pollution:

No source of pollution is recorded since the zoo is located far from Mangalore.

King Cobras in Pilikula Biological Park.

Chapter – 2

Appraisal of the present arrangement and constraints

2.1 Facilities in Different Sections and their Management:

2.1.1 Housing and Upkeep of Animals:

At present the zoo accommodates nearly 400 animals with 09 species of birds, 24 species of mammals, 26 species of reptiles and 08 species of Western Ghats fishes. Spacious enclosures, with enough vegetation and meet the requirements prescribed by the Central Zoo Authority. All the enclosures are connected by underground drainage system.

2.1.2 Existing Structures and Facilities:

The park has newly constructed enclosures for Sloth Bears, Bonnet Macaque, Leopard, Tiger, Lion, Barking Deer, Black Buck, Malbar Squirrel, Leopard Cat, Jungle Cat, Civet Cat, Toddy Cat, Spotted Deer, Sambar, Elephant, Porcupine, Wild Boar and semi-permanent enclosures for Common Langur, Jackal and Birds which have to be shifted to new permanent enclosure in the coming years according to the master plan. The construction of snake house is almost in the final stage of completion.

The park also has infrastructure facilities like veterinary hospital with operation theatre, diagnostic lab, quarantine, post-mortem building other facilities like treatment squeezers, close observation cages, hand rearing facilities for young ones, tranquilizing guns and necessary drugs, etc.

New veterinary hospital, quarantine and post mortem building were constructed with the financial assistance from Central Zoo Authority. Office building, toilet complexes, paragolas, Kitchen and store rooms already exist

2.1.3 Water and Power Source:

For the development and maintenance of zoo a lot of water is required, mainly for cleaning of enclosures, for drinking purpose of animals and visitors, maintenance of lawns, gardens, toilets etc. Water is drawn from four bore wells with overhead tanks. Perennial water bodies are also found in the area. Water is also lifted from adjoining Gurupura river.

Power for the purpose of lighting, running motors is received from Karnataka Electricity Board and augmented by solar lighting system.

2.1.4 Garbage Disposal:

Network of drainages have been provided for all the enclosures with manholes, pipe line of 6" dia. Liquid waste will be drawn to a wet well and treated in a tertiary plant. Recycled water will be used for the gardening in park. The solid waste is disposed off in City dumping yard which is about 5Km away from the park. Park vehicle is used for the purpose. Under Ground Drainage system was laid by KUIDCEMP financed by Asian Development Bank.

2.1.5 Health Care of Animals:

Zoo has a Veterinary hospital with experienced Veterinarian, necessary equipments like tranquilizing guns, medicines etc. A veterinary hospital, quarantine and a post most mortem building funded by Central Zoo Authority is functional.

Routine treatment of sick animals and surgical cases are attended at this zoo itself. However for specific diagnosis, investigation etc. the zoo is taking the help from Government Veterinary Hospital Mangalore, Veterinary College Bangalore and Veterinary College Hassan. Faecal, blood and other samples are routinely examined and for conformation the samples are also sent to Government Veterinary Hospital Mangalore. For histo-pathological investigations specimens are sent to I.A.H and V.B, Bangalore, Karnataka.

The zoo hospital keeps the adequate stock of medicines including certain life saving drugs which are used for routine treatment and prophylaxis of animals. Tranquilizing equipment like Guns, Blow pipe etc. is available for restraining and handling animals.

Clean and hygienic food is fed to animals after routine checking the quality and quantity of the feed by veterinary officer, scientific officer and respective keepers. The zoo has a well planned prophylactic hygienic schedule to prevent diseases is as follows.

S.No.	Activities	Period
Hygiene		
1	Removal of faeces, urine, leftover feed etc.	Daily
2	Cleaning of the enclosure with suitable disinfectants i.e washing the floor of the animal cubicles.	Daily
3	Disinfection of the enclosure i.e spraying various disinfectants inside the enclosure.	Once in 15 days.
4	Disposal of liquid waste.	Daily through UGD.

S.No.	Activities	Period
5	Disposal of solid waste	Disposed daily to a dumping yard located 5 km away from the zoo.
Feeding		
6	Carnivores	Daily once in a day with fasting once in a week.
7	Herbivores	Thrice in a day daily.
8	Primates	Once in a day.
9	Birds	Twice in a day
10	Reptiles – Snakes	Twice in a week.
11	Reptiles – Crocodiles and Gharials	Twice in a week.
12	Pure drinking water in enclosure, cubicles, etc.	Round the clock.
Health Care		
13	Routine checkup of each and every animal for health and behaviour aspect by keepers, scientific officer and veterinary officer.	Daily.
14	If any animal is found sick treatment is carried out.	Immediately
15	Veterinary facility including medicine	Round the clock.
Deworming		
16	All animals	Once in three month.
17	Faecal sample analysis for parasitic infection	Once in a month, next day of fasting.
18	If animals found positive for parasitic infection	Immediate treatment
Prophylactic Measure		
19	Vaccination for Feline Fel-o-vax vaccine	2^{nd} month of birth. Once in a year for adults.

S.No.	Activities	Period
20	Vaccination for canines Anti Rabies vaccine Parvo virus vaccine Leptospira and Hepatitis	2nd month of birth. Once in a year for adults.
21	Vaccination for birds Ranikhet disease	2nd month of birth. Once in a year for adults.

2.1.6 Animal Records:

Records pertaining to health, treatment, disease, natality, mortality etc. are maintained in the format prescribed by Central Zoo Authority. Records are updated on daily basis.

2.2 Animal Collection Plan (Existing):

Annexure – I

2.3 General Zoo Administrations:

Pilikula Biological Park is one of the project areas of Pilikula Nisarga Dhama. The zoo is managed by a Director of the rank Deputy Conservator of Forests. The detail of the personnel employed is mentioned below.

S. No.	Designation	No. of Post
1	Director	01
2	Veterinary Officer	01
3	Scientific Officer	01
4	Supervisor	01
5	Security Officer	01
6	Zoo Keepers	12
7	Engineering Wing Project Engineer Assistant Engineer Junior Engineer	 01 01 01
8	Ticket Issuer	02
9	Security Guards	05
10	Horticulture Assistant Gardeners	01 06
11	Sweepers	02

The present zoo **Director** is of the rank of Deputy Conservator of Forests and has 33 years of experience in forest department including 15 years of experience in zoo management. He has also served as Regional Director, Environment. He has himself exposed to many foreign zoos in USA, UK, Canada. He has to his credit the development of forest in this area including the botanical section. He has also attended the following training and meeting conducted by Central Zoo Authority.

- 14th meeting of sub-committee on zoo designing of the Central Zoo Authority, New Delhi, on 5th July 2005.
- Zoo Directors Training Programme organized at Nandankanan Biological Park, Bhubaneswar from 10th – 15th April 2006.
- International Workshop on Zoo Education with special reference to fund raising, public relation and marketing at Ahmedabad on 26th – 28th November 2007.
- Hands on training on ARK'S software by ISIS team at Pune on 1st–6th December 2008.

Veterinary Officer has M.V.Sc. degree in veterinary science with experience in animal husbandry department. He has attended the following training programme organized by Central Zoo Authority, New Delhi.

- National Seminar on "Advances in Management and Diseases of Wild Animals" at Bangalore on 20 – 21 June 2008.
- Workshop on "Veterinary Aspects of Captive Animals Management on 17th March 2009 at Mysore Zoo.

Scientific Officer with M.Sc. degree in Applied Zoology. He has been trained by Central Zoo Authority in following training and workshops.

- Workshop on initiating conservation breeding programme on 16th November 2007 for endangered species in South India.
- A Short course on Amphibian biodiversity conservation on 10th – 16th December 2007 at Periyar.
- Middle level Zoo officer training programme on 13th – 22nd October 2008 at Dehradun.
- Hands on Training on ARK'S software by ISIS team at Pune on 1st – 6th December 2008.

Senior Supervisor with Diploma in Engineering qualification has been trained on hand rearing technique of orphaned animals at Training Programme conducted by Mysore Zoo on 29th – 30th July 2008.

Supervisor: A retired Forester of wildlife wing of Karnataka Forest Department.

All **Zoo Keepers** have been specially trained and have attended regional level Zoo Keepers Training Programme organized by Central Zoo Authority.

2.4 Visitor Amenities:

The zoo is open for the visitors from 9:30 A.M. to 5:30 P.M. It is closed on Mondays. Near the main gate a parking lot is provided. At the entrance basic necessary information has been displayed with suitable information boards and also the Do's and Don'ts inside the zoo. Entry fee for adult (Above 12yrs of age) Rs.20/-, children (5-12 yrs) Rs.10/-, photo camera Rs.25/- and video camera Rs.100/


Garden and Resting Place in Pilikula Biological Park

Drinking water facilities and toilets are also provided in the zoo. Refreshment facility is also available.

Simple and attractive sign boards guide the visitors through proper pathway so as not to miss any displayed animals.

2.5 Education and Research:

The zoo promotes education and research on Western Ghats fauna with a variety of activities like nature camps, celebrating wildlife week, world environment day etc. involving school children, local NGO's and educational institutions. School children, NGO's and institutions participate in conservation education activities with great enthusiasm and extend their full support to the zoo, in turn they are benefited in the form of education and information.


Conducting training program for Teachers & School Children

Many students from schools, colleges and universities take up their project work in studying the captive wild animals and also their management in this zoo.

2.6 Visitation:

Existing Tourist Inflow to Pilikula Biological Park:

Year	*Adults*	*Children*	*Total*
2000 – 01	13800	5100	18900
2001 – 02	74000	20900	94900
2002 – 03	78500	28200	106700
2003 – 04	99500	45500	145000
2004 – 05	105000	72000	177000
2005 – 06	211000	78000	289000
2006 – 07	281000	107000	388000
2007 – 08	313000	121000	434000

A Visit of Dr. A. P. J. Abdul Kalam to Pilikula Biological Park

A Visit of Tourism Minister to Pilikula Biological Park

2.7 Revenue from Entry Fee:

Average revenue from entry fee and other rent charges from kiosk etc. is about Rs.50,00,000/- per annum. Since Park is on developmental stage, so far children from local area are allowed free. However as park expands with display of more animals and amenities, it is proposed to raise the entry fees to fetch more revenue.

2.8 Landscaping:

Landscaping is done by the horticulture wing of the zoo. Western Ghats species of fruit yielding and flowering trees are planted by replacing the existing plantation of acacia and casuarina species wherever found. Barren patches of the area will be covered with trees to give a forest look to the park.

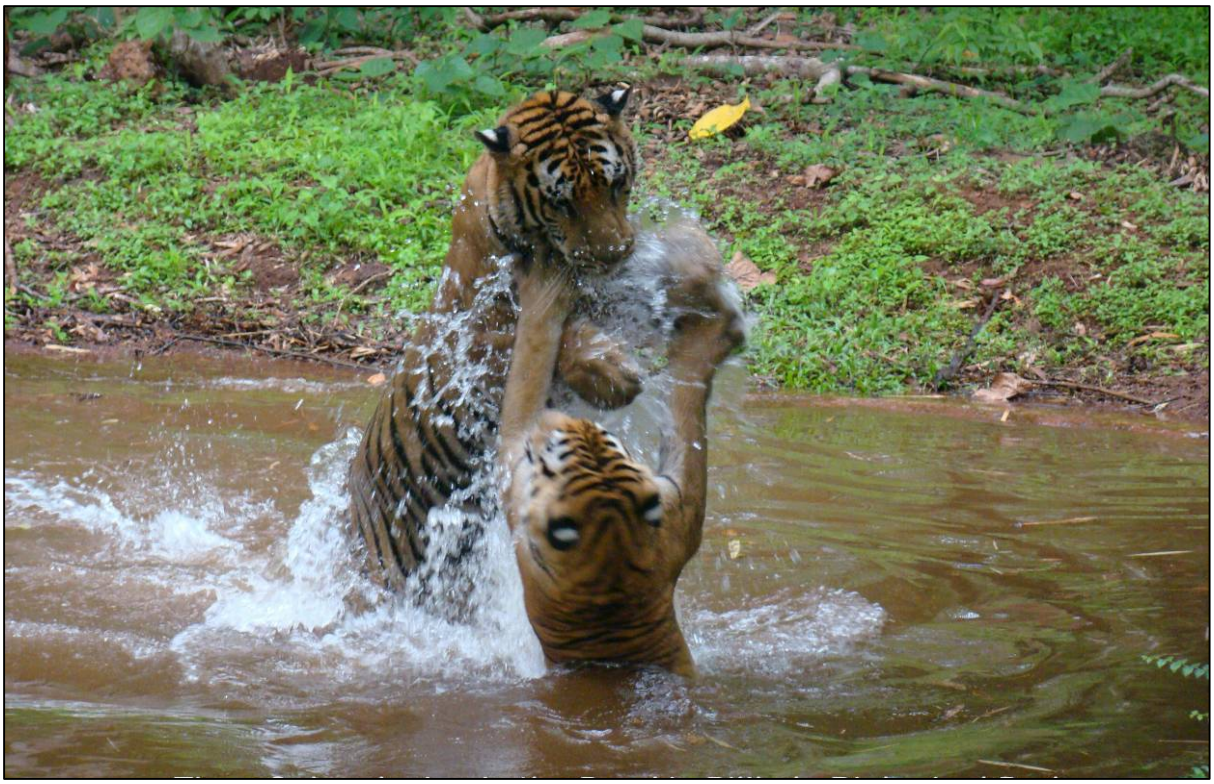
2.9 Vegetation:

The natural vegetation occurring in the site may be classified as a mix of tropical semi – evergreen forests and tropical moist deciduous forest.

The predominant vegetation species include:

- *Artocarpus hirsute*
- *Cinnamomum spp.*
- *Calophyllum inophyllum*
- *Diospyros spp.*
- *Elaeocarpus serratus*
- *Garcinica spp.*
- *Holigarna arnottiana*
- *Hopea parviflora*
- *Hopea whitineia*
- *Ixora arborea*
- *Lagaerstroemia lanceolata*
- *Terminalia paniculata*
- *Webera spp.*
- *Strobilanthes spp.*
- *Santalum alba,*
- *Bamboos,*
- *Numerous varieties of canes.*

The northern fringes of the site are endowed with luxuriant vegetation representative of the above. However predominant areas of the site have lost vegetation cover due to various biotic factors such as excessive quarrying, overgrazing etc. prior to the establishment Pilikula. It is an effort to restore green cover has extensively planted *Acacia auriculiformis* and *Casuarina spp*. throughout the site along with some flowering and fruit yielding plants of Western Ghats. Nearly 60000 plants of 236 rare plant species of Western Ghats are planted in Pilikula with the help of Indo-Novergein project. The resting places have developed lawns and ornamental species.



Tiger Cubs playing in the pond in Pilikula Biological Park

PART – II

Chapter – III

Future objective including vision, mission statement/ theme and strategy

3.1 Introduction:

The Master Plan for the development of Biological Park is proposed for the next 10 years i.e. 2009 – 2019. As the park is relatively new and certain developments have already been initiated, improvement to the existing enclosures wherever necessary are proposed. Further expansion is recommended taking into consideration, the availability of land, vegetation, water, topography and convenience of management. The guidelines of Central Zoo Authority are kept in view while making the future development.

3.2 Mission:

To promote the conservation of fauna of Western Ghats region through education, scientific research, captive breeding and establishment of rescue centre.

3.3 Theme:

- Broad taxonomical display of wild animal species of national importance with special emphasis on fauna of Western Ghats region.
- Off display conservation breeding centers for King Cobra, Mouse Deer, Malabar giant squirrel and endangered species of Western Ghats region.

3.4 Objective:

- Showcase the rich fauna and flora of the Western Ghats.
- Conservation and breeding of endangered species found in Western Ghats region for display, exchange, breeding loans and rehabilitation to the wild in keeping with the National Policy and guidelines from time to time.
- Promote awareness among the public in general and students in particular on the need to protect and conserve wildlife and its habitat.
- Encourage research and scientific studies useful for zoo and wildlife management.
- To function as a rescue centre for wild animals posing danger to the humans, wild animals entering into human habitation, orphaned and injured animals in this region.
- Recreation for the purpose of providing wholesome, healthy educational activity by utilizing the natural features.

Chapter – IV
Future Action Plan

4.1 Proposal to Achieve the Objective:

As the biological park is located at the foothills of the Western Ghats, the above objectives are proposed to be achieved by displaying the fauna representative of the Western Ghats. A few other varieties of birds and animals found in other parts of the country are also proposed to be displayed, as they are of attractive value.

- Display of the fauna in a natural habitat as possible.
- Keeping in view the guidelines of Central Zoo Authority, the enclosures would be large so that all animals get adequate space for free movement and exercise and no animals is unduly dominated or harassed by any other animal.
- Every animal shall be provided appropriate upkeep and health care so as to ensure a healthy quality of life and enable the zoo population to sustain itself through procreation.
- Encourage research on biology, behaviour, nutrition and veterinary aspects of animals in captivity and develop necessary expertise. Subsequently, disseminate information on scientific aspects of management through publications and periodicals.
- Take up identified breeding programmes in consultation with the Central Zoo Authority and other zoos in the country, so as to create socially, genetically viable groups. Priority would be given to endangered Western Ghats species.
- Attractive and effective signage methods, education material, folders and audiovisual device be used to communicate the message of conservation.

4.2 Master Layout and Plan:
(Approved vide letter no.F.No.23-1/97-CZA(385(Vol.II)(M)/2839 dated 17.05.2013 of CZA New Delhi.)

Proposed layout map in contour map with existing natural landmarks, buildings, vegetation roads and paths, enclosures, drainage, water supply etc.

4.3 Animal Collection/display Plan: Overall strategy:

It is proposed that Pilikula Biological Park will have five broad categories of collection/display of animals. These are:

- Animals already existing in the park
- Animals which can be obtained on exchange basis from other Indian zoos.
- Rescued Animals exclusively found in the Western Ghats Region and Coastal Karnataka.
- Animals occurring elsewhere in the Indian sub-continent (including Sri Lanka, Bangladesh, Pakistan and trans-Himalayan realm) 10 %
- Animals from outside Indian sub-continent (as and when available) 10%

4.4 Theme for Designing Exhibit of Animals:

Tradition system of arranging display of animals as per taxonomic classification is common in the zoo's.

In Pilikula Biological Park enclosures of birds, reptiles, mammals and fish species are displayed in separate blocks. But park is not strictly adopting a perfect theme. Some animals will be housed in a fassion according to their biological requirements, behaviour type. Density of vegetation and microclimate situation in the pockets of the Park are also taken into consideration for providing enclosures to animals. Fairly large and spacious enclosures will be constructed according to the requirement of the individual animal. Care is taken to maintain the existing tree growth. Planting of evergreen fruit yielding trees is being taken up in and around the enclosures. Moat system will be adopted while constructing the enclosures. For constructing moat large area has to be cleared. But in unavoidable circumstances wall or chain link mesh will be used to construct the enclosure to avoid destruction of natural existing natural tree growth.

Thick tree screening will be provided between herbivours and carnivores enclosures so that the animals could not see each other, it will help in reducing stress among the captive animals.

4.5 Animal Collection Plan:

Mammals

S.No.	Species	Present Stock				Proposed Collection				Animals to be acquired or removed			
		M	F	U	T	M	F	U	T	M	F	U	T
1	Bear Sloth	0	0	0	0	2	4	0	6	2	4	0	6
2	Buck Black	21	20	0	41	10	10	0	20	0	0	0	0
3	Buffalo Wild	0	0	0	0	2	4	0	6	2	4	0	6
4	Caracal	0	0	0	0	2	4	0	6	2	4	0	6
5	Cat Jungle	1	1	0	2	2	4	0	6	2	4	0	6
6	Cat Leopard	1	0	0	1	2	4	0	6	1	4	0	5
7	Cat Malabar Fishing	0	0	0	0	2	4	0	6	2	4	0	6
8	Civet Common Palm	5	5	0	10	5	5	0	10	0	0	0	0
9	Civet Indian Small	1	0	0	1	2	4	0	6	1	4	0	5
10	Deer Barking	7	7	4	18	10	10	0	20	0	0	0	0
11	Deer Hog	0	0	0	0	10	10	0	20	2	4	0	6
12	Deer Sambar	11	17	3	31	10	10	0	20	0	0	0	0
13	Deer Spotted	18	19	2	39	10	10	0	20	0	0	0	0
14	Indian Gaur	0	0	0	0	2	4	0	6	2	4	0	6
15	Nilgai	0	0	0	0	10	10	0	20	2	4	0	6
16	Deer Mouse	4	5	6	15	10	10	0	20	0	0	0	0
17	Dog Wild	0	0	0	0	5	5	0	10	2	4	0	6
18	Fox	0	0	0	0	5	5	0	10	2	4	0	6
19	Hare Black Naped	1	1	0	2	10	10	0	20	1	2	0	3
20	Hare Rufous tailed	0	0	0	0	5	5	0	10	2	4	0	6
21	Hyena	0	0	0	0	2	4	0	6	1	2	0	3

22	Jackal	9	7	0	16	10	10	0	20	0	0	0	0
23	Langur Common	1	0	0	1	2	4	0	6	1	2	0	3
24	Langur Nilgiri	0	0	0	0	2	4	0	6	1	2	0	3
25	Leopard/ Panther	3	4	0	7	4	4	0	8	0	0	0	0
26	Lion Asiatic	0	0	0	0	2	4	0	6	1	2	0	3
27	Loris Slender	0	0	0	0	2	4	0	6	1	2	0	3
28	Macaque Bonnet	6	5	1	12	4	8	0	12	0	0	0	0
29	Macaque Liontailed	0	0	0	0	2	4	0	6	1	2	0	0
30	Macaque Rhesus	0	0	0	0	2	4	0	6	1	2	0	0
31	Mongoose Common	4	4	0	8	5	5	0	10	0	0	0	0
32	Otter Clawless	0	0	0	0	2	4	0	6	1	2	0	3
33	Otter Common Indian	0	0	0	0	2	4	0	6	1	2	0	3
34	Otter Smooth	0	0	0	0	2	4	0	6	1	2	0	3
35	Pig Wild	2	3	0	5	2	4	0	6	0	0	0	0
36	Porcupine Indian	2	4	0	6	2	4	0	6	0	0	0	0
37	Squirrel Flying	0	0	0	0	2	4	0	6	1	2	0	3
38	Squirrel Giant	3	1	0	4	2	4	0	6	0	2	0	2
39	Tiger Bengal	5	3	0	8	2	4	0	6	0	0	0	0
40	Wolf	0	0	0	0	2	4	0	6	1	2	0	3
Exotic Mammals													
41	Baboon	0	0	0	0	2	4	0	6	1	2	0	3
42	Cheetah African	0	0	0	0	2	4	0	6	1	2	0	3
43	Giraffe	0	0	0	0	1	2	0	3	1	2	0	3
44	Hippopotamus	0	0	0	0	1	2	0	3	1	2	0	3
45	Jaguar	0	0	0	0	1	2	0	3	1	2	0	3
46	Monkey Capuchin	0	0	0	0	2	4	0	6	1	2	0	3
47	Monkey African Green	0	0	0	0	2	4	0	6	1	2	0	3
48	Monkey Squirrel	0	0	0	0	2	4	0	6	1	2	0	3
49	Zebra	0	0	0	0	2	4	0	6	1	2	0	3

Reptiles

S.No.	Species	Present Stock				Proposed Collection				Animals to be acquired or removed			
		M	F	U	T	M	F	U	T	M	F	U	T
1	Boa Common Sand	0	0	0	4	2	4	0	6	0	0	0	0
2	Boa Red Sand	0	0	0	9	2	4	0	6	0	0	0	0
3	Boa Whitaker's	0	0	0	19	4	6	0	10	0	0	9	9
4	Bronzeback Common	0	0	2	2	2	4	0	6	0	0	0	0
5	Bronzeback Painted	0	0	1	1	2	4	0	6	1	2	0	3
6	Cat Snake Beddome's	0	0	0	0	2	4	0	6	1	2	0	3
7	Cat Snake Ceylon	0	0	5	5	2	4	0	6	0	0	0	0
8	Cat Snake Common	0	0	0	0	2	4	0	6	1	2	0	3
9	Cat Snake Forsten's	0	0	0	0	2	4	0	6	1	2	0	3
10	Chemaeleon Indian	0	0	0	0	2	4	0	6	1	2	0	3
11	Cobra India	0	0	18	18	4	6	0	10	0	0	8	8
12	Cobra King	10	4	1	15	4	6	0	10	4	0	0	4
13	Crocodile Gharial	1	0	0	1	2	4	0	6	2	2	0	4
14	Crocodile Marsh	1	1	3	5	2	4	0	6	0	0	0	0
15	Keelback Beddome's	0	0	0	0	2	4	0	6	1	2	0	3
16	Keelback Checkered	0	0	10	10	4	6	0	10	0	0	0	0
17	Keelback Green	0	0	0	0	4	6	0	10	1	2	0	3
18	Keelback Hill	0	0	0	0	2	4	0	6	1	2	0	3
19	Keelback Olive	0	0	0	0	2	4	0	6	1	2	0	3

20	Keelback Stripped	0	0	10	10	4	6	0	10	0	0	0	0
21	Krait Common	0	0	2	2	2	4	0	6	1	1	0	2
22	Kukri Common	0	0	0	0	2	4	0	6	1	2	0	3
23	Kukri Russel's	0	0	3	3	2	4	0	6	0	0	0	0
24	Kukri Western	0	0	0	0	2	4	0	6	1	2	0	3
25	Lizard Monitor	0	0	5	5	2	4	0	6	0	0	0	0
26	Pit-Viper Bamboo	0	0	0	0	1	2	0	3	1	2	0	3
27	Pit-viper Hump Nosed	0	0	4	4	2	4	0	6	0	0	0	0
28	Pit-Viper Malabar	0	0	1	1	2	4	0	6	1	1	0	2
29	Python Indian Rock	0	0	13	13	4	6	0	10	0	0	3	3
30	Python Reticulated	0	0	0	0	4	6	0	10	2	2	0	4
31	Racer Banded	0	0	2	2	2	4	0	6	1	1	0	2
32	Snake Common Trinket	0	0	0	0	2	4	0	6	2	2	0	4
33	Snake Flying Ornate	0	0	0	0	2	4	0	6	2	2	0	4
34	Snake Indian Rat	0	0	12	12	4	6	0	10	0	0	0	0
35	Snake Montane Trinket	0	0	3	3	2	4	0	6	0	0	0	0
36	Vine Snake Brown	0	0	0	0	2	4	0	6	1	2	0	3
37	Vine Snake Common	0	0	5	5	2	4	0	6	0	0	0	0
38	Viper Russel's	0	0	7	7	2	4	0	6	0	0	0	0
39	Viper Saw-Scaled	0	0	0	0	2	4	0	6	2	4	0	6
40	Wolf Snake Common	0	0	3	3	2	4	0	6	1	1	0	2
41	Wolf Snake Travancore	0	0	0	0	2	4	0	6	1	2	0	3
42	Tortoise Star	0	0	52	52	10	10	0	20	0	0	32	32
43	Turtle Flap Shelled	0	0	8	8	10	10	0	20	0	0	0	0
44	Turtle Giant Soft Shelled	1	0	0	1	2	4	0	6	1	2	0	3
45	Turtle Indian Black	0	0	41	41	10	10	0	20	0	0	21	21
46	Sea Snake Spp.	0	0	0	0	0	0	20	20	0	0	20	20
Exotic Reptiles													
42	Caiman Spectacled	0	0	0	0	2	4	0	6	2	4	0	6
43	Crocodile Caiman	0	0	0	0	2	4	0	6	2	4	0	6
44	Crocodile Nile	0	0	0	0	2	4	0	6	2	4	0	6
45	Crocodile Siamensis	0	0	0	0	2	4	0	6	2	4	0	6
46	Iguana	0	0	0	0	2	4	0	6	2	4	0	6
47	Slider RedEared	0	0	22	22	10	10	0	20	0	0	2	2

Birds:

S.No.	Species	Present Stock				Proposed Collection				Animals to be acquired or removed			
		M	F	U	T	M	F	U	T	M	F	U	T
1	Blue Bird Fairy	0	0	0	0	2	4	0	6	2	4	0	6
2	Cormorant spp.	0	0	0	0	2	4	0	6	2	4	0	6
3	Duck Spotbill	0	0	0	0	2	4	0	6	2	4	0	6
4	Duck Mallard	0	0	11	11	2	4	0	6	0	0	0	0
5	Eagle Black	0	0	0	0	2	4	0	6	2	4	0	6
6	Eagle White Bellied Sea	0	0	1	1	2	4	0	6	2	4	0	6
7	Egret spp.	0	0	0	0	2	4	0	6	2	4	0	6
8	Fowl Red Spur	1	2	0	3	2	4	0	6	2	2	0	4
9	Goose	0	0	23	23	4	6	0	10	0	0	13	13
10	Heron Grey	0	0	0	0	2	4	0	6	2	4	0	6
11	Heron Night	0	0	0	0	2	4	0	6	2	4	0	6
12	Heron Purple	0	0	0	0	2	4	0	6	2	4	0	6

13	Hornbill Malabar Gray	0	0	0	0	2	4	0	6	2	4	0	6
14	Hornbill Malabar Pied	0	0	0	0	2	4	0	6	2	4	0	6
15	Ibis Black	0	0	0	0	2	4	0	6	2	4	0	6
16	Ibis White	0	0	0	0	2	4	0	6	2	4	0	6
17	Jungle Fowl Grey	0	1	0	1	2	4	0	6	1	2	0	3
18	Kingfisher spp.	0	0	0	0	2	4	0	6	2	4	0	6
19	Kite Brahminy	0	0	3	3	2	4	0	6	2	2	0	4
20	Kite Pariah/Black	0	0	19	19	4	6	0	10	0	0	9	9
21	Koel	0	2	0	0	4	4	0	8	2	2	0	4
22	Moorhen	0	0	0	0	2	4	0	6	2	4	0	6
23	Myna Hill	0	0	0	0	2	4	0	6	2	4	0	6
24	Owl Barn	0	0	10	10	4	6	0	10	0	0	0	0
25	Owl Bay	0	0	1	1	2	4	0	6	2	2	0	4
26	Owl Grey Horned	0	0	1	1	2	4	0	6	2	2	0	4
27	Owl Scoups	0	0	2	2	2	4	0	6	2	2	0	4
28	Parakeet Bluewinged	0	0	0	0	2	4	0	6	2	4	0	6
29	Parakeet Rose Ringed	5	5	16	26	4	6	0	10	0	0	16	16
30	Parakeet Plum headed	0	0	1	1	2	4	0	6	2	2	0	4
31	Peafowl	5	3	0	8	4	6	0	10	0	2	0	2
32	Pelican Grey	0	0	0	0	2	4	0	6	2	4	0	6
33	Pigeon Green Imperial	0	0	0	0	2	4	0	6	2	4	0	6
34	Pigeon Nilgiri Wood	0	0	0	0	2	4	0	6	2	4	0	6
35	Spoon Bill	0	0	0	0	2	4	0	6	2	4	0	6
36	Stork Blacknecked	0	0	0	0	2	4	0	6	2	4	0	6
37	Stork Greater Adjutant	0	0	0	0	2	4	0	6	2	4	0	6
38	Stork Lesser Adjutant	0	0	0	0	2	4	0	6	2	4	0	6
39	Stork Openbilled	0	0	0	0	2	4	0	6	2	4	0	6
40	Stork Painted	0	0	0	0	2	4	0	6	2	4	0	6
41	Teals Cotton	0	0	0	0	2	4	0	6	2	4	0	6
42	Teals Whistling	0	0	3	3	2	4	0	6	2	2	0	4
43	Waterhen	1	1	0	2	4	4	0	8	2	2	0	4
Exotic Birds													
44	Budgerigar	0	0	66	66	45	50	0	95	0	0	0	0
45	Cockatiel	4	2	0	6	10	10	0	20	0	0	0	0
46	Dove Dimond	0	0	6	6	25	25	0	50	0	0	0	0
47	Finch Zebra	0	0	8	8	25	25	0	50	0	0	0	0
48	Fowl Guneia	4	2	0	6	4	6	0	10	0	0	0	0
49	Pheasant Red Golden	1	1	0	2	5	5	0	10	0	0	0	0
50	Pheasant Yellow Golden	1	1	0	2	5	5	0	10	0	0	0	0
51	Pheasant Lady Amherset	1	1	0	2	5	5	0	10	0	0	0	0
52	Sparrow Java	0	0	5	5	25	25	0	50	0	0	0	0
53	Cockatoo spp.	0	0	0	0	10	10	0	20	5	5	0	10
54	Conure Sun	1	1	0	2	5	5	0	10	2	2	0	4
55	Emu	2	2	0	4	5	5	0	10	1	1	0	2
56	Lorikeet spp.	0	0	0	0	10	10	0	20	10	10	0	20
57	Lovebird Peach Faced	0	0	1	1	10	10	0	20	5	5	0	10
58	Macaw Blue and Gold	1	1	0	2	4	4	0	8	2	2	0	4
59	Macaw Green Winged	0	1	0	1	4	4	0	8	2	2	0	4
60	Macaw spp.	0	0	0	0	4	4	0	8	4	4	0	8
61	Ostrich	0	0	0	0	2	2	0	4	2	2	0	4
62	Parrot African Grey	1	1	0	2	4	4	0	8	2	2	0	4
63	Parrot Spp.	0	0	0	0	4	4	0	8	4	4	0	8
64	Toucan Channel Billed	0	0	1	1	3	3	0	6	2	2	0	4

Fishes:

S.No.	Species	Present Stock				Proposed Collection				Animals to be acquired or removed			
		M	F	U	T	M	F	U	T	M	F	U	T
1	Hunase/Murangi	0	0	5	5	0	0	10	10	0	0	0	0
2	Kijan	0	0	12	12	0	0	12	12	0	0	0	0
3	Kol Kijan	0	0	8	8	0	0	8	8	0	0	0	0
4	Kuchhu	0	0	9	9	0	0	9	9	0	0	0	0
5	Madanji/Korava	0	0	6	6	0	0	6	6	0	0	0	0
6	Moogumalli/Kudian	0	0	8	8	0	0	8	8	0	0	0	0
7	Mugudu/Magur	0	0	14	14	0	0	14	14	0	0	0	0
8	Mulvel/Kurimeenu	0	0	2	2	0	0	2	2	0	0	0	0

4.6 Proposed Development:

4.6.1 Veterinary Section:

The veterinary section is a very essential part of the animal care staff of the zoo. A zoo veterinarian should be able to cope with all sorts of animals from a small bird to the mighty tiger. Good veterinary care also depends upon capable and observant keepers, who must closely work with the veterinarian. Many animals are difficult to observe and even more difficult to handle, making veterinary care of zoo animals more demanding than that of domestic animals. But, over the years, many zoo's in the country have veterinarians who have developed necessary expertise in treating zoo animals. As such a close liason needs to be maintained with them as well as the local veterinary college.

Veterinary hospital, animal quarantine ward and post mortem building funded by Central Zoo Authority is functional. Some additional amenities require to be improved to make the hospital more responsive to the day to day treatment of the captive animals.

Newly Constructed Veterinary Hospital

Newly Constructed Post-mortem Building

Newly Constructed Animal Quarantine Building

Chairman, Karnataka Coastal Authority is releasing a rescued Jackal Pup into the newly constructed Quarantine, Minister for Tourism, District in-charge Minister, Mangalore MLA are seen

The new veterinary hospital needs to have the following:

4.6.2 Surgery Section:

A well equipped operation theatre should be a part of zoo hospital. Infighting among the wild animals is commonly referred to the zoo hospital with serious injuries, fractures, dislocations, tear wounds etc. Such cases are to be taken to the surgery section to be operated to save the life of the animal. Tranquilizing drugs and accessories, surgical instruments, suturing material, antiseptic drugs, sterilization material should be made available in this section.

4.6.3 Radiological Section:

A X – ray unit is very essential in taking radiological film of the effected part for immediate diagnosis. A small animal under sedation can be shifted to the X – ray room and X-ray films can be taken to know the kind of fracture, dislocation etc, and referred to the surgical section for further treatment. The mobile X-ray unit can be taken to the field where large animals are to be attended.

4.6.4 Treatment Section:

It is an important section where treatment is provided to small and medium animals which can be shifted to the zoo hospital for emergency treatment. Necessary treatment could be provided here, and then the animals are shifted to inpatient ward facility for follow up treatment. All necessary samples are to be collected for diseases diagnostic procedures and treatment provided against viral/bacterial diseases.

4.6.5 Pharmacy Section:

All the important veterinary drugs are to be stored in zoo hospital or pharmacy for daily use to attend treatment, prophylactics, supplementations etc. Vaccines and other drugs, which need to be kept at low temperature (4 – 7 degrees C), are to be kept in a refrigerator.

4.6.6 Intensive Care Unit:

Animals in critical condition need special care and monitoring and therefore are to be kept in the intensive care unit. When they show recovery, they can be further shifted to inpatient ward facilities.

4.6.7 Mini Lab:

Routine blood, urine and faecal examination are to be conducted in the zoo hospital mini lab for diagnostic purpose. The mini lab should be well equipped to meet all the requirements of examining various samples on daily basis.

4.6.8 Isolation Ward:

Animals suffering from zoonotic infections and contagious diseases are to be kept in the isolation ward for necessary treatment. The isolation ward will be located in hospital complex and away from inpatient wards.

4.6.9 Quarantine Section:

Animals which are rescued, injured, orphaned etc. are required to be kept under quarantine for providing necessary treatment, to observe their behaviour, sample collection etc. to rule out any disease and for supportive treatment. The animals could also be vaccinated to protect them from viral and bacterial diseases. These animals are kept for short duration then will be release into the enclosures, rescue centre.

4.6.10 In-Patient Ward:

After treatment animal should be close watched till recovery in separate cubicles or rooms in In-Patient ward. It should be near the veterinary hospital.

An inpatient ward facility badly required in Pilikula Biological Park. Nearly Rs.5,00,000 will be saved from the fund allotted for the construction of veterinary hospital, quarantine and post-mortem buildings. From this saving inpatient ward will be constructed near the veterinary hospital complex after obtaining approval from Central Zoo Authority.

4.7 Control of Epidemics:

Necessary vaccination is done to all captive animals as prophylactic measures as schedule. Deworming of all animals is done once in three months or as and when required. Scheduled chart displaying the particulars of vaccination, deworming and other prophylactic measures and next due date should be displayed on the wall of veterinary hospital.

4.8 Disposal of Carcasses:

At present the dead bodies are disposed by burying. As solar incinerators are available, it is proposed to install one incinerator in future for proper disposal of carcass. Carcasses of animals that die of communicable diseases should be disposed of only by burning, without opening the body cavity.

4.9 Nutrition and Diet of Zoo Animals:

- As there are very many established zoos in the country, they have been adapting a hygiene and nutritious diet for various animals in captivity, duly documented. The same diet supplemented with vitamins on the advice of the zoo veterinarian could be put into use and a diet chart or schedule for each species drawn up.
- The chart so drawn up should be displayed at the enclosure and should also be available with the animal keeper and the zoo veterinarian.
- All feed being supplied to the animals should be checked and examined by the zoo veterinarian for its quality and quantity daily before being distributed to the captive animals.
- Feed should be supplied at a particular time so that the animals become accustomed to the schedule and animals outside the cages would move into them at the appropriate time. This would be useful especially for the carnivores, as they have to be locked up in their cages at night as a security precaution.
- Suitable variation should be made in the diet from time to time to avoid monotony.
- Sick, pregnant and young animals would have to be put on a separate diet on the advice of the veterinarian.
- Carnivores are starved for one day in a week so as to clean the animals digestive system.
- The zoo should have a proper store, refrigeration and kitchen for storage and supply of food products. They should be able to stock food articles for 3-4 days at a time during emergency.
- As far as possible feeding by visitors should not be allowed and totally discouraged.

4.10 Construction of Animal Enclosures:

Currently enclosures for tiger, leopard, lion, and some of other species exist. Animals which are in semi-permanent enclosures have to be shifted to new specious enclosures.

More enclosures are required for housing the animals. Keeping in mind of the biological requirements of the individual animal designs are made. According to the master plan and layout plan enclosures have to be constructed. In the master plan provision is made for the construction of enclosures, maintenance of the enclosures for another ten years. Adjoining area will be earmarked for future development of the biological park.

4.11 List of Animal Enclosures to be:

Newly Constructed	Modified	Demolished and Reconstructed
Mammals		
Buffalo Wild	Bear Sloth	
Caracal	Buck Black	
Cat Malabar Fishing	Deer Sambar	
Deer Hog	Deer Spotted	
Indian Gaur	Deer Mouse	
Nilgai	Macaque Bonnet	
Fox	Squirrel Giant	
Hare Black Naped		
Hare Rufous tailed		
Hyena		
Langur Common		
Langur Nilgiri		
Lion Asiatic		
Loris Slender		
Macaque Liontailed		
Macaque Rhesus		
Otter Clawless		
Otter Common Indian		
Otter Smooth		
Squirrel Flying		
Wolf		
Exotic Mammals		
Baboon		
Cheetah African		
Giraffe		
Jaguar		
Monkey Capuchin		
Monkey African Green		
Monkey Squirrel		
Zebra		
Reptiles		
Bronzeback Painted		Lizard Monitor
Cat Snake Beddome's		
Cat Snake Common		
Cat Snake Forsten's		
Chemaeleon Indian		
Crocodile Gharial		
Crocodile Marsh		
Keelback Beddome's		
Keelback Green		
Keelback Hill		
Keelback Olive		
Kukri Common		
Kukri Russel's		

Kukri Western		
Pit-Viper Bamboo		
Pit-viper Hump Nosed		
Pit-Viper Malabar		
Snake Flying Ornate		
Vine Snake Brown		
Viper Saw-Scaled		
Wolf Snake Common		
Wolf Snake Travancore		
Tortoise Star		
Turtle Flap Shelled		
Turtle Giant Soft Shelled		
Turtle Indian Black		
Sea Snake Spp.		
Exotic Reptiles		
Caiman Spectacled		
Crocodile Caiman		
Crocodile Nile		
Crocodile Siamensis		
Iguana		
Slider RedEared		
Birds		
Blue Bird Fairy	Goose	Kite Brahminy
Duck Mallard		Kite Pariah/Black
Eagle Black		
Egret spp.		
Fowl Red Spur		
Heron Grey		
Heron Night		
Heron Purple		
Hornbill Malabar Gray		
Hornbill Malabar Pied		
Ibis Black		
Ibis White		
Jungle Fowl Grey		
Kingfisher spp.		
Koel		
Moorhen		
Myna Hill		
Owl Barn		
Owl Bay		
Owl Grey Horned		
Owl Scoups		
Parakeet Bluewinged		
Parakeet Plum headed		
Pelican Grey		
Pigeon Green Imperial		
Pigeon Nilgiri Wood		
Spoon Bill		
Stork Blacknecked		
Stork Greater Adjutant		
Stork Lesser Adjutant		
Stork Openbilled		
Stork Painted		
Teals Cotton		
Teals Whistling		
Waterhen		

Exotic Birds		
Budgerigar		
Cockatiel		
Cockatoo spp.		
Conure Sun		
Dove Dimond		
Emu		
Finch Zebra		
Fowl Guneia		
Lorikeet spp.		
Lovebird Peach Faced		
Macaw Blue and Gold		
Macaw Green Winged		
Macaw spp.		
Ostrich		
Parrot African Grey		
Parrot Spp.		
Pheasant Red Golden		
Pheasant Yellow Golden		
Pheasant Lady Amherset		
Sparrow Java		
Toucan Channel Billed		

4.12 Construction of Roads, Visitors Amenities etc.:

Planning is also done for roads, footpaths, water supply, gardening, planting trees in the area. Facilities like refreshment kiosks, toilets, drinking water, resting places, rain shelters, wheel chairs, first aid, and gift shops for visitors will be provided. Pollution free vehicles, for visitors will be arranged.

4.13 Protection to Free Ranging Animals:

Pilikula Biological Park has vast outlying area which has a host of free ranging animals. The zoo vegetation plays an important role in offering these free ranging animals with an excellent habitat and condition for their growth and proliferation. These animals do not have any barrier for their movement and roam freely in the zoo. The free ranging animals in Pilikula Biological Park include mongoose, squirrel, jackal, jungle cats, porcupines, monitor lizard, snakes, and nearly 60 species of birds. Free ranging birds play a very important role in attracting the visitors who are interested in bird watching. For this purpose a vast area of nearly 80 acres in Pilikula Nisarga Dhama is earmarked for developing an Arboretum consisting of plant species occurring elsewhere in Coastal Karnataka including some exclusive trees of the Western Ghats. Herbs and Shrubs of Medicinal value plants which are grown in this area seem to have colonized. The area will develop into a natural habitat for free ranging birds and animals while flowering and fruit yielding plants will attract more and more fauna including insects like butterflies, beetles, bees, etc. Hence area will be developed for the visitors who are interested in bird watching, trekking nature ramble etc.

A view of Western Ghats

4.14 Interpretation Centre:

Proposed interpretation center will have educational interpretational hall, biological museum, seminar hall etc.

4.15 Enrichment and up gradation of Existing enclosures:

Panther enclosure:

Properly designed 40' height chain link mesh enclosure will be painted every year. Wooden resting platform will be replaced with new one. Additional two animal houses are required to avoid conjection.

Tiger Enclosure:

At present 8 tigers are housed in the enclosures. Additional animal house with 2 cubicles will have to be constructed. Enclosures have sufficient tree growth. Over head sprinklers will be provided to keep the enclosure green and cool. Hiding cave and platform will be constructed.

Elephant Enclosure:

Now elephants are in herbivores common enclosure along with other herbivores. They started uprooting the trees, so large spacious moated enclosures with large bathing tank pond will be constructed.

Lion Enclosure:

Storm water falling into moat in rainy seasons will be diverted parmenently. Chain link mesh of isolation area will be replaced.

Mouse Deer Enclosure:

Since mouse deer started breeding, enclosure has to be expanded. Some more grass will be planted in open patches.

Small Cat Enclosures: Thatched roof of visitors path has to be replaced with tiled roof and laterite wall for easy maintenance.

Black Buck Enclosure:

Black Buck enclosure will be expanded towards herbivores open enclosure.

Bonnet Macaque Enclosure:

Re-plastering of moat has to be done.

Sloth Bear Enclosure:

Cave and a shelter will be constructed in exhibit area. Some more trees will be planted and proper protection will be given with laterite wall cover for the planted trees till they grow.

Birds Aviary:

Existing chain linked birds aviaries will have to be dismantled and new aviaries have to be constructed with good design. It is proposed to construct walk through spacious aquatic birds aviary with tree growth and water ponds.

Snake Park:

New snake house is being constructed. It will meet all the biological requirements of the reptiles. For Tortoise, crocodiles and indigenous fishes, aquatic park will be constructed in the old snake park area.

Development of Aquatic Park in Pilikula Biological Park

Newly constructed Snake House in Pilikula Biological Park

4.16 Animal Record Keeping:

As per the guidelines issued by the CZA the animal records pertaining to the Birth, Death, Treatment, Acquisition, Behaviour etc. are to be recorded in the prescribed format and the same should be sent to Central Zoo Authority regularly.

Following are Records has to be maintained regularly: (Annexure - III)

- Keeper's Dairy - (Annexure – IIIa)
- Daily Report - Annexure – IIIb)
- Animal History Card - (Annexure – IIIc)
- Studbooks - (Annexure – IIId)
- Treatment Card - (Annexure – IIIe)
- Inventory - (Annexure – IIIf)
- Birth Report - (Annexure – IIIg)
- Death Report - (Annexure – IIIh)

4.17 ARKS:

Central Zoo Authority has sponsored Pilikula Biological Park for joining Animal Record Keeping System (ARKS) of ISIS (International Species Information System). Henceforth ARKS software will be used for record keeping of animals and the details can be accessed by any ARKS member. The ARKS data has to be updated daily and submitted to ISIS and Central Zoo Authority every month.

4.18 Sanitation:

- Cleanliness of enclosures is the key to the health of captive animals. As such, it is very necessary to make proper arrangements for proper disposal system i.e., daily cleaning and removal of excreta, leftover food, bones, garbage etc. from the enclosures and the zoo premises.

- The enclosure required to be disinfected daily with proper disinfectants like whitol, dettol, khorsolin.
- Clean portable water should be provided to the animals daily, water purifier like sukoren should be added to the drinking water.
- Utensils etc. used in preparation of food and subsequent distribution also require to be cleaned thoroughly.
- Taking into consideration the visitation, toilets require to be provided well distributed all over the zoo. The toilets should be provided with adequate water and kept clean from time to time.
- All enclosures are to be connected by an underground drainage system so that the wastes are drained out and collected at a point preferably on the periphery or outside the zoo to be treated and later used for gardening.
- The zoo premises also need to be kept clean and swept daily. Dust/ garbage bins need to be placed atleast 50m apart, with arrangements to be cleaned twice a day.

As precautionary measures domesticated animals like cattle and dogs of surrounding area will be vaccinated against foot and mouth disease and rabies every year by the Pilikula Biological Park administration free of cost. It will prevent any outbreak of such disease in the adjoining villages spreading inside the zoo.

4.19 Conservation Breeding of Endangered Species:

Conservation breeding of endangered species is also one of the objectives of the zoo. Hence this zoo utilizes more of its space and resource for conservation of endangered species of Western Ghats. The zoo was successful in natural breeding of Tiger, Leopard, Jackal, Bonnet Macaque, Black Buck, Barking Deer, Sambar, Spotted Deer, Mouse Deer, Indian Cobra, Indian Rock Python, Rat Snake, Whitaker's Boa, Malabar Pit Viper and Common Tortoises. Now care is taken to control the unwanted breeding of animals by isolating the males from females.

Baby Mouse Deer with its Mother in Pilikula Biological Park

Tiger Cubs with its Mother in Pilikula Biological Park

Python Incubating its eggs in Pilikula Biological Park

The proposal of King Cobra breeding has been approved by Central Zoo Authority and it will be started immediately after receipt of fund from Central Zoo Authority.

The proposals for conservation breeding of Malabar Squirrel and Western Ghat Fish species have been sent to Central Zoo Authority for approval.

Conservation breeding of endangered species identified by Central Zoo Authority will be taken up for exchange with the zoos and rehabilitation in the wild.

Projects taken up of conservation breeding is as follows:

- King Cobra
- Western Ghats Fish Species
- Malabar Squirrel
- Mouse Deer – have been bred.
- Lion Tailed Macaque

4.20 Marking of Endangered Animals:

Marking of Bengal Tiger, King Cobra, Giant Squirrel and Mouse Deer have been taken up. Marking could not be completed due to the shortage of marking material and it will be completed soon.

Microchiping of King Cobra and Tiger in Pilikula Biological Park

4.21 Planting of Trees and Development of Gardens:

It is proposed to improve the existing gardens and lawns as the place for resting for the visitors. Planting of different species of flowering and fruit yielding plants will be done inside the animal enclosure and also along the pathways. This will in turn provide natural environment for the animals. Fruits, berries, leaves of such plants will be used as fodder to the animals. The plants planted along the pathway and blank areas will give a forest look and also shade inside the zoo.

4.22 Tree Species Recommended for Planting:

Taking into consideration the warm sultry climate along the coast, it is necessary that the park is covered with trees in addition to those existing. While planting, care needs to be taken to plant varieties which are common in natural habitat and bear edible fruits for the

captive animals, existing exotic plants like Accaia and Casuarina will be replaced with Western Ghats species in phased manner. The tree species recommended for planting area:

- *Artocarpus hirsuta*
- *Artocarpus integrifolia*
- *Mangifera indica*
- *Ficus glomorata*
- *Ficus mysorensis*
- *Ficus bengalensis*
- *Hopea paviflora*
- *Hopea wightiana*
- *Calophyllum spp.*
- *Terminalia spp.*
- *Tamrindus indica*
- *Garcinia spp.*
- *Tamrindus bagerstoegnia*
- *Psidium guava*
- *Eugenia jambolana*
- *Azadirachta indica*
- *Emblica officinalis*
- *Bambusa bamboo*
- *Annona squamosa*
- *Pterocarpus marsupian*
- *Santalum album*
- *Syzygium zeylenicum*
- *Mimusops roxberghiana*
- *Calamus spp.*
- *Caryota spp.*
- *Michelia champaka*

4.23 Fodder Farming:

Nearly 5 acrs of marshy land area available in herbivores enclosure will be fenced with barbed wire and hybrid grass and other fodder plants will be grown to feed the animals. There is also lot of fallow private agricultural land is available around Pilikula Biological Park. Farmers will be encouraged to grow fodder in their land. Planting material will be supplied to the farmers and attractive payment will be made to them. This will help the zoo in getting the fodder easily and benefit the neighboring farmers in earning money.

4.24 Establishment of Rescue Centers –
Rescuing the animal from the human habitation:

It is common in this region wild animals like panthers, poisonous snakes and other animals stray into human habitation and cause panic in the locality. Public usually request for the help from zoo authority. Tranquilizing guns of different ranges, medicines, traps, cages, cotton and nylon nets of different dimensions, pickup van, light weight ladders, ropes, snake tongs, hand gloves stretchers for transporting animals will be in the stock and made readily

available. Staff will be trained for this purpose. Sufficient stock of antivenom drugs will be made available. It is required because at the crucial time such drugs may not be available in the hospital or drug stores in the vicinity.

Rescue centres will be established for the wild animals of Western Ghats species which are frequently rescued in this region. It will cater the need of Coastal and Malnad region of Karnataka state. Leopard is the more common animal suffer in the human-animal conflict.

4.25 Vandalism:

The zoo will attract people of different age groups and of diverse educational and cultural background. While majority would be interested in spending time viewing the exhibits and relaxing, there are bound to be some anti social elements who are out to create problems. This may extend from molestation, eve teasing to causing injury to the animals or damage to the environment. As such guidelines are to be drafted to minimize such incidents of vandalism.

Section 38J of the wildlife protection act provides for 'Prohibition of teasing etc. in a Zoo'. It mentions that no person shall tease, molest, injure or feed any animal or cause disturbance to the animals by noise or otherwise, or litter the grounds in a zoo.
To assist the staff in controlling the visitor, volunteers or NGO's need to be involved so as to perambulate the park and curtail any offences.

Sensitive enclosures like carnivores, aviaries, primates should be given more attention, as visitors are likely to tease or feed the animals in these enclosures.

A Police outpost outside or near the zoo would be helpful to deal with grave offences. Proper warning boards will be displayed near the enclosures.

4.26 Zoo Education:

As the zoo has been attracting more and more visitors, expectations from the zoo are bound to go up. The zoo is generally considered a means of amusement and entertainment, and now in turn should be considered as a great medium of education. The emphasis therefore in the zoo management would be perceptible shift in innovative creation of educational activities. This would call for developing an imaginative training program that focuses on local environment and its problems.

The concept of educating the zoo visitor is a subject that has not received adequate attention. Since sufficient information, on a scientific a systematic way is not provided to the visitors, most of them regard the visit only as an amusement activity. Since hundred would be visiting the zoo every day, this would be and ideal location for developing awareness for the environment and its associated problems.

Hence it is proposed to have

- An 'Interpretation Centre' be set up
- The zoo is placed on the educational curriculum of the district schools and colleges.
- Emphasis is laid on providing conservation oriented programs through proper signage, guide maps, pamphlets and folders, brochures, posters and stickers, audio visual programs and guide tours.
- NGO's and volunteers should be encouraged and if needed, they can be given a short training to carry out educational programs.
- Opening of Zoo management certificate/ diploma course with recognition of University.
- Workshops for school teachers in the zoo, would form a link between the zoo and school children.
- Interpretive signage is a must at each enclosure highlighting the species, its status, distribution and habitat.
- Appropriate maps / signage at the entrance, intersection, cross roads should be able to provide the visitor information on their location within the zoo in relation to the species displayed.
- For the blind, a small area to be located, where stuffed animals are kept in a circle connected by a rope. As the blind person moves holding the rope, they can touch and feel each stuffed animal and Brille lable provided on the animal giving the name and description of the animal or a taped commentary provided.
- Informative Pamphlets,
- Souvenir shop- T-shirts, caps and other gift items.
- Interaction between the staff and the visitor to be provided.

For further involvement of the visitors and school children, the following activities could be done:

- **Competition for school children:** Essay, debates, elocution, drawing and painting competitions can be arranged. Apart from these programs, slogan contest, naming the new born animal are some of the programs can be conducted. In addition competition of the handicapped children could also be done.
- **Celebrations:** The zoo will celebrate the Wildlife Week, International Tiger Day, World Environment Day, World Forestry Day, Earth Day, Animal Welfare Fortnight, Vanamahotsava etc. every year. Various competitions can be conducted like quiz, essay, painting, photography, etc.
- **Adoption of Animals:** To inculcate love towards the captive animals, the public could be requested to adapt an animal for a year by paying its feeding cost.
- **Special Events:**
  - Birthdays of few important animals be celebrated by inviting school children.
  - Celebration of new arrivals is widely published to muster good number of visitors.

- Competition be arranged for preparing zoo maps, brouchures, writing catchy slogans and cartoons etc to build up awareness.

4.27 Signage:

Signs are the most widely used method to direct visitors. Proper signs help people find their way and prevent tedious enquires. They can furnish interesting information at the way side and warn where necessary.

Sign boards can be of following types:

- Directional Sign – show the way to a place.
- Orientation sign – helps the visitor to orient himself or give instructions.
- Interpretative sign – convey a conservation message.

As highly visible product of management efforts, signs deserve pre care than they commonly receive. Well designed, functional and sparingly placed signs reflect well on management and can be maintained with skilled craftsmen. A standardized design can enhance recognition and appearance. Tattered, rusty, faded and illegible signs indicate poor management. Therefore it is better not to put up a sign that cannot be maintained.

Interpretive signage at each enclosure is a must displaying scientific information regarding the animal, its status, distribution and habitat. The signage should not dominate or compete with the animal exhibit in their size, placement or colour.

4.28 Eco Friendly Transportation – An Initiative to Have a Pollution Free Zone:

As a model eco tourism destination and as a social responsibility it is endeavoured to make the zoo a pollution free zone. To achieve this objective, it is suggested that all vehicular movement to be restricted to the main entry. Internal transportation is proposed as follows:

4.29 Electric Buggies:

It is proposed to acquire and maintain an adequate number of battery operated buggies to ferry tourists to and fro within the zoo. A nominal charge may be charged.

The electric or battery operated buggy is an ideal eco friendly and cost- effective method of transporting people and goods within zoo. Being easy to operate, virtually silent with zero emission it is a convenient and comfortable alternative to the modern methods of transportation. These battery operated vehicles are made in India and meet all safety standards and incorporate the latest state of art technology. It has a top speed of 20kmph and can travel up to 50kms per charge. It is available in2,4,6 and 8 seater versions.

4.30 Bicycle Transportation:

In order to position as an environment friendly tourist destination, a bicycle hiring system is proposed as an alternative to use of buggies. This would encourage visitors particularly individuals and nature enthusiast to explore the zoo at their own pace and leisure. Hiring options for one day, half day and hourly basis may be considered. The bicycle would be custom built and would incorporate, storage basket, water bottle holders, visibility stickers, airless tyres and a green flag popularizing vision Pilikula.

4.31 Security System:

Security system has to be upgraded along with the development and extension of the zoo. Security personnel will be increased as required. All the zoo staff and security personnel will be equipped with a mobile wireless set with a base station in Directors office.

The Park has also plans to instal surveillance cameras near all the animal enclosure, entrance and near all critical points, this will be monitored with a base monitor in the Director's office.

The height of the compound wall all around the zoo boundary will be increased by providing "**Y**" angle posts over the masonry pillars and fenced with barbed wire. To prevent intrusions, alarm system along the proposed barbed wire string of the compound wall will be introduced.

4.32 Communication System:

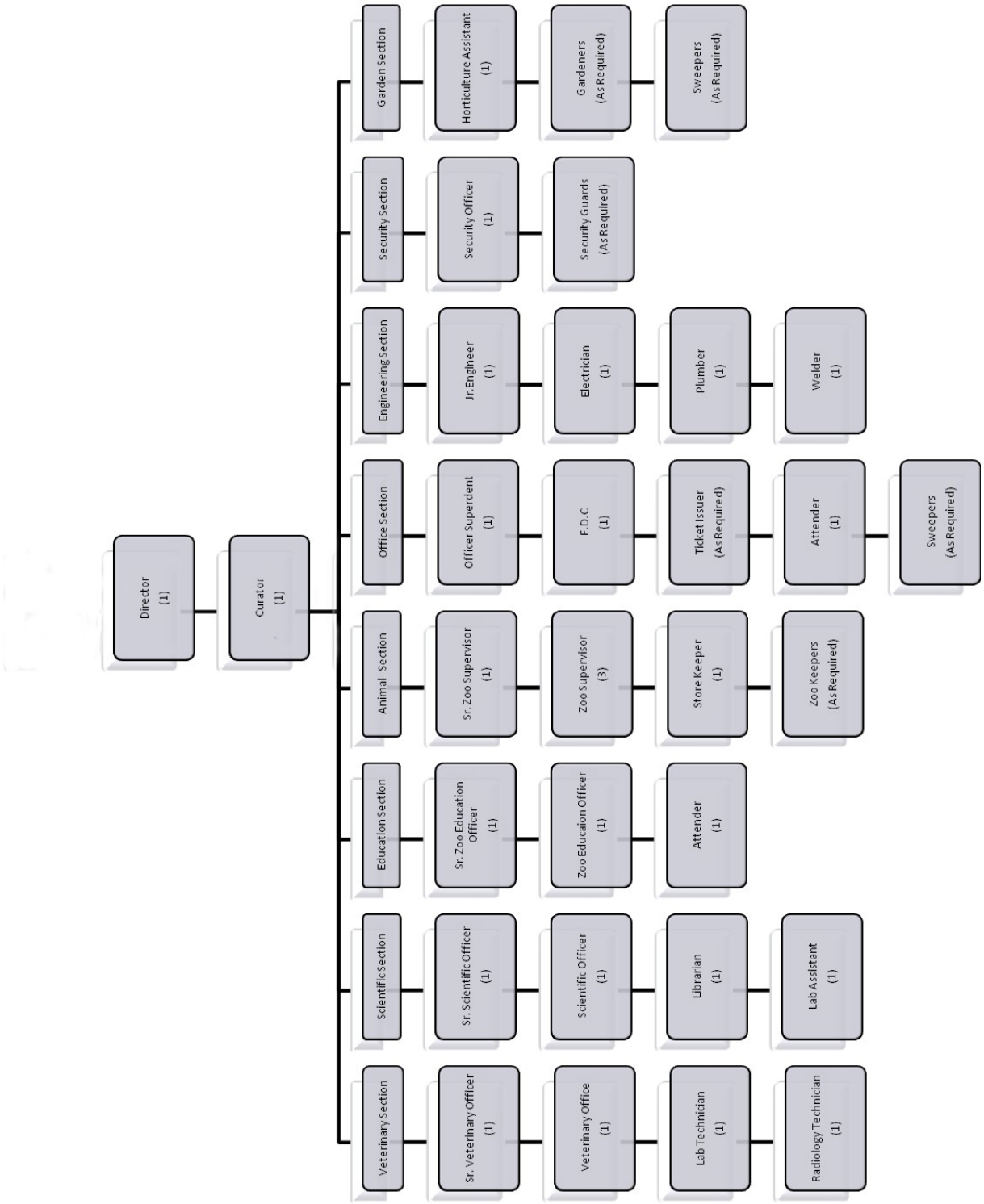
Staff will be properly equipped with latest communication system. So that they can trace on the messages and prepare to meet any eventualities.

4.33 Research:

Research activities are one of the objectives of the zoo. The zoo is interested to take up research activities related to animal behaviour, breeding, health, and other related aspects for the better management of species and to improve the captive propagation of endangered species. Encouragement is given to the students of Universities and Colleges to take up research. The information generated will be utilized in the problem solution and management of zoo.

Chapter – V
Personnel Planning

5.1 Administration Section:



S.No.	Post	No.	Minimum Qualification
1	Director	01	Rank of Deputy Conservator of Forests serving or retired with vast experience in zoo management.
2	Curator	01	Rank of Assistant Conservator of Forests serving or retired with vast experience in zoo management.
Veterinary Section:			
4	Senior Veterinary Officer	01	Rank of Assistant Director of Animal Husbandry serving or retired or experienced veterinarian with M.V.Sc.
5	Veterinary Officer	01	Rank of Veterinary Officer of Animal Husbandry serving or retired or experienced veterinarian with M.V.Sc.
6	Lab Technician	01	Qualified diploma or certificate holder
7	Radiology Technician	01	Qualified diploma or certificate holder
Scientific Section:			
8	Senior Scientific Officer	01	Ph.D. / M.Sc. in Zoology with vast zoo experience with minimum 8 years of service as scientific officer/ biologist in central zoo authority recognized zoo.
9	Scientific Officer	01	M.Sc. in Zoology
10	Librarian	01	Qualified diploma or certificate holder
11	Lab Assistant	01	Qualified diploma or certificate holder
Education Section:			
12	Senior Zoo Education Officer	01	M.Sc. in Zoology with vast zoo experience as education officer in central zoo authority recognized zoo.
13	Zoo Education Officer	01	M.Sc in Zoology
14	Attender	01	S.S.L.C. with basic computer knowledge
Animal Section:			
15	Senior Zoo Supervisor	01	Graduation with civil engineering or diploma with experience in zoo management
16	Zoo Supervisor	03	Diploma in civil engineering
17	Store Keeper	01	B.Com with basic computer knwoledge
18	Zoo Keepers	As required	High school or experienced in animal handling in recognized zoos.
Office Section:			
19	Officer Superindent	01	Rank of superintendent serving or retired or experienced degree holder.
20	F.D.C.	01	Rank of F.D.C serving or retired or experienced with computer knlowdge
21	Ticket Issuer	As required	S.S.L.C. with basic computer knowledge
22	Attender	01	S.S.L.C. with basic computer knowledge
23	Sweepers	As required	Primary passed with experience
Engineering Section:			
24	Assistant Engineer	01	B.E./Diploma in civil engineering with experience.
25	Electrician	01	Qualified diploma or certificate holder
26	Plumber	01	Qualified diploma or certificate holder

27	Welder	01	Qualified diploma or certificate holder
Security Section:			
28	Security Officer	01	Ex-Servicemen form Indian Army
29	Security Guards	As required	Highschool passed with vast experience
Garden Section:			
30	Horticulture Assistant	01	Qualified and experienced in horticulture and gardening
31	Gardeners	As required	High School passed with vast experience in gardening
32	Sweepers	As required	Primary passed with experience

Chapter – VI
Disaster Management

The management of zoo should be prepared to deal with any disaster in the zoo. Proper written plan will be ready for dealing the situation. Necessary requirement and resource will be made available in the zoo for dealing with emergency situations. Disaster often strikes without any notice or in very short notice. Till date the zoo has not experienced any major disaster problems, but zoo should be always ready to meet any disaster. Zoo Director should be present on the site and distribute the work among the staff during such events.

The major disasters are mostly of natural calamities, which are identified as follows.

- Fire
- Cyclone
- Monsoon Floods
- Epidemics

In such an event, the zoo should be in a position to access the damages and immediate steps to be taken.

- Risk assessment
- Likely impact and damage of water supply, breaking of enclosures, barriers and escape of animals. In most cases it may affect animals, visitors and cause damage to property. Security system adopted may be breached and animals may escape zoo thus resulting in panic among public.
- To prevent spreading of epidemic
- The guidance and command for facing such exigencies and also alternative command if the first command fails.
- Equipments needed to speed up restoration measures.
- Training to the staff to meet such exigencies and operate such equipments.
- Fire tracing need to be done.
- Security personnel to be alerted and mobilized by wireless communication.
- Power chain saws need to be kept ready.
- Suitable vehicles to be kept ready to meet any eventualities.
- Tranquilizing equipments and chemicals to be kept ready.
- Ambulance van should be requisitioned.
- First Aid arrangements to be ensured.
- Volunteers, Police personnel and other helping hands to be utilized
- Periodic mock drills to stimulate preparedness among staff and to test the working conditions of equipments which shall be kept maintained at all times.
- Visitors should be evacuated from the area.
- Medical Doctors and hospitals need to be informed and the phone, fax, mail to be kept in access.

Equipments Required

- Axes/Spades/Crowbars
- Diesel operated Saw
- Ropes (Steel/Nylon)
- Manual Saws
- Diesel pumping sets
- HAM Radio
- Guns with ammunitions
- Water tankers and hose pipes
- Kerosene/Gas lights/candels and match box
- Training equipments
- First Aid Kits
- Generator sets
- Torches and batteries
- Rope/Iron ladders
- Spare chain linked mesh, angular iron, poles, nut and bolts with pols for using them
- Hooters and whistle for alert and signaling
- Consumables like Diesel, Petrol, batteries, LPG,etc
- Water jets to drive the animals.
- Disaster Handling Manual

Support from Outside agencies:

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

- Deputy Commissioner of the District
- Commandant, Home Guards
- City Police Commissioner
- Jurisdictional Police Officer
- Police Control Room
- Fire Brigade
- Disaster Management Unit of the Stare
- MESCOM (Mangalore Electricity supply company)
- Hospitals
- Ambulance
- Official Superior Authorities
- Volunteers/NGO's/ Animal Care Trust etc.
- Veterinary Doctors
- Institute of Animal Health and Veterinary Biological, Bangalore

- City Corporation Authorities

Monsoon Preparation:

During monsoon, June to August rainfall is very high in this region. Prior to onset of monsoon, work of cleaning the debris all along the compound wall, making arrangement for free flow of storm water will be completed. Cutting of dead and other trees which are posing danger to the moats and compound wall will have to be cleaned. Proper drainage will be given to all moats. During heavy downpour, animals will be restricted to the animal houses. Supervisory staff and animal keepers should thoroughly check the exhibit area, moats, fences, animal houses before releasing them to the exhibit area.Care will be taken to clear storm water from the moat to avoid carnivores swim and escape from the enclosure.

Contingency Plan

7.1 Escape of Animals – Contingency Plan:

With enclosures differing with each species and some species being released into open enclosures during the day, there have been cases due to the negligence of the staff or vagaries of nature resulting in enclosure giving way partially or a tree branch falling across the moat and facilitating escape of animals. In such contingency, it becomes very necessary to plan for such an eventuality. This plan needs to be provided to all the staff and requires to be strictly followed.

- The escape of any animal should be brought to the immediate notice of the Director and the senior most official on duty.
- Adequate provision are to be made for stocking tranquilizing equipment, nets, cages, fire arms, wireless sets, veterinary care and vehicle for fast transport of staff and equipment.
- Separate staff to be assigned for visitor control during this period.
- Liaison with other departments like police, fire brigade is necessary.
- Public address system to be kept handy in such situation.
- Staff to be trained from time to time in the use of tranquilizers, dosage etc. and fire arms.
- Mock drills carried out annually to keep the staff alert.
- As far as possible the escaped animal should be captured alive. Only when there is any danger to the public, as a last resort, the Director of the Zoo should be authorized to kill the animal.
- All cases of escape and attempts at capture should be documented, so that it is useful for the future and the matter discussed with other zoos.
- After each incident, the matter should be discussed and any lacunae in the zoo improved upon, so that there is no repetition in future.
- All the iron enclosures will be regularly repaired and painted. Moats and parapet of the enclosures will be properly maintained.

7.2 Labour Strike – Contingency Plan:

As the zoo grows, the number of workers would increase and before the management could realize the workers may organize themselves into union and strikes may result from any management/labour dispute. In such an eventuality, the Zoo Director and his staff would be responsible for the welfare of the captive animals, their day to day maintenance and public safety for which a Contingency Plan would be necessary.

- When the Director learns of the proposed labour strike he should immediately try to diffuse the same by holding meetings with the labour unions, leaders and workers and an understanding reached in the interest of zoo.

- The assistance of local labour officer should also be sought to stop the strike by discussions with the striking staff.
- If the labourers are persistent on the strike, in such a contingency, the Director should be capable of obtaining minimum number of animal caretakers from other zoos, or temporary labour hired, or volunteers or NGO's kept on role.
- The trustees should be kept informed of the happenings and the local Police and Press also informed for any assistance if required.
- The safety of the Zoo animals during this period should be given priority, and if the Director can manage with alternate arrangements, the zoo should be kept open.
- Supply of food articles without a break should be arranged and if necessary additional food stocks stored to overcome break in supplies.

7.3 Safety of Visitors:

Visitors may accidentally fall inside the moat. Proper standoff barriers should be there. Warning boards will be fixed to erected poles. Aluminum ladders, ropes, nets poles and sticks will be kept ready in an easily accessible place. Tranquilizing guns with medicines, riffle should be in the stock. Alarm system, public address systems and sufficient no. of walkie talkies facilities are required in the zoo.

7.4 Infighting among the animals:

Infighting in some animal species is common. Behaviour of such animals will be watched and only compatible animals will be released together to the public exhibition.

All effort will be taken to separate the fighting animals immediately without causing serious injuries.

Separated animals have to be driven back to the animal houses and treated if necessary. Crackers, long sticks and tranquilizing guns will be used to separate to animals. Water jet will have to be used with hose pipe on fighting animals to separate them.

7.5 Food Management:

Scarcity of food will occur during bandhs, communal disturbance, cerfew etc.

Now a days political parties calling 'state bandhs' have become common. During such period supply of meet, feed and fodder stop abruptly. Zoo can't keep the animals starving if the supply stops for couple of days. Zoo should have alternative source of supply. Pilikula Biological Park has a unit of rabbits, rat and mice breeding and rearing centre. This will be expanded to produce more meat. Unit of poultry rearing will be established. To start with a unit of 5,000 birds will be established. With the assistance of fisheries department, Fish breeding farm will be introduced for breeding species like Tilapia.

7.6 Handling of Terrorist attack, Bombs:

C.C.T.V. will be installed in vital points. Visitors will be properly checked before entering the zoo. All the staff and security guards will be more vigil. Staff will be trained in handling such situation.

7.7 Break down of Power System:

Power generators and sufficient fuel for the same to run a minimum of one day will be kept in stock. Generator connection will be given to the office, veterinary hospital, stores, inpatient ward and to the main gate. Solar lighting system will also be provided to the large animal enclosures, reptile house and vital places.

7.8 First Aid:

First aid kits will be made readily available in the zoo. At least one trained paramedical staff will be appointed. Couple of wheelchairs stretchers will be made available. In serious incidents qualified doctors will be called.

7.9 Controlling the Stray Animals:

Stray dogs will not be allowed to enter the zoo premises. They may kill the captive animals or spread some diseases. Compound wall will be strengthen properly. Opening if any in the boundary compound wall will be properly plugged.

7.10 Fire Control:

During summer seasons specially during March to May, weather of this region is sunny and very hot. Dried leaf litter may catch fire and spread into adjoining enclosures. Thatched and tiled roofs of the enclosure can catch fire.

Dried leaves and litters will be collected properly disposed off. Areas will thoroughly drenched with water sprinklers. It will prevent catching fire and also keep the area cool.

Smoking will be strictly prohibited. All the zoo keepers will keep vigil around their enclosures during day time. There should be sufficient pipe lines inside the zoo area, taps in regular intervals and stock of hose pipes. There will be network of service roads. Each animal house will have at least one fire extinguisher.

7.11 Mass Vaccination of Live Stock in Zoo Vicinity

Mass vaccination against foot and mouth disease and rabies to the cattle and dogs of the surrounding villages are administered during wildlife week celebration day every year. Pilikula Biological Park is conducting free vaccination camp against foot and mouth disease of cattle and rabies of dogs of adjoining villages as a precautionary measure against any outbreak of contiguous diseases in the villages which will affect the zoo animals.

Chapter - VIII
Upgradation of Skill and Knowledge

Officers and staff of the Park should have latest knowledge of zoo management. This can be done by deputing them for different training courses conducted by C.Z.A. or other agencies. They must get opportunity to know the new techeniques, regarding the health care, handling, diet and handling of captive animals. Director and other supervising officers should get latest knowledge of zoo designing and management techniques. Veterinary officer should improve the technique of handling and treating the wild animals.

Chapter - IX
E. Governance

Zoo will have sufficient number of computer and accessories. Proper network system will be provided. Website of the zoo will be updated regularly. E.ticketing system will help the visitors to book the entry ticket. Staff will be given smart identity cards.

C.C.T.V. system will be installed in startagic location including breeding enclosures. Movement of visitors and animals will be monitored from the distance during day and night.

Chapter – X and XI
Budget and Management Plan

Since the inception of the Pilikula Biological Park in 2001 main source of income apart from entry fee, is from the donors, sponsors, institutions, corporate sector etc.

In keeping with the requirements of the National Zoo Policy Article 3.1.1, a 'corpus fund' will be created exclusively with a view to meet the coast of feed, veterinary care and upkeep of the animals on sustained basis.

Based on the funds proposed to be generated, the budget for ten years i.e. 2009 – 2019 is given as follows.

Proposed budget for the year 2009 – 10:

Revenue			**Probable Expenditure**		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	50.00	A.	**New Works:**	
				1. Construction of Snake house.	35.00
2.	Rent from Cafeteria and Vehicle Parking.	2.00		2. Construction of barricade in snake house.	0.80
				3. Construction of Tortoise enclosures – 4no.	4.00
3.	Central Zoo Authority.	32.95			
				4. Construction of Native fish ponds.	3.00
4.	KUIDCEMP	35.00			
5.	Environment Department.	2.00		5. Construction of mahout quarters – 3n0.	7.00
6.	Conducting training camps	1.00		6. Construction of kitchen and stores for storing elephant feed.	2.00
7.	From donors, corporate sponsors, Institutions, Public sectors, State Government, Central Government.	138.10		7. Construction of veterinary hospital, quarantine, post-mortem and in-patient ward.	32.95
				8. Construction of Porcupine enclosure.	6.00
				9. Construction of Wild Dog enclosure.	8.00
				10. Construction of Wild Boar enclosure.	7.00
				11. Construction of Hippopotamus enclosure.	12.00
				12. Construction of Jackal enclosure.	7.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				13. Construction of Bison enclosure.	6.00
				14. Construction of a part of herbivore wall.	8.00
				15. Providing water supply to the enclosure.	3.00
				16. Construction of over head tank.	5.25
				17. Barbed wire fencing of boundary wall of the zoo.	2.25
				18. Construction of Off-display enclosure for King Cobra breeding.	6.30
				19. Construction of Rabbit rearing enclosure.	3.00
				20. Establishment of Insect Museum.	2.50
			B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	3.00
				2. Purchase of X-ray unit and other diagnosing equipments.	25.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	25.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	13.00
			E.	**Security:**	
				1. Salary towards the security staff.	4.50
				2. Surveillance system (I-Phase)	2.00
				3. Communication system (I-Phase)	1.00
			F.	**Publicity:**	2.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
			G.	**Education Activities:** 1. Printing of educational materials, broachers etc.	1.00
			H.	**Signage:** 1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	2.00
			J.	**Vehicle Hire Charges:** 1. For transportation of feed and fodder, animal rescue and for extension activities.	3.00
			K.	**Maintenance:** 1. Annual maintenance of all the existing structures including electrification and plumbing works.	10.00
				2. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	6.00
				3. Cleaning of premises, toilets and other sanitary works.	2.00
	Total	**261.55**	L.	**Unforeseen:** **Total**	1.00 **261.55**

Proposed budget for the year 2010 – 11:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	80.00	A.	**New Works:** 1. Construction of birds aviary – 4no.	40.00
2.	Rent from Cafeteria and Vehicle Parking.	4.00		2. Construction of aquatic birds aviary.	50.00
3.	Conducting	1.50		3. Construction of nocturnal bird house.	25.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
	training camps				
4.	From donors, corporate sponsors, Instituations, Public sectors, State Government, Central Governement.	286.75		4. Construction of Hyena enclosure.	10.00
				5. Construction of Otter enclosure.	15.00
				6. Construction of Common Langur enclosure.	20.00
				7. Construction of Malabar Squirrel.	10.00
				8. Construction of Flying Squirrel.	10.00
				9. Construction of kitchen and store room.	10.00
				10. Construction of Off-display enclosure for Malabar Squirrel breeding.	8.00
				11. Construction of Off-display enclosure for Mouse Deer breeding.	10.00
				12. Construction of Poultry unit.	3.00
				13. Construction of roads and pathway.	15.00
				14. Construction of rain shelters for visitors.	0.75
				15. Providing overhead sprinklers for Tiger, Lion and Leopard enclosure.	5.00
				16. Purchase of Generator.	2.00
				17. Establishment of mobile rescue unit with suitable vehicle and equipments.	5.00
			B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	5.00
				2. Purchase of ultrasound and other equipments.	30.00
			C.	**Feed and Fodder:**	

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				1. Cost of feed and fodder.	30.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	15.50
			E.	**Security:**	
				1. Salary towards the security staff.	5.00
				2. Surveillance system (II-Phase)	2.00
				3. Communication system (II-Phase)	1.00
			F.	**Publicity:**	5.00
			G.	**Education Activities:**	
				1. Purchase of computers and projectors.	1.00
				2. Training camps, Printing of educational materials, broachers etc.	1.50
			H.	**Signage:**	
				1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	4.00
			J.	**Vehicle Hire Charges:**	
				1. For transportation of feed and fodder, animal rescue and for extension activities.	5.00
			K.	**Maintenance:**	
				1. Annual maintenance of all the existing structures including electrification and plumbing works.	15.00
				1. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	8.00
				2. Cleaning of premises, toilets and other sanitary works.	2.50

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
			L.	**Unforeseen:**	3.00
	Total	**261.55**		**Total**	**261.55**

Proposed budget for the year 2011 – 12:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	100.00	A.	**New Works:**	
				1. Construction of primate enclosures – 2no.	50.00
2.	Rent from Cafeteria and Vehicle Parking.	8.00		2. Construction of additional birds aviary.	30.00
				3. Extension of snake house.	25.00
3.	Conducting training camps	2.00		4. Construction of enclosure for animals of national importance.	25.00
4.	From donors, corporate sponsors, Instituations, Public sectors, State Government, Central Governement.	297.50		5. Construction of Bats enclosure.	15.00
				6. Purchase of battery operated vehicle.	40.00
				7. Purchase of transport cages and animal handling equipments.	5.00
				8. Construction of Interpretation hall (Phase-I)	25.00
			B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	7.00
				2. Purchase of necessary equipments.	35.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	35.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
			D.	**Establishment:** 1. Salary, T.A., medical allowance etc. of the staff.	18.00
			E.	**Security:** 1. Salary towards the security staff.	6.00
				2. Surveillance system (III-Phase)	2.00
				3. Communication system (III-Phase)	2.00
			F.	**Publicity:**	5.00
			G.	**Education Activities:**	1.50
				1. Purchase of computers and projectors.	2.00
				2. Training camps, Printing of educational materials, broachers etc.	25.00
				3. Establishment of biological park management course.	
			H.	**Signage:** 1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	10.00
			J.	**Vehicle Hire Charges:** 1. For transportation of feed and fodder, animal rescue and for extension activities.	7.00
			K.	**Maintenance:** 1. Annual maintenance of all the existing structures including electrification and plumbing works.	20.00
				2. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	10.00
				3. Cleaning of premises,	03.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				toilets and other sanitary works.	
			L.		4.00
				Unforeseen:	
	Total	**407.50**		**Total**	**407.50**

Proposed budget for the year 2012 – 13:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	150.00	A.	**New Works:**	
				1. Construction of primate enclosures – 2no.	60.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	16.00		2. Creation of Children Park.	20.00
				3. Construction of birds aviary.	25.00
				4. Construction of aerial pathway in herbivores enclosure.	30.00
3.	Conducting training camps	3.00			
4.	From donors, corporate sponsors, Instituations, Public sectors, State Government, Central Governement.	311.50		5. Providing solar lighting.	10.00
				6. Construction of bats enclosure	10.00
				7. Construction of roads and pathway	18.00
				8. Construction of entry plaza and ticket counter	10.00
				9. Providing overhead sprinklers for hyena, jackal, wild boar, and porcupine enclosure.	5.00
				10. Purchase of battery operated vehicle	20.00
				11. Purchase of transport cages and animal handling equipments.	4.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				12. Construction of Interpretation hall (Phase-II)	35.00
			B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	10.00
				2. Purchase of necessary equipments.	30.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	40.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	20.00
			E.	**Security:**	
				1. Salary towards the security staff.	7.00
				2. Surveillance system	2.00
				3. Communication system	2.00
					6.00
			F.	**Publicity:**	
			G.	**Education Activities:**	2.50
				1. Purchase of computers and projectors.	3.00
				2. Training camps, Printing of educational materials, broachers etc.	40.00
				3. Establishment of biological park management course (Phase-II).	
			H.	**Signage:**	5.00
				1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	
			J.	**Vehicle Hire Charges:**	8.00
				1. For transportation of feed	

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				and fodder, animal rescue and for extension activities.	
			K.		30.00
				Maintenance:	
				1. Annual maintenance of all the existing structures including electrification and plumbing works.	4.00
				2. Maintenance of computers and other electronic equipments.	2.00
				3. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	5.00
				4. Maintenance of pumps, generators, vehicles etc. including fuel.	5.00
				5. Cleaning of premises, toilets and other sanitary works.	5.00
	Total	**470.50**		**Unforeseen:**	**407.50**
				Total	

Proposed budget for the year 2013 – 14:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	200.00	A.	**New Works:** 1. Construction of Aviary Park.	20.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	20.00		2. Creation of park with live size animal models for visually impaired.	30.00
				3. Construction of enclosure for animals of national	25.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
3.	Conducting training camps	5.00		importance.	
				4. Construction of roads and pathway	20.00
4.	From donors, corporate sponsors, Instituations, Public sectors, State Government, Central Governement.	114.50		5. Purchase of transport cages and animal handling equipments.	5.00
				6. Construction and completion of Interpretation hall (Phase-III)	30.00
			B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	12.00
				2. Purchase of necessary equipments.	20.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	45.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	25.00
			E.	**Security:**	
				1. Salary towards the security staff.	8.00
				2. Surveillance system	2.00
			F.	**Publicity:**	8.00
			G.	**Education Activities:**	3.00
				1. Training camps, Printing of educational materials, broachers etc.	
			H.	**Signage:**	
				1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	10.00
			J.	**Vehicle Hire Charges:**	

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				2. For transportation of feed and fodder, animal rescue and for extension activities.	10.00
			K.	**Maintenance:**	
				1. Annual maintenance of all the existing structures including electrification and plumbing works.	40.00
				2. Maintenance of computers and other electronic equipments.	5.00
				3. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	6.00
			.	4. Maintenance of pumps, generators, vehicles etc. including fuel.	3.00
				5. Cleaning of premises, toilets and other sanitary works.	6.00
				Unforeseen:	6.50
	Total	**339.00**		**Total**	**339.50**

Proposed budget for the year 2014 – 15:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	250.00	A.	**New Works:**	
				1. Construction of enclosure for animals of national importance and Western Ghats species.	50.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	25.00		2. Up gradation of existing enclosure.	50.00
3.	Conducting	6.00		3. Purchase of transport cages and animal	5.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
	training camps			handling equipments.	
4.	From donors, corporate sponsors, Institutions, Public sectors, State Government, Central Governement.	65.00	B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	15.00
				2. Purchase of necessary equipments.	10.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	50.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	25.00
			E.	**Security:**	
				1. Salary towards the security staff.	10.00
			F.	**Publicity:**	10.00
			G.	**Education Activities:**	
				1. Training camps, Printing of educational materials, broachers etc.	6.00
			H.	**Signage:**	
				1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	8.00
			J.	**Vehicle Hire Charges:**	13.00
				1. For transportation of feed and fodder, animal rescue and for extension activities.	
			K.	**Maintenance:**	60.00
				1. Annual maintenance of all the existing structures including electrification and plumbing works.	
				2. Maintenance of computers and other electronic	3.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				equipments.	7.00
				3. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	4.00
				4. Maintenance of pumps, generators, vehicles etc. including fuel.	7.00
				5. Cleaning of premises, toilets and other sanitary works.	8.00
				Unforeseen:	**341.00**
	Total	**341.00**		**Total**	

Proposed budget for the year 2015 – 16:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	350.00	A.	**New Works:**	
				1. Construction of enclosure for animals of national importance and Western Ghats species.	25.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	30.00		2. Up gradation of existing enclosure.	20.00
				3. Construction of new squeezers. Purchase of transport cages and animal handling equipments.	8.00
3.	Conducting training camps	7.00			
4.	From donors, corporate sponsors, Institutions, Public sectors, State Government, Central Government.	_	B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	20.00
				2. Purchase of necessary equipments.	20.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	60.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
			D.	**Establishment:** 1. Salary, T.A., medical allowance etc. of the staff.	30.00
			E.	**Security:** 1. Salary towards the security staff.	12.00
			F.	**Publicity:**	10.00
			G.	**Education Activities:** 1. Training camps, Printing of educational materials, broachers etc.	7.00
			H.	**Signage:** 1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	8.00
			J.	**Vehicle Hire Charges:** 1. For transportation of feed and fodder, animal rescue and for extension activities.	15.00
			K.	**Maintenance:** 1. Annual maintenance of all the existing structures including electrification and plumbing works.	80.00
				2. Maintenance of computers and other electronic equipments.	4.00
				3. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	8.00
			.	4. Maintenance of pumps, generators, vehicles etc. including fuel.	5.00
				5. Cleaning of premises, toilets and other sanitary works.	7.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
	Total	**387.00**		**Unforeseen:**	8.00
				Total	**347.00**

Proposed budget for the year 2016 – 17:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	375.00	A.	**New Works:**	
				1. Construction of enclosure for newly acquired animals.	30.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	30.00		2. Up gradation of existing enclosure.	20.00
				3. Up gradation of squeeze cages, purchase of transport cages and animal handling equipments.	10.00
3.	Conducting training camps	10.00			
4.	From donors, corporate sponsors, Institutions, Public sectors, State Government, Central Government.	–	B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	25.00
				2. Purchase of necessary equipments.	20.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	65.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	32.00
			E.	**Security:**	
				1. Salary towards the security staff.	14.00
			F.	**Publicity:**	10.00
			G.	**Education Activities:**	
				1. Training camps, Printing of educational materials, broachers etc.	10.00

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
			H.	**Signage:** 1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	10.00
			J.	**Vehicle Hire Charges:** 1. For transportation of feed and fodder, animal rescue and for extension activities.	15.00
			K.	**Maintenance:** 1. Annual maintenance of all the existing structures including electrification and plumbing works.	50.00
				2. Maintenance of computers and other electronic equipments.	2.00
				3. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	10.00
				4. Maintenance of pumps, generators, vehicles etc. including fuel.	5.50
				5. Cleaning of premises, toilets and other sanitary works.	8.00
				Unforeseen:	10.00
	Total	**415.00**		**Total**	**346.50**

Proposed budget for the year 2017 – 18:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	400.00	A.	**New Works:**	
				1. Construction of enclosure for newly acquired animals.	50.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	30.00		2. Up gradation of existing enclosure.	40.00
				3. Construction, upgradation of squeeze cages.	10.00
3.	Conducting training camps	12.00		Purchase of transport cages and animal handling equipments.	
4.	From donors, corporate sponsors, Instituations, Public sectors, State Government, Central Governement.	–	B.	**Health and Care:**	
				1. Purchase of surgical instruments, medicines, vaccinations etc.	30.00
				2. Purchase of necessary equipments.	25.00
			C.	**Feed and Fodder:**	
				1. Cost of feed and fodder.	70.00
			D.	**Establishment:**	
				1. Salary, T.A., medical allowance etc. of the staff.	35.00
			E.	**Security:**	
				1. Salary towards the security staff.	16.00
			F.	**Publicity:**	11.00
			G.	**Education Activities:**	
				1. Training camps, Printing of educational materials, broachers etc.	12.00
			H.	**Signage:**	
				1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	11.00
			J.		

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
			K.	**Vehicle Hire Charges:** 1. For transportation of feed and fodder, animal rescue and for extension activities.	18.00
				Maintenance:	50.00
				1. Annual maintenance of all the existing structures including electrification and plumbing works.	3.00
				2. Maintenance of computers and other electronic equipments.	12.00
			.	3. Maintenance of lawns and gardens, developing new lawn and garden, planting of Western Ghats species.	6.00
				4. Maintenance of pumps, generators, vehicles etc. including fuel.	10.00
				5. Cleaning of premises, toilets and other sanitary works.	10.00
	Total	**442.00**		**Unforeseen:** **Total**	**419.00**

Proposed budget for the year 2018 – 19:

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
1.	Expected revenue by means of entry fee.	450.00	A.	**New Works:** 1. Up gradation of existing enclosure.	50.00
2.	Rent from Cafeteria, Vehicle Parking and battery operated vehicle.	35.00		2. Up gradation of squeeze cages. Purchase of transport cages and animal handling equipments.	10.00
3.	Conducting	15.00	B.		

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
	training camps			**Health and Care:**	20.00
4.	From donors, corporate sponsors, Institutions, Public sectors, State Government, Central Government.	–		1. Purchase of surgical instruments, medicines, vaccinations etc.	
				2. Purchase of necessary equipments.	20.00
			C.	**Feed and Fodder:**	80.00
				1. Cost of feed and fodder.	
			D.	**Establishment:**	37.00
				1. Salary, T.A., medical allowance etc. of the staff.	
			E.	**Security:**	18.00
				1. Salary towards the security staff.	
			F.	**Publicity:**	12.00
			G.	**Education Activities:**	15.00
				1. Training camps, Printing of educational materials, broachers etc.	
			H.	**Signage:**	12.00
				1. Providing new sign boards, display boards and replacing/repair of old boards wherever necessary.	
			J.	**Vehicle Hire Charges:**	22.00
				1. For transportation of feed and fodder, animal rescue and for extension activities.	
			K.	**Maintenance:**	50.00
				1. Annual maintenance of all the existing structures including electrification and plumbing works.	4.00
				2. Maintenance of computers and other electronic equipments.	15.00
				3. Maintenance of lawns and gardens, developing new	

Revenue			Probable Expenditure		
Sl. No.	**Details of Revenue**	**Probable Revenue (Rs.) in lakhs**	**Sl. No.**	**Details of Works**	**Probable amount required (Rs.) in lakhs**
				lawn and garden, planting of Western Ghats species.	7.00
				4. Maintenance of pumps, generators, vehicles etc. including fuel.	12.00
				5. Cleaning of premises, toilets and other sanitary works.	10.00
	Total	**500.00**		**Unforeseen:**	**409.00**
				Total	

Proposed Entry View

Proposed Entry Area View

Proposed Entry Area Deck View

ANIMAL SCULPTURE TO PLAY

ANIMAL SCULPTURE TO PLAY

PLAY NETS

SPIRAL MOUND

WOODEN FRAME SWINGS

Proposed Children Play Area

TERRA FIRMA
LANDSCAPE ARCHITECTURE

Proposed Resting Area with Kiosk View

TERRA FIRMA
LANDSCAPE ARCHITECTURE

Proposed Road View

SIGNAGE NEAR ENCLOSURE

PLANTER

SIGNAGE FOR LOCATION MAP

DUSTBIN

SIGNAGE FOR ENCLOSURE

SEATER

DRINKING WATER FOUNTAIN

Proposed Signage and Street Furniture

Proposed Buggy Waiting Area View

Annexure - I

Inventory Report for the Year 2008-2009
Dr. Shivaram Karanth Pilikula Biological Park, Mangalore, Karnataka.

Endangered Species* **Part-I**

S.No.	Animal Name	Scientific Name	Closing Stock 31.03.2009			
			M	F	U	T
	Bird					
1	Kite Brahminy	*Haliastur indus*	0	0	1	**1**
2	Kite Pariah/Black	*Milvus migrans*	0	0	8	**8**
3	Myna Hill	*Gracula religiosa*	0	0	2	**2**
4	Peafowl	*Pavo cristatus*	4	3	0	**7**
	Total Bird		**4**	**3**	**11**	**18**
	Mammal					
5	Bear Sloth	*Melursus ursinus*	2	1	0	**3**
6	Black Buck	*Antilope cervicapra*	21	20	0	**41**
7	Cat Jungle	*Felis chaus*	1	1	0	**2**
8	Cat Leopard	*Felis bengalensis*	1	0	0	**1**
9	Civet Common Palm	*Paradoxurus hermaphroditus*	5	5	0	**10**
10	Civet Indian Small	*Viverricula indica*	1	1	0	**2**
11	Deer Mouse	*Tragulus meminna*	2	1	0	**3**
12	Deer Swamp	*Cervus duvaceli*	1	0	0	**1**
13	Elephant Indian	*Elephas maximus*	1	1	0	**2**
14	Jackal	*Canis aureus*	4	4	0	**8**
15	Langur Common	*Presbytis entellus*	1	1	0	**2**
16	Leopard/ Panther	*Panthera pardus*	4	1	0	**5**
17	Macaque Bonnet	*Macaca radiata*	5	5	0	**10**
18	Squirrel Flying	*Petinomys fuscocapillus*	1	1	0	**2**
19	Squirrel Giant	*Ratufa indica*	1	2	0	**3**
20	Tiger Bengal	*Panthera tigris tigris*	3	4	0	**7**
	Total Mammal		**54**	**48**	**0**	**102**
	Reptile					
21	Cobra Indian	*Naja naja*	0	0	18	**18**
22	Cobra King	*Ophiophagus hanna*	6	4	0	**10**
23	Crocodile Gharial	*Gavialis gangeticus*	1	0	0	**1**
24	Crocodile Marsh	*Crocodylus palustris*	1	1	3	**5**
25	Keelback Checkered	*Henochropis piscator*	0	0	10	**10**

Other Species **Part-II**

S.No.	Animal Name	Scientific Name	Closing Stock 31.03.2008			
			M	F	U	T
	Bird					
1	Ducks	*Anatidae*	0	0	11	**11**
2	Emu	*Dromaius novaehollandiae*	1	1	0	**2**
3	Goose	*Anatidae*	8	4	2	**14**
4	Owl Barn	*Tyto alba*	0	0	5	**5**
5	Parakeet Rose Ringed	*Psittacula krameri*	0	2	0	**2**
	Total Bird		**9**	**7**	**18**	**34**
	Mammal					
6	Deer Barking	*Muntiacus muntjak*	3	2	2	**7**
7	Deer Sambar	*Cervus unicolor*	8	18	0	**26**
8	Deer Spotted	*Axis axis*	28	25	0	**53**
9	Hare Black Naped	*Lepus nigricollis*	1	1	0	**2**
10	Lion Hybrid	*Panthera leo*	1	1	0	**2**
11	Pig Wild	*Sus scrofa*	2	1	0	**3**
12	Porcupine Indian	*Hystrix indica*	3	3	0	**6**
	Total Mammal		**46**	**51**	**2**	**99**
	Reptile					
13	Banded Racer	*Argyrogena fasciolata*	0	0	2	**2**
14	Boa Common Sand	*Gongylophis conicus*	0	0	2	**2**
15	Boa Red Sand	*Eryx johnii*	0	0	2	**2**
16	Boa Whitaker's	*Eryx whitakeri*	0	0	18	**18**
17	Krait Common Indian	*Bungarus caeruleus*	0	0	2	**2**
18	Snake Ceylon Cat	*Boiga ceylonensis*	0	0	2	**2**
19	Snake Green Vine	*Ahaeutualla nasuttus*	0	0	2	**2**
20	Snake Bronzeback	*Deudrelaphis tristis*	0	0	2	**2**
21	Snake Montane Trinket	*Coelognathus helena monticollaris*	0	0	2	**2**
22	Snake Common Wolf	*Lycodon aulicus*	0	0	3	**3**
23	Tortoise Indian	*Testudinidae*	0	0	4	**4**
24	Tortoise Pond	*Testudinidae*	0	0	4	**4**
25	Turtle Backwater		0	0	1	**1**
25	Turtle Mud or Flap-Shell	*Lissemys punctata*	0	0	2	**2**
26	Viper Hump Nosed Pit	*Hypnale hypnale*	0	0	1	**1**
27	Viper Malabar Pit	*Trimeresums malbaricus*	0	0	1	**1**
	Total Reptile		**0**	**0**	**48**	**48**

Pisces of Western Ghats

28	Hunase / Murangi	*Lepidocephalus thermalis*	0	0	5	5
29	Kijan	*Puntius filamentosus*	0	0	12	12
30	Kol kijan	*Rasbora daniconius*	0	0	8	8
31	Kuchhu	*Channa striatus*	0	0	9	9
32	Madanji / Korava	*Chenna punctatus*	0	0	6	6
33	Moogumalli / Kudian	*Aplocheilus lineatus*	0	0	8	8
34	Mugudu / Magur	*Clarius batrachus*	0	0	14	14
35	Mulvel / Kuri meenu	*Labeo nigriscens*	0	0	2	2
	Total Fish		0	0	64	64
	Total Animals		**55**	**58**	**68**	**181**

Annexure -IIa

Pilikula Biological Park

Keeper's Diary

Name of the Zoo Keeper _____

Section/ beat _____

Day & Date: _____/_____/_____

S. No.	Enclosure	Species/ individual/ Sex	Observation

Signature of the Keeper

Signature of the Animal Supervisor

Annexure -IIb

Pilikula Biological Park

Daily Report

Day & Date_____/_____

S. No.	Section/ Beat and enclosure	Species/ individual	Observations	Action taken/ required

In-charge--Animal Section **Biologist** **Veterinary Officer** **Director**

Annexure –IIc

Pilikula Biological Park

ANIMAL HISTORY CARD

Vernacular (local) name & Common Name :	Scientific name of the species :
House name and ID number of the animal :	Sex: M/F:
Distinguishing mark:	Type of marking – Transponder / Ear tag / Ring/ Others:
National Studbook number of the animal	International Studbook number of the animal
Sire : (Name and National Studbook number)	Dam : (Name and National Studbook number)
Date of Birth (dd:mm:yyyy)	When and from where acquired
Physical health check-up details	Genetic health check-up details
Date of death or other mode of disposal (dd:mm:yyyy)	Remarks

Annexure –IId

Pilikula Biological Park

Proforma for Studbook

Species: Common name(Scientific name)_____

Sl. No.	House Name and Number	National Studbook number	International Studbook number (if any)	Sex	Sire (National Studbook number)	Dam (National Studbook Number)	Date of Birth dd.mm.yy.	Location	Since when dd.mm.yy.	Date of Death/ other mode of disposal dd.mm.yy	Remarks

Annexure –IIe

Pilikula Biological Park

ANIMAL TREATMENT CARD

1. Card No. :
2. Common Name & Individual Name (if any) :
3. Scientific Name :
4. Animal ID :
5. National Studbook No. (if any) :
6. Sex: Date of Birth/Age
7. Date & Time of Illness :
8. Date & Time of Treatment :
9. History of Illness :
10. Physical details:

Body weight :	Respiration:
Temperature:	Mucous membrane:
Pulse:	Secretion, if any:

11. Physical Analysis:

Gait:	Defecation:
Urination:	Feeding habit:

12. Tests Conducted

Urine:	Skin scrapings:
Faecal:	Blood:
Biopsy:	X ray:

13. Other examination (if any)
14. Remarks

Veterinary Officer

Annexure -IIf

Pilikula Biological Park
Inventory Report for Year :

Endangered Species*

S.No	Animal Name	Scientific Name	Opening Stock as on				Births			Acquisitions			Disposals			Deaths			Closing Stock as on			
Birds			M	F	U	T	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	T
1. 2. ….																						
Total Birds																						
Mammals 1. 2. …..																						
Total Mammals																						
Reptiles/ Amphibians 1. 2. …..																						
Total Reptiles/ Amphibians																						
Invertebrates 1. 2. ……																						
Total Invertebrates																						
Total Animals																						

*Animals under Sch- I and II of Wild Life (Protection) Act, 1972

Curator (Animals) **Director**

Annexure –IIf

Proforma for Annual Inventory Report
Inventory Report for the Year :

Other than endangered Species

S.No	Animal Name	Scientific Name	Opening Stock as on 1-4-				Births			Acquisitions			Disposals			Deaths			Closing Stock as on 31-03-			
Birds			M	F	U	T	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	T
1. 2. ….																						
Total Birds																						
Mammals 1. 2. ….																						
Total Mammals																						
Reptiles/ Amphibians 1. 2. …																						
Total Reptiles/ Amphibians																						
Invertebrates 1. 2. ….																						
Total Invertebrates																						
Total Animals																						

Curator (Animals) **Director**

Annexure –IIg

Pilikula Biological Park

Death Report for the Year :

Endangered Species

Sl. No.	Animal Name (with individual identification mark, if any)	Scientific Name	Sex	Date of Death	Cause of Death

*Animals under Sch – I and II of Wild Life (Protection) Act, 1972

Veterinary Officer **Director**

Annexure –IIh

Performa for reporting birth/death of the individuals of the species under Co-ordinated Planned Conservation Breeding Programme to the Central Zoo Authority/ Species Co-ordinator

(Within 24 Hours)

Vernacular (local) name of the Species :	Scientific name of the species :
House name and ID number of the animal :	Sex: M/F:
Distinguishing mark:	Type of marking – Transponder / Ear tag / leg band/ Others:
National Stud/ Herd book number of the animal	International Stud/ Herd book number of the animal
Sire : (Name and National Stud/ Herd book number)	Dam : (Name and National Stud/Herd book number)
Date of Birth: dd/mm/yy	Mode of delivery/ incubation/ rearing etc.
Date of death: dd/mm/yy	Cause of death:
Remarks :	

Annexure - IIi

Pilikula Biological Park

Post-Mortem Report

No. Date:

Kind of animal	Scientific name	Sex	Personal name Animal ID/or National Studbook number (if any)	Age	Size	Weight

Time, date and place of death
Time and date of post-mortem Examination
Short history of illness, if any.
A. General description:
B. Organ-wise description of lesions_____

1. Head and neck …. ….. …….. ……. ……. (a) Skull and brain
   (b) Cervical vertebrae
2. Thorax …. ….. …….. ……. ……. (a) Lungs
   (b) Heart
   (c) Ribs
3. Abdomen …. ….. …….. ……. ……. (a) Liver
   (b) Stomach
   (c) Intestines
   (d) Kidney
   (e) Spleen
4. Pelvic girdle …. ….. …….. ……. ……. (a) Uterus and Ovaries
   (b) Bladder
   (c) Genital passage
5. Limbs …. ….. …….. ……. ……. (a) Fore limbs
   (b) Hind limbs
6. Any other special features:
   Biological tests done (if any)
   i) Blood
   ii)Urine
   iii) Discharges
   iv) Biopsy
7. Opinion (cause of death)
8. Instruction for disposal

Place:
DATE: Signature …. ….. …….. ……. ……

Name …. ….. …….. …….
Designation …. ….. …….. …….