Deccan Education Society's

FERGUSSON CENTRE FOR HIGHER LEARNING

TIRUPATI

(Village: Kurrakalava, Mandal: Renigunta, District: Chittoor, Andhra Pradesh)

A Rapid Biodiversity Assessment of the Campus

April 2019

Assessor

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DECCAN EDUCATION SOCIETY

(DES)

PUNE

This report has been prepared by

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PREFACE

Deccan Education Society (DES), Pune, has been engaged in imparting quality education and training since the year 1884. The Society has more than 50 institutes in Western Maharashtra. In the year 2009, DES, at the behest of Government of Andhra Pradesh, ventured to Tirupati to establish its first campus outside the state of Maharashtra. The DES purchased about 20 hectares land in the Renigunta Mandal of Andhra Pradesh to open its new campus for educational activities.

At the first instance, to a lay person, the above land appears to be barren, the soil is alkaline and only some grasses and thorny shrubs are seen here and there. Initially the DES planted about a thousand tree saplings, most of which have survived the parched conditions on the campus. The campus presently has two buildings, the Main Building and the Guest House. DES proposes to start the second phase of construction in the month of July 2019. While the proposal for the second phase of construction was being prepared, it was suggested that the biodiversity of the campus be studied and taken into consideration before further development activities are undertaken. This should be done to ensure that the existing flora and fauna be preserved to the best extent possible.

Sincere thanks to Dr. Sanjeev B. Nalavade, who has carried out several biodiversity surveys, for accepting our request and spending his valuable time for carrying out the biodiversity survey of this campus and helping us become aware of the campus biodiversity.

My heartfelt gratitude to the management of DES and the staff of FCHL for providing all the necessary support, financial and logistic, for carrying out the survey.

Sachin P. Khedkar

1. WHAT IS BIODIVERSITY?

Biodiversity is a short form of Biological diversity. It is a composite term. It refers to the variety and variability of life on earth. Biodiversity is a scale of variation at the genetic, species, and ecosystem level. The 1992 United Nations Earth Summit defined "biological diversity" as **" the variability among living organisms from all sources, including, 'inter alia', terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems"** (United Nations Convention on Biological Diversity). The term biological diversity was used first by J. Arthur Harris, an American researcher in 1916. The term was reintroduced to the scientific community by Thomas Lovejoy, "The Godfather of Biodiversity", in 1980. The contracted form biodiversity was coined by W. G. Rosen in 1985.

India is one of the mega-biodiversity countries in the world. The species diversity of some major taxonomic groups (species number in parenthesis) is as follows: Mammals (423), Birds(1233), Reptiles(526), Amphibia(342), Pisces/Fishes(3022), Flowering plants(17926). The genetic diversity is equally rich. Take the example of Indian mango. Its taxonomic name is *Mangifera indica*. But it has more than 1500 varieties (sub-species or genetic diversity) which are grown in India. Some of the major varieties are: Banganpalli, Langra, Fernandin, Alphonso, Dashehari, Amrapalli, Neelam, Totapuri, Chausa and Mallika. The ecosystem diversity is also quite varied and diverse. India is one of the few countries in the world with such diverse ecosystems as Himalayan Temperate Tundra, Tropical forest (from wet-evergreen to thorn types), Tropical deserts, Mangroves, Freshwater rivers, Estuaries and Marine.

Table 1: Biodiversity of India and Andhra Pradesh: A comparative Chart

Taxonomic group	India @ (Number of species)	Andhra Pradesh # (Number of species)
Flowering plants	17926	2800
Arthropods	74175	1337
Fish	3022	780
Amphibians	342	23
Reptiles	526	103
Birds	1233	1232
Mammals	423	108

@ http://nbaindia.org # http://apbiodiversity.ap.nic.in

Why conserve Biodiversity?

A healthy biodiversity provides a number of natural services for everyone. These are called Ecosystem services. Some of these are:-

- Protection of water resources
- Formation and protection of soil
- Storage and recycling of nutrients
- Pollution breakdown and absorption of pollutants
- Contribution towards climate balance
- Preservation of ecosystems
- Recovery from natural disaster impact

Biodiversity has been responsible for providing following Biological resources:-

- Food and fodder
- Medicinal plants and pharmaceutical drugs
- Timber products

- Ornamental plants
- Fuel wood
- Seed stocks
- Diversity in genes, species and ecosystems

Some of the social benefits are:-

- Research, study and education
- Recreation and Tourism
- Cultural and Spiritual values

With so many diverse and varied benefits from Biodiversity, it becomes imperative to protect, conserve and maintain the biological diversity, for the healthy environment meant for future generations.

Why study Biodiversity?

The biodiversity became the core of environmental conservation after the Rio Summit of 1992. Three conventions were signed at the Summit. One of them was the **Convention on Biological Diversity** (**CBD**), which is a multilateral treaty. The Convention has three main goals viz. 1. The conservation of biodiversity; the sustainable use of its components; and the fair and equitable sharing of benefits among the communities, arising out of the biological resources. The prime objective of the CBD is to develop national strategies for conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development. India is one of the signatories of the Convention. To be in tune with the Convention, India has passed the 'National Biodiversity Act 2002' and established the National Biodiversity Authority in 2003 to implement the Act. As per the Act, every state of the Union is to establish 'State Biodiversity Board (SBB)' and Biodiversity Management Committees (BMC)' at the village, taluka, district ,town and city levels. Such committees are supposed to maintain People's Biodiversity Registers (PBRs,a kind of database on local biodiversity, maintained by local people) for the area within their jurisdiction. The PBR is prepared

through actual ground survey, information from elderly knowledgeable individuals from the vicinity and secondary data collected from other sources such as district gazetteers, forest working plans, popular literature, research material etc. Such an information is very vital for conserving the local biodiversity, its sustainable use, equitable distribution of biological resources among the beneficiaries, for overcoming ecological issues, and for dealing with problems such as the climate change. PBRs will also help in patenting issues involving biological resources. Many academic institutions have large campuses, ranging from few *gunthas* to hundreds of hectares. If the campus is new and up-coming, the institute needs to know the native flora and fauna, so that the initial development does not disturb the native biodiversity. Maintaining and enriching biodiversity through proper land use is a challenging task, especially in rapidly changing urban environment. Educational institutes, by treating their sprawling campuses as living laboratories, can help protect, conserve and enhance the campus biodiversity. Every campus lies within jurisdiction of some urban or rural local self-governing body. Through its own campus biodiversity assessment, the institute can contribute towards the larger process of PBR making of the town or the village, in which jurisdiction it lies. In fact the biodiversity study provides an opportunity for cooperation between the institute (including its staff & students) and the local community. It is an opportunity to preserve the already existing habitats and to create new ones in tandem with local geography, soil and climate. If properly landscaped, a green campus should provide a serene, peaceful, eco-friendly and therefore ideal work environment for staff and students alike. A portion of the campus can be a micro sanctuary, providing protection to native flora and fauna. Such a wildlife area also provides the students and staff, an opportunity for studying biodiversity, thereby creating greater awareness about biodiversity, in particular, and environmental issues in general. A biodiversity-rich campus forms an inevitable part of a green, environment-friendly campus.

2. INTRODUCTION: THE AREA AND THE HABITATS

The Fergusson Centre for Higher Learning, an institute of which has been recently established, is located near the Kurakalva village of Renigunta Mandal of Chittoor District in Andhra Pradesh. The Institute campus occupies a plot admeasuring 20 hectares (~ 50 acres).The Institute was inaugurated in 2018. The coordinates of the Institute (Main building) are: Latitude: 18° 37’ 20.6” N , Longitude: 79° 32’ 23.6” E. The Institute is located about 1 km (line of sight) from the Tirupati International Airport, 6 km from the Renigunta Railway station and about 16 km from the Tirupati town.

The plot on which the Institute is located is more or less flat with a water channel/nullah running through it. The channel was totally dry when visited in April 2019. But according to local authorities, it holds water to its fullest during the Monsoon months. The area is located in the Swarnamukhi river basin which passes along the Tirupati town. The river passes around 1.2 km south of the Campus. The altitude of the place is around 100 m (328 ft) above the mean sea level. Geologically the area is under Precambrian rocks, where the gneisses and granites forming the basement (Precambrian) are extensively exposed. The tor-like rock formation found on the Campus belongs to this type. The area is surrounded by hills all around it. These hill ranges lie around 6 to 8 km. away from the Campus and rise to more than 600 m. from the mean sea level.

The **climate** of the nearest weather station, Renigunta, is as follows:

The Koppen-Geiger climate classification is Aw (Tropical Wet & Dry climate). The average annual temperature is 28.6° C. Precipitation here averages 939 mm. February is the driest month with 3 mm of rains, whereas October is the wettest month with 188 mm of average rainfall. May is the hottest month with 33.3°C average temperature. The maximum daily temperature sometime crosses 40° C. whereas December average temperature is 24° C.

The rainy season is six months period from July to December. The area receives rainfall from both the South-west and the North-east Monsoon winds. But the amount received during the South-west monsoon is more than that received during the North-east Monsoon season. (Source: en.climate.data.org)

Methodology:

The emphasis was on the actual field survey. Accordingly three days in April 2019 (15th -17th) were used for actual field survey. A base-map of the Campus was prepared based on the satellite image available on the 'wikimapia.org' site. This map was used for marking habitats while on the field. Major habitats were also photographed for documentation purpose.

The faunal & floral surveys were done using the traditional techniques. The birds were watched on the field using a (Nikon 10X42) binocular. Wherever possible, birds were also photo-documented using a Nikon D 5300 camera with 70-300 lens. The locations of birds seen were also marked on the map, noting the time of sighting, number, sex, habitat and behaviour of the birds seen. The field guide used for identification of birds on the field was: Birds of the Indian Subcontinent by Grimmett, Inskipp & Inskipp (2nd Edn.2011). We expected very few mammals on the Campus. Only some bats were seen flying after the sunset. The presence of some mammals such as the Black-naped hare was noted through the indirect evidences such as the round droppings found at some spots on the Campus across the channel.

We searched for reptiles at appropriate places such as rocky patches, tree clumps, hedges and ant-hills. All the reptiles seen on the Campus were photo-documented. Frogs

were mostly found only in the lotus-pond behind the Main building, except the Common toad. Butterflies were observed during day-time while moths and other night-flying insects were observed around the bulbs and street lights after sunset.

Some arthropods such as the spiders were also noted.

Major Habitats-

The major habitat types identified were:

1. Open country with short grass
2. Grass & scrub country.
3. Plantations.
4. Tree clumps.
5. Water features.
6. Buildings.
7. Rock features.

The area under each habitat was calculated using 1 cm X 1 cm. grid technique. The area under each habitat is as follows:-

Table 2: Campus Habitat types

Habitat type	Area under the habitat(%)
Open country with short grass	64.52
Grass & scrub	18.28
Plantations	7.53
Tree clumps	3.22
Water features	3.76
Buildings	1.61
Rock features	1.07
Total	**99.99**

1. **Open country with short grass:** This is probably the original habitat of the Campus. It occupies 64.52 percent of the Campus thereby making it the most dominant habitat of the Campus. This type is found mostly around the Main building and in the northern half of the Campus across the channel.
2. **Grass & scrub country:** This is the next important habitat after the Open country. It is mostly found to the east of the channel and in the north-central portion of the Campus. It consists of some grassy patches with thorny shrubs & bushes.
3. **Plantations:** Plantation has been done as a continuous belt along the western boundary and in an adjoining plot west of the entry gate. Trees are planted in rows. It was informed that initially about 1500 saplings were planted. The actual count showed that almost 1000 trees are alive and growing in healthy conditions, giving the success rate of 66.66 percent, which is reasonably good. The trees planted mostly belong to following species:-
4. **Tree clumps:** These are clumps of short & medium sized trees growing together. Some of the clumps are dense and impenetrable.
5. **Water features:** The water channel that passes through the property is the major feature. A ditch at the end of the plantation belt and a lily pond behind the Main building are the other two micro-water features. A stream criss-crosses the area from east to west. The stream course was totally dry when visited in April 2019.
6. **Buildings:** The Main building is at present the largest man-made structure on the campus. Another smaller structure is the Guest House, hardly 50 m away to the west from the Main building.
7. **Rock features:** There are a few exposed rocks especially in the eastern part of the Campus. A line of rock, may be previously part of a tor, is seen rooted in the eastern part of the Campus.

Tree Clump

Rock Field

Plantation

Grass & Scrub

Artificial Pond

Barren Patch

3. FLORAL DIVERSITY

The April 2019 survey yielded only 38 plant species. The reason for such a limited number of species found, was that the survey was done at the height of summer, when most of the grasses and herbs are dried, dead and non-existent. The channel and the streams were also totally dry, with total absence of aquatic plants. The dry season survey shows that the Campus flora is tree-dominated. Almost 55 percent plants (21 species) enumerated on the Campus are trees. It is followed by 'Shrubs, bushes and herbs' category with 26.31 percent (10 species) share. Four species of grasses were found with 10.52 percent share. Two species of creepers (5.26 percent share) and only one species of aquatic plant (2.63 percent share) was found during the survey. The Monsoon survey should return more plants belonging especially to grasses, herbs and aquatic plant categories. Among the planted trees, the prominent species are: Indian lilac or Neem tree, Karanj or Pongam oiltree, Copper -pod or Yellow Poinciana, Indian jujube or Ber, Indian gooseberry, Sacred fig tree or Peepal, Indian-almond, and the Indian Drumstick tree. Some exotic species have also made the Campus, their local home. These include: Pink

Morning Glory, Coatbuttons or Tridax daisy, Singapore cherry & Mesquite tree. The original vegetation of the area seems to be the Tropical grass & scrub type. This is reflected in the dominance of Acacia trees on the plot. Though 38 species were noted, only 32 could be identified with certainty. Of the total 32 species, 56.25% (18 species) are native, 31.25% (10 species) are exotic, 9.37% are exotic but naturalized here. There is doubt about the nativity of one species (3.125%).

Table 3: List of Identified Plants on the Campus

Sr. No.	Common Name	Scientific Name	Telugu names	Remark
Bushes & Shrubs				
1	Aloe plant	*Aloe vera*		@Exotic but naturalized
2	Carandas plum or Bengal Currant	*Carissa carandas*		# Native
3	Coatbuttons or Tridax daisy	*Tridax procumbens*		Exotic weed.
4	Giant calotrope	*Calotropis gigantea*		Native
5	Moon Flower	*Ipomea alba*		$ Exotic
6	Pink Morning Glory	Ipomoea carnea		Exotic, invasive.
7	Prickly Pear	*Opuntia elatior*	జెముడు nagajemudu, నాగతాళి nagatali	Exotic, invasive.
8	Spikethorn ?	*Maytenus Sp.*		Native ?
9	Yellow Bell	*Tecoma stans*		Exotic
Trees				
10	Babul or Indian gum Arabic tree	*Acacia nelotica*	నల్ల తుమ్మ [Telugu]	Native
11	Banana	*Musa sp.*		Exotic but naturalized. Planted.
12	Banyan tree	*Ficus benghalensis*		Planted. Native

13	Copperpod or Yellow poinciana	*Peltophorum pterocarpum*		Planted. Exotic?
14	Devil tree	*Alstonia scholaris*		Native
15	Fan Palm	**?**		A pair across the channel
16	Indian almond	*Terminalia catappa*		Planted. Native.
17	Indian Drumstick tree	*Moringa oleifera*		Planted. Native.
18	Indian gooseberry	Phyllanthus emblica		Planted. Native.
19	Mahuwa tree	*Madhuca indica*	vippa (విప్ప)	Native.
20	Mesquite tree	*Prosopis juliflora*	*Mulla tumma* , *Sarkar tumma* or "Chilla chettu" or "Japan Tumma Chettu".	Exotic & invasive. Quite common all over the Campus.
21	Peepal or Sacred fig	Ficus religiosa		Planted. Native.
22	Prickly Sesban	Sesbania bispinosa		Native
23	Singapore cherry	*Muntingia calabura*		Planted. Exotic. Seeds are devoured by birds & bats alike.
24	Rosy Trumpet tree	*Tabebuia rosea*		Exotic
25	Toddy Palm or Palmyra Palm	Borassus flabellifer		Native
26	White Frangipani	*Plumeria sp.*	*deva ganneru* (divine nerium)	Planted around the Lotus pond. Exotic, but naturalized.
27	Wild Date Palm	*Phoenix sylvestris*		Native
Creepers, Grasses & Aquatic plants				
28	Midnapore Creeper	*Rivea hypocrateriformis*		Native.
29	Speading hogweed or Punarnava	*Boerhavia diffusa*		Native. Medicinal properties.

30	Turpeth	*Operculina turpethum*		Native.
31	Cogon grass	*Imperata cylindrica*		Native. Behind the Main building
32	Indian lotus	*Nelumbo nucifera*		Native. Cultivated & maintained in the Lotus Pond, behind the Main building

@ **Exotic, but naturalized**: Species that are non-native & alien in a region, but have been growing here for the last many centuries, maybe millennia of years, and have become part of the native environment.

Native: A species that occurs naturally within a region.

$ **Exotic**: A species that has been introduced to an area from outside its native range.

Rusty Shield Bearer

White Trumpet Creeper

Indian Milkweed

Carandas Plum

4. FAUNAL DIVERSITY

The faunal diversity that was surveyed on the Campus, mostly covered mammals, birds, reptiles, amphibians and some arthropods such as butterflies and spiders. The overall faunal diversity found during the survey was as follows:-

Table 4: General Faunal Diversity (April 2019)

Faunal Group	No.of Species
Mammals	04
Birds	34
Reptiles	08
Amphibians	02
Insects	12
Spiders	02
Scorpions	01

Wild mammals were surveyed using 1) Direct sighting and 2) Indirect evidences (hair, scats,pug mark ,burrows etc.) methods. Of the four mammals listed below, one (Three-striped squirrel) was found out-side the survey area in a village about 4 km. away. Though we could not find any evidence of this squirrel on the Campus, its absence on the Campus is part due to lack of huge trees of Ficus. Also the plot is more or less isolated and hardly has any corridor connection with the groves in the vicinity.

Mammalian Diversity

Three-striped Palm Squirrel (*Funambulus palmarum):* Not observed in the present survey on the Campus. A few seen in the vicinity of Sree Parasurameshwara Swami Vari Temple, Gudimallam around 4 km. from the DES Campus. A few of these squirrels are expected to be seen on the Campus in the near future, when the Campus will be more green with tall trees.

Black-naped Hare (*Lepus nigricollis*)-Dried round-shaped droppings were found at many places on the Campus, especially across the channel.

Pipistrelle Bat (*Pipistrelle* Sp.): Very common, as scores were seen flying over the Campus , especially around the Guest house as well as around the Mani building, after sun-set.

Short-nosed Fruit bat (*Cynopterus sphinx) :* Some were seen feeding on fruiting trees in the Plantation belt.

Table 5: List of Mammals (Including those seen in the vicinity)

Sr. No.	Common Name	Scientific Name
1	Three-striped Palm Squirrel	*Funambulus palmarum*
2	Hare Indian	*Lepus nigricollis*
3	Pipistrelle Bat	*Pipistrelle* Sp.
4	Fruit bat Short-nosed	*Cynopterus sphinx*

Avian diversity

The survey period being the summer time, we expected to see only resident birds. In all we could watch 34 species in three days, which is a reasonably good number, this being the height of the summer season. Surprisingly we came across a few winter migratory birds, such as the Brown shrike. The Campus bird-fauna was divided into groups based on their habits and habitats. The five groups such defined are: 1. Open country birds 2. Garden & woodland birds 3. Scavenger & Commensal of humans (COH) birds 4. Birds of Prey & 5.Aquatic birds. The results are as follows:-

Table 6: Group-wise Bird Diversity

Group type	Number of bird species under the group	Group-wise Percentage (%)
Open country	18	52.94
Garden & woodland	06	17.64

Scavenger & COH	04	11.76
Birds of Prey	02	5.88
Aquatic	04	11.76
Total	**34**	**99.98**

The Avifauna was surveyed through the 1. Direct sighting method 2. Bird Calls and 3. Indirect evidences such as feathers, deserted nests etc.

More than half the birds on the Campus belong to the Open country category. This is obvious because 'open country' is the most dominant habitat of the Campus. The prominent open country birds seen on the Campus include three species of lark, one species of lapwing (Yellow-wattled), Pied bushchat, Grey francolin, Chestnut-bellied Sandgrouse and Eurasian thick-knee. The last was seen on an open grass patch to the east of the Channel. The Sandgrouse were seen flying in small flocks, over the Campus, during the morning and evening hours. The flocks landed on an open plot adjoining the Airport. The next most important group is the Garden & Woodland birds, sharing 17.64% of the Campus bird fauna. This is mostly because of the tree plantation area and few large Ficus trees present on the Campus. The common garden birds seen were the two species of Bulbul, two species of Sunbird, Southern coucal and Ashy prinia. The Scavenger and the Commensal-of-humans birds include two species of Crow, Rock pigeon and Common myna. Only two birds of prey were seen, the Common Kestrel (female) and the Spotted owlet, which was frequently heard during the night time. Among the aquatic birds sighted were the Cattle egret, Pond heron, Red-wattled lapwing and White-browed wagtail. Besides the Spotted owlet, the only nocturnal bird that was heard was the Indian nightjar.

Table 7: List of Birds observed on the Campus (April 2019)

Sr.No.	Common Name	Scientific Name
1	Bee-eater Green	*Merops orientalis*
2	Bulbul Redvented	*Pycnonotus cafer*
3	Bulbul Redwhiskered	*Pycnonotus jocosus*
4	Bushlark Jerdon's	*Mirafra affinis*
5	Bushchat Pied	*Saxicola caprata*
6	Coucal Southern	*Centropus (sinensis) parroti*
7	Crow House	*Corvus splendens*
8	Crow Indian Jungle	*Corvus macrorhynchos*
9	Dove Eurasian Collared	*Streptopelia decaocto*
10	Dove Laughing	*Stigmatopelia senegalensis*
11	Drongo Black	*Dicrurus macrocerus*
12	Egret Cattle	*Bubulcus ibis*
13	Francolin Grey	*Francolinus pondicerianus*
14	Heron Indian Pond	*Ardeola grayii*

15	Kestrel Common	*Falco tinnunculus*
16	Lapwing Red-wattled	*Vanellus indicus*
17	Lapwing Yellow-wattled	*Vanellus malabaricus*
18	Lark Rufous-tailed	*Ammomanes phoenicura*
19	Myna Common	*Acridotheres tristis*
20	Nightjar Indian	*Caprimulgus asiaticus*
21	Pigeon Common	*Columba livia*
22	Owlet Spotted	*Athene brama*
23	Prinia Ashy	*Prinia socialis*
24	Robin Indian	*Saxicoloides fulicatus*
25	Sandgrouse Chestnut-bellied	*Pterocles exustus*
26	Silverbill Indian	*Euodice malabarica*
27	Sparrow-lark Ashy-crowned	*Eremopterix griseus*
28	Shrike Brown	*Lanius cristatus*
29	Sunbird Purple	*Cinnyris asiaticus*
30	Sunbird Purple-rumped	*Leptocoma zeylonica*
31	Swallow Red-rumped	*Cecropis daurica*
32	Swift Asian Palm	*Cypsiurus balasiensis*
33	Thick-knee Eurasian	*Burhinus oedicnemus*
34	Wagtail White-browed	*Motacilla maderaspatensis*

Reptile Diversity

The presence of eight species of reptile was noted on the Campus. Six of these were seen during the present survey, whereas two were previously reported by Mr. Akshay Deshpande, a faculty of the Institute, are also included in the present list. A full grown house gecko was found in one of the bathrooms of the Guest House. A few Flat-tailed House Geckos were sighted in the veranda & roof of the guest-house porch. At least three individuals seen, mostly in sub-adult or young stage, indicate that this species breeds here.

Fan-throated lizard is the commonest reptile of the Campus. At least a dozen individuals were seen in different parts of the Campus. A male Sitana was seen opening and shutting its throaty-fan, near the Guest- house. A few Indian garden lizards were also found around shrubbery on the Campus. One was found taking refuge in the croton bushes near the guest-house porch. A skink was seen moving in the vearanda of the Main building. This was most probably the common Brahminy skink. Among the snakes, a two meter (6 foot) long Dhaman or Rat-snake was seen sunning on the bank of a ditch at the farther end of the Plantation belt. When it saw us (me and Dr.Khedkar) approaching, it hurriedly disappeared in a nearby mud-hole. As per the information provided by Mr. Deshpande and the security guards on duty, a cobra snake has been recently sighted on the Campus. Mr. Deshpande also photo-documented the presence of a Banded Racer snake in the Guest-house.

Table 8: List of Reptiles found on the Campus

Sr. No.	Common Name	Scientific Name
1	Gecko House	*Hemidactylus frenatus*
2	Flat-tailed House Gecko	(*Hemidactylus platyurus*)
3	Lizard Fan-throated	*Sitana ponticeriana*
4	Lizard Indian Garden	*Calotes versicolor*
5	Rat Snake, Indian or Dhaman	*Ptyas mucosus*
6	Skink Common or Brahminy ?	*Mabuya carinata*
7	Racer Banded	*Argyrogena fasciolatus*
8	Cobra Spectacled or Binocellate	*Naja naja*

Amphibian Diversity

The presence of three species was confirmed. A Common Indian toad was seen in the veranda of the Guest house. Many Skittering frogs were seen in the Lotus Pond developed behind the Main building.Prof.Deshpande provided a photograph of Common Tree frog seen in the bathroom of the Guest house during the Monsoon season of 2018.

Table 9: List of Amphibians of the Campus

Sr. No.	Common Name	Scientific Name
1	Common Tree frog	*Polypedates maculatus*
2	Skittering Frog	*Euphlyctis cyanophlyctis*
3	Common Indian toad	*Bufo melanosticus*

Arthropods (Insects, Spiders & Scorpions):

In all 15 species of arthropods were noted during the survey. The presence of six species of butterfly was confirmed. The first two were photo-documented by Mr. Deshpande, whereas the next four were found during the present survey. Among the other insects, a dragonfly called as the Granite ghost, was seen on the walls of the Guest House as well the Main Building. Numerous sand-pit traps were found scattered all around the Campus on appropriate soft soil surfaces, made by the predatory larva of the Ant-lion. A large black click beetle was found in the porch of the Guest house.

A common spider called Pantropical Jumper was seen on the walls of the Guest-House and the Main building. Another house spider species seen on the walls of the Guest house could not be identified. Mr. Deshpande has come across a scorpion in one of the rooms of the guest house.

Table 10: Arthropods observed on the Campus.

Sr. No.	Common Name	Scientific Name
1	Blue Pansy	*Junonia orithya* Linn.
2	Tailed Jay	*Graphium agamemnon*
3	Lime	*Papilio demoleus*
4	Plain Tiger	*Danaus chrysippus*
5	White Orange Tip	*Ixias marianne*
6	Yellow Pansy	*Precis hierta*
6	Granite Ghost (Dragonfly)	*Bradinopyga geminata*
7	Antlion	*Myrmeleon sp.*
8	Honey Bee	*Apis sp.*
9	Horse Fly	Tabanidae sp.
10	Carpenter Bee	*Xylocopa sp.*
11	Click Beetle Large Black	*Fam. Elateridae*
	Plant bug	
12	Blister Beetle Orange & White	*Mylabris sp.*
13	Pantropical Jumper	*Plexippus paykulli*
14	House Spider	*?*
15	Scorpion	

In spite of the peak summer season, the diversity that was found on the Campus was reasonably good. With Monsoon and winter season surveys, the Campus species diversity is sure to double than found during the present survey.

5. RECOMMENDATIONS AND SUGGESTIONS

Here are some recommendations and suggestions for maintaining and enriching the habitat and species diversity of the Campus.

1. The **Trees-clumps** need protection. It is not possible to protect all the 'clumps', but at least the two, one to the north of the bridge across the channel and another to the east of the main building, are ideal for protection.
2. A good **grass-&-scrub country** can be developed along the eastern margin of the plot across the bridge.
3. Please avoid the pair of the **Fan palm** from cutting. The pair can be easily merged with proper land-scaping with any future structure that is likely to come up at/around the spot.
4. Try to preserve the **line of stone** that is found near the eastern boundary of the plot.
5. Develop an **eco-pond** of about few gunthas (6-10) near and at the lower level than the channel. The preferred location is any spot between the Channel and the Main building.
6. Erect one or two **hawk perches** (watch-poles) meant for birds-of-prey such as Shikra, Kestrel, Sparrow-hawk,Eagle etc. The best place for them is the open grass patch in the north-west corner of the plot.
7. Keep/Develop a small one guntha fine sand-bed reserved for such ground-nesting fauna such as the ant-lions larvae.
8. Plant more **flowering and fruiting trees and shrubs** to attract birds and insects, including butterflies and bees. (List attached at the end.)
9. Plant a line of **bamboos** along the inward side of the outer fence of the property.
10. Make a **land-fill** for dumping organic material (dry leaves, fallen flowers, fruits and nuts, branches etc.), that is collected/produced on the Campus. These fills can be further converted into '**Composting Pits'**.
11. Erect **picture-boards** depicting some prominent animals: mammals, birds, reptiles, amphibians and butterflies found on the Campus. One can also provide a

board providing a brief note about the ‘Campus Biodiversity’ at/near the main entrance.

12. Have a ‘**Nature Club’** or ‘**Biodiversity Club**’ in the Institute. Engage and involve students in various Biodiversity related activities, including ‘Biodiversity Monitoring Workshops’, ‘Continuous Biodiversity Monitoring’ program, ’Paint Your Backyard Biodiversity’ Competition, etc.
13. Develop a **Coffee-table book** about the Biodiversity of the Campus. This should be based on the information coming out of the full one-year survey covering all the three seasons.

6. REFERENCES

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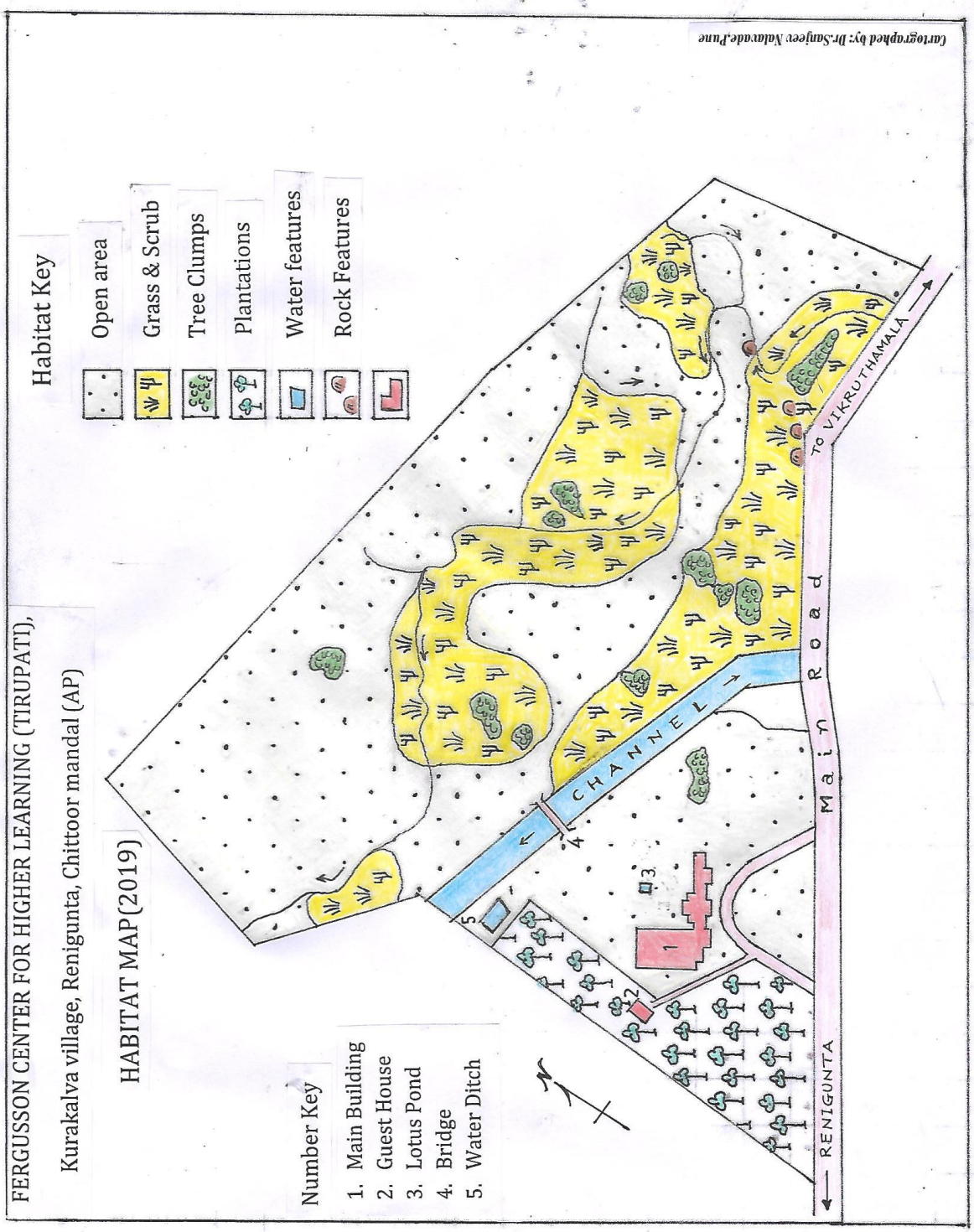
7. MAP


FERGUSSON CENTER FOR HIGHER LEARNING (TIRUPATI),
Kurakalva village, Renigunta, Chittoor mandal (AP)
HABITAT MAP(2019)
Habitat Key
Open area
Grass & Scrub
Tree Clumps
Plantations
Water features
Rock Features
Number Key
1. Main Building
2. Guest House
3. Lotus Pond
4. Bridge
5. Water Ditch
CHANNEL
Main Road
RENIGUNTA
TO VIKRUTHAMALA
Cartograpked by: Dr.Sanjeev Nalavadde,Pune

8. PHOTOGRAPHS

Granite Ghost Dragonfly

Tri-colored Blister Beetle

Ant-lion larva pit

Tabanid Fly

Plain Tiger Butterfly

Pan-Tropical Jumper spider

Skitter Frog

House Gecko

Common Garden Lizard

Fan-throated Lizard male

Pond Heron

Brown Shrike

Laughing Dove

House Crow

Jerdon's Bushlark

Rufous-tailed Lark

Black Drongo

Purple Sunbird female

Red-vented Bulbul

Green Bee-eater

Common Kestrel

Indian Robin

All photographs: Dr. Sanjeev B. Nalavade