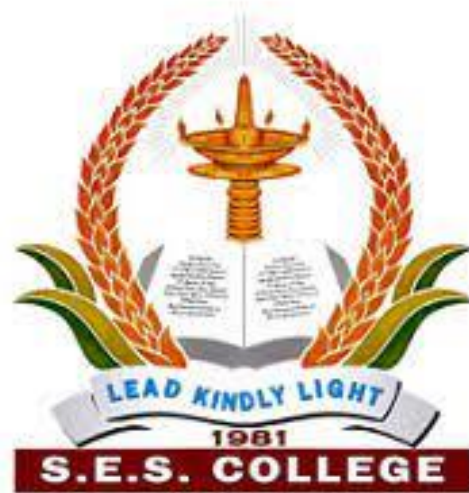


# **GREEN AUDIT REPORT**

**2020-2021**



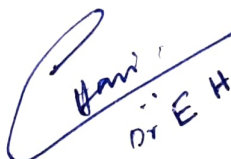
# **SES COLLEGE**

# **SREEKANDAPURAM**


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## **INTRODUCTION:**

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyse environmental practices within and outside of the concerned place, which will have an impact on the eco-friendly atmosphere. Green audit is a valuable means for a college to determine how and where they are using the most energy or water or other resources; the college can then consider how to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric CO<sub>2</sub> from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures.

## **OBJECTIVES:**

In recent time, the Green Audit of an institution has been becoming a paramount important for self-assessment of the institution which reflects the role of the institution in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since its inception. Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

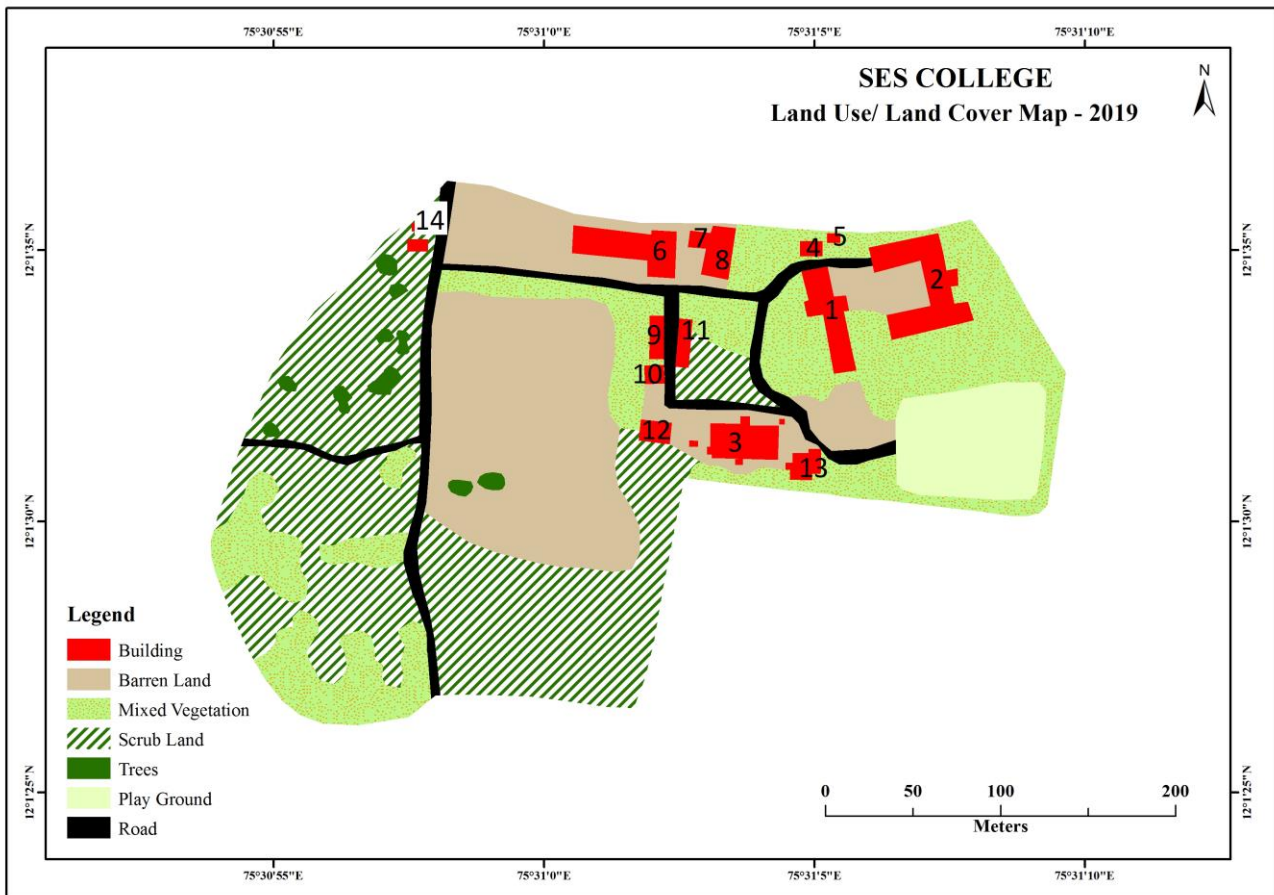
- To map the Geographical Location of the college
- To document the floral and faunal diversity of the college
- To document the waste disposal system.
- To document various carbon emission source and its reduction method.

## **METHODOLOGY:**

The purpose of the green audit of SES is to ensure that the practices followed in the campus are in accordance with the Green Policy of the country. The methodology includes: collection of data, physical inspection of the campus, observation and review of the documentation and data analysis.

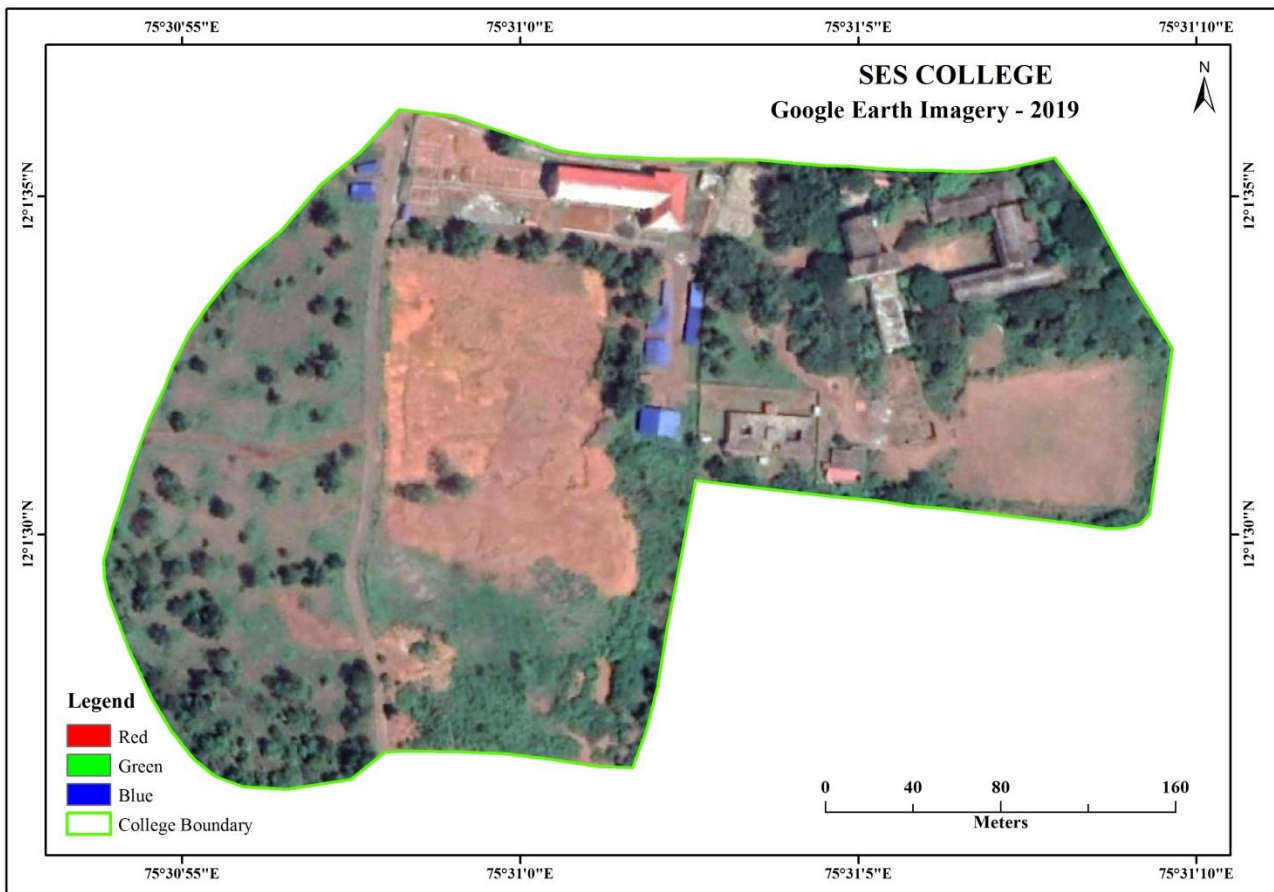
# LAND USE PATTERN

Two types of data that are field survey data and Google earth data for Geo referencing have been used in this study by Dr. T K Prasad.

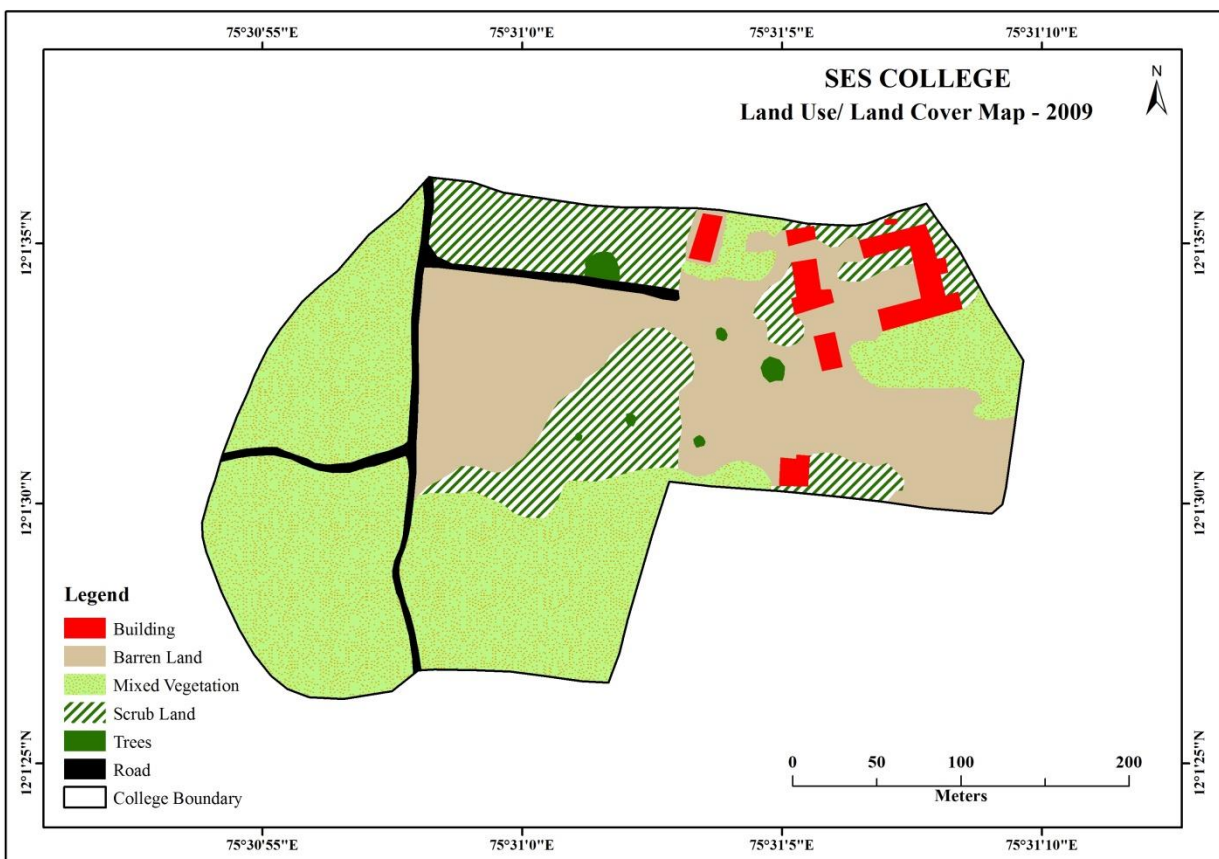


1. A Block
2. B Block
3. Womens Hostel
4. Cooperative Store
5. Students Union Room
6. K.M. Varughese Memorial Block
7. Day Care Centre
8. BasketBall Court
- 9, 10, 11. Car Parking
12. College Bus Parking
13. Canteen
14. Studens Vehicle Parking area

# Campus Map 2019



# Campus Map 2009





# GREEN AUDITING

Green accounting is the systematic identification, quantification, recording, reporting and analysis of components of ecological diversity and expressing the same in financial or social terms. "Green Auditing", an umbrella term, is known by another name "Environmental Auditing". The term "Green" means Eco-friendly or not damaging the Environment. "GREEN" can be considered as an acronym of "Global Readiness in Ensuring Ecological Neutrality". A preliminary attempt towards green auditing was done in the campus, mainly with the hope that it will form a baseline for future analyses.

## PLANT AND ANIMAL DIVERSITY

The diversity of the flora and fauna in an area gives an idea about the health and sustainability of the ecosystem. As a part of the green auditing of the SES College campus, the biology departments of the Payyanur College, Payyanur conducted surveys for the quantitative and qualitative assessment of the flora and fauna and are listed the floral and faunal diversity based on those field observations.

SES college campus can be identified as a midland laterite hillock area, where laterite stone mining was a major threat, may be before the starting of the college itself. The average annual rainfall is 3900 mm and more than 75% of this occur during the period of Southwest Monsoon (June to September). Maximum rainfall occurs in the month of July (Prasad and Parthasarathy, 2018).

## PLANT BIODIVERSITY

The flora of the campus varies seasonally as in any other laterite hill areas of Northern Kerala, which is indicated by the phyto-sociological changes during different seasons. Tree trunks are covered with mosses during the rainy season and appeared to be slimy because of the presence of algae. Extensive studies are required for the identification and quantification of the species belonging to lower groups.

There are 56 species of plants which are either shrubs or trees among the flowering plants. The qualitative assessment of the flowering plant species belonging to the monocots and other lower tracheophytes are not carried out. The dominant angiosperm species are *Tectona grandis* and *Acacia auriculiformes*.

Sl. No.	Botanical name	Family	Habit	Number of plants
1	<i>Acacia auriculiformes</i>	Fabaceae	tree	29
2	<i>Acacia mangea</i>	Fabaceae	tree	13
3	<i>Acalypha hispida</i>	Euphorbiaceae	shrub	2
4	<i>Achras sapota</i>	Sapotaceae	tree	1
5	<i>Anacardium occidentale</i>	Anacardiaceae	tree	9

6	<i>Artocarpus heterophyllus</i>	Moraceae	tree	3
7	<i>Bauhinia pupurea</i>	Fabaceae	tree	4
8	<i>Bauhinia tomentosa</i>	Fabaceae	shrub	6
9	<i>Bougainvillea spp.</i>	Nyctaginaceae	shrub	8
10	<i>Caesalpinia coriaria</i>	Fabaceae	tree	6
11	<i>Calliandra haematocephala</i>	Fabaceae	shrub	2
12	<i>Careya arborea</i>	Lecythidaceae	tree	3
13	<i>Carica papaya</i>	Caricaceae	shrub	1
14	<i>Cassia fistula</i>	Fabaceae	tree	10
15	<i>Casuarina equisetifolia</i>	Casuarinaceae	tree	3
16	<i>Cocos nucifera</i>	Arecaceae	tree	2
17	<i>Cupressus macrocarpa</i>	Cupressaceae*	shrub	15
18	<i>Cycas circinalis</i>	Cycadaceae*	Tree	2
19	<i>Cycas revoluta</i>	Cycadaceae*	Tree	1
20	<i>Dalbergia latifolia</i>	Fabaceae	Tree	2
21	<i>Delonix regia</i>	Fabaceae	Tree	16
22	<i>Dracaena cochinchinensis</i>	Asparagaceae	shrub	3
23	<i>Dracaena marginata</i>	Asparagaceae	shrub	2
24	<i>Elaeis guineensis</i>	Arecaceae	Tree	1
25	<i>Embllica officinalis</i>	Euphorbiaceae	Tree	11
26	<i>Enterolobium saman (Samanea saman)</i>	Fabaceae	Tree	4
27	<i>Ficus benghalensis</i>	Moraceae	Tree	1
28	<i>Ficus benjamina</i>	Moraceae	Tree	2
29	<i>Ficus religiosa</i>	Moraceae	Tree	1
30	<i>Glyrricidia macculata</i>	Fabaceae	shrub	1
31`	<i>Hamelia patens</i>	Rubiaceae	shrub	2
32	<i>Hibiscus rosa-sinensis</i>	Malvaceae	shrub	5
33	<i>Lagerstroemia indica</i>	Lythraceae	Tree	3
34	<i>Leucaena leucocephala</i>	Fabaceae	Tree	2
35	<i>Macranga peltata</i>	Euphorbiaceae	Tree	9
36	<i>Mangifera indica</i>	Anacardiaceae	Tree	12
37	<i>Manihot esculenta</i>	Euphorbiaceae	shrub	3
38	<i>Melia azadiracta</i>	Meliaceae	Tree	1
39	<i>Mimusops elengii</i>	Sapotaceae	Tree	2
40	<i>Peltophorum pterocarpum</i>	Fabaceae	Tree	2
41	<i>Plumeria alba</i>	Apocynaceae	Tree	2
42	<i>Pongamia pinnata</i>	Fabaceae	Tree	4
43	<i>Psidium guajava</i>	Myrtaceae	Tree	2
44	<i>Santalum album</i>	Santalaceae	Tree	15
45	<i>Senna nitida (Cassia antillana)</i>	Fabaceae	shrub	3
46	<i>Senna siamea</i>	Fabaceae	Tree	3
47	<i>Simarouba glauca</i>	Simaroubaceae	Tree	1
48	<i>Spathodea companulata</i>	Bignoniaceae	Tree	2
49	<i>Strychnos nux-vomica</i>	Loganiaceae	Tree	2
50	<i>Syzygium cumini</i>	Myrtaceae	Tree	5
51	<i>Swittenia mahagoni</i>	Meliaceae	Tree	2
52	<i>Tamarindus indicus</i>	Fabaceae	Tree	2
53	<i>Tecoma stans</i>	Bignoniaceae	Tree	3



54	<i>Tectona grandis</i>	Verbenaceae	Tree	68
55	<i>Terminalia catappa</i>	Combretaceae	Tree	2
56	<i>Trema orientalis</i>	Cannabaceae	Tree	9

\*Gymnosperms

**TABLE.1:LIST OF TREE/SHRUB SPECIES IN SES COLLEGE**

Out of these 56 species, only a very few can be considered as the local native plants. Angiosperms such as *Mangifera indica*, *Emblica officinalis*, *Artocarpus heterophyllus*, *Dalbergia latifolia*, *Anacardium occidentale*, *Strychnos nuxvomica*, *Santalum album*, *Tamarindus indicus* and *Macranga peltata* can be considered as native flora which is found also in other plots near to this campus. *Cycas circinalis*, a gymnosperm, also can be considered as a native flora.

The dominant species, *Tectona grandis*, cannot be considered as a member of native flora. The dominance of this plant is contributed much by the saplings planted on the borders of the playground situated on the southeast side of the campus. *Acacia auriculiformes* is distributed widely in the campus is also resulted from the social forestry programme; but their propagation and establishment may be a threat to other flora. The dominant angiosperm family of the campus is Fabaceae, the legume family, with all the three subfamilies, Pappilionaceae, Caesalpiniaceae and Mimosaceae.

There are more than 30 varieties of grass species in the campus. Presence of insectivorous plants and other endemic plants of typical laterite hill flora are to be studied further during the extensive floral survey of the campus.

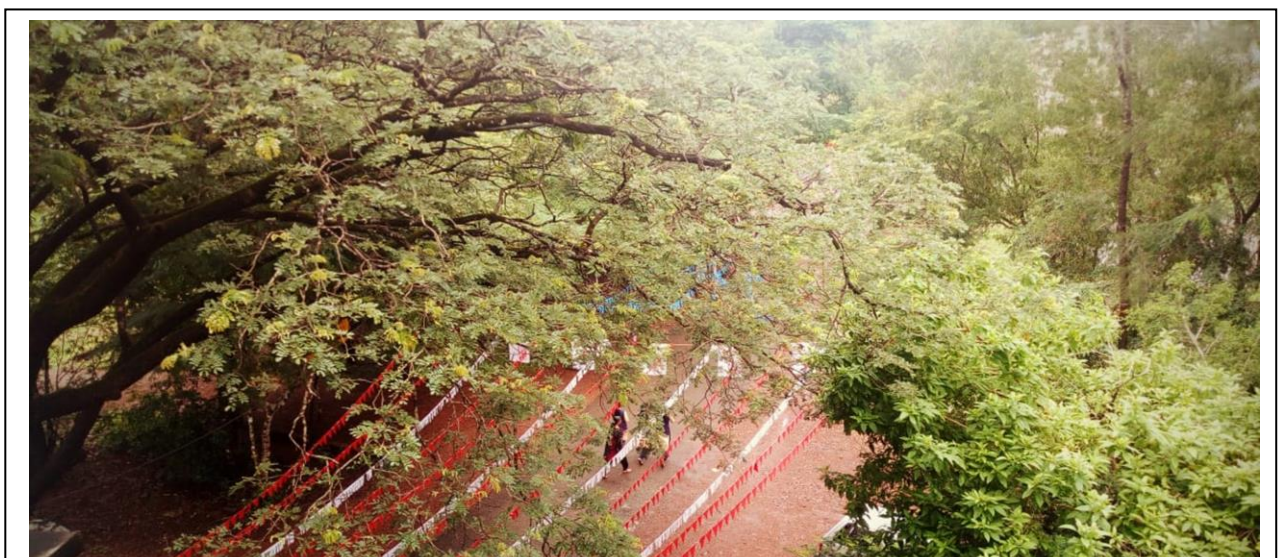
The effort taken by the stake holders to enrich the flora is very evident in its diversity of plant species. The social forestry programme is contributed much to the floral diversity of the campus. The presence of *Elaeis guineensis*, the oil palm, is giving an idea on the degree of introduction, coming out of enthusiastic and aesthetic minds.

## DIFFRENT VIEWS OF THE CAMPUS





## GREENARY OF SES COLLEGE







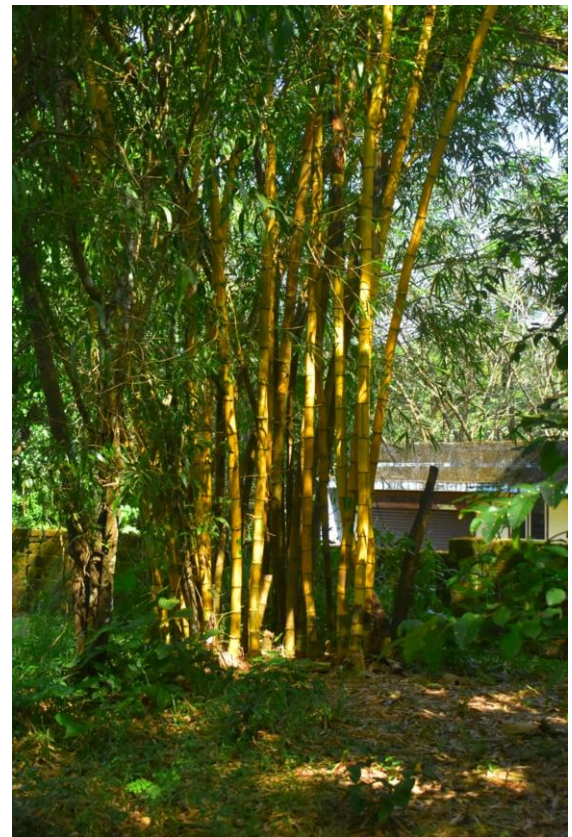
*Delonix regia*



*Elaeis guineensis*



*Senna nitida*



*Bambusa vulgare*

# ANIMAL DIVERSITY

A one-time transect survey was conducted in the campus to estimate the diversity of two important animal groups, viz. birds and butterflies as indicators of animal diversity. A team of four zoologists observed the campus for 3 hours covering a distance of 2 kms by walk. (geo coordinates - IN (12.026,75.518). (Details of the bird survey are uploaded at eBird website and can be accessed at <https://ebird.org/checklist/S76785304>)

## Why birds and butterflies?

The major reasons for selecting these two groups were

- 1) They are well studied groups and easy for identification.
- 2) They are very conspicuous with their attractive colors and thus can be surveyed easily.
- 3) They need not be killed and collected as even a sight or a photograph is enough for identification.
- 4) Birds represent vertebrates and butterflies represent invertebrates and
- 5) Butterfly diversity is a primary indicator of the host plant diversity and bird diversity indicates insect diversity and habitat suitability.

## 1) BIRDS:

A total of 56 birds belonging to 29 species were observed in the transect (table 2).

Sl No.	Name of the bird	Number of observations
1.	Indian Peafowl	1
2.	Green Bee-eater	2
3.	Blue-tailed Bee-eater	1
4.	White-cheeked Barbet	1
5.	Black-headed Cuckooshrike	2
6.	Indian Golden Oriole	1
7.	Common Iora	2
8.	Ashy Drongo	1
9.	Greater Racket-tailed Drongo	1
10.	Indian Paradise-Flycatcher	2
11.	Rufous Treepie	2
12.	Large-billed Crow	1
13.	Common Tailorbird	1
14.	Gray-breasted Prinia	4
15.	Plain Prinia	2
16.	Blyth's Reed Warbler	2
17.	Flame-throated Bulbul	1
18.	Red-vented Bulbul	2
19.	Red-whiskered Bulbul	3
20.	Yellow-browed Bulbul	2
21.	Green Warbler	1
22.	Rufous Babbler	4
23.	Jungle Babbler	3
24.	Chestnut-tailed Starling	1
25.	Purple-rumped Sunbird	2
26.	Crimson-backed Sunbird	4
27.	Purple Sunbird	1
28.	Loten's Sunbird	4
29.	Golden-fronted Leafbird	2

**TABLE.2:** Birds recorded in the transect





**Indian Peafowl**



**Green Bee-eater**



**Blue-tailed Bee-eater**



**White-cheeked Barbet**



**Black-headed Cuckooshrike**



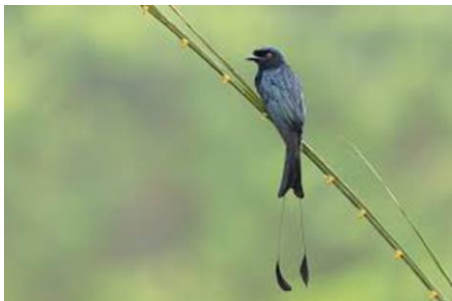
**Indian Golden Oriole**



**Common Iora**



**Ashy Drongo**



**Greater Racket-tailed Drongo**



**Indian Paradise-Flycatcher**



**Rufous Treepie**



**Large-billed Crow**



**Common Tailorbird**



**Gray-breasted Prinia**



**Plain Prinia**



**Blyth's Reed Warbler**



**Flame-throated Bulbul**



**Red-vented Bulbul**



**Red-whiskered Bulbul**



**Yellow-browed Bulbul**



**Green Warbler**



**Rufous Babbler**



**Jungle Babbler**



**Chestnut-tailed Starling**





**Purple-rumped Sunbird**



**Crimson-backed Sunbird**



**Purple Sunbird**



**Loten's Sunbird**



**Golden-fronted Leafbird**

## 2) BUTTERFLIES:

A total of 29 butterflies belonging to 21 species were observed in the transect (table 3).

Sl No.	Name of the butterfly	Number of observations
1.	<i>Pachliopta aristolochiae</i>	2
2.	<i>Papilio budha</i>	1
3.	<i>Graphium Agamemnon</i>	1
4.	<i>Acraea violae</i>	1
5.	<i>Euploea core</i>	3
6.	<i>Hypolimnas bolina</i>	1
7.	<i>Neptis hylas</i>	1
8.	<i>Tirumala limniace</i>	3
9.	<i>Ariadne sp.</i>	1
10.	<i>Junonia iphita</i>	1
11.	<i>Junonia lemonias</i>	1
12.	<i>Eurema brigitta</i>	1
13.	<i>Catopsilia Pomona</i>	2
14.	<i>Delias eucharis</i>	1
15.	<i>Eurema sp.</i>	3
16.	<i>Leptosia nina</i>	1
17.	<i>Caleta decidia</i>	1
18.	<i>Euchrysops cnejus</i>	1
19.	<i>Polyommatus</i>	1
20.	<i>Jamides bochus</i>	1
21.	<i>Lycaenidae-sp</i>	1

**TABLE.3:** Butterflies recorded in the transect

## 3. DIVERSITY

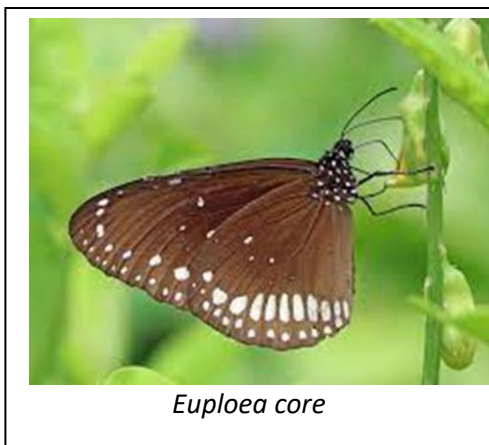
The common biodiversity indices were calculated and are given in the table 4, given below.

Index	Birds	Butterflies
Simpson Index	0.02662	0.02709
Dominance Index	0.9734	0.9729
Shannon Index	3.239	2.931

**TABLE.4:** Diversity indices of the transect for butterflies and birds.

The indices indicate a comparatively rich diversity of birds and butterflies in the campus. More intensive surveys over different seasons and a comparative study of the surrounding areas of the campus would be required for concrete conclusions.







*Neptis hylas*



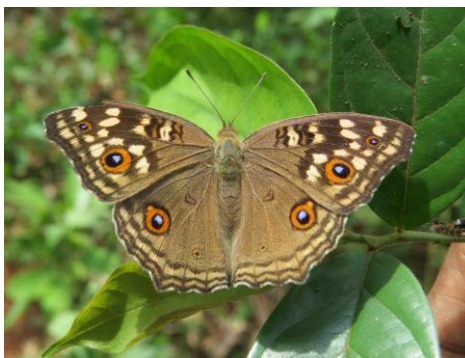
*Tirumala limniace*



*Ariadne sp*



*Junonia iphita*



*Junonia lemonias*



*Eurema brigitta*



*Catopsilia pomona*



*Delias eucharis*



*Leptosia nina*



*Caleta decida*



*Euchrysops cnejus*



*Jamides bochus*

## CONCLUSION

The unsustainable and unplanned exploitation of land resources is the major reason for degradation of our environment. Land resources being finite in extent imply more judicious use to meet the ever-increasing demands. The present study recommends to use this land in a planned and sustainable way to retain its higher biodiversity. Biofencing using locally available flowering plants- herbs, shrubs and climbers can increase the butterfly and bird diversity of the campus. More extensive surveys are required for the better understanding of the seasonal and spatial distribution of flora and fauna in the campus.

## Reference

Prasad T. K. and G.R. Parthasarathy, 2018. Effect of Laterite mining on the Land Use of Midland Hillocks of Kannur District, Kerala - A Case Study. *International Journal of Science and Research (IJSR)* Volume 7 Issue 3,pp. 1454-1460.



# WASTE DISPOSAL OF S.E.S.

S.E.S. College takes all possible measures to keep the campus clean by proper management of all types of wastes. Green Protocol is strictly observed for all college activities and student celebrations, and the students are advised to practice the 3R's- Reduce, Reuse and Recycle. The College is declared as Plastic Free by taking a Plastic free Campus oath. Other than periodic campus cleaning activities, Swachh Bharath Abhiyan scheme is also exercised with the active involvement of NSS volunteers and NCC Cadets.



## 1. Solid waste management :

The College has employed adequate supporting staff to keep the campus clean and hygiene. Dust bins are installed at classrooms, staff rooms and various points (separate in colour for biodegradable and non-biodegradable wastes) in the campus to collect solid wastes.

The food wastes are dumped in a compost tank kept for this purpose. Insistence on the use of cloth banner, paper files, etc. has made the campus virtually plastic free. With Green Protocol in place, problem of solid waste management is neatly addressed. Plastic and paper wastes, if any, are sold to waste collectors. Quantum of non-biodegradable solid waste has dropped considerably as a result of institutional drive to conscientize the students regarding reuse and recycle of utility products. Students bring their lunch in steel containers and use of steel glasses and glass tumblers is insisted in the canteen .**The College students' Union have sponsored steel glasses to the College.** Three larger pits have been constructed at three points in the college campus for the management of bigger biodegradable wastes. Such decayed bio wastes are later used as fertilisers for the plants and trees on campus.



## 2. E-waste management :

Electronic goods are put to optimum use by extending their use by proper upgradation and maintenance. Out-dated computer monitors, CPUs and computer peripherals are stored at collection points and it would be later stocked in a separate room. Periodic checking ensures that nonworking/ old electronic equipments are disposed of properly.

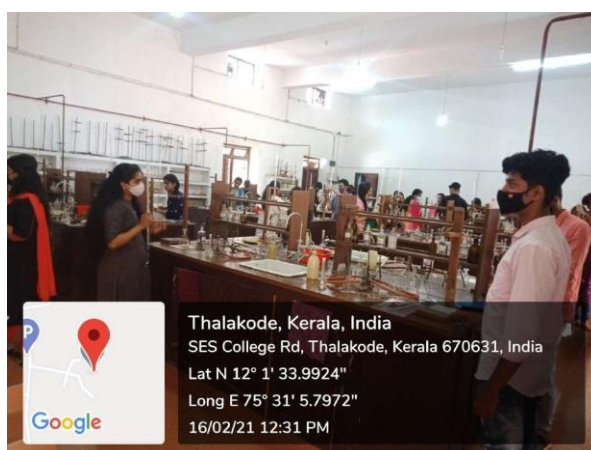


## 3. Liquid waste management :

Toilet wastes are discharged into underground sewage pits. Chemical waste is drained off without causing harm to the environment.

## 4. Chemicals & Radio Active Waste Management :

The waste of non-toxic chemicals and re-agents in the form of liquids are usually channeled out safely without any harm to the bio diversity. The gaseous wastes in the form of fumes are expelled through exhaust fans installed in Chemistry lab. Different outdated lab devices and study materials, both animate and inanimate, are kept for the upcoming Science Museum.

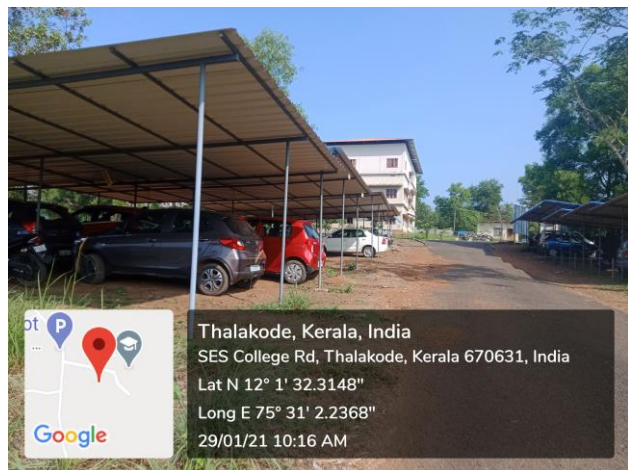




## CARBON FOOT PRINT

The carbon release is an important measure of how sustainable we are. There are many different ways carbon emission by an individual. Vehicle use is one of the most important factor among that. Here the students from Department of Mathematics, made a survey among all in the whole campus and the data is as follows. Being a campus consisting of numerous students and located topographically hilly area, the students are encouraged to use institute bus rather than two wheelers or four wheelers which leads to fuel saving and also less emission of greenhouse gases. It is promising to see that more than 95% of the students use public transport facilities to come to college which connect to institute bus from nearby towns.

As a humble step from the faculties, we use carpooling technique which is the way to use up the full seating capacity of a car, which would otherwise remain unused if it were just the driver using the car. Carpooling is also a more environmentally sustainable way to travel as sharing journeys reduces carbon emissions, air pollution, traffic congestion on the roads, and the need for parking spaces. Green committee of our institute often encourage carpooling, especially during periods of high pollution or high fuel prices. As an allegiance to this effort five faculties follow the car pooling technique which results in avoiding 15 vehicles which would have contributed to large amount of hydrocarbons.



## CONCLUSIONS AND FUTURE PLANS

1. The total green cover of the campus is being reduced – making the campus more green should be an area of future thrust. Use this land in a planned and sustainable way to retain its higher biodiversity..
2. The campus harbours rich biodiversity as evident from the studies on animals and plants. The different habitats in the campus need to be preserved for a sustainable existence and as a message for the student community and general public at large.
3. Biofencing using locally available flowering plants- herbs, shrubs and climbers can increase the butterfly and bird diversity of the campus.
4. The chemistry of soil and water of the campus calls for some scientific interventions
5. Food waste and plastic wastes are not posing serious threats at present. However more vigilant measures and awareness programs are needed to make our campus a model one.
6. E waste, though not a visible issue at present, is going to be a serious issue in the near future. Steps to reduce, reuse and recycle e wastes are to be planned in a scientific way.
7. More rain water harvesting projects can be taken up in the campus .
8. Implement a mechanism to dispose solid waste in a scientific manner.