GREEN AUDIT – 2021

VIMALA COLLEGE
(AUTONOMOUS), THRISSUR
KERALA

EXECUTED BY

ATHUL ENERGY CONSULTANTS PVT LTD
4th FLOOR, CAPITAL LEGEND BUILDING,
KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020
Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

March 2021

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follow the principles of sustainability. Hence an evaluation is needed to understand where it stands on the path towards becoming an environment friendly, talent nurturing educational institution. This Green Audit was done with the aim to assess and rate the sustainable nature of the campus. The college's vision is:*"We envision the total transformation of young women for their enrichment and of the society at large and the nation as a whole"* with *"environment sustenance"* as one of its core value. A strong adherence to such sustainable practices could be observed by the inspecting team during the visits.

ACKNOWLEDGEMENT

We express our sincere gratitude to the management of Vimala College (Autonomous), Thrissur for giving us an opportunity to carry out the project of Green Audit. We are extremely thankful to all the staff for their support to carry out the studies and for input data, and measurements related to the project of Green audit.

1	**Dr Sr Beena Jose**	**Principal**
2	**Minimol K Jose**	IQAC Coordinator
3	**Mr Santhosh P Jose**	Coordinator Green Audit Committee
4	**Dr Manju Madhavan**	Jt. Coordinator Green Audit Committee
5	**Dr Mimi Mani Panakkal**	Member, Green Audit Committee
6	**Ms Jilu Jose**	Member, Green Audit Committee

Also congratulating our Green audit team members for successfully completing the assignment in time and making their best efforts to add value.

GREEN AUDIT TEAM

1. **Mr. Santhosh A**
   Registered Energy Auditor of Bureau of Energy Efficiency (BEE – Govt. of India)Accredited Energy Auditor No – EA 7597

2. **Mr. ASHOK KMP GRIHA** Certified Professional
   Project Director - ME, Energy Engineering.

Yours faithfully

Managing Director
Athul Energy Consultants Pvt Ltd

GENERAL DETAILS

The general details of Vimala College are given below in table.

TABLE 1: GENERAL DETAILS

Sl. No:	Particulars	Details
1	Name of the College	Vimala College (Autonomous)
2	Address	Ramavarmapuram,
		Thrissur-680009
3	Contact Person	Dr. Minimol K
4	Contact Phone numbers & Fax	0487- 2332080
		0487-23221759
5	E-mail ID	mail@vimalacollege.edu.in
6	Type of Building	Educational Institution
7	Annual Working Days	210
8	No. of Shifts	Day Shift (One) (8.30AM- 3 PM)
9	No. of students enrolled	2841
10	No. of teaching staff	143
11	No. of non-teaching staff	34
12	Total campus area	26 Acre
13	Total Built Up area	522720Ft^2
14	No. of PG courses	16
15	No. of UG courses	19
16	No. of hostel students	350
17	No. of plants in the college	600
18	No. of plant species in college	300
19	Grounds and stadium	International Aquatic Complex, 200 M. Track, Basketball court, Indoor stadium, Badminton Court, Kabbady Court, Table tennis board, Volley Ball court

ABOUT VIMALA COLLEGE

Sprawling over 26 acres of land and situated in the cultural capital of the state, lauded for its rich heritage, Vimala College, Thrissur was set up as a citadel of education, enlightenment and progress of young women in 1967. Undying enthusiasm, visionary diligence and a passion to bring out change, defined, moulded and transformed the dream of the CMC Management into what the College has become today. In the 54th year of inception, Vimala stands tall as one of the most prestigious and sought-after institutions in the state. The driving spirit of Vimala can be seen reflected in its mission statement:

We dedicate ourselves to the mission of training women for academic excellence, development of skills and character formation based on the love of God and service to the society and country.

Bifurcated from St. Mary's College and affiliated to the University of Calicut, Vimala offers 19 Undergraduate and 16 Post Graduate programmes along with other certificate and short term courses and is a Centre for Research in English, Physics, Commerce, Social work, Economics and Malayalam.

Managed by Nirmala Province, Thrissur of the Congregation of Mother of Carmel (CMC), the College is under the religious jurisdiction of the Catholic Archbishop of Thrissur. With an enrolment of 2841 students, faculty strength of 143members and an administrative team of 34 staff, the College is engaged in bringing into fruition the dream that shaped the legacy bequeathed to her by the founders. All efforts are made to sustain and enhance quality through the synchronization of innovative measures and traditional values. With remarkable strides in curricular, co-curricular and extra- curricular spheres, the College has defined a concrete position for herself in the educational map of the state and envisions a journey of greater achievements in the future. The infrastructure and educational resources have been consistently expanded to meet the growing academic requirements. Technology enhanced teaching-learning experience and work culture havepropelled the productivity forward and raised the merit of the institution.

Accredited at the national level with a Five Star status in 2001 by the NAAC, the institution has undergone two subsequent cycles of re-accreditation in 2008 and 2014 and presently holds the top

grade A with a CGPA of 3.50 on a 4 point scale. The University Grants Commission (UGC) conferred autonomy to the College in 2015 and identified as a College with Potential for Excellence in 2016. The Ministry of Human Resource Development, Government of India awarded the College the 52nd and77th positions in the National Institution Ranking Framework (NIRF) of the years 2017 and 2018 respectively. The college was in 100-150 band of NIRF Rankings 2019 and got 99th position in NIRF 2020 Rankings. Vimala College is a mentor college in NAAC Paramarsh Scheme from 2018.

Vimala College has a full-fledged DST -FIST funded laboratory and presently 6 science departmentsof college is supported under DBT-STAR College Scheme. The college is also supported under RUSA (RASHTRIYA UCHCHATAR SHIKSHA ABHIYAN) by the Ministry of Human Resource Development, Government of India.

In 2018 UGC approved two B.Voc programmes - Web Technology and Food processing, and community college offering three courses Diploma in Interior Architecture and Design (DIAD), Diploma in Digital Video Production and Diploma in Tourism Management and Hospitality.

Figure 1: ***FRONT VIEW OF COLLEGE***

GREEN AUDIT

The rapid urbanization, uncontrolled population growth and economic development have led to various environmental crises in our ecosystem like the irreversible changes in natural balance, irregularities in rainfall and distributions, raising global temperature, variations and imbalances in climatic conditions, and air quality etc. These disturbances create pronounced changes in ecosystem. For combating to these adverse effects, it is essential to adopt the strategies and practices of the Green Campus which will reduce the emission of remarkable pollutants to atmosphere and thus ensure sustainable development. So, it is very important to monitor and conduct a detailed study about the existing environmental conditions and Green Audit was carried out, which aims to analyze the established and following eco-friendly practices and environmental quality within the campus. Keeping this in mind, Vimala college has conducted a Green Audit in the campus with the help of an external authority with the following objectives:

- Understanding the environment by drafting a simple sketch of the campus.
- Monitoring the current practices of the resource consumptions like the land and water.
- Identify the existing best practices.
- Suggesting the viable solutions for improving the ecological sustainability of campus.
- Compiling the report with the above-mentioned details.

CAMPUS ENVIRONMENT

A clean and healthy environment aids effective and conducive learning environment. The environment in and around the college campus plays an important role in maintaining a healthy atmosphere. Vimala College premises are filled with arrays of beautiful flowers, plants and trees. The buildings and landscape that surrounds it makes the College campus a sight to behold. College maintains a botanical garden, RET Garden, Fitness Garden, large open basketball ground, and a Nakshatravanam. The importance of Green cover and its relevance in the present day context is a subject that is pertinent and crucial for sustainable development especially in the context of urbanization. Sustainability of an ecosystem depends on the number of plants and trees in and around the surroundings.

FIGURE 2: CAMPUS VIEW

OTHER BUILDINGS IN CAMPUS

Hostels and indoor stadium and Vimala Social Centre are the other major buildings in the campus. Beautiful aquatic complex is constructed 1.5 kM away from college

FIGURE 3: ***OTHER MAJOR BUILDINGS***

SUSTAINABLE CONSTRUCTION OF BUILDINGS

Buildings are the major pollutants that affect the urban air quality and contribute to climate change. Buildings are the major consumers of energy during their construction,operation and maintenance. Energy consuming devices installed to achieve the comfort levels for the occupants gives rise to heat generation which adversely affects the environment within the building and the surrounding.

Vimala College has adopted and developed an ecological design in their buildings and thus minimising the negative impact on ecosystem. Their conscious approach to the constructional activities avoids the adverse effects on ecological damage. Vimala College management constructed the building with best utilisation of land, classrooms with abundant light and natural ventilation. Indoor air quality is increased by maximum day light and avoids the sick building syndrome.

FIGURE 4: BUILDING VIEW

1. BUILT UP AREA

TABLE 2: BUILDING DETAILS

Sl.No:	Floor	Total Built Up Area
		Ft^2
1	Main Block	64447
2	Chavara Block	44610
3	Lissuex Block	36000
4	Euphrasia Block	15000
5	Other Facilities	362663
Total		**522720**

BUILDING USAGE

FIGURE 5: MAIN BLOCK

Main block consists office, class rooms, laboratories and conference hall. This block is constructed as a square C type building with projected center which gives maximum ventilation and natural lighting into the class rooms. This aesthetic, sustainable design and the grey colour of the college gave an extraordinary, peaceful look to the college.

Main block consists of ICT Enabled class rooms, Carmel Conference Hall, Christ Conference Hall, Laboratories of Chemistry UG and PG Programmes, Chemistry Instrumentation lab, Physics UG and PG lab, DST-FIST Lab, Chomsky Language Lab, Botany Lab, Tissue Culture Lab, Zoology Labs, and a Library with , INFLIBNET hub, Research Hub and Media Room. Others facilities include Principal's Office, Administrative office, Vice Principal's office, IQAC, Visitors Room, Departments of Chemistry, English, Physics, Hindi, Political Science and Psychology, Botany, Zoology, Enquiry with telephone booth and reprographic facility and two Guest rooms.

CHAVARA BLOCK

FIGURE 6: CHAVARA BLOCK

This block consists of seminar hall, class rooms and laboratories. Silver Jubilee Seminar Hall, Laboratories of Food and nutrition lab, textile clothing labs, textile texting lab, Nutri-bio chemistry lab, garment construction lab, food processing lab, Computing equipment and CAD Lab of Social work dept. Departments of Malayalam, Statistics, Social Work, Home Science and Mathematics function in this block. Other facilities include Canteen, Recreation room for non-teaching staff, Centre for Women Studies, Library storage room, CGPT Room, and so on.

LISSUEX BLOCK

Lissuex block has 6 floors consisting of 26 class rooms, 2 seminar halls (Lissuex Hall and Marian Hall), 4 computer laboratories. Office for Autonomy, Controller of Examinations with strong room, Chief examiners' room etc. Exam controller functions in this block. Departments of Computer Science, Economics, Commerce, Sociology, 2 elevators and a tress worked protected open space at top occupy this building.

EUPHRASIA BLOCK

FIGURE 7: EUPHARASIA BLOCK

Euphrasia block consists of Department of Physical Education, Office rooms for NCC, NSS, Jesus Youth, College Union, Digital video Production lab, Amphitheatre, Store, Press, Sickroom for students, Recreation room for teachers, start-up hubs, Mushroom cultivation and training centre.

Other facilities include Auditorium, Staff Quarters, Chapel, bible study room, comfort stations for male and female separately, leisure tower, College Hostel, Prayer Room etc.

FIGURE 8: AUDITORIUM

2. CARBON DIOXIDE LEVELS

Air quality is a major concern inside a building. The percentage share of oxygen and carbon dioxide should be such that the occupants are able to perform their tasks without any discomfort. This is done through a provision of fresh air duct in air-conditioned rooms or by providing windows. Numerous factors need to be considered like the number of occupants, weather pattern and air quality of the location. for the design and fabrication of the buildings. The prime area of consideration is the production of carbon-dioxide (CO_2) within the building. This is also associated with respiration which produces CO_2. As a result, the carbon-dioxide levels will increase if ventilations are not provided.

As per various standards (like the ASHRAE Standard 62.1-2016), indoor CO_2 concentrations up to 1200 ppm is considered acceptable. For typical outdoor conditions, this valuemay change from 300 to 500 ppm.

The measurements were recorded along different locations inside the campus and the peak values are given in the following sections. The key concentration was on the study of carbon dioxide levels.

TABLE 3: CO2 LEVELS

Sl. No.	AREA	Measured CO2	Standard CO2 level (Range)	Remarks
		Main Block		
1	Physics Class room	600	300-500	**Good**
2	Corridor	425	300-500	**Good**
3	Laboratory	600	300-500	**Good**
4	Physics faculty room	650	300-500	**Good**
5	Front Office	340	300-500	**Good**
		Chavara Block		
1	Class room	560	300-500	**Good**
2	Corridor	450	300-500	**Good**
3	Laboratory	550	300-500	**Good**
4	Chemistry faculty room	550	300-500	**Good**
5	Front Office	360	300-500	**Good**
		Lessuex Block		
1	Canteen	550	300-500	**Good**
2	Auditorium	450	300-500	**Good**

5. OPEN GROUNDS

Education is incomplete without sports and games. The importance of games and sports in students' life is immense. Sports and games are beneficial in teaching punctuality, responsibility, patience, discipline, and dedication. It has proved to be very therapeutic in nature. Students are the youth of our nation, and they need to be energetic, physically active, and mentally fit. By understanding the responsibility. Vimala College has built and maintained a hockey ground; volley ball, football , basketball courts in green surroundings.

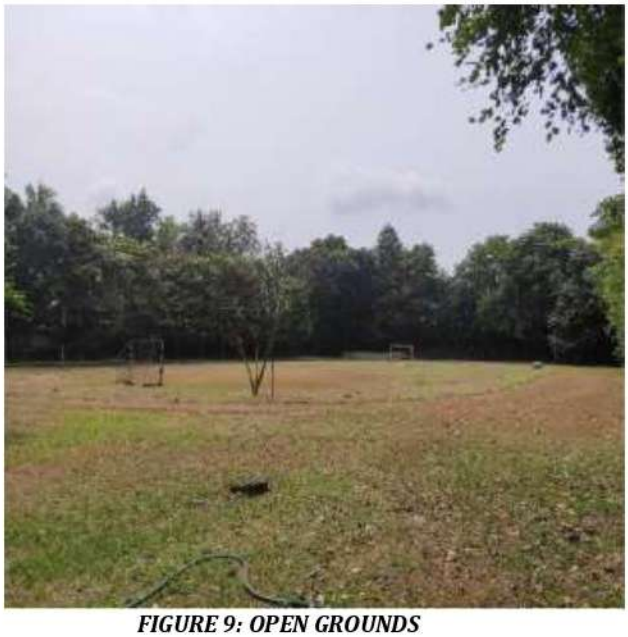


FIGURE 9: OPEN GROUNDS

6. INDOOR STADIUM

Vimala College owns and maintains facilities for hosting indoor games like volleyball, badminton, and basketball. The stadium has all the modern facilities for hosting indoor games.

7. AQUATIC COMPLEX

Vimala College has constructed an international aquatic complex which has swimming tracks, separate kid's pool and trainers' pool.

Figure 10 INDOOR STADIUM AND SWIMMING POOL

8. BOTANICAL GARDEN

Department of Botany maintains a botanical garden near the basketball court of the college premises. Botanical gardens maintain collections of living plants for the purposes of scientific research, to promote environment awareness, to impart conservation consciousness among students. This also plays an important role in the preservation of species for the benefit of students, researchers, and the general public. The garden comprises of different varieties of medicinal plants, ferns house, rare collection of xerophytic plants and aquatic plants along with ornamental plants and vegetables. A vertical garden, rockery, green house and vermin compost unit is also maintained.

Figure 11 BOTANICAL GARDEN

The medicinal plants grown in the botanical garden include *Aloe, Centella, Tulsi, Ashwagandha, Lemon grass, Bryophyllum, Vitex, Andrographis, tinospora, Phyllanthus, Eryngium, Ruta* etc. reported to be the rich source of antioxidants, antibacterial properties which boost the immunity and metabolism.

Figure 12 MEDECINAL GARDEN

Ferns and bryophytes are known as the bioindicators of a healthy ecosystem. The collection of these lower forms includes *Riccia, Anthoceros* pteridophytes like *Pteris, Nephrolepis, Selaginella, Agalomorpha, Equisetum* etc. Moreover, a collection of aquatic plants like *Trapa, Jussiaea, Hydrilla, Chara, Nymphaea, Salvinia* etc. Were neatly maintained in a small pond which makes garden more attractive.

Figure 13 AQUATIC GARDEN AND FERN HOUSE

The ornamental plants like Bottle brush, Butterfly pea, Firebrush, Golden trumpet, Dracaena, *Allamanda, Porana, Acalypa, Asparagus, Mussaenda, Chlorophytum, Lantana, Cainum, Plumeria, Clerodendron, Sansevieria, Duranta, Ichnocarpus* grown mainly for decorative purposes and to create a pleasant atmosphere in the garden. Rockery serves as the main attraction of the botanical garden with a couple of xerophytic plants like *Opuntia, Caralluma, Cactus* etc. Definitely botanical garden holds ecological, medicinal, aesthetic, recreational and conservational values.Botanical garden also hosts a large number of medicinal plants. As our life style is now getting techno savy we are moving away from nature. Traditionally there are a lot of herbs here used for the ailments related to different seasons.

Figure 14 ROCKERY AND VERTICAL GARDEN

LIST OF **MEDICINAL PLANTS IN THE BOTANICAL GARDEN**

Figure 15 LIST OF MEDECINAL PLANTS

Sl No	Botanical name	Vernacular Name
1.	Oroxylum indicum (L.) Kurz	palakapayyani
2.	Cardiospermum grandiflorum Sw.	uzhinja
3.	Butea monosperma (Lam.) Taub.	chamatha
4.	Abelmoschus moschatus Medik.	kasthoorivenda
5.	Aphanamixis polystachya (Wall.) R.Parker	Chemmaram
6.	Justicia gendarussa Burm.f.	Vathamkolli
7.	Crescentia cujeta L	kamandalu
8.	Garcinia gummi-gutta (L.) Roxb.	Kudampuly
9.	Plectranthus hadiensis (Forssk.) Schweinf. ex Sprenger	Jaruveli
10.	Aristolochia indica L.	Karalvegam
11.	*Hemigraphis alternata* (Burm.f.) T.Anderson	Murikooty
12.	Pseudarthria viscida (L.) Wight & Arn.	Moovila
13.	Sapindus mukorossi Gaertn.	Uruvanji
14.	Inula racemosa Hook.f.	Pushakkaramulla
15.	Baliospermum montanum (Willd.) Müll.Arg.	Danti
16.	Jasminum grandiflorum L.	Pichakam
17.	Achyranthes aspera L.	Kadaladi
18.	Cyclea peltata (Lam.) Hook.f. & Thomson	Padathali
19.	Amaranthus spinosus L.	Cherucheera
20.	Ailanthus triphysa (Dennst.) Alston	Matti
21.	Lagerstroemia speciosa (L.) Pers.	Manimaruth
22.	Syzygium cumini (L.) Skeels	Njaval
23.	Justicia adhatoda L.	Adalodakam
24.	Vitex negundo L.	Karinechi
25.	Premna serratifolia L.	Munja
26.	Aristolochia indica L.	Garudakodi
27.	Andrographis paniculata (Burm.f.) Nees	Keeriyatha
28.	Piper longum L.	Thippalli
29.	Ayapana triplinervis (Vahl) R.M.King & H.Rob.	Ayyappana
30.	Holarrhena pubescens Wall. ex G.Don	Kadukapala
31.	Oxalis corniculata L.	Puliyarila
32.	Desmodium triflorum (L.) DC.	Nilamperanda
33.	Rauvolfia serpentina (L.) Benth. ex Kurz	Sarpagandi
34.	Myxopyrum serratulum A.W.Hill	Chathuramulla
35.	Clinacanthus siamensis Bremek.	Vishapacha
36.	Annona squamosa L.	Seethapazham
37.	Curcuma longa L.	Manjal
38.	Croton persimilis Müll.Arg.	Thomarayam
39.	Strobilanthus heyneanus Nees	Karinkurinji

40.	Cassia fistula L.	Kanikkonna
41.	Cissus quadrangularis L.	Changalamperanda
42.	Commiphora caudata (Wight & Arn.) Engl.	Edinjil
43.	Trachyspermum ammi (L.) Sprague	Aimodakam
44.	Solanum pseudocapsicum L.	Jerusalamjerry
45.	Clitoria ternatea L.	Sankupushpam
46.	Bacopa monnieri (L.) Wettst.	Brahmi
47.	Morinda citrifolia L.	Nonni
48.	Wrightia tinctoria R.Br.	Dhandapala
49.	Piper betle L	Vettila
50.	Tamarindus indica L.	Vaalanpuli
51.	Sida cordifolia Linn.	Kurumthotti
52.	*Chrysopogon zizanioides* (L.) Roberty	Raamacham
53.	Crotalaria retusa L.	Kilumkampetti-thakara
54.	Lawsonia inermis L.	Mailanji
55.	Ocimum sanctum L.	Thulasi
56.	*Murraya koenigii* (L.) Spreng.	curryveppu
57.	Prunus dulcis (Mill.) D.A.Webb	Badham
58.	Tabernaemontana divaricata (L.) R.Br. ex Roem. & Schult.	Nandhyarvattam
59.	Gmelina arborea Roxb.	Kumizhu
60.	Cynodon dactylon (L.) Pers.	Sivapullu
61.	Syzygium jambos (L.) Alston	Peera
62.	Ocimum tenuiflorum L.	Kaattuthulasi
63.	Nyctanthes arbor-tristis L.	Pavizhamalli
64.	Citrus limon (L.) Osbeck	Cherunaarakam
65.	Annona reticulata L.	Aatha
66.	Hibiscus rosa-sinensis L	Chembarathi
67.	Scaevola taccada (Gaertn.) Roxb.	Bhadraksham
68.	Aegle marmelos (L.) Corrêa	Koovalam
69.	Catharanthus roseus (L.) G.Don	Nithyakalyani
70.	Piper nigram L	Kurumulak
71.	Chrysophyllum caimito L.	Sattarapple
72.	Cajanus cajan (L.) Millsp.	Thorapayar
73.	Calotropis gigantea (L.) Dryand.	Eruku
74.	Saraca asoca (Roxb.) Willd.	Asokam
75.	Millettia pinnata (L.) Panigrahi	Ungu

VEGETABLE GARDEN

Gardening can provide students with hands-on learning opportunities while increasing environmental awarenessA rich vegetable garden is maintained by the Vimala College. The students of Bhoomithra sena, NSS and the Department of Botany always get actively involved in the construction and maintenance of the vegetable garden. Cauliflower, Amaranthus, Ladies finger, Tomato and chilly are usually cultivated. Olericulture is practiced by using fertilizers of organic origin such as compost manure, green manure; thus instilling the benefits of organic farming among students.

Figure 16 VEGETABLE GARDEN


Organic Farming For Better Health

NAKSHTRAVANAM

Each individual is born under a particular star, known as his or her birth star. In Vedic astrology, the zodiac is divided into 27 nakshatras or stars and each star has been associated with a particular tree. The concept of a Nakshatravanam involves the planting of these trees in a grove and nurturing them, to develop a place of sanctity which ultimately aims the conservation of species. The details of the trees maintained in the Nakshatravanam of the Vimala College (Autonomous), Thrissur are given below.

Figure 17 NAKSHTRAVANAM

ARBORETEUM

Vimala college stakeholders nurtured and marinated arboretum in the back side of main building. Apart from this, the pathways leading to various buildings are lined with trees and plants, which shows the interest of college authorities to inculcate values of sustainability among students.

Figure 18 ARBORETEUM

LIST OF TREES IN THE CAMPUS

The college campus consists of more than 300 species of plants out of which 100 species are trees. There are about 400 trees are maintained in the campus.

TABLE 4: LIST OF TREES

Sl No	BOTANICAL NAME	COMMON NAME	No of Plants
1.	*Adenanthera pavonina* L.	Bead coral, Red wood, മഞ്ചാടി	3
2.	*Aegle marmelos* (L.) Correa	Bael tree, കൂവളം, (ചിത്തിര - കൂവളം)	3
3.	*Ailanthus triphysa* (Dennst.) Alston	Matti	2
4.	*Alstonia venenata* R.Br	Vishgni	1
5.	*Annona muricata* L.	Soursop, *graviola, guyabano*, മുള്ളാത്ത	2
6.	*Annona reticulata* L.	Custard apple, wild sweetsop, soursop, bullock's heart	2
7.	*Annona squamosa* L.	Seethapazham	1
8.	*Aporosa cardiosperma*(Gaertn.) Merr	(തൂക്കണാട്ട - വവട്ടി)	1
9.	*Araucaria heterophylla* (Salisb.) Franco	Living Christmas tree, കുന്തിരിക്കവെടി	2
10.	*Areca catechu* L.	Areca palm, അടക്ക , പാക്	4
11.	*Artocarpus altilis*(Parkinson) Fosberg	Bread fruit, കടപ്ലാവ്	1
12.	*Artocarpus heterophyllus* Lam	Jack fruit tree (ഉന്നാടം - പ്ലാവ്)	3
13.	*Averrhoa bilimbi* L.	Bilimbi, Cucumber tree, ഇരുമ്പപുളി,	1
14.	*Averrhoa carambola* L.	Carambola apple, ചതുരപുളി	1
15.	*Azadirachta indica* A.Juss.	Neem, ആര്യവപ്പു,	3
16.	*Baliospermum montanum* (Willd.) Müll.Arg.	Danti	1
17.	*Bambusa bambos* (L.) Voss	Giant thorny bamboo, മുള	20
18.	*Bambusa tuldoides* Munro	Verdant bamboo	1
19.	*Bambusa vulgaris* Schrad.	Yellow bamboo, മഞ്ഞമുള	1
20.	*Bambusa multiplex* (Lour.) Raeusch.exSchult. '*Vareigata*'	Variegated edge bamboo,	1
21.	*Barringtonia acutangula* Gaertn	Attuvanchimaram	3
22.	*Bauhinia acuminata* L.	Dwarf white bauhinia, വവള്ളമന്താരം, മന്താരം	1
3.	*Bauhinia purpurea* L.	Purple bauhinia, , മന്താരം	1
24.	*Bauhinia tomentosa* L	Yellow mandaram	1
25.	*Borassus flabellifer* L.	Palmyra palm, കരിമ്പന (ഉന്നാതി - കരിമ്പന)	1
26.	*Bridelia retusa* (L.) A.Juss	മുള്ളുവങ്ങ,	4
27.	*Butea monosperma* (Lam.)	Flame-of-the-forest, palash	1

28.	*Caesalpinia pulcherima* L	Rajamali	2
29.	*Calliandra haematocephala* Hassk.	Red Powder Puff,	1
30.	*Calotropis gigantea (*L.) Dryand.	(തിരുവാണം - എരിക്ക്)	3
31.	*Cassia fistula* L.	Kanikkonna	3
32.	*Casuarina equisetifolia* L.	Casuarina tree, Horsetail tree,	1
33.	*Chrysophyllum cainito* L.	Star apple	1
34.	*Citharexylum spinosum* L.	Fiddlewood, പാരിജാതം	4
35.	*Citrus limetta* Risso	Cherunaarakam, നാരങ്ങ	2
36.	*Cocos nucifera* L.	Coconut, വതങ്ങ്	3
37.	*Crataeva magna* (Lour.) DC.	Neermathalam	1
38.	*Dalbergia latifolia* Roxb.	Indian rose wood	1
39.	*Dillenia indica* L	Elephant apple	1
40.	*Diospyros buxifolia* (Blume) Hiern	എലിവചവിയൻ,	1
41.	*Diospyros melanoxylon* Roxb	Coromandel ebony, East Indian ebony	1
42.	*Elaeis guineensis* Jacq.	Oil Palm, എണ്ണപ്പന	1
43.	*Ficus auriculata* Lour.	(കാർത്തിക - അത്തി)Elephantear fig tree	1
44.	*Ficus benghalensis* L	Banyan, (മകം - പരാൽ)	1
45.	*Ficus benjamina* L	Benjamin Tree, Golden fig, Java fig, Weeping Fig, ജിലി, വവളാൽ	4
46.	*Ficus microcarpa* L. f.	(ഉത്രം - ഇത്തി)	1
47.	*Ficus religiosa* L	Sacred fig . (പൂയം - അരയാൽ)	1
48.	*Flacourtia indica* (Burm. f.) Merr.	Batoko palm (വിശാഖം - വയങ്കത)	1
49.	*Flacourtia jangomas*(Lour.) Raeusch.	ലുവിള	2
50.	*Garcinia gummi-gutta* (L.) Roxb.	Kudampuly കുടംപുളി	2
51.	*Garcinia mangostana* L.	Mangosteen	2
52.	*Grevillea robusta* A.Cunn. ex R.Br.	Silver oak	1
53.	*Hibiscus mutabilis* L.	Changing rose	1
54.	*Holigarna arnottiana* Wall. ex Hook. f.	Cheru	1
55.	*Lagerstroemia speciosa* (L.) Pers.	Manimaruth	1
56.	*Libidibia coriaria* (Jacq.) Schltdl.	Divi-divi	3
57.	*Licuala grandis*Wendl.	Ruffled Fan palm	1
58.	*Licuala spinosa* Wurmb	Mangrove fan palm	1
59.	*Livistona chinensis* (Jacq.) R.Br. ex Mart.	Chinese fan palm	1
60.	*Madhuca longifolia*(Koenig) Macbr. var. latifolia (Roxb.) A. Chev.	ഇലൂപ, ഇരിപ്പ(പരവതി - ഇലിപ്പ)	1
61.	*Magnolia champaca*(L.) Baill. ex Pierre	Champak, വചമ്പകം	1
62.	*Mangifera indica* L.	Mango tree, (പൂരുരുുാതി - മാവ്)	5
63.	*Manilkara zapota* (L.)P.Royen	chikoo, സപ്പോട്ട	6
64.	*Melaleuca citrina* (Curtis) Dum.Cours.	Bottle Brush	2
65.	*Melaleuca linariifolia* Sm.	snow-in-summer,	1

66.	*Mesua ferrea* L	(ആയില്യം – നാകവൃക്ഷം)Naga tree	1
67.	*Milletia pinnata* (L.) Panigrahi	Indian beech, ,ഉങ്ങ്	2
68.	*Mimusops elengi* L.	Spanish cherry (അനിഴം - ഇലഞ്ഞി)	2
69.	*Moringa pterygosperma* Gaertn.	Drumstick tree	1
70.	*Murraya koenigii* (L.) Spreng.	Curry leaf tree, Curry bush, കറിക്കവപ്പില, കറിക്കവപ്പ്	1
71.	*Murraya paniculata* (L.) Jack	Orange jasmine, കാട്ടുമുല്ല, മരമുല്ല	1
72.	*Neolamarckia cadamba* (Roxb.) Bosser	Cadamb (ചതയം - കടമ്പ്)	1
73.	*Nephelium lappaceum* L.	Rambutan	1
74.	*Phyllanthus emblica* L.	Indian gooseberry, (ഭരണി - വനല്ലി)	3
75.	*Plumeria pudica* Jacq.	Fiddle Leaf Plumeria	1
76.	*Polyalthia longifolia* (Sonn.) Thwaites	False ashoka, അരണമരം	30
77.	*Pouteria campechiana* Baehni	egg fruit, cupcake fruit, canistel, മുട്ടപ്പഴം	1
78.	*Psidium guajava* L	Guava, Guajava, പേര	1
79.	*Pterocarpus santalinus* L.f.	Red sandalwood	1
80.	*Punica granatum* L.	Pome Granate, Anar, മാതളം	1
81.	*Ravenala madagascarensis* Sonner.	Traveller's tree, traveller's palm	1
82.	*Samanea saman*(Jacq.) Merr.	Rain Tree	2
83.	*Santalum album* L.	Indian sandalwood, ചന്ദനം	2
84.	*Saraca asoca* (Roxb.) Willd.	the ashoka tree, അശോകം	3
85.	*Senegalia catechu* (L.) Skeels.	(മകയിരം - കരിങ്ങാലി) Catechu,	2
86.	*Simarouba glauca* DC.	paradise-tree, ലക്ഷ്മി തരു	1
87.	*Spondias pinnata* (L.f.) Kurz	(അത്തം - അമ്പഴം) Hog plum	2
88.	*Strychnos nux-vomica* L.	(അശ്വതി - കാഞ്ഞിരം) strychnine tree,	1
89.	*Swietenia macrophylla* King	Mahogany,	7
90.	*Syzygium aqueum* (Burm.f.) Alston	Rose-apple, ചാമ്പ,	1
91.	*Syzygium cumini* (L.) Skeels.	Malabar plum (രാഹിണി - ഞാവൽ)	2
92.	*Syzygium jambos* (L.) Alston	Rose-apple	1
93.	*Syzygium malaccense* (L) Merr. & Perry	Malay rose apple, ചുവന്ന ചാമ്പ	1
94.	*Tamarindus indica* L.	Vaalanpuli	1
95.	*Terminalia arjuna* (Roxb. ex DC.) Wight &Arn.	Arjuna, (ചാതി - നീർമരുത്)	1
96.	*Terminalia catappa* L.	Country almond, Malabar almond,	1
97.	*Thespesia populnea* (L.) Soland. ex Correa	Bhendi/പൂപ്പരുത്തി, പൂവരശ്	1
98.	*Vateria indica* L.	Indian copal tree മൂലം - വെള്ളപ്പയ്ൻ	1
99.	*Vitex negundo* L.	Negundo Chastetree, കരിനൊച്ചി,	1
100.	*Wrightia tinctoria* (Roxb.) R. Br.	Pala indigo plant, ദന്തപ്പാല	1

2. RET GARDEN

Department of Botany maintains a Rare Endangered Threatened Plant Garden in the college. The garden comprises endangered medicinal plants through living collections, which benefit pollinators like butterflies, honeybees, bats, and birds, and plays an important role in the production of our crops. Plants are the essential resource for human existence and we should be aware that plants across the world are endangered with many facing extinction. The conservation of RET plants plays a vital role in stability of ecosystem and balance of nature. Collection of these endangered medicinal plants maintained near college hostel is listed below.

Figure 19 RET GARDEN

List of Plants in RET Garden

Table 5 LIST OF PLANTS IN RET GARDEN

	Botanical Name	Common Name
1.	*Solanum diphyllum* L.,,	
2.	Lasiobema scandens (Linne) de Wi	(നാഗവള്ളി),
3.	Caryota urens L. ,	ചൂണ്ടപ്പന
4.	Cassia fistula L.	കണികൊന്ന,
5.	Jatropha multifida L.	ചുരകള്ളി,
6.	Aegle marmelos (L.) Correa	കൂവളം,
7.	*Citharexylum spinosum* L.	പാരിജാതം ,
8.	Lagerstroemia speciosa (L.) Pers.	മണിമരുത്,,
9.	Azadirachta indica A.Juss.	ആര്യവേപ്പു,
10.	Caesalpinia pulcherrima (L.) Swartz,	രാജമല്ലി,
11.	Tectona grandis L. f. Teak	തേക്ക്,
12.	Bridelia retusa (L.) A.Juss.	മുള്ളു വേങ്ങ,
13.	Murraya koenigii (L.) Spreng.	കറിവേപ്പ്

14.	Albizia saman (Jacq.) F.Muell.,	മഴമരം
15.	Maranta arundinacea L.	
16.	Curcuma aeruginosa Roxb.	നീലക്കുവ:
17.	Artocarpus hirsutus Lam.	ആഞ്ഞിലി,
18.	Oroxylum indicum (L.) Benth. ex Kurz	പലകപയ്യാനി,
19.	Breynia retusa (Dennst.) Alston	പെരുംനിരൂരി
20.	Leucaena leucocephala(Lam.) de Wit	ഇപ്പിലിപ്പിൽ,,
21.	Ziziphus oenoplia (L.) Mill.	
22.	Holigarna arnottiana Hook. f.	ചേര്

CARBON SEQUESTRATION

Sustainably managed forests play an important role in mitigating climate change by confiscating carbon from the atmosphere and storing securely. Trees can remove carbon dioxide from the atmosphere via the natural process of photosynthesis and store carbon (C) in leaves, branches, stems and roots. Several scientific studies reported that the vegetation can directly and indirectly affect local and regional air quality of the environment by sequestering carbon dioxide which results in the reduction of the temperature, removal of air pollutants and thereby maintaining the microclimatic conditions in optimal levels. However, the amount of carbon stored in trees depends on a number of features including tree species, growth conditions in the environment, age of tree and density of surrounding trees.

Calculation Method adopted for carbon content in trees.

The rate of carbon sequestration depends on the growth characteristics of the tree species,the conditions for growth where the tree is planted, and the density of the tree's wood.

1. Determine the total (green) weight of the tree.
2. Determine the dry weight of the tree.
3. Determine the weight of carbon in the tree.
4. Determine the weight of carbon dioxide sequestered in the tree
5. Determine the weight of CO2 sequestered in the tree per

yearFor determining the Total weight of tree:

$W = 0.15D^2H$

Determine the dry weight of the tree

To determine the dry weight of the tree, multiply the weight of the tree by72.5%

Determine the weight of carbon in the tree

The average carbon content is generally 50% of the tree's total volume.

Therefore, to determine the weight of carbon in the tree, multiply the dry weight of the tree by 50%.

Determine the weight of carbon dioxide sequestered in the tree

CO2 is composed of one molecule of Carbon and 2 molecules of Oxygen.

The atomic weight of Carbon is 12.001115.

The atomic weight of Oxygen is 15.9994.

The weight of CO2 is C+2*O=43.999915.

The ratio of CO2 to C is 43.999915/12.001115=3.6663.

Therefore, to determine the weight of carbon dioxide sequestered in the tree, multiply theWeight of carbon in the tree by 3.6663.

FIGURE 20: FIELD MEASUREMENT OF CARBON SEQUESTRATION

TABLE 6: CARBON SEQUESTRATION

Sl no:	Location	CO2 Sequestration (Ton) per annum
1	Star Garden	14.016
2	Leisure tower side, Hostel, - Medicinal plants, Auditorium , Indoor Stadium	36.6
3	College Front , Botanical garden, Chavara square	25.2216
4	Library front . Canteen Fitness Garden Arboretum Nakshatravanam	35.268
Total		**111.1056**

WATER RESOURCES AND CONSERVATION

The requirement of water for the college, hostels and gardening etc. are met by supply from 4 wells in the within the main campus. In addition to this, College hostel also neatly maintains a big well.

The water from different wells is checked in an accredited laboratory in time to time to ensure its potability.

TABLE 7: WATER SOURCES

Location	Source
College boundary	Well
College Hostel	Well
KWA connection	Water authority connection

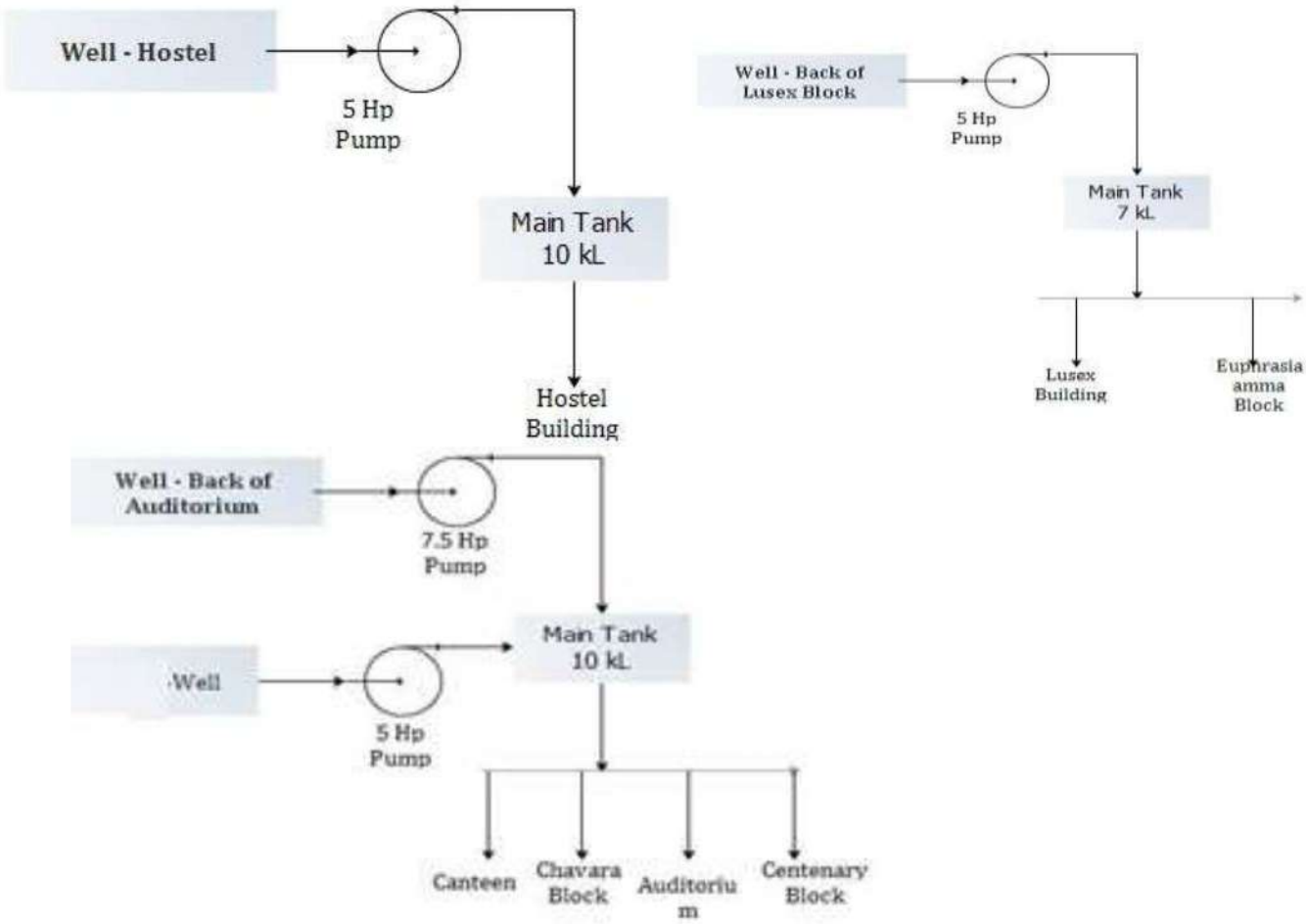


FIGURE 21: WATER FLOW DIAGRAM

The water outlet points in the college campus and hostel are listed in the following table. All the wells ,tanks and taps are neatly maintained .

TABLE 8: WATER TAPS

Location	No: of taps
Main block	
Staff toilet	6
Physics and Chemistry lab	47
Common Toilets	27
Wash room	23
Total	103
Chavara Block	
Staff room	5
Wash Room	15
Toilets	12
Total	32
Grand Total	135

RAIN WATER HARVESTING

The Vimala College campus itself is 26 acres of land availing the average rain fall of 3120Lacs of water. This is more than sufficient to meet the water requirements. Vimala College has implemented many procedures for collecting rain water such as rooftop harvesting and pits for recharging the ground water resources.

The rainwater from entire college campus and roof top of building is collected through PVC pipes and fed into ground at four locations in the campus and details are given in the below table. These three natural sites are selected for rainwater harvesting, ground water recharge.

TABLE 9: GROUND WATER RECHARGING POINTS

Location	Source	Result
Front side of college	Water From main building	Reuse of water in the well
Euphrasiya Block percolation pits	Water from Roof of EuphrasiyanBlock	Water table will raise
Euphrasia Block	From Roof	Well recharging
	From Roof	For using flush in the toilets
Through campus	**Open irrigational canal from Peechi**	Increase of ground water table by hydro geological seepages .
Near Auditorium	**Auditorium**	Percolation pits for well recharging

College Hostel	**Bath room water for ground water recharge along with rain water**	Increase of ground water table and also reduce the effect of alkalinity of bath room water by dilusion
College Hostel	**Drainage water**	For irrigation and gardening
Kitchen back yard	**Kitchen waste water**	For gardening
College Hostel	Rain water from roof	Used in flush of toilets and thus reduction of water consumption

All the requirements including watering plants, wash room requirements and cleaning purposes were met with the aid of recharged wells in the Campus.

Figure 22 FRONT SIDE OF COLLEGE &EUPHRASIA BLOCK WELL

Figure 23 RAIN WATER TANK FOR TOILT FLESH &WELL IN BACK SIDE OF AUDITORIUM

FIGURE 24: GROUND WATER RECHARGING POINTS

SPECIAL INITIATIVES OF COLLEGE

I. *Fitness garden*

College maintains an open fitness garden to create awareness among students and staff, health and fitness in relation to the environment.

Figure 25 FITNESS GARDEN

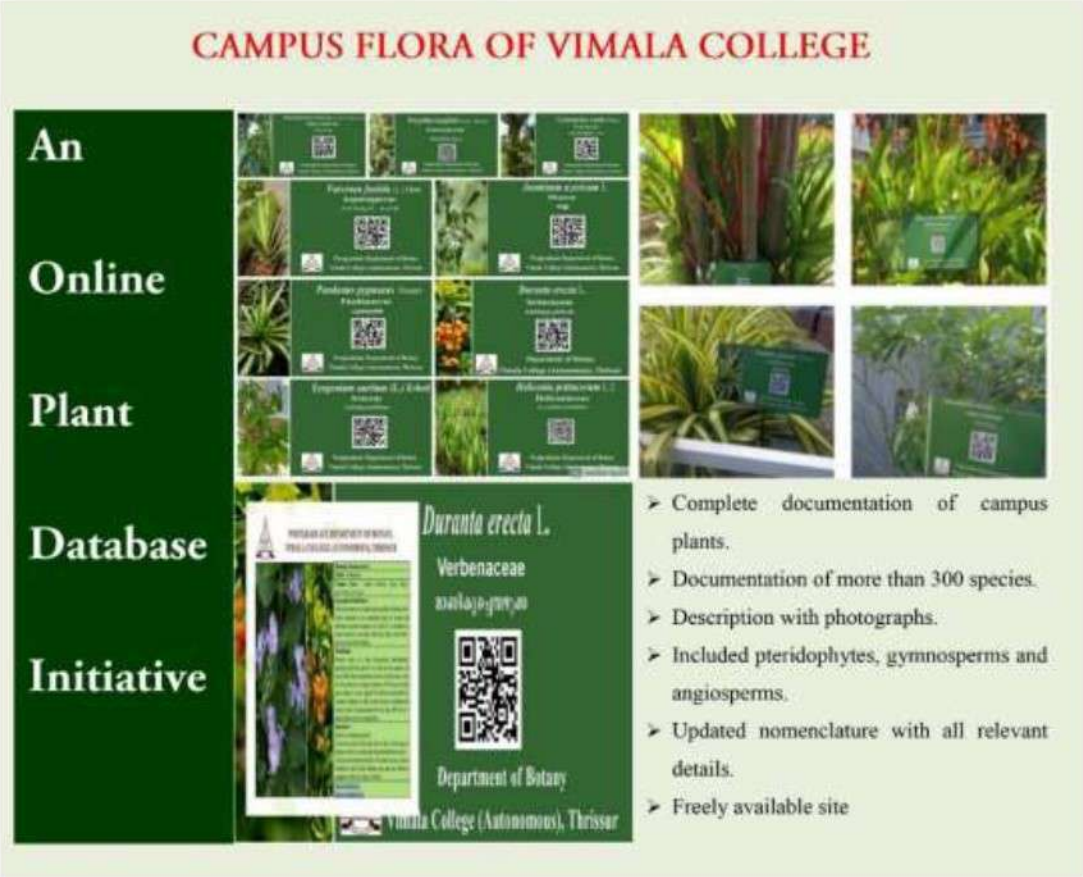
II. *Leisure Tower*

College maintains an open leisure tower surrounded by trees near the premises of Nakshatravanam. This place is an area for relaxation for students to exchange their vibrant ideas, exhibit their entrepreneur skills, venue for workshops, debates, discussions and chit chats.

Figure 26 LEISURE TOWER

DIGITALISATION OF CAMPUS FLORA

Digitalization and Complete documentation of campus plants has been started by the Department of Botany. Detailed documentation includes description with photographs, updated nomenclature with all relevant details of more than 300 species. The documentation will be freely available in the website



GLIMPSES OF COLLEGE ACTIVITIES

KSCSTE sponsored science popularization programme by Department of Botany at Co-operative Public School ,setting of Nakshatravanam at school campus 15.11.2016.

World Environment Day Celebrations 05.06.2017 by NSS,NCC

25.09.2017 Vegetable Garden setting

1.11.2017 Kerala Piravi Day – Paddy seed sowing at Padukkad

17.07.2018 Exhibition of medicinal plants and herbal products

The NSS units of Vimala College celebrated NSS day and Golden Jubilee year with bamboo planting by Principal Dr.sr. Beena Jose2019-2020

.

A Programme of vegetable sales and Exhibition 'Haritham' were organized on 4-9-2019. – Department of Econ omics

Planting of "Neermathalam"-(*Crateva magna*) Department of Botany, as part of World Environmental Day on 7th of June 2019

.




'ONATHINU ORUMURAMPACHAKARI'Department of Botany, Vimala College Thrissur, in association with Krishibhavan Cheroor introduced a vegetable garden on 2 August 2019

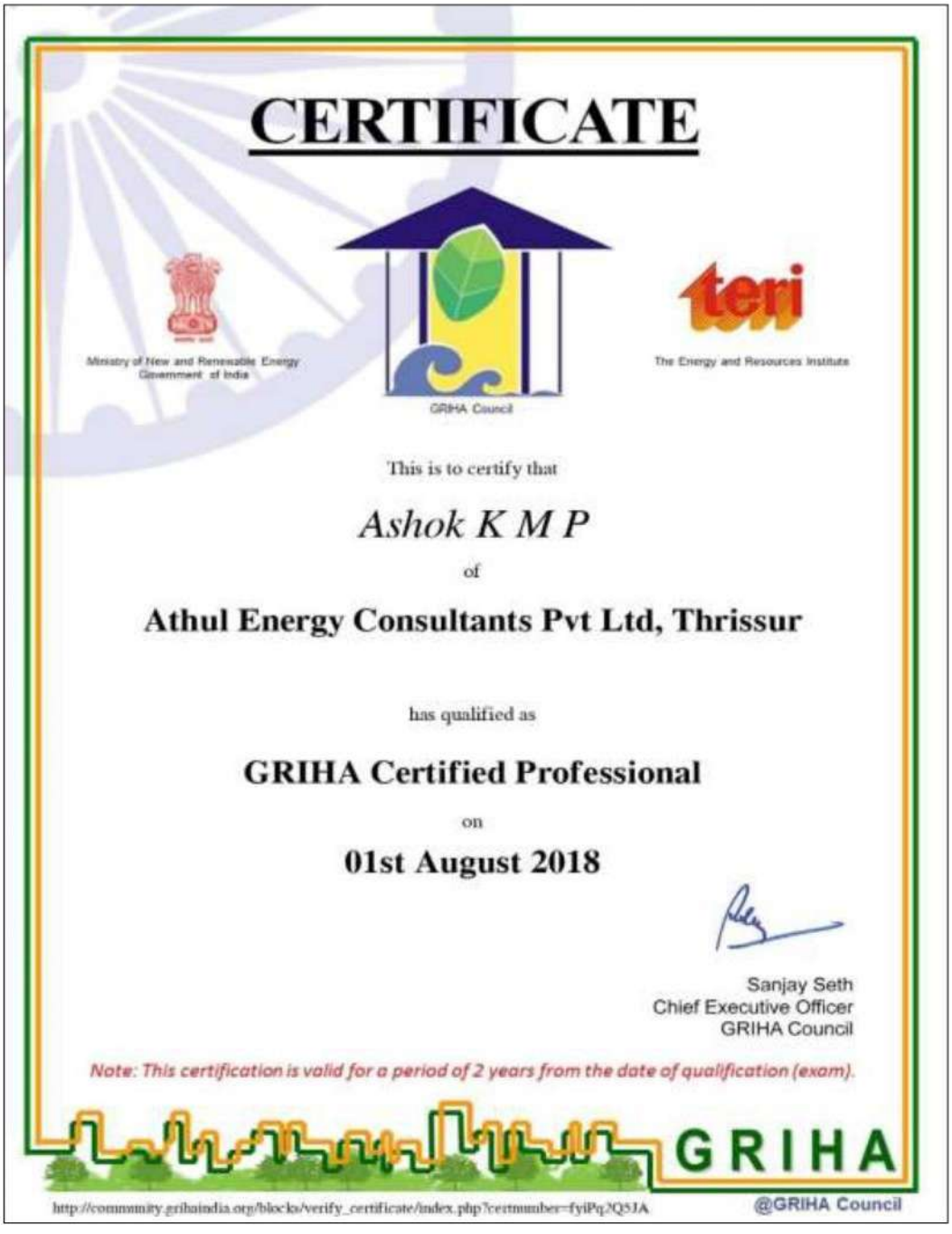

As part of Green initiative ecorestoration programmes Department of Botany provided Bamboo Saplngs to Thekkumkkara Panchayath on 10-12-2019.

As the Pandemic pinned us to our homes, we got more connected to the nature and the environment around us. This Environment day 2020, NCC Cadets of Vimala College planted saplings at their own home with their family and pledged to protect nature for a better tomorrow.

CONCLUSION:

Green audit report was compiled by Athul Energy Consultants Pvt Ltd, Thrissur for IQAC, Vimala College. The data for the present report was collected directly from the students, staffs and representatives of the management during campus visits. The collected data were analyzed and interpreted using standard procedures.

We the auditors observed that entire Vimala fraternity have taken continuous and considerable effort for nurturing and maintaining the greenery in the campus which should be well appreciated. However, some suggestions and recommendations were listed in the executive summary for implementing in the campus to attaining higher levels of environment sustainability in upcoming days



CERTIFICATE

Ministry of New and Renewable Energy
Government of India

GRIHA Council

The Energy and Resources Institute

This is to certify that

Ashok K M P

of

Athul Energy Consultants Pvt Ltd, Thrissur

has qualified as

GRIHA Certified Professional

on

01st August 2018

Sanjay Seth
Chief Executive Officer
GRIHA Council

Note: This certification is valid for a period of 2 years from the date of qualification (exam).

GRIHA

http://community.grihaindia.org/blocks/verify_certificate/index.php?certnumber=fyiPq2Q5JA

@GRIHA Council