REPORT OF GREEN CAMPUS AUDIT

Submitted to

T. K. MADHAVA MEMORIAL COLLEGE
ALAPPUZHA, KERALA, INDIA.

Date of Audit: 03.01.2020

Submitted by

NATURE SCIENCE FOUNDATION
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Motto

'Save the Nature to Save the Future' & 'Go Green to Save the Planet'

Contents

1. Introduction

Green campus is an area of the Organisation or the Organisation as a whole itself contributing to have an infrastructure or development that is structured and planned to incur less energy, less water, less or pollution free, less or no CO_2 emission (Aparajita, 1995). Green Campus Audit is a tool of the environment management system which is used methodologically for protection and conservation of environment and sustenance of the ecosystem. Green campus constitutes the environmental friendly practices and education combined to promote sustainable and eco-friendly practices along with user-friendly technology in the campus. It creates environmental culture, develops sustainable solutions to environmental problems and provides solutions to various social and economic needs (APHA, 1981). It provides the concept of Green building and oxygenated building which in turn provides a healthy atmosphere to the stakeholders.

Green Campus Audit ensures the Organization's campus should be greenish with large diversity of trees, herbs, shrubs, climbers and lawns to reduce the environmental pollution and soil erosion, also useful for biodiversity conservation, landscape management, proper water irrigation, natural topography and vegetation (Gowri and Harikrishnan, 2014). The maintenance of an eco-friendly campus ensures a neat and clean environment. For the benefit of stakeholders, solid state management, recycling of water, disposal of sewage and waste materials including electronic and biomedical wastes, plastic use, etc. should be followed consistently in the organization campus.

Green Campus Audit procedures includes the definition of green audit, methodology on how to conduct Green audit at Educational Institutions and Industrial sectors as per the checklist of Environment Management Systems and International Standards on ISO 14001:2015, Indian Green Building Council, Swachh Bharath Scheme under Clean India Mission to understand the principles and importance of various audits in the context of the organization and risk assessment at 360˚ views (Gnanamangai *et al*., 2018). It analyses to help the educational institutions and industries to maintain eco-friendly environment and personal hygiene to various stakeholders and supports the nation as a whole for the noble cause of environmental protection and nature conservation which in turn enhances the quality of life to all living beings (Arora, 2017).

2. Aims and Objectives of Green Campus Audit

- To recognise the initiatives taken towards the green campus by means of gardening by the Organization.
- To identify and provide baseline information to assess threat and risk to the ecosystem due to Organization development.
- To recognise and resolve different environmental threats of the Organization.
- To grow a large number of oxygen producing and carbon-di-oxide absorbing plants in the campus to give a pure atmosphere to the stakeholders.
- To ensure proper utilization of resources available in the surrounding areas towards future welfare of the community.
- To set a procedure for disposal of all kinds of wastes and use green cover as a carbon sink for pollution free air.

- To assess the greenish nature of an Organization campus in terms of trees, herbs, shrubs, climbers, twins, lianas, lawns and reflected in reducing the environmental pollution soil erosion, biodiversity conservation, landscape management, natural topography and vegetation.

3. Scope and Goals of Green Auditing

The Management of the Organization (Auditee) should be shown their inherent commitment towards making ecofriendly atmosphere through the green auditing and ready to encourage all types of green activities. They should promote all kinds of green activities such as conduct of environment awareness programmes, campus farming, planting trees, maintenance of greening, irrigation, use of biofertilizers and avoidance of chemical fertilizers and agrochemicals on the campus etc., before and after the green auditing. The management should formulate 'Green and Environment Policies' based on green auditing report. A clean and healthy environment should enhance an effective teaching and learning process and provides a conducive learning environment to the stakeholders. They should create the awareness on the importance of environment through environmental education among the student members. Green Audit is the most efficient and ecological way to manage environmental problems (IGBC, 2018).

Green campus audit may be beneficial to the campus in improving the greenery activities which in turn useful to save the planet for future generation. Green campus audit is a kind of professional care and a simple indigenized system about the environment monitoring in terms of planting a large number of trees which is the responsibility of each and every individual who are the part of economical, financial, social, environmental factors. It is necessary to conduct green audit frequently at least once in three years in campus because students and staff members should aware of the green audit and its advantages to save the planet by means of 'Go green concept' and help the institution to set environmental examples for the community, and thereby to educate the young learners. Green audit is a professional and useful tool for an Organization to determine how and where they are maintaining the campus eco-friendly manner (WGBC, 2018). It can also be used to implement the mitigation measures is a win-win situation for all the stakeholders and the planet. It gives an opportunity for the development of ownership, personal and social responsibility for the stakeholders.

Green campus audit is nothing but a professional tool to assess the greenery activities in the educational institutions and give a value addition to the campus and considered as a resource management process. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency (Pradip and Patil, 2014). Green campus audit process may be undertaken at frequent intervals and their results can illustrate improvement or change over time. There are several target listed in the Green audit process in which a few are taken into consideration as per the Indian scenario is concerned. Eco-campus focuses on the reduction of carbon emissions, water consumption, wastes to landfill and enhance energy use conservation to integrate environmental considerations into all contracts and services considered to have significant environmental impacts.

4. About the Organization

T. K. Madhava Memorial College

Madhavan dedicated his life to the cause of the oppressed people. In the year 1964, the college is noted as a temple of learning established through the efforts of Karthikappally, Karunagappally and Mavelikkara SNDP Unions. About 14 Sree Narayana Colleges were established throughout the length and breadth of Kerala that resembles the living monuments of the great guru. During this last few decades, the institution has concurred a niche for itself among the illustrious cluster of institutions during this last 4 decades.

The institution has been a pioneering institution of higher education in Alappuzha district after being named by the freedom fighter and social reformer T. K. Madhavan. In maintaining the quality of education, the institution is in forefront and also reinforcing the rural people of backward and marginalized community. Alumni and faculty of the institution with regard to political, literacy, cultural, scientific and entrepreneurial firmaments have made appreciable contributions, since its inception. This also includes the lead contributions of poet and the lyricist Anil Panachooran, renowned Malayalam actor Ashokan, Pro Vice Chancellor of Sree Narayanaguru Open University Prof (Dr.) S. V. Sudheer to the institution.

Mission and Vision

T. K. Madhava Memorial College, upholding the ideology of the great saint & social reformer, Sree Narayana Guru, ‘Enlightenment through Education’, envisages accessible, transformative and quality education, to equip students with knowledge and skills in their chosen stream, inculcate values, provide opportunities for students to realize their full potential and thus shape them into responsible citizens. Their mission is to prepare young minds to imbibe knowledge, skills and sensitivity. Igniting the scientific and rational thinking among youth and elevating them socially and economically backward community through quality and inclusive education. The institution makes sure gender equality and transformative education and also imparts quality education in science, humanities and commerce by integrating traditional and innovative teaching and learning practices.

For instilling the philosophy and vision of the quintessential leader, T. K. Madhavan, created a platform for students for exploring their creative potential and nurturing the spirit of critical thinking. T. K. Madhava memorial college foster conceptual understanding and outcome based education at par with New Education Policy. The institution also equips students and teachers with the skills needed to adapt better to the changing global scenario. Students are been encouraged in value-based, integrated and scholastic thinking practice for transforming towards a liberated society. T. K. M. Memorial College is following the core values in the form of Steer system which comprises of Skill & Strength, Truth & Trust, Equality & Ethics, Endurance & Empowerment, Research & Renovation.

5. Audit Details

Date / Day of Audit	**: 03.01.2020 (Saturday)**
Venue of Audit	**: TKMM College, Alappuzha, Kerala** Alappuzha - 690513, Kerala, India.
Audited by	**: Nature Science Foundation,** Coimbatore - 641 004, Tamil Nadu, India.
Audit type	**:** Green Campus Audit
Name of ISO EMS Auditor	**: Mrs. S. Rajalakshmi,** Chairman, ISO QMS & EMS Auditor, NSF.
Name of the Lead Auditor	**: Dr. R. Mary Josephine,** Board of Directors & Botanist, NSF.
Name of Subject Expert-I	**: Dr. D. Vinoth Kumar,** Joint Director & Biotechnologist, NSF.
Name of Subject Expert-II	**: Dr. K. Suresh Kumar,** Tamil Nadu Agriculture University, Coimbatore.
Name of IGBC AP Auditor	**: Dr. B. Mythili Gnanamangai,** IGBC AP, Indian Green Building Council.
Name of ASSOCHAM Auditor	**: Er. Ashutosh Kumar Srivastava,** Associated Chambers of Commerce and Industry
Name of Eco & Green Officer	**: Ms. S. Sowndharya,** Eco & Green Council Programme Officer, NSF.

6. Procedures followed in Green Campus Audit

Green campus audit is a structured process of documenting the credentials in terms of number of trees, herbs, shrubs, lawns, climbers and lianas reflected in reducing the environmental pollution and soil erosion and useful for biodiversity conservation, landscape management, natural topography and vegetation. It is a kind of a professional tool for assessing the green campus. Green audit projects the best environmental practices and initiatives taken in the organisation at the prescribed site of audit that brings added value to the organisation in maintaining the eco-friendly campus to the stakeholders. The first step of the audit is ensuring that the organisation has a central role in building the green campus, in order to validate the same (Adeniji, 2008).

Green campus is not intended for the self-sustainability of the building alone, it also involves in propagation of the green campus initiatives so as to be adopted by any individuals and organization at a minimum cost. Green campus audit has been conducted as per the checklist of Nature Science Foundation, Coimbatore, Tamil Nadu, India (www.nsfonline.org.in) through the authenticated Professionals for people qualified to investigate and evaluate the campus for validating the best environmental practices. Professional team of ISO Environment Management Audit (14001:2015), Indian Green Building Council Accredited Professionals, Experts of Green campus Lead Auditors and Botanists / Zoologists / Biotechnologists were selected to conduct the Green campus audit process.

During the audit, the nature of plants and animals / birds species present in the campus were recorded. Establishment of lawns, trees, herbs, shrubs and climbers and establishment of terrace / kitchen / herbal / zodiac / ornamental / medicinal garden / aquarium and aquatic (hydrophytes) plants in the campus were recorded. Labelling of

common names and Botanical names of plants were observed. The operation of the water irrigation system, trip and sprinkler irrigation methods and use of recycled water for irrigation purpose or any other purpose in the campus area were noted. The number of water wells, bore wells and water reservoir facilities in the campus were also noted as per the Audit Manual of Gnanamangai *et al*. (2018).

Attempts made for water scarcity during summer season towards the maintenance of plants and frequency of watering for plantations in the campus were noted. Biodiversity conservation education, projects, awareness programmes, etc., through Indian Biodiversity Act and Ministry of Environment, Forests and Climate Change, Government of India and the conduct of outreach programmes for dissemination of Green campus motto were recorded (Venkataraman, 2009). Conduct of outreach programmes for dissemination of Green campus motto to the students and staff members including public domain and signing of MoU with Government and Non-Governmental Organizations to ensure green campus activities for future generation were noted. Technology driven solutions initiated by the Green campus organization can also be disseminated and documented successively for propagating the attitude of the Green campus in wider masses.

The purpose of the green audit is to ensure that the practices followed in the campus are in accordance with the Green and Environment Policy developed by the Government and private agencies working with environment sustainable development adopted by the institution. The criteria, methods/procedures, checklists and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire along with checklists, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a four step process comprising of data collection, data analysis, best practices followed in the campus and recommendations and suggestions given to the organization to improve the greeneries practices further.

6.1. Study of Flora and Fauna diversities at TKMM College

TKMM College Campus is situated on the Western Ghats that is Arabican sea shore. It is located about 30 km from Alappuzha. With a campus of over 25 acres, TKMM College is considered as one of the Green Educational Institution in Alappuzha with a rich flora and faunal diversity. It is situated in picturesque surroundings adjacent to the Arabian seas shore, with green hills strewn around. The campus now quite clean, green and has much less pollution to the rest of the city. The College campus is important not only from education point of view but also as green lung. It is frequently visited by several nature enthusiasts to study the floral and faunal aspects. Biodiversity provides a useful measure of the quality of the environment and the ecological studies are important aspects of environment, in view of the consideration of environmental quality and protection of natural flora and fauna.

6.2. Documentation of Plant species at TKMM College Campus

Various vascular plant species were collected across TKMM College campus and subjected to identify them based on botanical name, family, habitat, uses and anthropogenic disturbances to the natural vegetation in campus. The plants were freshly collected and their digital photographs were also taken. The collected plant specimens have been identified using taxonomic literatures (Gamble and Fischer, 1915-1936; Matthew, 1983; Nair and Henry, 1983; Henry *et al*., 1989; Chandrabose and Nair, 1988). Further, their identification was confirmed by matching with authentic specimens in the Madras Herbarium (MH), Botanical Survey of India, Southern Circle, Coimbatore, India. The voucher specimens were deposited at the Herbarium of Department of Botany, Bharathiar University, Coimbatore for future reference.

Key to Plant Families Identification

1a. Seeds enclosed in fruit wall, Perianth Present……..2
b. Seeds not enclosed in fruit wall, perianth absent…….....Gymnosperm
2a. Leaves usually net veined seeds-2…….....…….……3
b. Leaves parallel veined, seeds-1……..……..……..66
3a. Petals free……..……...4
b. petals connate …….....41
4a. Corolla and calyx present……....……....…5
b. Corolla and calyx absent…….....……....24
5a. calyx of united sepals; ovary inferior .....……31
b. Calyx of distict or unit sepals; ovary syncarpous……..……6
6a. Sepals imbricate in bud ……..…….....7
b. Sepals valvate in bud…….....……24
7a. Sepals more or less united at the base…….....……19
b. Sepals free …….....8
8a. Stamens more than 12 ……..9
b. Stamens 10 or fewer …….. 13
9a. Sepals 2-3……11
b. Sepals 4 or more…….....10
10a. Stamens inserted on the disck…….....… Cleomaceae
b. Stamens inserted of the gynophore …….……Capparaceae
11a. Trees, Petals more or like the sepals; carpels free …….. Mangnoliaceae
b. Herbs, petals coloured unlike the sepals; carpels united……12
12a. Plants with yellow sap, Flowers pedicelled ……Papaveraceae
B. Plants with watery sap, Flowers sessile……Portulacaceae
13a. Flowers unisexual,gynoecium apocarpus……..... Menispermaceae
b. Flowers bisexual, gynoecium Syncarpous……..……14
14a. Petals 4, Stamens 6 …….....……Brassicaceae
b. Petals 5, Stamens ∞…….…….....15
15a. Ovary1, loculated …….…….....16
b. Ovary 2-more loculated…… 17
16a. Flowers actinomorphic, placentas free- central …….....Caryophyllaceae
b. Flowers zygomorphic, placentas parietal …….....…….……..Viloaceae
17a. Filaments of anthers more or less united ……...…….Polygalaceae
b. Filaments of anthers more or less united ……..……18

18a. Leaves stipulate; stamens 5 or 10 ……19
b. Leaves exstipulate; stamens usually 8 ……Sapindaceae
19a. Style 5; stamen 5 …… Oxalidaceae
b. Style many; stamens 10 …… Zygophyllaceae
20a. Leaves pellucid-gland dotted …… Rutaceae
b. Leaves not gland dotted ……21
21a. Placentas parietal; Fruit elongated ……..Moringaceae
b. Placentas axile; Fruits not elongated ……22
22a. Ovules and seeds pendulous; sometimes horizontal……..Meliaceae
b. Ovules and seeds erect or ascending ……...23
23a. Stamens alternate with the petals…….... Anacardiaceae
b. Stamens opposite the petals ……..Vitaceae
24a. Leaves simple; Flowers 3-merous……Annonaceae
b. Leaves compound; Flowers 4-6 merous …… 25
25a. Filaments of anther united into a columnar toothed cup…….....26
b. Filaments of anther free; rarely connate at the base in ring …….....28
26a. Stamens 15; anther united ……Stericuliaceae
b. Stamens 2; anther free……...27
27a. Anther unilocular; pollen muricate …….....Malvaceae
b. Anther bilocular; pollen smooth ……Bombacaceae
28a. Stamens 4-5; usually embraced and adnate to the base of the petal……29
b. Stamen many; atleast twice as many as and free from the petals …….....30
29a. Shrub …….Lythraceae
b. Straggler ……..Rhamnaceae
30a. Anther dehisce by slits; fruits capsule ……Tiliaceae
b. Anther dehisce by spores; fruits drupe ……Elaeocarpaceae
31a. Ovary sycarpous; placentas 3-5, parietal……...32
b. Ovary 1 or more free, placentas basal……33
32a. Climbing herbs tendril……Passifloraceae
b. Erect shrubs or trees with tendril……..Turneraceae
33a. Ovules arising from the inner angles or from base of the carpels or loculi……34
b. Ovules pendulous form the apex of the carpels or locules…….Combretaceae
34a. Carpels solitary; fruits legume……..35
b. Carpels more than 1; fruits otherwise……37
35a. Flowers zygomorphic; petals imbricate……36
b. Flowers actinomorphic; petals valvate…….Mimosaceae
36a. Upper petals outermost stamens monodelphous or diadelphous……Fabaceae
b. Upper petals innermost stamens always free ……Caesalpiniaceae
37a. Flowers unisexual……...Cucurbitaceae
b. Flowers bisexual……...38
38a. Ovary 1-celled……..Cactaceae
b. Ovary more than 1 celled……..39
39a. Carpels free if ultimately united the styles distinct……40
b. Carpels and styles united throughout……Myrtaceae
40a. Flowers in dichasial – polychasial cyme……Molluginaceae
b. Flowers in clustered, cymes or solitary…….Aizoaceae
41a. Ovary inferior, stamens as many as the corolla lobes……42

b. Ovary superior, stamens numerous……...43
42a. Anther free; ovary 2-loculed; stipulate…….Rubiaceae
b. Anther syngenesious; ovary 1-loculed, exstipulate…….Asteraceae
43a. Ovary 1-loculed; placentation free central……...Plumbaginaceae
b. Ovary 2-many loculed; placentation axile or parietal……44
44a. Ovary 3 or more carplelled……..Sapotaceae
b. Ovary 2-carpelled……..45
45a. Corolla actinomorphic……...46
b. Corolla zygomorphic……50
46a. Plants leafless; parasitic……Cuscutaceae
b. Plants leafy ; not parasitic ……47
47a. Leaves opposite; stamens 2……48
b. Leaves alternate; stamens 4 or more ……49
48a. Leaves not scabrid, corolla tube white: fruits berry ……Oleaceae
b. Leaves scabrid; corolla tube orange; fruits capsules ……Nyctanthaceae
49.a. Anther inseperratable; corona present ……Asclepidiaceae
b. Anther seperatable; corona absent ……..Apocyanaceae
50a. Corolla lobes imbricate ;fruit drupe ……Boraginaceae
b. Corolla lobes plicate; fruit capsule ……Convolvulaceae
51.a Ovary cells many ovulated …….Solanaceae
b. Ovary cells 1-4 ovuled…….52
52.a Carpels 2 or more ovulated ; fruits dehiscent ……53
b. Carpels 1 –ovulated ; fruits indehiscent …….....57
53.a Fruits dehiscent; seeds supported on reticulae……...Acanthaceae
b. Fruits indehiscent; seeds not supported on reticulae……54
54.a Leaves compound; fruits elongated; seeds winged ……Bignoniaceae
b. Leaves simple;fruits not elongated, seeds not winged……55
55.a Ovules many on swollen placentas; seeds albuminous……Scropulariaceae
b. Ovules 2 lobed placenta ; seeds not albuminous……..56
56.a Flowers solitary; axile placentation ……...Pedaliaceae
b. Flowers raceme; axile placentation……Marytiniaceae
57.a Ovary entire, style terminal ……..Verbinaceae
b. Ovary 4 –lobed, style gynobasic…….Lamiaceae
58.a Flower bisexual ……59
b. Flower unisexual ……62
59.a. Ovary inferior ……..60
b. Ovary superior ……61
60.a Ovary 4-6 loculated; ovules many …….Aristolochiaceae
b. Ovary 1-loculated; ovules 1-4 ……..Santalaceae
61.a Perianth not tubular ……Amarathaceae
b. Perianth trubular …….....Nyctaginaceae
62a. Leafless trees; brachlets ribbed and joined at the nodes……Casuarinaceae
b. Leaves well developed ; brachlets not ribbed and not joined at the nodes……63
63 a. Ovary 1- loculed; ovules 1-2 in each loule……64
b. Ovary 2 or more loculed;ovules 1 or 2 in each locule……65
64a. Leaves glandular……Euphorbiaceae
b. Leaves eglandular……...Urticaceae

65a. Filaments inflexed in bud with reversed anther……Moraceae
b. Filaments not inflexed in bud, not with reversed anther……Ulmaceae
66a. Terrestrial or epiphytic……..67
b. Aquatic, marsh or riparian…….Cyperaceae
67a. Arbrorescent woody; leaf blade many nerved articulate with sheath...Bambusaceae
b. Herbs with herbaceous culms; leaf blade sessile not articulate with sheath…….68
68a. Perianth 0 or reduced to scale……...Araceae
b. Perianth present…….....69
70a. Plant armed……71
b. Plant unarmed……...72
71a. Plants Xerophytic; leaves fibrous…….Agavaceae
b. Plants not xerophytic; leaves nor fibrous……..Lilliaceae
72 a. Perianth segments connate……..Amaryllidaceae
b. Perianth segments free……..73
73a. Outer perianth calycine; inner coroline……Commelinaceae
b. Outer and inner perianth……..74

6.3. Documentation of Animal species at TKMM College campus

Animals like Mammals and Birds were observed by visual sightings and by calls also the avifaunal data were obsereved through the Nikon 8 x 40 binoculars and photographs were taken by Canon 600 D camera (55-250 mm). The recorded data was noted in the field work note. They were identified with the help of field guide- "Birds of Indian subcontinent" by Richard Grimmett, and the IUCN category of the birds were also noted with the same. The point count and transect line methods were used to record the number of bird species in the study area in which regular visits and personal visits were carried out (Ferenc *et al.*, 2014). The surveys were conducted to understand the distribution of bird species in relation to habitats and nesting behavior of birds in the study area. Based on survey richness and abundance of bird species were calculated using Shannon-weaver diversity index. Based on available data and species were selected for nest site selection study. Selected species of birds was analyses for its nest site characteristics between the habitats and also plant species preference was enumerated and assessed. The number of breeding bird species and nests found in different habitats as depend variables such as biotic and biotic factors as the indepent variable (Jayson and Mathew, 2000; Beebee and Griffiths, 2000).

7. Green Campus Audit Observations

It covers both qualitative and quantitative measurements including physical observation of greeneries in terms of growing of terrestrial and aquatic plants, animals and microflora in natural and planted vegetation and their maintenance. Topography, landscape management design and soil erosion control are playing important role in environment sustainable development in the campus. Similarly, biodiversity conservation strategies are very essential to conserve a variety of plant and animal species in the campus ecosystem. Best practices followed on green campus initiatives in the Organization and recommendations for greening are illustrated in the audit report.

7.1. Flora diversity in TKMM College Campus

Ensuring the rich biodiversity in the green campus is an important parameter which reflects the real-time ecosystem. Plants are indicators for assessing the varying levels of environmental quality. In general, plants improve the outdoor air quality with increased oxygen levels and reduced temperature and carbon-di-oxide. The green and varying colour of the flowering plants improve the ambience of the Organization environment. The record on maintenance of the plant biomass and its management are important with respect to green campus initiatives. The existence of such plants and birds in the green campus may be recorded for the rich flora and fauna which are being considered as a value addition to the campus.

The observations indicated that TKMM College campus has more than 74-80% of wild as well as native plant species and the other 10-15% plant species are ornamental in nature coming under the planted vegetation. The native plant traits promote the indigenous fauna at the site area. Hence, the accountancy of 70% of the wild traits are leveraged for the native animals and birds. The most probable natural vegetation of TKMM College campus is the dry deciduous type. The remnants of this past vegetation are found in the campus.

The most plants recorded are *Melia azedarach* L., *Acacia ferruginea* Dc., *Acacia planifrons* Wight & Arn., *Albizia lebbeck* (L.) Wild., *Dichrostachys cinerea* (L.), *Wrightia tinctoria* R. Br, *Ficus benghalensis* L., *Ficus religiosa* L., *Borassus flabellifer* L., which are dominant trees species characteristic to the vegetation of the campus. Some of the shrub species like *Hibiscus lunarifolius* Wild., *Sida rhombifolia* L., *Crotalaria pallida* Dryand., *Crotalaria retusa* L., *Tephrosia hookeriana* Wight & Arn., *Solanum surattens* Burm., *Jatropha gossypiifolia* L., *Euphorbia cyanthophora* Murr., *Calotropis gigantea* and *Helicteras isora* are also rather common in the campus.

The ground flora here is comparatively sparse, but fairly rich in undistributed areas. Some of the common weeds like *Argemone Mexicana* L., *Alysicarpus monilifer* L., *Boerhavia diffusa* L., *Cleome viscosa* L., *Dipteracanthus patulus* (Jacq.), *Euphorbhia hirta* L., *Hibiscus ovalifolius* (Forskal), *Indigofera linnaei* Ali, *Lagascea mollis* (Jacq.), *Malvastrum coromandelianum* L., *Peristrophe bicalyculata* (Retz.), *Polycarpea corymbosa* L., *Ageratum conyzoides* L. and *Parthinium hysterophrous* L. are found to be predominant. The species such as *Argemone mexicana* L., *Talinum portulacifolium* (Forskl), *Turnera ulmifolia* L., *Plumbago zeylanica* L., *Dautra metal* L., *Striga densifolia* (Benth.) Benth and *Achyranthus aspera* L. are some common herbs in the campus.

Some of the common climbers found among the shrubs are *Cissampelos pareira* L. var. *hirsuta*, *Cocculus hirsutus* L., *Cyclea peltata* (Lam.), *Tinospora cordifolia* (wild.), *Toddalia asiatica* L., *Coccinia grandis* L., *Mukia madraspatana* L) *Jasminum grandiflorum* L. *Jasminum cuspidatum* Rottl., *Jasminum trichotomum* Heyne, *Hemidesmus indicus* L., and *Tylophora indica* (Burm.f).

This campus is rich in grass speices like *Alpuda mutica* L., *Cymbopogan caesius* (Nees ex Hook. & Arn.), *Heteropogan contortus* L. P.Beauv. Ex Roemer & Schltes,

Rottboellia cochinchinensis (Lour.), *Dactylotenium aegyptium* (L.) P.Beauv., *Eragrostis aspera* (Jacq.), *Eragrostiella bifaria* (Vahl) Bor, Eleusine indica (L.) Gaertner, Axonopus compressus (SW.) P.Beauv., *Echinochloa colona* (L.) Link, *Melinis repens* (Wild.), *Panicum maximum* Jacq., *Setaria pumila* (Poiret) Roemer& Schultes, *Setaria verticillata* (L.) P.Beauv., along with *Agave Americana* L., *Asparagus racemosus* Wild., and *Cyperus rotundus* L.

Most of the species found are common in the campus, some of the species *Cucumis dipsaceus* Ehrenb, *Caralluma bicolor* Ramach., *Hybanthus puberulus* M. Gilbert are rare species. Some endemic grass species like *Chloris bournei* Rang & Tadul., *Panicum psilopodium* Trin., and *Perotis indica* (L.) Kuntze are also occurring in the campus. Number of these species decreased and some even face the danger of going extinct due to regular clearing and construction activities. Therefore in terms of preserving the floral biodiversity, it is importance to set up a botanical garden in the confines of the campus and cultivate these plants and protect the ones that grow naturally on the grounds upon the vegetation maintenance.

Invasive species

The campus has 10 invasive species such as *Ageratum conyzoides* L., *Alternanthera pungens* H.B.K., *Alternanthera sessils* (L.) R.Br. ex Dc., *Argemone mexicana* L., *Bidens pilosa* L., *Borassus flabellifer* L., *Calotropis gigantea* (L.) R.Br., *Catharanthus roseus* (L.) Don, *Corchorus aestuans* L., *Corchorus trilocularis* L., *Ocimum americanum* L., *Parthenium hysterophorus* L., *Passiflora foetida* L. *Pedalium murex* L., *Portulaca oleracea* L., *Spermacoce hispida* L., *Tridax procumbens* L and *Waltheria indica* L. This is clearly indicated disturbances to the natural setting in the vegetated areas.

The alien / exotic species *viz.,Annona squamosa* L., *Asparagus racemosus* Wild., *Borassus flabellifer* L., *Eucalyptus tereticornis* SM., *Holoptelea integrifolia* (Roxb.) Planchon, *Jatropha gassypiifolia* L., Manilkara achras (Mill.), *Millingtonia horensis* L.F*Cassia fistula* L., *Cassia siamea* Lam., *Casuarina equisetifolia* J.R & G.Frost., *Delonix regia* (Boj. ex Hook.), *Eucalyptus tereticornis* Sm., *Guaiacum officinalae* L., *Parkia biglandulosa* Wight & Arn., *Pterocarpus marsupium* Roxb., *Samanea saman* (Jacq.) Merr., *Santalum album* L., *Thespesia populanea* (L.) Sol. Ex Corr. Serr. and *Roystonea regia*, Kunth.

Some of the species are utilized as fruit yielding like *Annona squamosa* L., (Seetha), *Artocarpus heterophyllus* Lam., (Pala), *Mangifera indica* L. (Maa) Thwaites., *Moringa pterygosperma* Gaertn. (Murungai), *Phyllanthus acidus* (L.) Skeels. (Aranelli), *Phyllanthus emblica* L. (Nelli), *Psidium guajava* L., (Koyya) and *Syzygium cumini* (L.) Skeels. (Naval). Species such as *Cordia sebestena* L., *Jacaranda mimosifolia* D., *Millingtonia hortensis* L.F., *Plumeria alba* L., *Plumeria rubra* L., *Tabebuia rosea* (Bertol.) DC. and *Tecoma stans* (L.) Kunth. are also utilized for their attractive flowers.

The biodiversity of TKMM College Campus comprises a total of 62 species belonging to 29 genera under 18 families excluding the lichens, pteridophytes, bryophytes and mycoflora which was not possible during the present study. Of these,

Dicots are dominating with 13 families whereas, monocots with 5 families. Over all the Tree were the most dominant flora 26 (41.9%) followed by Shrubs 20 (32.1%), Herbs 10 (16%) and Climbers 6 (10%). Among dicots, Polypetalae formed a larger percentage with 4 families, 10 genera and 18 species, Gamopetalae with 3 families, 8 genera and 14 species and Monochlamydeae with 3 families, 6 genera and 10 species. In monocots 8 families are spreading over 5 genera belonging to 20 species. Fabaceae is the first dominant family with 7 species followed by Poaceae with 4 species and Areaceae and Apocynaceae with each 3 species. During the study in the campus, a total of 12 alien and 14 invasive floral species were recorded. This clearly indicated disturbances to the natural setting in the vegetated sector.

List of Flowering plants in the TKMM College campus, India

S.No	Common Name	Scientific Name	Family	Habitat
1.	Monkey Bush	*Abutilon indicum*	Malvaceae	Herbs
2.	Knot Grass	*Aerva lanata*	Amaranthaceae	Herb
3.	Blue weed	*Ageratum houstonianum*	Asteraceae	Shrub
4.	Spiny amaranth	*Amaranthus spinosus*	Amaranthaceae	Herb
5.	Cashew nut	*Anacardium occidentale*	Anacardiaceae	Tree
6.	Sugar apple	*Anona squamosa*	Annonaceae	tree
7.	Flamingo Flower	*Anthurium andraeanum*	Areaceae	Herb
8.	Common needle grass	*Aristida pinnata*	Poaceae	herb
9.	Jack fruit	*Atrocarpus heterophyllus*	Moraceae	Tree
10.	Neem Tree	*Azadiracta indica*	Meliaceae	Tree
11.	Bamboo	*Bambusa vulgaris*	Poaceae	Tree
12.	Butterfly Tree	*Bauhinia purpurea*	Fabaceae	Tree
13.	Paper flower	*Bougainvillea glabra Choisy*	Nyctaginaceae	Climber
14.	Great bougainvillea	*Bougainvillea spectabilis*	Nyctaginaceae	Tree
15.	Devil's backbone	*Bryophyllum daigremontianum*	Cassulaceae	herb
16.	Flame of the forest	*Butea monosperma*	Fabaceae	Tree
17.	Peacock flower	*Caesalpinia pulcherima*	Caesalpiniaceae	Shrub
18.	Surinamese stick	*Calliandra surinamensis*	Leguminosae	Tree
19.	Bottlebrushes	*Callistemon lanceolatus*	Myrtaceae	Tree
20.	Papaya	*Carica papaya*	Caricaceae	Tree
21.	Golden shower	*Cassia fistula* L.	Fabaceae	Tree
22.	Bright eyes	*Catharanthus roseus* L.	Apocynaceae	Herb
23.	Swollen finger grass	*Chloris barbata*	poaceae	herb
24.	Lemon	*Citrus limon* (L.) Osbeck	Rutaceae	Shrub
25.	Cocunut	*Cocos nucifera* L.	Areaceae	Tree
26.	Variegated Croton	*Codiaeum variegatum*	Euphorbiaceae	shrub
27.	Buffalo calf plant	*Combretum albidum*	Combretaceae	Climbers
28.	Broadleaf palm-lily	*Cordyline fruticosa*	Asparagaceae	Shrub
29.	King sago	*Cycas revoluta*	Cycadaceae	Tree
30.	Indian rosewood	*Dalbergia sissoo*	Leguminosae	tree
31.	Male bamboo	*Dendrocalamus strictus*	Poaceae	Tree

32.	Golden dewdrops	*Duranta erecta* L.	*Verbenaceae*	Shrubs
33.	Areca palm	*Dypsis lutescenes*	Arecaceae	Tree
34.	Fasle Daisy	*Eclipta prostrata*	Asteraceae	Herb
35.	Money Plant	*Epipremnum aureum*	Areaceae	Climber
36.	Asthma weed	*Euphorbia hirta* L.	Euphorbiaceae	Herb
37.	Weeping fig	*Ficus benjamina*	Moraceae	tree
38.	Flame Lily	*Gloriosa superba*	Lilliaceae	Herb
39.	Hibiscus	*Hibiscus rosa-sinensis*	Malvaceae	Shrub
40.	Water Morning Glory	*Ipomoea aquatica*	Convolvulaceae	Herb
41.	Chinese ixora	*Ixora chinensis*	Rubiaceaea	Shrub
42.	Common Jasmine	*Jasminum officinale*	Oleaceae	climbers
43.	Mango Tree	*Mangifera indica* L.	Anacardiaceae	Tree
44.	Shame plant	*Mimosa pudica*	Fabaceae	Creeper
45.	Spanish cherry	*Mimusops elunji*	Sapotaceae	Tree
46.	Curry Leaf Tree	*Murraya koenigii*	Rutaceae	Tree
47.	Dwarf banana	*Musa acuminata*	Musaceae	Tree
48.	Nerium	*Nerium oleander* L.	Apocynaceae	Shrub
49.	Common Basil	*Ocimum basilicum*	Lamiaceae	Herb
50.	Yellow Flame Tree	*Pelthophorum pterocarpum*	Fabaceae	Tree
51.	Canary Island date palm	*Phoenix canariensis*	Arecaceae	tree
52.	Pagoda-tree	*Plumeria alba*	Apocynaceae	Tree
53.	Moss rose	*Portulaca grandiflora*	Portulacaceae	Herb
54.	Pomegranate	*Punica granatum*	Lythraceae	shrub
55.	Sandal Wood	*Santalum album*	Santalaceae	Tree
56.	Caribean trumpet tree	*Tabebuia aurea*	Bignoniaceae	Tree
57.	Tamarind	*Tamarindus indica* L.	Fabaceae	Tree
58.	Yellow Balls	*Tecoma stans* L.	Bignonaceae	shrub
59.	Teak	*Tectona grandis*	Lamiaceae	Tree
60.	Almond Tree	*Terminalia catappa* L.	Combretaceae	Tree
61.	Kakkalankodi	*Wattakaka volubils*	Asclepiadaceae	Climber
62.	Moovila	*Psudarthria visida*	Fabaceae	Herb

Mimosa pudica

Hibuscus rosa-sinensis

Tagetes erecta L.

Bauhinia purpurea

Cucuma longa

Musa paradisiaca

Syzygium cumini

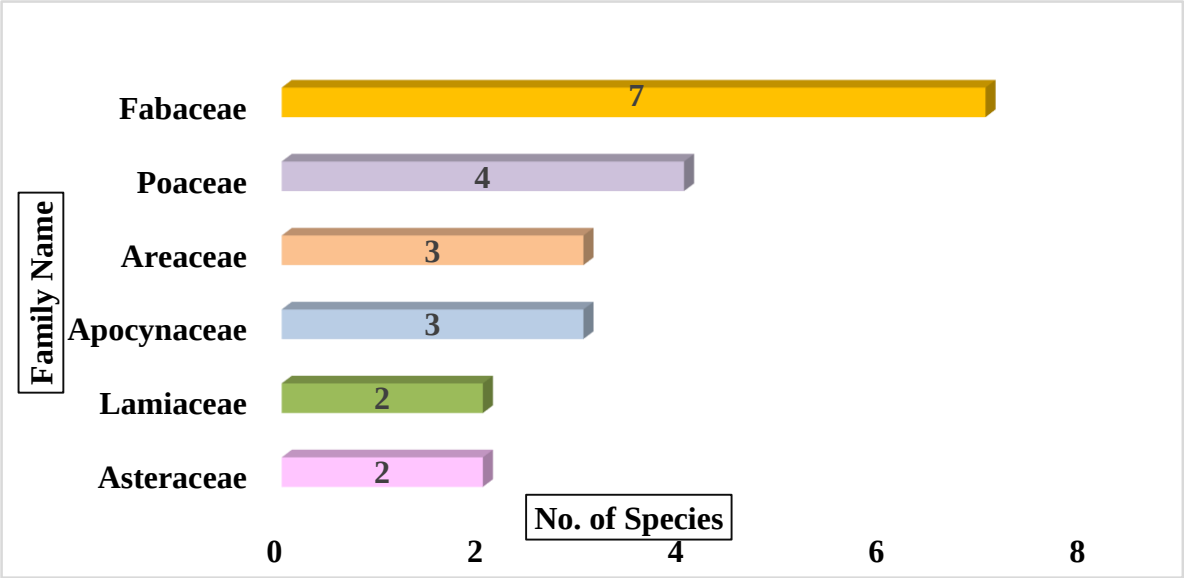
Cynodon dactylon

Mangifera indica

7.2. Fauna diversity in TKMM College campus

The observations on fauna diversity incated that the TKMM College has a large number of living as well as visiting animals, birds, reptiles and insects including termids. A total number of 9 birds belonging to the 8 species were recorded from different habitats during winter and summer, of them one of which were endemic to the western Ghats like purple rumped sunbird. Totally 8 species of birds representing 5 families and 3 orders were observed during this study, passeiformes constituted the predominated group representing 11. Total number of 9 bird species,out of them 6 species were migrant, 5 species were local migrant during winter and summer season because of unfavour environment and low availability of food resources. Migratory bird

species like Red winged creased cuckoo, Indian cuckoo, forest wag tail, Yellow browed bulbul, Paddy field warbler, small green billed malkhoa, Alexadrine parakeet, Rose ringed parakeet and red whiskered bulbul.



Birds Diversity in TKMM College campus

S.No	Common Name	Scientific Name
1.	Red wattled Lapwing	*Vanellinae*
2.	Eurasian hoopoe	*Upupa epops*
3.	Red vented bulbul	*Pycnonotus cafer*
4.	Black kite	*Milvus migrans*
5.	Common sand piper	*Actitis hypoleucos*
6.	Yellow wattled lapwing	*Vanellus indicus*
7.	Lotens sunbird	*Cinnyris loteniusduc*
8.	Wood sand piper	*Tringa glareola*

7.3. Butterflies diversity in TKMM College campus

TKMM College campus has five family level diversities such as Papilionidae, Pieridae, Nymphalidae, Lycaenidae and Hesperiidae in which Common butterflies species such as Mormon, Rose, Birdwing, Emigrant, Grass yellow, Gull Wanderer, Emigrant, Brown, Eggfly, Brown, Eggfly, Pansy, Grey and Pansy are commonly found.

List of Butterflies recorded in TKMM College campus

S.No.	Common Name	Scientific Name	Family
1.	Blue Mormon	*Papilio polymnestor*	Papilionidae
2.	Common Jay	*Graphium doson*	Papilionidae
3.	Common Mormon	*Papilio polytes*	Papilionidae
4.	Common Rose	*Pachliopta aristolochiae*	Papilionidae
5.	Crimson Rose	*Pachliopta hector*	Papilionidae
6.	Lime Butterfly	*Papilio demoleus*	Papilionidae
7.	Southern Birdwing	*Troides minos*	Papilionidae
8.	Small Branded Swift	*Pelopidas mathias*	Hesperiidae

7.4. Mammals diversity in TKMM College campus

Mammals are a group of vertebrate animals constituting the class Mammalia, and characterized by the presence of mammary glands which in females produce milk for feeding (nursing) their young, a neocortex (a region of brain), fur or hair, and three middle ear bones. These characteristics distinguish them from reptiles and birds, from which they diverged in the Carboniferous. The largest orders are the rodents, bats and Eulipotyphla (hedgehogs, moles and shrews). The observation on diversity of mammals in TKMM College campus indicated that around 6 species are Mammals are commonly distributed. The commonly found mammals are Grey Mangoose, Short-nosed Fruit Bat, House Rat and Indian Mole-rat.

S.No.	Common Name	Scientific Name	Common Name
1.	Three-striped Palm Squirrel	*Funambulus palmarum*	Anil
2.	Common or Grey Mangoose	*Herpestes edwardsi*	Keeri Pillai
3.	Indian Flying Fox	*Pteropus giganteus*	Periya Vowaal
4.	Short-nosed Fruit Bat	*Cynopterus sphinx*	Vowaal
5.	House Rat	*Rattus rattus*	Sundeli
6.	Indian Mole-rat	*Bandicota bengalensis*	Peruchali

7.5. An account of more Oxygen producing and Carbon dioxide absorbing plants in the Campus

There are some plants which are being considered highly efficient in oxygen production and carbon dioxide absorption which in turn reflected the quality of the green campus. If more oxygen is made available in the campus naturally, the stakeholders may be free from various cardiovascular and pulmonary problems and breathing troubles. The snake plant (*Sansevieria zeylanica*) otherwise known as the mother-in-law's tongue and Gerbera Daisy (*Gerbera jamesonii*) plant are unique for its night time oxygen production, and ability to purify air through the removal of various toxic gases in the atmosphere. Although there are options available for increasing oxygen by reducing CO_2 through means such as oxygenators and air purifiers, there are a variety of natural alternatives for increasing air quality that are beneficial for both body and mind. TKMM College campus has a maximum number of more oxygen producing and CO_2 absorbing plants such as *Areca Palm, Money plant, Neem tree, Tamarind tree, Ficus, Bamboo, Arjun tree, Magizhamboo, Marudhu, Maramalli, Nettilingam, Manja arali, Puvarasu* and *Pongam* trees.

7.6. Lawns, Trees, Herbs, Shrubs, Climbers and Lianas in TKMM College Campus

Lawns are gazing features of unutilized land made to cover the soil with green grass for the ambience of the place to have a greenish look. Lawn provides a hollow space among the building structures. The shaded trees in between the grass lawn, pathways and garden benches are meaningful lineaments to the green campus. The advantage of lawn is that it prevents the unintended weeds growth in the unutilized landscape areas. Trees that are native to land with medicinal value, ethnicity and environmental value add an advantage to green building. Purpose of trees is to provide shade, atmospheric CO_2 sequestration and supply of oxygen that serves the purpose of a green campus. Herbs are small plants with medicinal values and shrubs are small plants with thick stems and can hold soil to some extent than the herbs and serve the purpose of soil erosion. Climbers can grow with the support of wall structures and the climbers can enhance the wall value with greeneries.

TKMM College campus has a large number of trees, herbal plants, shrubs, climbers, lianas, twiners and lawns. It is further observed that all the plants are growing profusely and showing healthier free from pests and diseases attack. A total of 20 type of shrub species are available in the campus. The commonly available native as well as wild shrub species in the TKMM College campus are Kakithapoo (*Bougainvillea spectabilis*), Madhanakamaboo (*Cycas revolute*), Pigeon-berry (*Duranta plumieri*), Nilamulli (*Eranthemum roseum*), Sembaruthi (*Hibiscus rosa-sinensis*), Vetchi (*Ixora coccinea*), Malli (*Jasminum sambac*) and Arali (*Nerium odorum).*

Similar to that of shrubs, there are 10 kinds of herbs available in the TKMM College campus. The predominant species of herbs available in the TKMM College campus are Kunukkuth thukki (*Micrococca mercurialis*), Melaanelli (*Phyllanthus maderaspatensis*), Keelanelli (*Phyllanthus niruri*), Otra mullu (*Priva leptostachya*), Adai-otti (*Pupalia lappacea*), Kirantinayan (*Ruellia prostrata*), Pattasukai (*Ruellia tuberosa*), Vettu kayathalai (*Tridax procumbens*) and Kattu paruthi (*Turnera ulmifolia*).

The existence of climber, creepers, twiners and lianas species available which accounted more than 9 species in the TKMM College campus are Kayathalai (*Allamanda cathartica*), Kattu-kodsi (*Cocculus hirsutus*), Amirtaval (*Tinospora cordifolia*) and Sinthal (*Monstera deliciosa*). The major grasses are Periapullu (*Aristida pinnata*), Chevvarakupul (*Chloris barbata*), Arugam Pillu (*Cynodon dactylon*), Korai Pollu (*Cyperus rotundus*) and Crowfoot grass (*Dactyloctenium aegyptium*). Creepers are plants with weak stem that grow along the ground, around another plant, or up a wall by means of extending stems or branches. Climbers are plants whose stems are weak, so they climb up trees and walls for support to grow. They are the type of herbs and shrubs which are green in colour and grow vigorously without any pest and disease attach which are observed in TKMM College campus.

7.7. Rainwater Harvesting System and Percolation Pond

Rainwater harvesting system is a traditional old practice not only in drought prone areas and also in areas having seasonal rainfall. The Indian traditional rainwater harvesting is being practiced in various parts of the country to improve the ground water status (Musayev *et al*., 2015; Khanal *et al*., 2018). Now the threatening features of the

lower ground level of water has created a revamp of newly featured rainwater harvesting systems. Indian traditional rainwater harvesting systems are constructed based on three modes either direct pumped, indirect pumped or by gravity alone in the campus. In addition, lakes, bonds, water channels and any other water reservoir methods are considered as the rainwater harvesting system. The green campus should have adopted any of the above said modes of rainwater harvesting or any new methods that has the benefit of conserving the water resource as well. A small square shaped pit containing gravels and sands may be constructed near the building in which rainwater will be harvested from the roof of the building using a pipe. During the audit, there are three well developed rain harvesting systems such as 1) pond, 2) square shaped pit containing gravels and sands and 3) water channels connected with a square shaped pit observed with TKMM College campus. Rainwater harvesting structures and recharge wells have been commissioned in the campus at different locations.

8. Best practices followed on Green Campus initiatives in the Organization

1. It is observed that TKMM College is maintaining more than 75% of the green cover area after building construction as per the guidelines of World Green Building Council and Indian Green Building Council to provide a healthy environment and ecofriendly atmosphere to the stakeholders. It is calculated that the natural vegetation was 24.9% and planted vegetation was 32.5%.

2. TKMM College campus is located in the the Western Ghats belonging to Kerala which provide pure atmosphere to the stakeholders under natural environment, topology, landscape and soil erosion. The campus is established without disturbing the natural vegetation along with the artificially created topography like pathways and parking areas.

3. In view of floral biodiversity in TKMM college campus, a sum 62 species belonging to 29 Genera under 18 families covering trees, herbs, shrubs, climbers, lianas, twiners and lawns. It is observed that all the plants are growing profusely and showing healthier free from pests and diseases.

4. In view of faunal biodiversity in TKMM College campus, a total of 6 living Mammals species belonging to two Genera under two families, visiting Mammals about 4 species belonging to two Genera under two families, 8 species of birds, 8 species of Butterflies and 3 species Mosquitos were recorded.

5. TKMM College has established ‘Rainwater harvesting system’ and ‘Percolation pond’ to recharge the borewells by collecting rainwaters from the building roofs, open areas and playgrounds including unexplored areas which are channelized to flow of rainwaters to increase the ground water level.

6. The campus has a maximum number of more oxygen producing and carbon dioxide absorbing plants such as *Areca* Palm, Money plant, Neem tree, Arjun tree and Pongam trees including some of the shrub and herbal plants.

9. Recommendations for Greening

- It is recommended to establish a massive reforestation / afforestation planting programme in which a large number of trees and shrubs species can be planted by following the method of 'Miyawaki Concept' that helps a build dense, native forests and to restore the landscape management and control soil erosion.

- It is suggested to conduct a survey of non-flowering plants in the campus such as Lichens, Pteridophytes, Bryophytes and Mycoflora like Mushrooms and animals such as Grasshopper, Amphibians, Reptiles and Termites to substantiate the campus is found to be healthier environment to flora and fauna.

- The name board may be kept in each plant species in which the common name along with binomial name may be mentioned. The year of planting and economic importance with medicinal values if any may be mentioned in some plants so that the oldest as well as useful herbal plants may be identified in the campus.

- A complete data on the soil parameters such as pH, electrical conductivity, water holding capacity, total organic carbon, available nitrogen, exchangeable potassium, available phosphorus in the campus may be studied which may be useful for the cultivation of various native and wild type plant species.

- A complete data on the water quality parameters such as pH, TSS, BOD, COD, dissolved oxygen and dissolved carbon dioxide and macro and micro elements may be studied using bore well, open well, corporations, municipal RO, Aquaquad, Millipore, Distilled water and rain water which will be useful for the plant growth as well as to the stakeholders.

- Vermicompost production may be increased substantially using tree leaf litter, kitchen wastes and biodegradable waste materials available in the campus. The vermicompost manure can be used for plant cultivation and the excess amount of vermicompost may be sold in the local market as consultation work.

- The matured trees may be subjected to do white wash upto 3 feet height with limestone and neem oil mix to prevent the pests and diseases attack.

- Automatic water irrigation systems like drip and sprinkler irrigation methods adopted may be extended in the entire green area of the campus which in turn are useful to reduce the operation costs under energy conservation policy.

- Eco club student chapters, forums, cells, etc. may be started to among the life science students from which a large number of programmes on nature conservation and environmental protection may be conducted to rural, tribal and urban people.

10. Conclusion

TKMM College, Alappuzha, Kerala has made significant progression in teaching learning, research and consultancy, innovation and transfer of technology, community service and value education. It is a well-established State Government Aided Institute in Kerala which imparts quality education to rural, tribal and urban people across the state. This College is excellent in terms of academic activities and providing an eco-friendly atmosphere to the stakeholders. The College has taken enormous efforts to maintain green campus to the students, research scholars, staff members and parents in a sustainable manner which reflects the importance of the environment and stakeholders. It is conducting a large number of activities for the benefit of rural and tribal community people without disturbing the natural environment, topology, landscape management and vegetation. The College is maintaining more than 75% of the green cover area after building construction along with 24.9% of natural vegetation and 32.5% planted vegetation. The report of Green campus may lead to a prosperous future in the context of a significant Green campus and providing a sustainable environment to the stakeholders.

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