



**AMC GROUP OF
EDUCATIONAL INSTITUTIONS**
MANISSERI, OTTAPALAM, 679 521 KERALA

GREEN AUDIT REPORT 2020 – '21



Nature's Green Guardians Foundation
Trivandrum 695 043



AMC Group of Educational Institutions, Ottapalam
Manisseri, Palakkad, 679 521 Kerala

Green Audit Report 2020-'21

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AMC Group of Educational Institutions

Manisseri, Ottapalam, 679 521 Kerala

Profile

AMC (Allied Management College) Group of Educational Institutions - promoted by Trisha Charitable Trust - established this higher education institution in Kothayur road, Manisseri, Ottapalam, in a peaceful and congenial 7.0804-acre land in Vaniyamkulam Panchayat of Palakkad district, for imparting education to the future generation of leaders with a unique innovative approach.

The college had a modest beginning in 2003 in a rented premises at Kulappully, a suburb of Shornur Municipality. The institution in its early days was under New Port University with a Post Graduate programme in MBA. In 2004, it was shifted to the present, own, campus at Manisseri, near Ottapalam and started undergraduate programme in Bachelor of Commerce with 50 students with the University of Calicut for distance education. AMC acquired affiliation from University of Calicut for B. Com Finance, and BBA Finance, as well as approval by Government of Kerala in 2014. UG Programs of University of Calicut like B.Com Cooperation, B.Com Computer applications, and BA Economics were introduced in 2015. Further, during the period of COVID-19 pandemic, the institution got recognized for M.Com programme. It was upgraded as a PG college in 2020. The UG programme BBA-Human Resource Management was also introduced in 2020.

Trisha Charitable Trust was established in 2004 with diverse interests such as activities in the field of Education, Women empowerment, and Philanthropy. At AMC 799 students are pursuing their UG and PG courses in AY 2020-21. The college is committed to provide individual attention to students through mentoring system which enable the students to become emotionally strong to achieve their dreams. Programmes like TIPS and SMART help advanced learners and low learners alike.

AMC provides opportunities to the students to organize programmes under various clubs, cells, and committees which nurtures leadership qualities and creativity. The disciplined instructions also infuse moral values and social commitment among the students. AMC support the students in the field of sports, cultural activities, and social outreach. Rooftop Rainwater Harvesting, renewable energy generation, Incinerator and appropriate other waste disposal steps are implemented in the college, following a pragmatic protocol on environment and sustainability.

As the College is still under progressive development, ensuring least disturbance to the natural environment, the level of service in various essential sectors are yet not up to the mark attained by other similar institutions in the district/state. With suggestions from this Comprehensive Benchmark Green Audit, the College intends to raise its Shade of Green to a higher level than at present - as shunning wastes and developing sustainability.



Vision and Mission

Vision

**To Transform Rural Youth into
Vibrant, Responsible and Socially Committed Citizens,
in the Spirit of Education and Excellence**

Mould students to be vibrant and empower them, irrespective of caste, creed, and religion to fulfil their academic and professional passion in an institution that is diverse, welcoming and inclusive for all students, faculty and staff

Provide strength, support, and opportunities for both faculty members and students through teaching, mentoring, and by promoting arts and culture

Deliver a promise and shoulder the responsibility and commitment to the parents to impart tech-savvy infrastructure supported, affordable, quality education to each and every student

Mission

Build Morally, Professionally, Technologically Updated Future Citizens

Support students to enhance their learning potential by integrating technology into their curriculum

Ensure that students develop the essential interactive skills which make them competent to face the challenges of the emerging society

Inculcate moral values among students which help them to take right decisions and choose the path they need to build a better society and develop one's overall personality

Core Values

Commitment, Competency, and Creativity



AMC Manisseri: Land Utilization

The Campus land utilization under six major functional areas is as follow:

	Total area of the campus	7.0804 acre
1	Area of playground	2.75 acre
2	Area under open air Auditorium	[4860 Sq. ft.] 0.11 acre
3	Area on agriculture /gardening	0.30 acre
4	Barren area	0.15 acre
5	Area: other purposes (specify)	1.0 acre
6	Area under Tree cover	2.7704 acre

Table – 1: Details of Land utilized for various purposes at AMC GEI, Manisseri

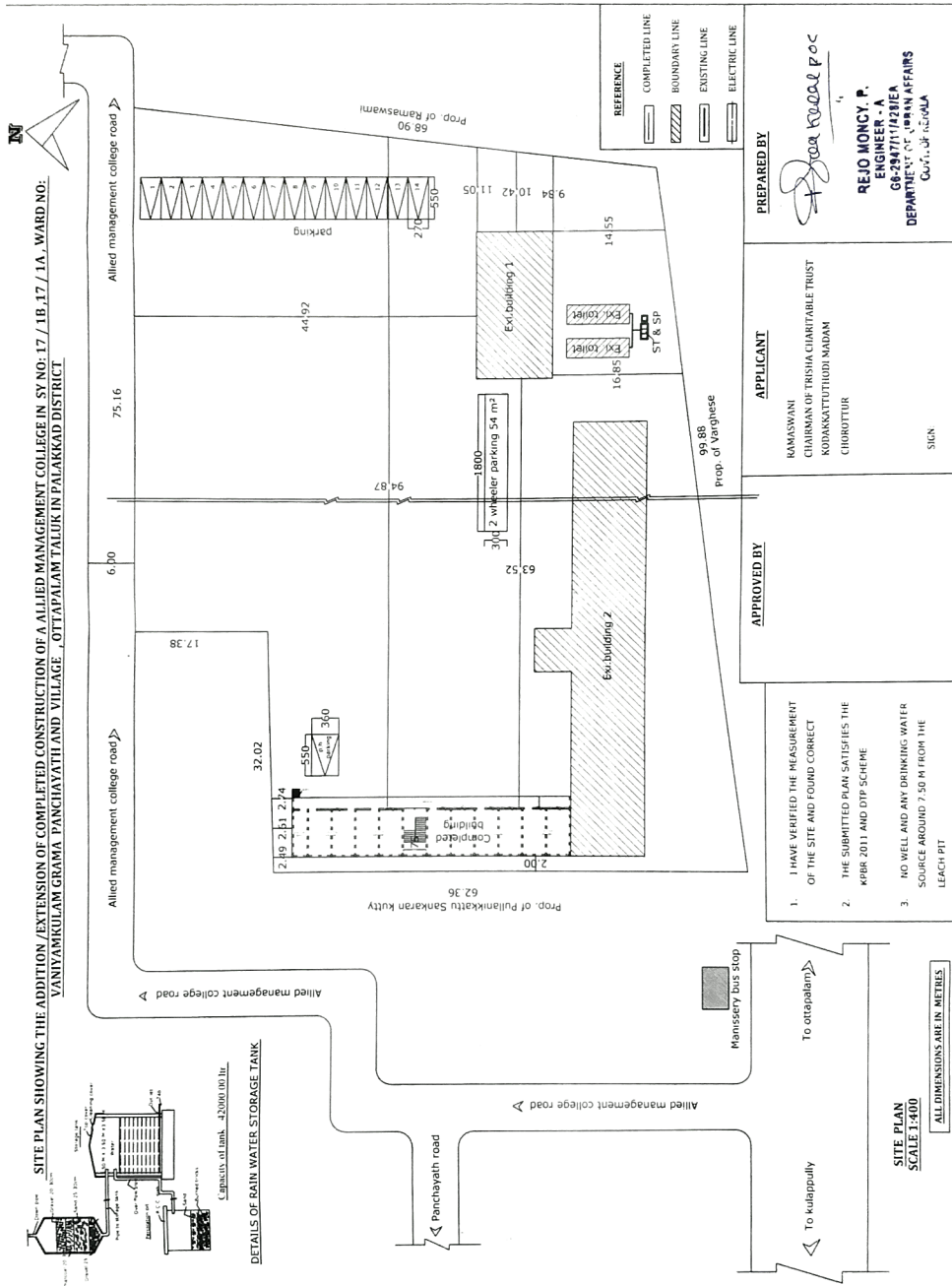
Details of buildings

The details of the buildings in the AMC Group of Educational Institutions in the Manisseri, Ottapalam campus as of 2021 June is as given in the table – 2.

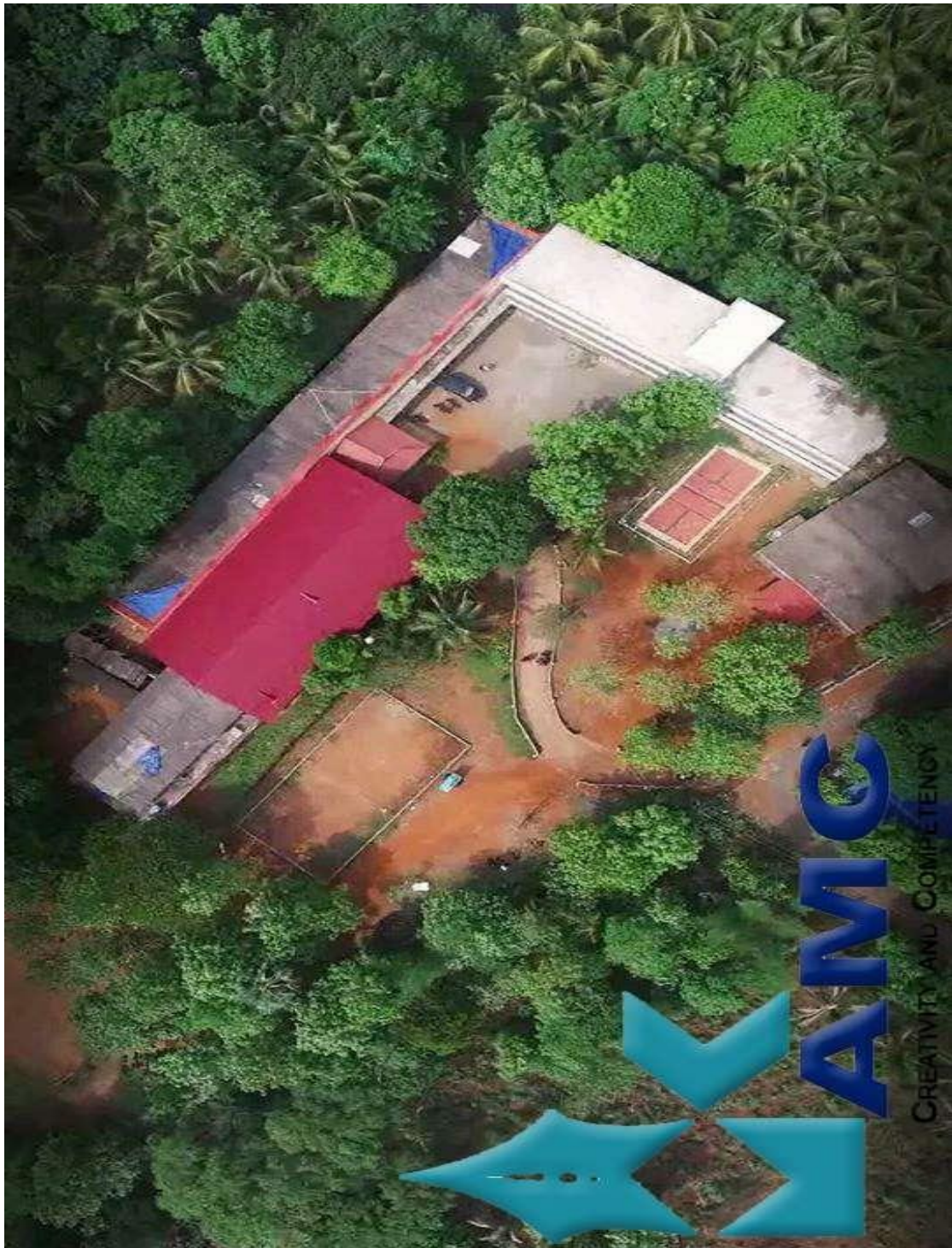
Building / Block name	Utility	Plinth area (sq. m.)	No. of Floors	Roof: concrete/ flat, sloppy/tiled
Hemambika Block	Classrooms, store room, library, health club	6000 sq. ft. (557.4 m ²)	3	Concrete, flat
Office Block	Office, presentation room, classrooms, ladies rest room, staff room	5580 sq. ft. (518.4 m ²)	1	Sheet
B. A. Block	Guest room, staff room, class rooms	2400 sq. ft. (223.0 m ²)	1	Concrete, sloppy
Audio Visual Hall	International video conference hall	1350 sq. ft. (125.0 m ²)	1	Sheet, sloppy

Table – 2: Building Particulars

AMC Group of Educational Institutions
 Manisseri, Ottapalam, 679 521 Kerala
Layout of Buildings



Aerial View of AMC



Executive Summary

This Green Audit Report of the campus of Allied Management College, Manisseri, Kerala, is prepared in a format that is easy for the students to comprehend the ecological values of learning at this institution, as well as to get reminded on how each student can try to contribute to the ongoing greening initiatives of the College community. Their appreciation of the facts appraised in this report will go a long way in our Nation moving fast towards green living. Green learning is a right, and at the same time a responsibility.

Observations and recommendations of the multidisciplinary green audit team on the overall green status of this higher education institution, is in effect an evaluation of the will of the community to work towards sustainable practices. The educated youth in any country should realise the truth that, being manmade many of the natural calamities are avoidable. The ability of our people to cope with their impacts should have been built up in stages. In short, a change of lifestyle is inevitable for everybody, and that can be achieved only if the educational institutions assume their crucial role, and direct their youthful energy and foresight towards a better tomorrow.

The findings of the Green Audit are only indicators on where and why additional efforts are required, and not in any way a criticism or commendation on its present performance. The College, affiliated to University of Calicut, has its courses mostly in subjects other than natural sciences or technology.

Green Auditing of a Higher Education Institution is a mandated activity as per Criterion VII (of the 7 criteria prescribed) under the 'Guidelines for Submission' of the mandatory annual Internal Quality Assurance Report (IQAR) by all Accredited Institutions. AMC decided to have its premises and performance green audited as the first step towards its journey to make it a greener campus.

One can speak of a college campus as "green", only if its performance is attuned to excellence and efficiency in the use of Land and Water resources, Energy including Use of Renewables etc., and based in its State of Health, Environmental Quality, good Transportation & Communication modes, as well as accessibility for the differently-abled students, and exhibiting only a lower level of than 'Carbon Footprint' it leaves behind through its activities.

For many centuries, Kerala has been a favoured destination for foreign traders and visitors, and they liked to call this destination as 'God's Own'. The youth here, as responsible future citizens are now doubly convinced that they are required to be a part of the efforts for '*building back better*' after the repeated disasters and health threats . No curriculum of studies in the past had covered anything like the causes and remedies of the problems the State and the Country are facing.

Therefore, students need to be proficient in the methods of analysing such situations objectively and acting jointly for solving them. Students should also realise that Green Audit is a better way to grapple with such situations. Green Audit is a tool to find out how and where an institution is using the most of energy, water, and other resources. The audited education institution can thus plan for the needed changes in their consumption style, and for considering more sustainable alternatives.

The Green Audit process for AMC, Manisseri for the year 2020-'21 therefore, involved the getting together of environment conscious students into Nature Club, and Club Green Guardians, and evaluating their own work for the year for areas other than their courses of study. An audit team with teachers and a team of experts who have practiced greening for years (including certified and accredited energy and environmental auditors and ecological administrators) through the Nature's Green Guardians Foundation (NGGF_n) worked for it, in spite of the fact that the year lacked several physical acts and procedures due to COVID management restrictions.

The partly simulated results showed that, the effective per capita carbon footprint of AMC Group of Educational Institutions, Manisseri, in Palakkad district, for the year 2020-'21 could be pegged at the level of 0.056 T CO₂ eq., compared to the per capita national average of 1.9 T CO₂eq. The low CF level is partly due to the low campus strength, and lack of study programmes related to science subjects, and also due to below average level of energy, water, and other welfare services. The Audit has made a number of observations in the respective chapters 1 to 3 on component audits, and under the section (Chapter 5) on Future Directions, to help the Management, the Staff, and the Students in their plans for making the college premises greener than at present, satisfying all norms and minimum standards. The natural green surroundings, if consolidated and enriched, can be an elevated base from which greening can be vigorously pursued in the coming years.

Prof. V K Damodaran

Chairman, NGGF_n

Former (Founder) Director of S&T and Environment Department &

Former (Founder) Director of Energy Management Centre-Kerala

And Former Secretary to Govt. of Kerala (Ex-Officio)

International Energy & Environment Expert/Ex-Consultant to UNIDO & UNEP

Trivandrum, 695 035. Dated: 20.04.2021

The Green Audit Team for AMC Group of Educational Institutions Manisseri, Ottapalam [2020 -'21]

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AMC Group of Educational Institutions

(Affiliated to Calicut University)

Manisseri, Ottapalam - 679521 (amcottapalam@gmail.com, amc-college.com)



Go Green

Campus Green Protocol

1. Support 'plastic free campus' drive by refusing to use banned plastic materials, plastic wrapped bouquets, plastics-based bags, banners, water bottles, lunch boxes, cups, and wrappers - within and outside the campus, and also at home
2. Reduce the use of fossil-fuel for transport, depend more on public transport, and cultivate the habit of vehicle sharing, and the use of e-mobility
3. Encourage water conservation, roof top rainwater harvesting, re-use of gray water etc. through appropriate measures, and educate the community on climate change impacts
4. Minimize energy losses, promote the use of sustainable energy sources, and resort to the use of energy efficient devices and gadgets at every opportunity
5. Practice bio-processing of bio-degradable wastes, through affordable technologies like biogas production, and successful composting
6. Resort to e-notices, e-banners, e-publicity, and digital slides for presentations - to reduce material use and environmental pollution
7. Keep inorganic wastes and e-wastes clean and dry, and stored separately and hand them over only to competent processing agencies
8. Keep classrooms, and open areas dust free, and the toilets and wash areas clean and litter free
9. All Stakeholders of the College accept the moral responsibility for keeping the premises at all times as "Waste-free, Clean, and Green"

Evaluated periodically

The success of the campus green initiative will be evaluated periodically through annual green audits



Green Audit 2020 – '21: Procedures and Priorities

To impart higher education for the predominantly rural youth, and lift them to a level of empowerment, the AMC group established a College in Manisseri, and has been working ever since towards excellence in teaching and learning, and in preserving the existing green surroundings. In order to identify and highlight the improvements required to meet the rising strength of students and their escalating needs, the management decided to conduct a 'benchmark green audit' of the Manisseri campus for the year 2020-21, and work for greening of all areas and activities to a better shade of green based on the audit observations and recommendations. The success of future greening can be evaluated based on the base condition obtaining from this audit.

The college administration has started work on several facets of the philosophy behind "Green Campus" - including Water and Energy Conservation, Tree Plantation, Waste Management, Mapping of Biodiversity, Community Outreach, etc., and the students are contributing towards environmental conservation and sustainable development.

Towards Detailed Green Auditing

Maximizing performance efficiency through conservation and adopting 'a route of minimal consumption' in all sectors of activities are the broad objectives of the management. This 'green auditing' is done for the academic year 2020-'21, even though the COVID-19 pandemic disrupted the regular routines of teaching and learning from March 2020. The consumption patterns that emerge therefore, will not reflect the state of ecosystem services available to the student community or its adequacy.

The stakeholders of this higher education institution have agreed to ensure the following:

1. Enhance and coordinate between various activities of the institution with increased importance given to ecological considerations and resources conservation;
2. Institutionalize all good practices initiated as part of work to acquire accreditation;
3. Introduce a desirable decision-making approach on the basis of 'life cycle cost' analysis of the infrastructure and services to be instituted;
4. Accept a dynamic system for functional and lifestyle changes by the students, teachers, and administrators of the institution; and
5. Review annually the progression of improvements made in infrastructure, manpower, and supporting technologies to achieve higher levels of greening the campus.

The Green Audit for the year was organised with months long preparations, and by informing and involving all stakeholders of the college, including the PTA. Thirty students and a few mentor-teachers were enrolled as members of 'Club Green Guardians', trained them on green auditing for 11 hours, in two phases, and completed the data collection stage of Green Audit, involving 7 domain experts having international experience. They are inducted as Green Guardians of the AMC.

Procedures:

1. Apart from the efficient use of energy, the scope of renewable energy integration is also aimed at, to minimize unavoidable imprints.
2. The procedure for Green auditing adopted by the team is to collect basic data on the components of green audit by the Green Guardians, refining them by the Faculty and Mentors, and showcase achievements and shortcomings - through photographs, where possible.
3. Set up feasible goals for the year ahead, and help to go up in steps.
4. In the end, convey the message to the community associated with the college, through its adopted villages, the students' homes etc. to bring about desirable changes in lifestyles, wherever possible.

Priorities:

While all the listed green audit components are equally important, priority for the current audit was set on:

1. Evaluating the compliance potential of the stakeholders
2. Examining in detail the reduction in carbon footprint possible in the major areas that emerge as the main emitters
3. Convincing the management on investment required, as well as the return on investment that is possible through 'Life Cycle Cost' analysis
4. Assessing the momentum gathered on student initiatives towards making the campus greener, a trend that is existing already in the institution.



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Go Green



Campus Population in 2020-'21

Category	Male	Female	Total
Students	457	342	799
Teaching Staff	7	25	32
Non-Teaching Staff	5	6	11
Total for 2020-'21	469	373	842

Programmes during 2020-'21

I	Post Graduate (PG) Programme
1	M Com Finance
2	
3	
II	Undergraduate - BA, BBA, B Com Programmes
1	B A Economics
2	BBA Finance
3	BBA Human Resource Management
4	B Com Finance
5	B Com Co-operation
6	B Com Computer Applications
7	

Component Audits

1. Audit on Green Campus Initiatives

1.1. Campus Trespass Restrictions

The Allied Management College (AMC), Manisseri, Ottapalam, Palakkad – is one of the recently instituted colleges in this region within a rural setting. It is a mixed college with 799 students studying during the audit year. At the inception stage in 2004, the founding members had envisioned this as a college, then in a 6.5-acre rural campus, and as an abode of education where learning is possible at affordable rates and living close to the nature in a very modest setting.



Check on Trespass and Directions to Visitors

Though the College has access gates on other side too, daily entry of students and staff as well as visitors and transportation of materials to the campus is regulated through the gate in this picture, opening on to the Ottapalam - Shornur road, which is attended to during working hours. Being a college in a village area, no stranger is likely to trespass the 'temple of learning'. People enter the college premises, only on genuine business.

As is indicated in the aerial photograph of the College area (Page 10), those who enter the campus in motor vehicles – cars and bikes – or by cycling, including students and faculty, are required to follow the movement routes which leads to the main office or other intended destinations, according to the directions from the Security person on Duty.

1.2. Use of Bicycles and EVs

Among the staff and students coming to AMC at Manisseri, 70 two wheelers, and one car form the personal transportation facility owned by individuals. These vehicles are shared to some extent among friends. A few of the daily commuters hire autorickshaws. There is only one student pedaling his bicycle to the college daily. A little over 20 students walk daily a distance of 2 km to attend the College. All others use several public transport/buses that are plying frequently - and alight right close to the college gate.



Two wheelers are parked under shades of trees

Kerala is on top of the Indian states having high population density and many roads even in Municipal Corporations are without obstacle-free footpath or cycle tracks. Students therefore feel it unsafe to depend on walking or cycling as a regular commutation mode. The annual road accidents in Kerala are close to 50,000 and this influences the parents in their choice of mode of travel of their children to the college. Within the campus during working hours, staff and students walk the distance between their activity areas.

Electric Vehicles (EVs) are catching the attention of people of Kerala only recently, as part of the 'Go Electric' national campaign vigorously being pushed by the concerned government agencies.

1.3. Pedestrian Friendly Pathways

The AMC has most convenient, green, and shaded pathways linking the different college building blocks, playgrounds, gym and other activity areas. The different blocks are having adequate separation and closeness, so as not to disturb academic work if students, guests

and visitors are required to pass by. The pathways are broad enough for groups of students to move in both directions at the same time, without crossing their ways or getting blocked.



Green and Serene pathways

These pathways are even, for gentle strolling or hurried jogging, and give easy access to all the activity areas, class rooms, departments, library, gardens, playgrounds, and the rest areas. There are many trees having distinctly dense and large canopy, dotting the route of the pathways. No regular motor vehicle movements are allowed along these pathways, except odd scooters/bikes at any time. The Audit found the campus as safe, but frequent clearing of bushes and hedges are required for the less trodden paths during the moist months.

1.4. Plastic Free Campus

The Principal, the IQAC, Students and all the other stakeholders at AMC, Manisseri, are rigorously following the Campus Green Protocol. The students in particular keep up their pledge of banishing plastics. in letter and spirit. Avoidance of plastics is targeted for all activities including honoring of guests at functions. The students have gone out into the nearby villages, to tribal pockets under their outreach programs, and to the homes around and persuaded even the local shop owners to avoid plastics completely, and embrace the 'Green Philosophy'.



Merging with Nature

Kerala Government too in recent years insist on green protocol to be followed at public places, and this initiative of students in eradicating plastics, and combating climate change impacts, is supportive of government eco-initiatives. The Audit team could not find plastics strewn around anywhere in the campus during visits.



AMC Library Interior: Reading area



Learning Home Electric Skills

2. Audit on Green Cover, Energy, Water & Environment

2.1. Green Cover (Biodiversity) Audit

A. Floral Diversity

To assess the floristic wealth of AMC campus, the club green guardians members trained by NGGFn have undertaken detailed survey of the trees having more than 10 cm girth at Breast height (130 cm above ground). The survey team was guided by the teachers. The team identified 167 trees in this category belonging to 22 Different species. The result of the tree survey is summarised in the following table.

Sl. No	Common name	Botanical name	No.of trees	Girth range at BH(cm)
1	Java plum	<i>Syzygium cumini</i>	2	18cm-220cm
2	Champak	<i>Magnolia champaca</i>	1	80cm
3	Ungu	<i>Pongamia pinnata</i>	7	18cm-71cm
4	Neem tree	<i>Azadirachta indica</i>	2	40 cm-40.3 cm
5	Gardenia	<i>Gardenia jasminoides</i>	1	110.4cm
6	Casuarina	<i>Casuarina equisetifolia</i>	2	39cm-50cm
7	Coconut tree	<i>Cocos nucifera</i>	2	75cm-80cm
8	Jack fruit tree	<i>Artocarpus heterophyllus</i>	2	29cm-155cm
9	Oleander	<i>Nerium oleander</i>	1	20cm
10	Almond tree	<i>Prunus dulcis</i>	1	30cm
11	Teak	<i>Tectona grandis</i>	98	20cm-116cm
12	Palm tree	<i>Roystonea regia</i>	19	44cm-160cm
13	Mango tree	<i>Mangifera indica</i>	2	20cm-25cm
14	Pavetta	<i>Pavetta indica</i>	11	23cm-90cm
15	Edala	<i>Olea dioica</i>	2	17cm-22cm
16	Uppila	<i>Macaranga peltate</i>	4	57cm-133cm
17	Golden shower tree	<i>Caasia fistula</i>	2	20.cm -20 cm
18	Gulmohar	<i>Delonix regia</i>	4	50cm- 110cm
19	Papaya	<i>Carica papaya</i>	1	26cm
20	Blackboard tree	<i>Alstonia scholaris</i>	1	30cm
21	Pullani	<i>Calycopteris floribundalam</i>	1	20cm
22	Parakam	<i>Ficus exasperate</i>	1	146cm



Herbal Garden at AMC

Sl. No	Common name	Scientific name
1	Murikkodi	<i>Hemigraphis alternata</i>
2	Kizharnelli	<i>Phyllanthus niruri</i>
3	Sathavari	<i>Asparagus racemosus</i>
4	Kiriyatha	<i>Andrographis paniculate</i>
5	Munja	<i>Premna serraefolia</i>
6	Thumba	<i>Leucas aspera</i>
7	Garudappacha	<i>Selaginella rupestris</i>
8	Kasthurimanjal	<i>Curcuma aromatics</i>
9	Vathamkolli	<i>Jusicia gendarussa</i>
10	Africanmalli	<i>Eryngium foetidum</i>
11	Putharichunda	<i>Solanum indicium</i>
12	Katarvazha	<i>Aloe vera.</i>
13	Thechi	<i>Ixora coccinea</i>
14	Insulin plant	<i>Chamaecostus cuspidatus</i>
15	Brahmi	<i>Bacopa monnieri</i>
16	Katuthrithavu	<i>Ocimum americanum</i>
17	Kammunistpacha	<i>Eupatorium odoratum</i>
18	Vayambu	<i>Acorus calamus</i>
19	Kurunthotti	<i>Sida cordifolia</i>
20	Ramacham	<i>Chrysopogon zizanioides</i>
21	Cheenamulaku	<i>Capsium frutescens</i>
22	Muthanga	<i>Cyperus rotundus</i>
23	Kunnikuru	<i>Abrus precatorius</i>
24	Puliyarila	<i>Oxalis corniculata</i>
25	Ilamulachi	<i>Bryophyllum pinnatum</i>
26	Neelayamari	<i>Indigofera tinctorial</i>
27	Adambu	<i>Ipomoea pescaprae.</i>
28	Nandyarvatam	<i>Tabernaemontana divaricata.</i>
29	Sanghupushpam	<i>Clitoriaternatea alba</i>
30	Vettila	<i>Piper betle</i>
31	Erukku	<i>Calotropis gigantean</i>
32.	Koduveli	<i>Plumbago zeylanica</i>
33	Adalodakam	<i>Justicia adhatida</i>
34	Vayalchulli	<i>Hygrophila auriculate</i>
35	Ginger	<i>Zingiver officinale</i>
36	Puthia	<i>Mentha arvensis</i>
37	Njetanga	<i>Physalis angulate</i>
38	Pepper	<i>Piper nigrum</i>
39	Kunnikuru	<i>Plectranthus amdoenicus</i>
40	Thiruthali	<i>Ipomoea obscura</i>
41	Uzhinja	<i>Cardisosvermum helicacaabum</i>
42	Vishnukranthi	<i>Evolvulus alsinoides</i>
43	Muyalchevi	<i>Emilia sonchifolia</i>
44	Cheroola	<i>Aerva lanoita.</i>
45	Nilappana	<i>Curculigo orchioides</i>
46	Karuka	<i>Cynodon dactylon</i>
47.	Mukkutti	<i>Biophytum sensitirum</i>
48.	Kanjunni	<i>Elipta prostrata</i>
49	Thulasi	<i>Ocimum tenuiflorum</i>
50	Philippine violet	<i>Barleria cristata</i>



B. Faunal Diversity

Sl. No	Species	Family Name	Common Name
1	<i>PavoCristatus</i>	<i>Phasianidae</i>	Peacock
2	<i>MegalamiaRubricapilla Malabarica</i>	<i>Megalaimidae</i>	Crimson-Fronted Barbet
3	<i>DicrurusAdsimilisMacrocerus</i>	<i>Dicruridae</i>	Black Drongo
4	<i>PloceusPhillipinus</i>	<i>Ploceidae</i>	Baya Weaver
5	<i>Passer Domesticus Indicus</i>	<i>Passeridae</i>	House Sparrow
6	<i>StreptopeliaChinensis</i>	<i>Columbidae</i>	Spotted Dove
7	<i>TephrodornisPondicerianus</i>	<i>Vangidae</i>	Common Wood Shrike
8	<i>AegithinaTiphia</i>	<i>Aegithinidae</i>	Common Iora
9	<i>CorvusBrachyrhynchos</i>	<i>Corvidae</i>	Common Crow
10	<i>CorvusMacrorhynchos</i>	<i>Corvidae</i>	Large-Billed Crow
11	<i>Bubulcus Ibis</i>	<i>Ardeidae</i>	Cattle Egret
12	<i>EgrettaGarzetta</i>	<i>Ardeidae</i>	Little Egret
13	<i>DicaeumErythrorhynchos</i>	<i>Dicaeidae</i>	Pale Billed Flower Pecker
14	<i>DinopiumBenghalense</i>	<i>Picidae</i>	Flameback Woodpecker
15	<i>MeropsLeschenaulti</i>	<i>Meropidae</i>	Chestnut headed Bee Eater
16	<i>Nectarinia Minima</i>	<i>Nectarinidae</i>	Crimson Backed Sunbird
17	<i>CentropusSinensis</i>	<i>Cuculidae</i>	Greater Coucal
18	<i>DicrurusLeucophaeus</i>	<i>Dicruridae</i>	Ashy Drongo
19	<i>AcridotheresTristis</i>	<i>Sturnidae</i>	Common Myna
20	<i>DendrocittaVagabunda</i>	<i>Corvidae</i>	Rufous Treepie
21	<i>TurdoidesAffinis</i>	<i>Leiotherichidae</i>	Yellowbilled Babbler
22	<i>CuculusMicropterus</i>	<i>Cuculidae</i>	Indian Cuckoo
23	<i>Pandion Haliaetus</i>	<i>Pandionidae</i>	Osprey
24	<i>FunambulusPalmarum</i>	<i>Sciuridae</i>	Indian Palm Squirrel
25	<i>Ratufa Indica</i>	<i>Scuiridae</i>	Giant Squirrel
26	<i>FelisCatus</i>	<i>Felidae</i>	Cat
27	<i>Sus Scrofa</i>	<i>Suidae</i>	Wild Boar
28	<i>Bandicota Indica</i>	<i>Muridae</i>	Greater Bandicoot Rat
29	<i>Pytas Mucosa</i>	<i>Colubridae</i>	Ratsnake
30	<i>AhaetullaNasuta</i>	<i>Colubridae</i>	Whip Snake
31	<i>CalotesCalotes</i>	<i>Agamidae</i>	Chameleon
32	<i>SphenomorphusDussumeiri</i>	<i>Scincidae</i>	Forest Skink
33	<i>Euploea Core</i>	<i>Nymphalidae</i>	Common Crow
34	<i>Tirumala Limniacea</i>	<i>Nymphalidae</i>	Blue Tiger
35	<i>HypolimnasBolina</i>	<i>Nymphalidae</i>	Great Eggfly
36	<i>Melanitis Leda</i>	<i>Nymphalidae</i>	Evening Brown
37	<i>DanusChrysippus</i>	<i>Nymphalidae</i>	Monarch Butterfly
38	<i>PapilioDemoleus</i>	<i>Papilionidae</i>	Swallowtail Butterfly
39	<i>Graphium Agamemnon</i>	<i>Papilionidae</i>	Tailed Jay
40	<i>PapilioPolytes</i>	<i>Papilionidae</i>	Common Mormon
41	<i>Peiris brassicae</i>	<i>Peiridae</i>	Cabbage butterfly
42	<i>Attacus atlas</i>	<i>Saturniidae</i>	Atlas moth
43	<i>Diplacodestrivialis</i>	<i>Libellulidae</i>	Ground skimmer
44	<i>Libelluladepressa</i>	<i>Libellulidae</i>	Broad bodied chaser
45	<i>Tholymistillarga</i>	<i>Libellulidae</i>	Coral tailed cloudwing
46	<i>Sympetrum fonscolombii</i>	<i>Libellulidae</i>	Red-veined darter
47	<i>Phymatostethadeschampsii</i>	<i>Cercopidae</i>	Banana leaf cercopid
48	<i>Oryctes rhinoceros</i>	<i>Scarabaiedae</i>	Rhinoceros beetle
49	<i>Scarabaeus viettei</i>	<i>Scarabaiedae</i>	Dung beetle
50	<i>Onthophagus Taurus</i>	<i>Scarabaiedae</i>	Dung beetle
51	<i>Leucopholisconeophora</i>	<i>Scarabaiedae</i>	Coconut white grub
52	<i>Hemidactylusfrenatus</i>	<i>Gekkonidae</i>	Common house gecko







Collection of Tree Data in progress

Observations/Suggestions

1. The biodiversity of the campus is not fully explored.
2. The Campus is having comparatively good greenery with trees and other herbal vegetation.
3. There is a need for detailed scientific study to explore the biodiversity and to analyze the contribution of the vegetation carbon sequestration, rainwater harvesting, etc.
4. The trees shall be properly geotagged and monitored annually for girth increment so that a clearer picture of annual carbon sequestration is obtained.
5. It is essential to develop a biodiversity register of the campus in a more informative form including the medicinal and commercial value of the species, conservation importance, etc. and with photographs of all plants and visiting/nurturing animals.
6. Special gardens like *Nakshatravana*, Butterfly garden, etc. shall be created to attract students and create awareness.
7. In view of the fairly rich greenery that is already maintained, there is a need for including more indigenous plant species which has more conservation potential for food, medicine, carbon sequestration potential, rarity, etc. This will also attract more birds and butterflies to the campus and increase the faunal diversity.

2.2.1. Energy Audit

In a college campus, it is customary in Kerala to have energy use from different sources such as electricity, petroleum gas, diesel, petrol, firewood, solar electric, solar thermal etc., to minimise the expenses for getting the needed energy services for the community to live and learn. Most of the time, the major component of carbon footprint – an indicator of ecological damage – in an educational institution will be from the energy related activities.

‘Energy Audit’ is a very useful activity through which every student and every connected family will be able to realise that, it is easy, at the same time profitable, to get ‘the same or more of work done’ with judiciously chosen lesser consumption route - called energy conservation - and also minimise the production of wastes within the campus. The major sources of carbon footprint (CF) are electricity and other forms of energy, transportation, wastes linked to food preparation and consumption, as well as other wastes generated. During the first ever green audit done at AMC, the data pertaining to electricity, transportation, and various types of wastes were monitored by the student green guardians to see how much ‘conservation conscious’ are the stakeholders in the Manisseri campus of the College.

To ascertain the energy consumption and devise ways for conserving energy, green guardians physically inspected every building and the rooms in it to know more about the fixtures like lamps, fans, and other connected equipment, noted their power, the average number of hours per day of use, the number of days they are normally put to use and arrived at the energy consumed in kWh (unit).

Sl.no	Name of Equipment	Power (watt)	No.	Average (hrs/day)	Energy kWh
1.	Tube light	36 W, 20 W	10	7.0	0.824
2.	Ceiling fan	56 W	8	1.0	0.224
3.	Speaker	10 W	4	1.0	0.040
4.	Table fan	55 W	2	5.0	0.275
5.	Computer	45 W	2	5.0	0.450
6.	CPU	90 W	2	5.0	0.900
7.	TV	85 W	1	1.0	0.085
8.	Scanner	16.5 W	1	7.0	0.017
9.	Printer	295 W	1	7.0	0.295
10.	Battery	850 W	4	7.0	3.400
11.	Camera	3 W	1	24.0	0.072
12.	Sound system	170 W	1	1.0	0.170
13.	Projector	340 W	1	1.0	0.340
14.	Round light	18 W	1	1.0	0.018
15.	Mike		1		
16.	Web camera		1		
1.	Bulb Outside AV Hall	7 W	4	8.0	0.224
2.	Tube light	24 W	1	8.0	0.192
3.	Bulb	100 W	1	1.0	0.100
4.	Bulb(big)	24 W	1	1.0	0.192
5	Camera	3 W	1	24.0	0.072

Table 2.2.1: Room-wise Equipment details & Energy Estimate for Audio Visual Hall

Sl No.	Building	Floor	Room Type	Equipment	Power (Watt)	No.	Average Use (hours/day)			
1	Office block	Ground floor	Presentation Room	Tube light	40 W	2	4 hr (0.32 kWh)			
				Fan	80 W	2	4 hr (0.64 kWh)			
				TV	70 W	1	1 hr (0.07 kWh)			
				LED bulb	12 W	1	2 hr (0.024 kWh)			
2		Ground floor	Room 1	Tube light	40 W	3	2 hr (0.24 kWh)			
				Fan	80 W	2	6 hr (0.96 kWh)			
3		Ground floor	Room 2	Tube light	40 W	2	2 hr (0.16 kWh)			
				Fan	80 W	2	6 hr (0.96 kWh)			
4		Ground floor	Room 3	Tube light	40 W	2	2 hr (0.16 kWh)			
				Fan	80 W	2	6 hr (0.96 kWh)			
5		Ground floor	Room 4	Tube light	40 W	1	2 hr (0.24 kWh)			
				Fan	80 W	2	6 hr (0.24 kWh)			
6		Ground floor	Room 5	Tube light	40 W	2	2 hr (0.16 kWh)			
				Fan	80 W	2	6 hr (0.24 kWh)			
7		Ground floor	Room 6	Tube light	40 W	2	2 hr (0.16 kWh)			
				Fan	80 W	2	6 hr (0.24 kWh)			
8		Ground floor	Room 7	Tube light	40 W	2	2 hr (0.16 kWh)			
				Fan	80 W	2	6 hr (0.24 kWh)			
9		Ground Floor	Office room (Principal)	LED Tube	20 W	5(3)	8 hr (0.48 kWh)			
				Fan	40 W	6(2)	7 hr (0.56 kWh)			
				Camera	50 W	2	24 hr (2.40 kWh)			
				Mini camera monitor	50 W	1	8 hr (0.40 kWh)			
10		Ground Floor	Visitors room	Camera	50 W	1	24 hr (1.20 kWh)			
				LED bulb	12 W	3(1)	8 hr (0.096 kWh)			
				Tube light	40 W	1	1 hr (0.04 kWh)			
				Fan	80 W	1	4 hr (0.32 kWh)			
				TV	50 W	1	8 hr (0.40 kWh)			
11		Ground Floor	Ladies resting room	Fan	80 W	2	1 hr (0.16 kWh)			
				Tube light	40 W	1	1 hr (0.04 kWh)			
				Washing machine	650 W	1	0.5 hr (0.65 kWh)			
				Fridge	375 W	1	1 hr (0.375 kWh)			
					50 W	1	1 hr (0.05 kWh)			
12		Ground Floor	Staff room	Camera	50 W	2	24 hr (2.4 kWh)			
				LED Tube light	20 W	1	7 hr (0.14 kWh)			
				Tube light	40 W	3	6 hr (0.72 kWh)			
				Ceiling fan	80 W	4	6 hr (1.92 kWh)			
				Cooler (not working)		1				
				Main Sw board	8 W	1	24 hr (0.192kWh)			
				Wifi modem	200 W	1	1 hr (0.20 kWh)			
				PC	100 W	1	1 hr (0.10 kWh)			
13		Ground Floor	Office	Inverter	50 W	1	24 hr (1.20 kWh)			
				Camera	50 W	1	24 hr (1.20 kWh)			
				PC	200 W	1	8 hr (1.60 kWh)			
				Laptop	200 W	1	2 hr (0.40 kWh)			
				Printer	40 W	1	5 hr (0.20 kWh)			
				LED Bulb	12 W	2	8 hr (0.192 kwh)			
				Pooja light	1 W	1	24 hr (0.024 kWh)			
				Table fan	60 W	1	8 hr (0.48 kWh)			

Total Usage: 24.313 kWh per day

Table 2.2.1.1: (Sample) Data Worksheet for assessing energy consumption
Such sheets are worked out and checked with the electricity bills

Month -> Charges	Energy Use Units (kWh)*	Energy Charges Rs.	Average cost per unit Rs.
June 2020	1,010		
July 2020			
August 2020	1,652		
September2020			
October2020	1,555		
November2020			
December2020	2,080		
January2021			
February 2021	1,787		
March 2021			
April 2021	1,942		
May 2021			
Year Total	10,026	Rs. 20,440	Rs. 10.52

* In view of COVID closure, actuals during 2019-20 is taken

Table 2.2.1.2: Electrical energy from KSEBL

AMC's average monthly electricity consumption comes to 836 kWh. The annual energy consumption that accounts for GHG emission due to electricity use in the campus is therefore based on the total for 2020-'21 as 10,026 units (kWh).

Observations

1. As an educational institution, it is not possible for keeping a uniform demand level either daily or monthly. The College being forced to stop offline classes by the government, the actual electricity bills for the audit period will only be the minimum. To get a picture of Carbon footprint contribution, data for the previous academic year is taken.
2. A College with only 799 students, not having a hostel or a canteen, especially catering to students from nearby localities, as well as not having programs in the science streams, the electricity consumption is bound to be lower than other established Arts & Science Colleges with hostel facilities. The annual per capita electricity consumption based on the campus population is 12 kwh.
3. The extent of power failures in the campus during class hours are not recorded in a log book.
4. As constructions are still not complete, the adequacy problem cannot be verified at this stage. Therefore, it is suggested that a detailed (investment grade) energy audit be conducted once the infrastructure expansion work is completed.
5. AMC should maintain a register on energy use of all forms and record the energy in units consumed every month, and the charges paid for it. Green Guardians can compare this with previous month's data and alert the IQAC team on trends and inadequacies.
6. As the College Authorities are conservation conscious and trying to propagate a 'minimalist' way of lifestyle, the intended benchmarks may be declared.

2.2.1. Energy Efficiency Improvement

In any energy application area, the most attractive opportunity in the path of greening through energy management is the avoidance of incandescent bulbs and replacement of ordinary fluorescent tubes. As the campus development works are still progressing, a decision can be taken to use only energy efficient devices, guided by the 'life cycle cost' philosophy, and demonstrate to students the merit of energy efficiency improvement in work places and homes as well.

Reduction in Carbon Footprint also arises due to electrical energy savings from LED lamps. Assuming 6 hrs per day of use, and 250 days in a year, the energy cost savings (at a cost of Rs. 5.00 per kWh; average cost at AMC is Rs. 10. 52) will be $(36\text{ W} \times 6\text{ h} \times 250\text{ d})$ divided by 1000 and multiplied by Rs. 5. That is Rs. 270 in a year from one tube light alone. Such a tube can now be purchased at a bulk rate cost of Rs. 250. That is 'money back' in even less than one year. Assuming a minimum of 5 years' life for the tube, the net profit from each replaced tube is over Rs. 1,000 (4 times) for an investment of Rs. 250.

Good quality tubes may last much longer than 5 years. It will be an illuminating exercise for the students to learn how much energy charges could the college save due to the use of better technology and compare it with the investment required and learn about the 'Life Cycle Cost' approach.

Observations and suggestions (for improvement of energy use pattern):

1. The strategy of physical isolation – i.e., removing the plugs from the plug base (socket) – when not in use – may be adopted, and this should be made known to the teachers and other staff, through stickers on or near the common office equipment. This will help: (i) in improving safety to the users and the equipment, and (ii) in reducing 'Phantom load' (consumption of a small amount of energy in the 'switched off' condition).
2. Prepare a Maintenance schedule for the switchboards and distribution boards, and exhibit them for all stakeholders to follow them without fail. The primary data collection by the students have taken stock of all gadgets and fixtures.
3. Arrange to keep Log Books for recording energy consumption, extent of power failures, and running of standby generator, etc.). These shall be periodically inspected by a designated member of teaching staff.
4. The room-wise data on connected load may be analyzed to find opportunities for energy efficiency improvements and payback period assessed. Lighting devices, fans etc. may be necessarily studied.
5. The CGG members may initiate an "energy needs" survey for the campus from students' perspective including all forms of energy service required, to prepare an action plan for the college.

1.2.2. Renewable Energy Use Audit

In the recent past, natural calamities like Okhi & 2018 floods, and viral diseases like Nipa, H1N1, and COVID-19 (two waves) gave Kerala a louder warning on the serious consequences of climate change and the factors that drive it. It is as a result of the excessive warming of the globe when compared to the situation at the time global industrialisation started (around 1850) is well known to the people of Kerala. The excessive warming of the globe was no doubt on account of the trapped greenhouse gases in our atmosphere. The major portion of these gases, to the extent of 70% plus, is due to CO₂ owing to the increased use of fossil fuels for energy generation - for motive power, lighting, and for other industrial uses. Therefore, global warming can only be halted through reduced use of energy from fossil fuels such as coal, oil, and natural gas. During 2020-21, a little over 70% of electricity the Kerala state is using is ultimately coming from fossil fuel power stations from states other than Kerala. Limiting the energy use will go contrary to the efforts to develop, and raise people's welfare. Yet, it is possible for us to improve our welfare using less energy, through increased energy efficiency, and further by shifting to the use of energy from non-fossil, and renewable sources such as wind, sunshine, water, biomass, etc.

During the audit year 2020-21, AMC which had not entered into the area of non-fossil energy, decided to install a solar photovoltaic (SPV) power plant of 8.0 kW in the campus and the project was nearing completion towards the end of the academic year. Being a grid-tie system, generated power goes to the KSEBL grid, from where the institutions draws the needed power. The plant details are given in table below.

	Type of RE	No. of Units	Size of Unit	Energy Output expected	% Total	Incurred Cost Rs.
1	Solar Energy (SPV)	1	8.0 kW	35 kWh* (units) per day	127% of electricity	Installed by KSEBL 'Soura'

**Commissioned only in October 2021. Output accounted in CF as potential remediation*

Table 2.2.2.1: Status of RE installations in AMC, Manisseri, Ottapalam

The cost of Solar Photovoltaic lighting has been coming down, and it has now reached a level where Solar PV can even be a commercial proposal. It is only natural that through its Green Campus Initiative, any education institution will be able to identify opportunities for developing locally feasible renewable energy (RE) sources, and for using them within their premises, in view of the mounting natural disasters faced by all countries of the world, due to unpredictable climate change impacts.

(Model Format): Record of Power Interruptions in the Campus

Time: (Hour & Minute); *Generator or Solar source connected; Remarks

Date	Time failed	Time restored	*Gen Start	Gen Stop	Remarks/ Reason

Table 2.2.2.2: Power Interruptions and Reliability of Electricity as a source



8.0 kW Solar PV plant at AMC Manisseri feeding the KSEBL grid



Solar inverter and other control devices

Observations and Suggestions:

1. With the specific objective of increasing the use of renewable energy, taking advantage of this window of opportunity, AMC can propose a Roof Top Solar PV addition, to make the campus “Net Zero”, so that carbon footprint is fully wiped off.
2. The students under the Club Green Guardians may also explore the possibility of establishing a biogas plant to utilize all the organic wastes in the campus and turn it to energy.

2.3. Water Audit

With the average annual rainfall for Kerala at 3107 mm, Palakkad district gets an average annual precipitation of 1218 mm only. Adequate and uninterrupted water supply for drinking, personal use, gardening, agriculture, and animal husbandry is however, uncertain in several districts of Kerala, especially in the northern districts. Water conservation is hence an essential activity that should be pursued as part of the greening initiatives. But, many people including good many students in Kerala, cannot imagine the prospect of a severe water shortage even in future.

Globally, The Alliance for Water Stewardship, Carbon Disclosure Project (CDP), Ceres, The Nature Conservancy, Water Footprint Network (WFN), World Resources Institute (WRI), WWF, and the Water Mandate Secretariat jointly conducted an exercise in 2013 to make the public familiarised with three terms: Water Scarcity, Water Stress, and Water Risk. Though these terms may sound similar, technically they are to be used to indicate different water availability situations.

“*Water Scarcity*” refers to the volumetric lack of water supply. This is generally calculated as a ratio of human water consumption to the available water supply in a given area. Water scarcity is an “*objective reality*” that can be measured with accuracy across regions and over a time scale.

“*Water Stress*” refers to the ability to meet human and ecological demands for water. Compared to scarcity, “*water stress*” is a broader concept. It considers several physical aspects related to water resources, including water scarcity, but also water quality, environmental flows, and the accessibility of water.

“*Water Risk*” refers to the probability of a difficult water-related event. Water risk is felt differently by any sector of society and the organizations or families within them. So, it is defined and interpreted differently, even when we experience the same degree of water scarcity or water stress. Many water-related conditions, such as water scarcity, pollution, poor governance, inadequate infrastructure, climate change, and others, create *risk* for many different sectors and organizations simultaneously.

We often hear of ‘water stressed’ regions where ‘extra care’ is required for discouraging the methods of wasteful water use by adults as well as children, farmers and others. As of 2019, according to World Resources Institute (WRI), the extremely high water-stress experiencing countries are - in order of their ranking - Qatar, Israel, Lebanon, Iran, Jordan, Libya, Kuwait, Saudi Arabia, Eritrea, UAE, San Marino, Bahrain, India (13th), Pakistan, Turkmenistan, Oman, and Botswana. It is in these 17 nations that nearly 1.7 billion (22%) of the world’s population reside, with India housing the lion’s share (1.37 billion or 18%). *So, India is also at risk.*

The annoying conclusion is that these 17 countries could experience the biggest economic losses from climate-related water scarcity – up to 14% of GDP by 2050 - and as many as 3.5 billion people could experience water scarcity by 2025.

It is in this context that the 'water audit' of 2020-'21 of AMC, Manisseri, Ottapalam is assuming importance. The annual average temperature ranges from 22 to 41.8 deg. C in Palakkad district.

AMC campus with a campus population of 842 manages its water requirements from one borewell as well as from rainwater harvesting and injection into the soil mass. The water details are shown in the following tables.

No	Source	Details
1	KWA/Municipal/supply	
2	Own well/s	Bore Well
3	Pond/Rain water Harvest	Rain Water Harvest
4	Others	Nil

Table 2.3.1: Water Sources in AMC

No	Items	Details
1	Water pumps: Electric/Diesel	Electric ½ HP/ well 1½ HP
2	Overhead Tank/s Capacity litre	4 tanks (2800 L) +1 fish pond (1500 L) = 4300 L
3	Pumping hours	2 hrs/day (fish pond), 2 hrs/day (well) total water supplied daily
4	Total water supplied daily other arrangements	2000 L for students,1500 L for gardening

Table 2.3.2: Water distribution particulars

Hand/Face/Floor/Utensil-wash by student and staff

Place no	Water source	Total persons using	Average time/ Person (Minute)	Water flow/ Min Litre	Disposal to drainage %	Dis open space %	Dis Treated Reused %	Dis Soak Pit %
1	New building	200	1 min	35 sec	3 %			
2	Eco	50	1 min	35 sec	2%			
3	Gents staff	5	1 min	10 sec	95%			
4	Main water filter	150	1 min	35 sec	3 %			
5	Ladies wash	200	1 min	10 sec	95 %			
6	Gents wash	100	1 min	10 sec	96 %			

Table 2.3.3: Water consumption particulars

Place of leakage	Water sources	Water loss/min (litre)
Nil		0.0

Table 2.3.3a: Water loss (Survey based)

No	Water Used for	Per Day Total
1	Toilet flushing	1,100 LPD
2	Cooking	LPD
3	Utensils wash	850 LPD
4	Floor wash	10 LPD
5	Gardening	1,500 LPD
6	Bathing/personal cleaning	LPD
7	Other/	LPD
8	Other/Occasional	40 LPD
9	Loss Thro' tap leaks	LPD
10	Loss Thro' pipe breaks	LPD
	Total	3,500 LPD

Table 2.3.4: Water consumption - Students' Assessment

No	Building	Taps	Single	Multi-taps	Bath room	Toilet	Toilet special
1	New building			4			4
2	Economics		2	2	2	2	8
3	Herbal garden	3					3
4	Security	1					1
5	Flower garden	3					3
6	Sprinkler	7					7
7	Wash + Gents toilet	19					19
8	Wash + Ladies toilet	12					12
9	Water filter			2			2

Table 2.3.4: Water outlets: Distribution Building-wise

There is no need for the campus community to depend upon KWA public water supply. The various functionalities for which this water is utilized is assessed by the student volunteers through surveys and sample measurements taken at user end. Through repeated awareness and education programmes, the students have acquired the water use behaviour of water starved area and is very conscious of water use in a frugal way.



Bore well recharging point, Filtering Unit, and one Distribution tank

As per the survey conducted to assess the quantum of water used for flushing, utensil washing, face washing, floor washing, bathing, cooking etc., the position during the current year is as given in Table 2.3.4. Separate water meters are not installed in the system to measure these. Therefore, the Student Green Guardians have collected data on water use through representative surveys and user point assessments.

Observations and Suggestions:

1. The total per capita water use works out to about 4.2 LPD only. This would meet only the essential needs. It is noted that students are in the habit of bringing lunch and snacks, plus drinking water from their own homes. Under such conditions, these levels are satisfactory.
2. The bodily water needs of a person per day (drinking) are generally close to 2 LPD and with cooking etc., the total needs may come to 16 LPD. Conservation of water through effective rainwater harvesting is considered as a helpful educational activity for students, to appreciate the potential impacts of climate change and for building resiliency against such impacts. Roof top rainwater harvesting is practiced in AMC and it is recharged to the soil. This is a commendable activity of educative value on water management strategies for a district like Palakkad.
3. The practice of re-using grey water for gardening as is done in many other colleges in Kerala, is not workable in AMC because hostel and canteen facilities are not available.
4. The water quality, as proved by random testing is acceptable. However, attempt should be made to obtain test certificate from a statutory laboratory. Water quality has been declining in most parts of India, and in Kerala, as a result of development activities of various kinds and it is worthwhile to bring this issue to the notice of students.

(Model) Register for Water Quality Test

Date Sample taken	Tested by (Lab.)	Findings	Other references

Seasonal checks may be got done by nearby Statutory Labs like the District PCB Lab.

5. Audit suggests that it will be beneficial for the college to prepare a ‘needs sheet’ based on the various utilization zones, and also assess the current pumping efficiency and look for an optimized internal water supply system. The needs survey should take in to account all the water using sectors, including vegetable gardens, herbal garden, toilet blocks, dining area wash basins, drinking water faucets, mini tea/coffee making tables, visitor guest room water needs, etc. Refer to national benchmarks on water service needs.
6. Student Green Guardians, and NSS members together can conduct the needs survey, and make the College water management system a replicable one.

2.4.

CGH – Clean, Green and Healthy – Audit

[Waste, Transportation, Health & Environmental Quality]

Colleges like Allied Management College in Manisseri, Ottapalam, Palakkad, focus their attention on nurturing a healthy mind and an ethical attitude in the students. It is well known that bodily health is not possible without a 'Healthy Planet Earth'. The health of Planet Earth, as is well known is ensured only through a 'Clean, Green and Healthy' way of life by the people. Every citizen should therefore respect the laws of nature and try to lead a way of life very close to the ways of Nature.

The Nature as we understand now is 4.5 billion years old, and the health of Nature - and its vicissitudes - have fed, as well as starved, millions of living organisms on and off, for long periods. The future citizens – students - are, therefore, to be trained not to deviate too far from Nature's "limits of tolerance". Reckless lifestyles create problems of wastes, pollution to the environment through transport vehicles, and in general results in the poor status of land, water, and air in terms of quality. The CGH audit is to ensure that the 'learning environment' for the students is of the right type, and healthy - in other words 'Green'.

2.4.1. Waste Audit

As any other established higher education institution operating in Kerala, AMC in Ottapalam is continuing to dispose of its wastes in a conventional and hygienic manner. As the College has a limited area, and the area being used predominantly for academic activities mostly in full day light, the nature and quantum of wastes are only of a limited pattern and quantum. There are differences in quantity of wastes generated between workdays and holidays, as well as between seasons, as the lion share of the students are 'day scholars'. An average figure per person per day for AMC activity type, is however worked out by observing students' activities ordinarily through a sample survey for a week by the student volunteers, and inspecting the disposal area, quantifying the measured wastes, and then extrapolating for the whole campus. In the current audit year, such measurements were not possible due to COVID restrictions and online class pattern.

For Indian academic campuses, assessment of wastes generation is done using empirical constants arrived at by research studies on waste generation, and these are given as guidelines for arriving at values for GHG emissions from wastes. Such values are used in evaluating the data on wastes in the AMC campus as well. The summary of Data Sheets on Wastes with Auditors' Remarks are given in Table 2.4.1.1 to 2.4.1.4. As in many rural areas proper disposal facilities are non-existent, the modes currently indicated are unacceptable from ecological considerations. It is possible for the College to build proper facilities during this campus development phase.

Area	No of Students	No of Bathrooms /Toilets	No of Floors	No of Rooms	No of Garbage Bins
Office Block	250	13	1	11	12
Hemambika Block	440	Nil	3	16	13
BA Block	109	1	1	6	7
Audio Visual Hall		Nil	1	2	2

Table 2.4.1.1: Waste Generation Data

Item	Quantity	Disposal type	Remarks
Food waste by students and staff	1 kg	Waste pit	
Food waste Canteen + Hostel	NA	Nil	
Paper waste Students and staff	2 kg	Bin	Sale to scrap
Paper waste bulk Canteen +Hostel	Nil	Nil	Sale to scrap
Plastic waste Individual	<1 kg	Bin	
Plastic waste bulk	1 kg	Bin	
Glass & utensils	0.5 g	Pit	
Electronic Waste Office + Lab	2 g	Waste pit	Sale to scrap

Table 2.4.1.2: Waste Material and Disposal Mode

Item	Unit (monthly)	Qty
Paper A4 80 g	800	1 kg
File Pad	10	<1kg
File cover	10	<1kg
Paper cups	60	<1kg
Paper plates	15	<1kg
Other paper items	20	<1kg
Printer Cartridge	18	<1kg

Table 2.4.1.3: Stationery Used and Disposed

Place	Total Kg/day	Major items	Disposal local body	Disposal Public area	Disposal Landfill	Burn	Recycle /reuse
Office	<1 kg	Bulb, Tube			Tube, Bulb		
Library	1g	Bulb, Wire			Bulb		Wire
Front	1g	Bulb, Wire			Bulb		Wire

Table 2.4.1.4: Electronic Wastes: Bulk Generation, Materials and Disposal Mode

Notes: (i). Carbon footprint calculations are in Chapter - 4; (ii). Being of small quantity, alternative solutions are not possible; (iii). Simple paper recycling, and converting them into useful or ornamental pieces by the girls are worthy examples. (Based on Student Survey)

Summary of Wastes Audit in AMC, Manisseri, Ottapalam

Adequate numbers of small garbage bins are provided in the office and academic areas in the College. Large enough waste receptacles are deployed prominently in open areas accessible by visitors.



Segregation of Wastes in Bins



Incinerator

R E C Y C L E Centre at AMC

Observations and Suggestions:

1. Most Toilets are provided as a facility cluster. European and Indian style toilet pans provided are to be expanded in number, provided in more dispersed way, and maintained well ventilated and super clean 24x7.
2. Being a mixed college, proper napkins disposal facilities are already provided, and incinerator unit set up. With the dispersion of toilets, its direct link to the napkin dropping facilities should be ensured.
3. Chemical and glass wastes originating from the laboratories on account of experiments and demonstration works are not important for AMC in view of the nature of programs offered. Any such wastes now are only on a limited scale. They are now disposed of safely. The handling system may be coordinated to comply with the hazardous wastes and e-wastes disposal norms.

2.4.2. Transportation Environment Audit

Reducing carbon footprint is a difficult task for Colleges, as transportation and energy use related share will be the most prominent in such institutions. Travel of students and employees to and from the campus has to be inexpensive and as comfortable as possible, for which public transport facilities like train and bus should be easily accessible. In the case of AMC, the college is in the outskirts of Ottapalam town. Buses are the most prominent option for daily commutation in such a setting. The data on the number of people using public and personal transport are collected by the student volunteers through a survey. The students and staff, other than scooter and car owning persons, use public transport system for daily commutation.

Students/ Staff coming in Own/Hired Vehicle:

1. Motor bike/scooter (single, shared) Per day
 - a. No. of Motor bike/scooter : 70 (students + staff)
 - b. No. of persons : 80
 - c. Total km travelled/day (To and fro) : 6 km/2 wheeler
2. Auto Rickshaw
 - a. No. of Auto Rickshaw used : 2
 - b. No. of Students : 1
 - c. Total km travelled/day (one way) : 1 km
3. Own Car (single, shared)
 - a. No. of Own cars : 1
 - b. No. of persons : 1
 - c. Total km travelled/day (To and fro) : 5 km to and fro
4. Shared Taxi Car
 - a. No. of Taxi cars : 12/day
 - b. No. of Students & Visitors : 10
 - c. Total km travelled/day (To and fro) : 10 km
5. Private Van/Mini Bus/Bus
 - a. No. of Autos – material transport : 1
 - b. No. of persons : 1
 - c. Total km travelled/day (To and fro) : 3 km
6. Public Transportation (Bus & Train)
 - a. No. of students : 380
 - b. Total km travelled/day (To and fro) : 6 km avg. to & fro
7. Students Cycling to College
 - a. No. of students : 1
 - b. Average km travelled by person/day : 2 km
8. Students Walking to College
 - a. No. of Students : 21
 - b. Average km travelled by person/day : 2 km/pax (to and fro)

Educational Institution Vehicles Operated during the Academic Year 2019-20

Car/Bus Nos.	Average No. of Persons per trip	Total distance travelled during the Year (km)	Fuel Consumed (Litre)
Car: 0	--	--	Nil
Bus: 0	--	--	Nil

*The emission calculation is made based on available data from test running:
2.3 kg CO₂/litre (petrol); 2.68 kg CO₂/litre (diesel) [DEFRA 2016]*

Table 2.4.2.1: Transportation data for AMC Group of Educational Institutions, Manisseri

The predominant mode of transportation for college students in Kerala is bus or train. In limited cases, they travel by bicycle or even may walk. Buses need diesel having heavy carbon footprint, in other words contribute to the generation of greenhouse gases (GHGs) generally referred to as carbon emissions (in the form of CO₂, Methane, Sulphur compounds, Nitrogen oxides etc.) and the total impacts are heavy. This has a direct bearing on the Global Warming and the consequent Climate Change (CC) effects. The purpose of Green Auditing is to make every staff and student understand the extent of damage each one inflicts on earth and on our own environment. Accurate assessment of such environmental damages is a time-consuming exercise.

Sl. No	Details/Type	No. of Vehicles	No. of staff /students	Total km/day to & from – Each
1	Motor bike/scooter (single/shared)	70	80	6 km
2	Auto Rickshaw used	2	1	1 km
3	Own car (single/shared)	1	1	1 km
4	Parents Shared	12/day	10	10 km
5	Mini Bus	Nil	Nil	Nil
6	Public Transport (Bus)	380	6 km
7	Cycling to college	1	1	2 km
8	Walking to college	21	2 km
9	Material Transport: office	1	...	3 km/day

Table 2.4.2.2: Transportation data - Summary

At the UN Framework Convention on Climate Change (UNFCCC-21) in December 2015, India too had committed to bring down our country's Carbon Foot Print on the global environment. Every Indian – be it a student, teacher, or parent, or anybody else not connected with it directly, should know how much burden each one is inflicting on the environment, and try to bring such impacts to 'near zero' through all possible remedial actions. 'Simple living' and 'Greener travel' generally help in keeping a low carbon footprint profile.

Emission of climate changing gases through transport system – both public and personal – is very high in India, and India stands third in respect to GHG emitting resource utilization globally. India is also at the 6th place in the 'after industrialization accumulated emissions' [170 years starting from 1850]. But, if we take per capita emissions, India is not a heavy polluter – it stands at 10th position only, and the quantum is less than one-third of the world average.

For assessing the carbon footprint due to transportation related to the functioning of the College, specific details were gathered by student volunteers through the survey.

The following additional assumptions are used for a rapid evaluation of the trend in transportation related carbon footprint:

1. Parents and occasional visitors generally use public transport; own car or taxi is used only in a limited way.

-
2. Within the campus, students do walk regularly, and since all buildings are close to each other, ordinarily there is no need to use vehicles inside the campus.
 3. Among the public transport (bus) users, there are private-bus or public-bus service users.



AMC Buildings: Immersed in Green



Observations & Suggestions:

1. The distance range of cars and scooters used by staff and students for commuting daily may be studied with finer precision.
2. Awareness on the benefit of using e-vehicles may be propagated more vigorously.
3. Every motor vehicle user should be reminded to plant additional tree/s within any greening exercise inside or outside the college campus, or at their own homes.

2.4.3. Health Audit

Ensuring a healthy environment for learning to the students is an acknowledged responsibility of all higher education institutions. The purpose of greening of college campuses is to ensure that the students are able to live and learn in as rich a healthy environment as possible for every student to be pampered with offerings to develop a young person's physical and intellectual capabilities to the full.

The method adopted by NGGFn for assessing the physical well-being of the educational institution in Green Auditing is as follows:

1. Examine the prevalence of major 'sick leave' cases, if there are any;
2. Examine the first aid and medical facilities available for resident students and staff, as well as for others during working hours;
3. Evaluate the atmospheric quality for adequacy, drainage systems for fast evacuation of liquids, and the extent of land pollution, if any in the campus; and
4. Assess the active involvement and achievements of students in arts, sports and games, especially in inter-collegiate and inter-university contests - as these are indications of their healthy mind and body.

Observations on these aspects in respect of AMC, Manisseri for 2020-'21 are:

Sick leave: Kerala is known for its low mortality and high morbidity status in comparison to the national health status. This is because most mothers are educated, and so even a minor headache is promptly taken care of, at least at the nearest primary health centre, or any clinic/hospital in the locality.

Year	Total No. of Students	Total Sick leaves availed in 2020-21	Average Per Capita sick leave
2020-21	799	1,324	1.65 days/year

Table 2.4.3.1: Per capita sick leave of students of AMC

It is true that most of the Colleges are not maintaining separate sick leave register for students. Common cold and minor flu usually affect some of them at least for a few days every year, and these interrupt their attention to lecture classes and laboratory practical. Notwithstanding these, Audit found that their participation in cultural and social activities are high. The students are active in NSS, outreach, and environment-related programs, and in cultural activities and sports and games.

Sick Room: Available. Trained staff, men and women, are ready to attend to the sick.

Medical facilities: Though AMC is located in a rural area, the services of private hospitals are available within a radius of 2 kilometres. There is also a Private Medical College in Vaniyamkulam, which is nearby. In addition, there are a number of Speciality Hospitals, Private Allopathic hospitals and Ayurvedic hospitals in the area. Medical officers are brought to the college regularly for giving the students lectures on health matters. Such talks are very beneficial, as the message influence the students in a positive manner.

Counselling: Today's students feel increased tension in their day to day life. Counselling facilities are provided to every student in the college. Besides, frequent interactions with designated Mentors too are arranged. Further, college arranges yoga practice, meditation, etc. for all those who are willing to join.



Students practice Yoga at AMC

Blood Donation by AMC students: Many students of AMC, both boys and girls, are regular blood donors, in camps as well as at local hospitals. The photographs below are from the World Blood Donors Day celebration by the College NYNA Social Service Club at P K Das Hospital.



Smiling Blood donors

Sports & Games

The AMC students – boys and girls – regularly participate in sports and games in the college, attend inter college competitions and try to prove their sports talents. Students of almost all departments are active in getting well trained in physical education and also in joining Gym and Yoga, all normal games and sports, athletics, and archery. Spacious playgrounds exist, which are now getting consolidated and getting ready to host inter-institutional sports activities.



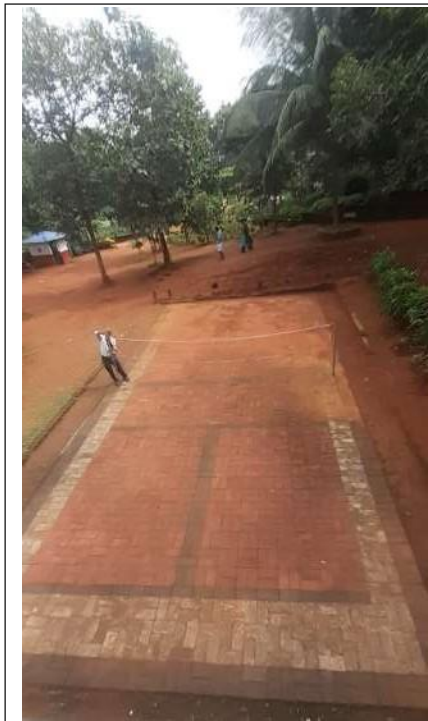
College Ground is Green Guarded



Gymnasium at AMC: Awaiting activities in Post COVID sessions



College Team



Facilities for sports and games like this are being developed in the AMC campus

Observations and Suggestions:

1. The COVID pandemic has impeded the completion of sports facilities and training.
2. With colleges coming back to normal operations and work timings, raising of healthy youth into shining sports stars require a comprehensive plan.
3. Training for girls in suitable sports and games items should also be planned and executed.

2.4.4. Environmental Quality Overview

The environmental quality of AMC in Manisseri is dictated by the rich natural green surroundings, deliberately left least disturbed and lovingly nurtured by the youthful students. The Principal, Vice Principal, members of teaching staff, students, the Parent Teacher Association, as well as the Directors of the Trust are very much enthusiastic in conserving the nature, in moderating consumption, and in appropriately reusing and recycling materials wherever possible. The buildings use natural construction materials and set fully immersed in greenery. Top soil is maintained pervious and the bore wells enjoy impregnation by harvested rainwater. Concreting and black topping of walkways and passages are discouraged to the extent possible.

1. The college has from its beginning been very frugal in using electricity, and all the natural resources. The per capita values are relatively low.
2. The same concept of 'conservation of resources' has been followed in the case of water use as well. Available ground water sources are exploited at a sustainable level and purchase of water from municipal source is not resorted to. Rainwater harvesting is done enthusiastically.
3. The 2018 'Great Floods of Kerala, and landslides and excess rains of 2019 did not inconvenience the campus; instead, the campus community could help those who were affected in multifarious ways, utilizing the youth power in the campus.
4. On the whole, except for the soon-to-be-demolished temporary structures, and the old class room furniture, the College Campus is seen to possess an environmental quality conducive to cool pursuit of learning.
5. With the completion of construction of the new Administration block, and renovation of old structures, and further following the suggestions under the various component audit sections, the Campus can start the journey towards a Cleaner, Greener and Healthier status.



College Library

2.5. Audit on Societal Commitment, Outreach & Promoting Green

The students in colleges, especially undergoing degree level classes should be alert on problems arising in the society, those which adversely affect our immediate environment, and also learn to chalk out programmes and projects for solving the problems through the sustainable development route. In almost every country, activities related to economic development is found to be contributing to large scale decline in environmental quality.

2.5.1. Expression of Societal Commitment

AMC students under the guidance of their teachers, has been doing a lot of social work. College also encourages students to participate in activities of Club Green Guardians, Arts Club, etc. Community interaction programmes are also planned. Such activities are coordinated by one or more members of the teaching staff and by the active student volunteer leaders.

NSS and Other Activities

Activities include: Protection of the Elderly, Post-flood care of habitats and habitants, Street shows like Flash Mob, LED Bulb Assembling training, Waste Management Training, Environment related activities, Tree planting, etc.

The activities are generally of diverse character, involving students of different tastes, ambitions and covering the following, but not limited to these only:

1. Blood Donation Camps
2. Blood Testing Camp
3. Energy Conservation Day
4. Flood Relief Camp
5. Green Guardians Club, Nature Club
6. Charity drive, Orphanage visit
7. Tree Planting drive
8. Teachers' Day; Republic Day; Gandhi Jayanthi; NSS Day
9. World Environment Day
10. World Blood Donation Day
11. Women's Day
12. Plastic Waste Prevention Campaign
13. Tribal Village visits
14. Flash Mob

Under normal working conditions, students are actively participating in repeated and continuous interaction with tribal hamlets and offering different kinds of help they need on important ecological, social, and development related issues. Greening, water management, energy conservation, and other issues are taken to the community, utilizing the outreach opportunities.



AMC students having a flash mob performance at the local bus station



AMC students interact with mentally retarded children

AMC has SFNSS (Self Financing National Service Scheme under the Calicut University), NYNA (Near You And Around) Social Service Club, Club Green Guardians, Blood Donor's Forum, Nature club, Arts Club, and other Department-wise Clubs.

Coordinated by staff members, every student including the freshers are required to participate in one or more of these community interaction programmes. They also keep active links with Haritha Keralam (Green Kerala), Suchitwa Keralam, Kudumbasree, and other programmes. They also carry out cleaning activities, greening activities, training for gainful income generating activities, also.

Arts and Culture

The activities of AMC students are equally good, compared to their commitment to environment, sports, and frugal practices.



Largest Mural painting done by an individual: Akshaya K R (Asia Book of Records)



1. Together they plan, 2. Ottam Thullal artist, student Rakhil First prize in Calicut University A Zone Art Fest 3. Ansar, 3rd prize for Mappila song

The families in the locality fuse very well with the student' initiatives in greening, learning, athletics and sports, as well as in their enthusiastic cultural programmes in the college and in intercollegiate contests

2.5.3. Promoting Green Strategies

For promoting Green strategies, several clubs and academic departments of Carmel joined hands with experts from outside, as well as with their own Faculty and started weaving a canvas of green areas pertinent to the present-day life. Even though the campus is maintained plastic free through the adopted green policy, and meticulous student volunteering is present, a comprehensive plan to exploit the green resources hidden within the campus – with all its vulnerabilities as evidenced during the 2018 floods, is yet to be made. These could be based on scientific studies.



LED lamp assembly workshop



Paper bag making workshop

Students learning Green Skills (above); At Attappadi Tribal homes with Onam Kits



Suggestion: There is good potential to increase the biodiversity – both floral and faunal – in the campus. Attention to be given for selectively introducing rare native species of medicinal and fruit trees in the process that will benefit the community.

3. Audit on Accessibility and Gender Justice

3.1. Built Environment and Accessibility Audit

AMC Group of Educational Institutions, Manisseri, Ottapalam, Palakkad has during the Audit Year 2020-'21, a student strength of 799. Total campus strength is 842.

Accessibility: There is only one differently-abled student currently studying in the college – a visually challenged Male, completing B A (Economics) in 2021. Students or Staff with physical, mental or visual challenges have very special considerations in the AMC campus. These are available for parents and visitors also. The College has already requested NGGFn to have a special accessibility audit by its expert to be conducted during the next AY, once the COVID protocols are withdrawn and advice the management on the needed modifications in this respect.

Number of differently-abled (<i>Divyang-jan</i>) students, teachers, and other staff During the Current Year (M+F)	:	1 Student, Male 21 yr., BA Economics (2018-21) Visually Impaired
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Table 3.1.1: Differently-abled students studying in AMC in 2020-'21

No.	Accessibility Check Point	
1	How many gates? How many are accessible/wheelchair entry type?	2 Accessible 1
2	Any tactile marked lines for visually impaired persons?	No
3	Foot paths with wheel Chair marks? Foot path with tactile lines?	No
4	Total no. of buildings? Multi-storey buildings?	4 1 Multi-storey
5	Building – 1, 2, 3, 4	
A	Ramps with wheel chair accessibility	No
B	Tactile marking	No
C	Accessible Toilets – at Floor No:	No
D	Accessible Ladies Toilet, Floor	No
E	Accessible furniture (on demand)	No
F	Signage	No
G	Accessible parking	No
6	Accessible Library	
A	Computers with screen readers	No
B	Accessible Books	No
C	Print to Text conversion facility	No
D	Trained Staff (on Accessibility)	No
7a	Location of Information Office	Near the Office
7b	Location of Documentation Centre	Central

The Institution with humanitarian considerations for its decisions is understood to be planning expansion of such facilities required by *Divyangjan* stakeholders in the future.

3.2. Rest Rooms Accessibility Audit

There are no toilets with accessibility considerations for other kinds of differently-abled persons now, since such a facility had not been on demand yet. Ramps for independent self-navigated wheel chair entry is not in position now in readiness to receive such students in future batches.

3.3. Audit on Signage and Guidance for *Divyangjan*

Differently-able persons – students and staff as well – can have the feeling of inclusiveness only if they are self-guided through easily understandable signage and guidance for locating and reaching the various venues, rest rooms, dining facilities, office and the common service areas. AMC is planning for providing proper signage and guidance, including floor signs to be installed. Further, the D-A assistance when needed, should start from the point of entry through the security guards, and later through the Information office, which should also be close to the main gate. The CGG and NSS volunteers are to be trained in ‘Mobility’ practices on how differently abled persons are to be assisted, guided, or briefed. This should be extended to students joining environment related clubs and groups, as well as to all newly joining members of the faculty too. The College is advised by the Audit to follow the international non-linguistic signs to be used in Signage works.

Observations and Suggestions:

1. Wherever physical support is required, as well as equipment such as special wheelchairs, easy release door locks and latches, etc. are to be used, for unaided free movement, the plans for toilets, ramps etc. should follow all the accessibility norms.
2. As a case in point, there shall not be doors or window leaves opening outward into the entry way of access, as it might obstruct and hurt the entrant seriously.
3. A special workshop may be arranged during the next available opportunity on how others can contribute to an ‘inclusive environment’ within a higher education institution. This could be educative on “Accessibility requirements” to the management, entire staff, and all students, and organized with an accessibility specialist present.
4. When accessibility rendered spots are not used regularly, sometimes cleaning staff and casual workers employed for small tasks may find it useful to make such open areas for stacking sparingly used tools and furniture. The Estates Officer of the college should inspect such spots in the campus with at least weekly regularity, and sign inspection slips/tags with compliance status recorded promptly.

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5. Like having fire safety training (even when there has been no history of fire hazards in the past), accessibility training to all levels of employees in administration should be imparted every year to make the campus fully “divyanganjana-proof”.

3.4. Audit on Introduction of Assistive Technologies

AMC needs accessible software for access to the main library, or appropriate screen readers for computers now. Also, it is better to have ‘book share’ membership meant for the visually challenged readers, and offer these facilities for such needy students or ‘print disabled’ others in the vicinity free of charge. This will keep the college ready with assistive technologies, duly updated when the needs arise.

Observations & Suggestions:

1. For accessibility audit, accessibility/mobility training, and for free consultation on assistive technologies, the designated Staff may contact the Charitable Trust working in this area for the past 10 years, and having active R&D link with Assitech of IIT Delhi, and other national and international institutions, by name “Chakshumathi”, Trivandrum 695 024 [e-mail: ramkamal@chakshumathi.com]. Contact: +91 79944 85311.

3.5. Focus on Environment in Outreach & Social Service

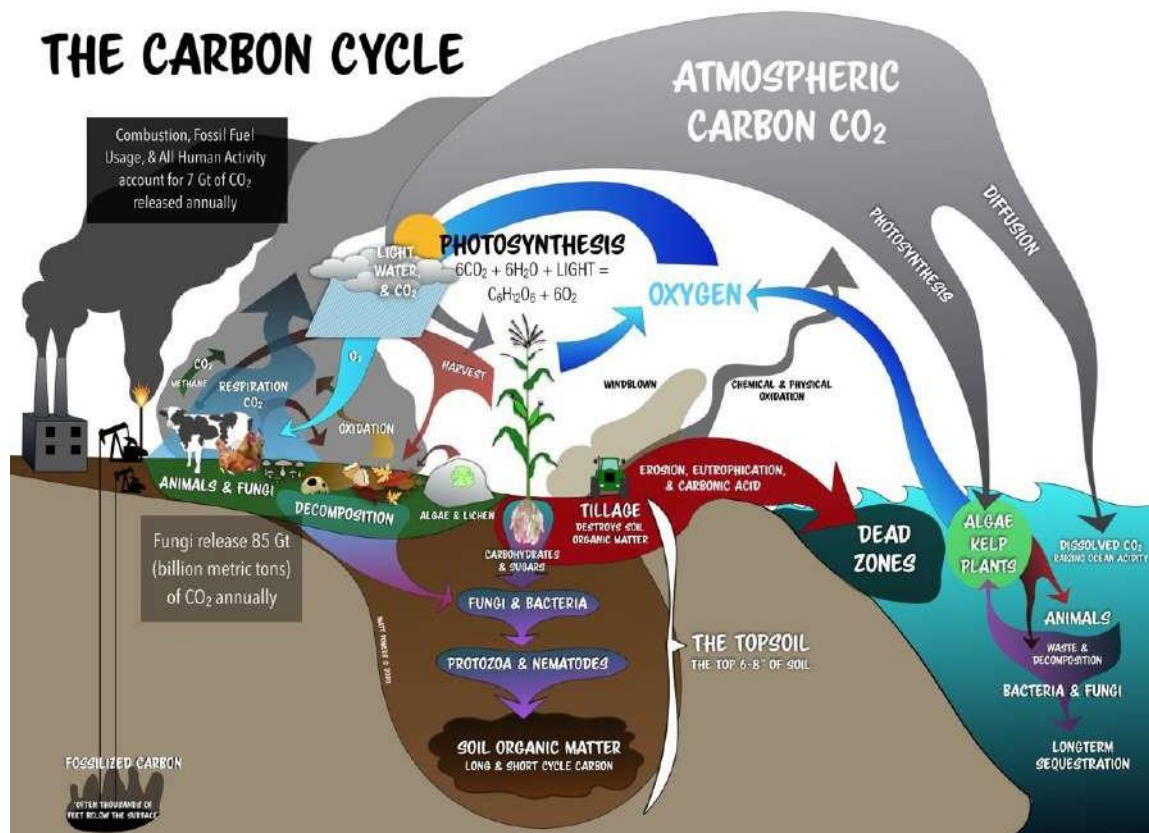
For healthy living, environment plays an important role. Students are made to understand that it provides all living beings with air, food, etc. It is correctly said that the difference between animals and humans is that “animals change themselves for the environment, but humans change the environment for themselves”. Environment is just like our neighbourhood, surrounding state of the environment, influence us, and also modify our growth and development. Therefore, all outreach and NSS programmes of SNCW are heavily weighted towards environment and sustainability related observances, interactions, and learning opportunities. The students of SNCW are also showing heavy interest in this direction as well as partaking them in large numbers – within and without the campus.

3.6. Audit on Universal Information and Enquiry Systems

The present arrangement of first interception for any visitor, parent or student at the SNCW campus is the IQAC room the Information Desk/Centre, which can be directly accessed from the entrance road – less than 100 m from the gate. With the present-day affinity to social media, the College has transferred several details required by prospective students and employees to the online platform and social media. However, updating these data and instructions is a tough challenge which the College will have to take up seriously. Even within the course of an academic year, these are liable to variations or change.

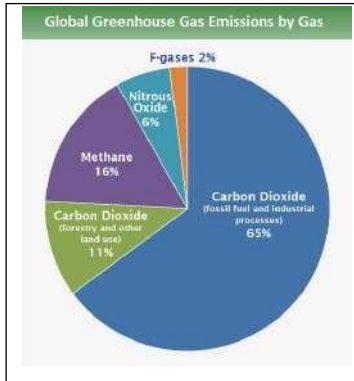
4. Carbon Footprint

Carbon Footprint is a measure of the total greenhouse gases emissions released into the atmosphere. This may result from either individual, organizational, or community based human activities. An acceptable definition is: *Carbon Footprint is the total amount of greenhouse gases produced directly and indirectly for supporting human activities, usually expressed in equivalent tons of Carbon dioxide (CO₂).*



The diagram above is due to Matt Powers, a famous author and powerful teacher. Matt says: “This is the carbon cycle, including oxygen and photosynthesis. Windmills or solar panels cannot solve the ‘brokenness’ of these loops. We need combined action to heal our planet, and keep it liveable for humans.” Matt continues in a recently published book titled ‘Regenerative Soils’: “We come to understand ‘*deep down in our hearts and guts*’ that we are part of nature. Not above it, not ruling over it. Part of it.” “Our earth operates in cycles and feedback loops. We need to slow down, observe and make wise decisions about energy, storage, and creating surpluses”. “We are dealing with an Oxygen problem as much as a stagnating Carbon cycle”.

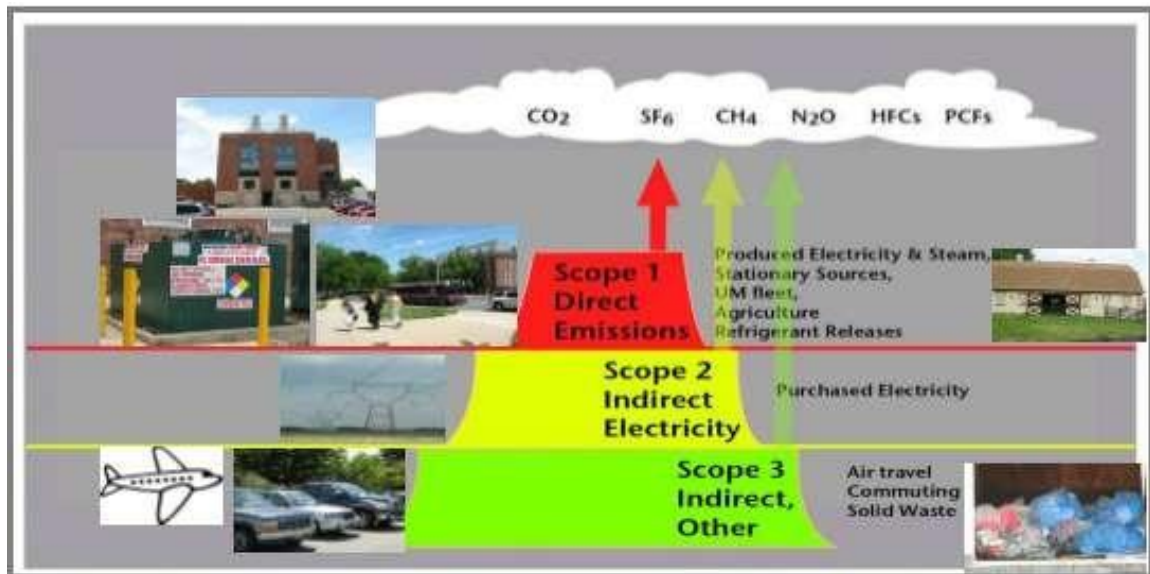
The whole world knows that Carbon is an essential element, and that we cannot go without it. Yet, there is a huge outcry on decarbonising. Why? The very essence of green auditing is to find answers to it - from our own environment.



The most common greenhouse gases (GHGs) in our environment are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the least harmful, but it is the most prominent GHG according to Intergovernmental Panel on Climate Change (IPCC), as it comprises 76% or more of all greenhouse gases, globally. The release of CO₂ into the earth's environment through human activities is commonly known as carbon emissions and its total impact is called 'carbon footprint' [Source: IPCC 2014].

The ability of earth to meet the excessive demands on resources of its population has been increasing day by day. This brings about adverse ecological impacts, which can be quantified as 'Ecological Footprints'. But, its computation is very complex and time consuming. The concept of 'Carbon Footprint' as a part of the 'Ecological Footprint' was put forward in 1990 by William E. Rees and Mathis Wackernagel.

Carbon Footprint (CF) by itself is not the complete measure of the damage to environment. The advantage of Carbon footprint approach is that it measures mainly the emissions of gases that cause climate change, and therefore can be more accurately assessed than the ecological footprints.



How emissions (Carbon Footprints) arise
 Source: University of Maryland Study Report

There are any number of popular software tools called 'CF calculator' for use by interested individuals and institutions for estimating the CF. Figures obtained from such tools are not very exact, but are good enough to have a comparison, or a picture of how large it is. This is in reality, more than sufficient to suggest how deep should the remedy be for the damages inflicted.

If the purpose of knowing the carbon footprint is only to create awareness on the related environmental problems, such software available on the internet can be handy. But, to plan remedial actions, a little more detailed, item-wise assessment is required. The 'carbon footprint' assessment, as an idea, was popularized worldwide by British Petroleum (BP) company under one of their campaigns only in 2005.

While the whole world believes now that CF is a simpler way than the EF to assess and look at the extent of damages to the environment that can happen, or is happening, Christopher Weber of Carnegie Mellon University is of opinion that the calculation of carbon footprints for many commonly used products is in effect a "complex job".

Take for example, the smart phones that being used in almost all countries. The data required for calculating the carbon footprint of a smart phone will require the CF figures connected with its: production, shipment, technology used, and how long it is used every day, as well as on what all functions of the device are actually being utilized. Therefore, to accurately calculate the carbon footprint of a smart phone, we require too much time, energy, and resources. It is not worth the trouble and time to go for such detailed study – just to know the CF.

To calculate the CF of an institution, industry, product, event, or service, we should first appreciate the fact that it is a complex task, and the efforts to obtain the same should be commensurate with what we want to do with that result.

Life Cycle Assessment

One such tool for CF assessment, now considered meaningful, is the LCA (Life Cycle Assessment) approach, which has as its base "the entity's impact during its whole life period". The ISO (The International Organization for Standardization) has a standard for this in ISO 14040:2006 (with the framework for conducting an LCA study). Another method is through the Greenhouse Gas (GHG) Protocol and the set of standards it has for tracking GHG emissions.

The Carbon Footprint calculation of a college like Allied Management College Group of Educational Institutions, Manisseri, Ottapalam, is to know whether or not the college activities are making excessive demands on the ecology of the campus and its surroundings, and then to attempt 'remediation' through possible 'reductions in consumption' as well as 'expansion of carbon sinks' such as the biodiversity. The College is at liberty to choose either to go for remediation to bring the compensation to the exactly required level, or even aim at 'excess' remediation if that doesn't cost heavily. But, doing it either way and feeling relaxed that one has remedied it to the satisfactory level, is possible only after assessing the damages it is inflicting on the immediate environment in a practical manner. We should not be using a cannon for killing a fly.

The important stakeholders like students, staff, and the management can explore all means of reducing the 'consumption' that may result in higher emissions, increase the use of low-emission energy forms, employ the 4R or 'reduce-reuse-recycle-refuse' strategy for waste management, and expand the GHG absorbing and sequestering technologies and greenery – to achieve a little more than what is demanded as per the findings. That will help the campus to grow 'Greener' than a 'Green Campus'.

The team assessing the CF should know that very tedious procedures involving continuous monitoring throughout the year to obtain a precise measure of the damages to the environment is not warranted. This green audit by NGGFn, therefore, is employing only empirical measures that quantify the ecological footprint to a reasonable accuracy, and suggest simple remediation measures within the reach of the institution, that would neutralise the impacts completely or to a substantial level. It should also look at the possibility of taking the positives present within reach, to levels a little higher than what is required. As the major contributors of damaging impacts are the higher number of stakeholders, their nature of consumption, and the transportation modes requiring fossil fuels, the approach for this Green Audit is to use empirical constants on the quantities arrived at for the major contributors. Remediation is to depend on expanding the available positive factors.

Creating awareness to the entire campus community on these and getting them to contribute voluntarily will be an effortless change in lifestyle, on which the institution as a whole can feel contented and be proud of.

Data Obtained from Component Audits

Component Audits in the Chapters 1 to 3 are the base elements under this Section. These component audit findings give us the following data:

1. The area covering the higher education institution/college
2. The total number of persons (students, teachers, other members of staff, visitors including parents and guests) involved in normal functioning of the institution
3. The number of people resident in the campus
4. The type and number of vehicles normally used for transportation
5. The forms and quantity of energy used in the campus and their origin
6. The amount of energy, water, food materials, stationeries etc. consumed
7. The amount of wastes including food waste and e-wastes
8. Amenities provided in the campus and their contribution to emissions

On the positive side:

1. The biodiversity in the campus and their potential to remediate emissions
2. The 'carbon positive' (renewable) energy generation within the campus
3. The amount of recycling/reuse of resources
4. The type of waste management resorted to
5. Water harvesting, water management, and waste reduction approaches

Assumptions:

The following assumptions based on well researched and globally accepted empirical procedures, are used for assessing the carbon footprint as well as for determining the remediation measures:

1. The coefficients taken are as per IPCC, International Energy Agency, India's BEE, or United Nations' FAO [in the case of food related items] as well as from India specific studies by Research Institutions.
2. The carbon emitted by a car while consuming 1 litre of petrol is taken as 2.3 kg CO₂, and of diesel as 2.68 kg CO₂.
3. Average distance covered by a car per litre of petrol in cities at 10 km.
4. The 'km run' by a bus as 4 km/L of diesel in towns and cities.
5. For the 'per capita carbon footprint' calculation, a bus is assumed to carry 50 passengers with the kilometrage as at assumption 4.
6. For an autorickshaw, the fuel need is assumed at 1 litre of fuel capable of getting 16 km of running on petrol.
7. Two wheelers are expected to get 50 km/litre on Petrol.
8. Carbon absorption capacity of one full-grown tree as 6.8 kg CO₂.
9. Carbon absorption capacity of semi-grown trees as 50% of that of full grown.
10. Carbon absorption of bush plants as varying widely according to the species. Certain bushes absorb as high as 49,000 gCO₂ per plant, whereas some others absorb as low as 150 g CO₂ per plant. As a general guide, the per-plant carbon absorption is assumed as 200 g CO₂.
11. The carbon absorption capacity of a 10-sq. ft. area of lawn is 1 g CO₂ per day.
12. A person uses about 550 litre of pure oxygen/day (Arbor Day Foundation).
13. Paper used is assumed to be of density 80 gsm (average).
14. Firewood is assumed to have not more than 10-20% moisture before burning.
15. Contribution of events & festivals in the campus to CF is based on the no. of events, participants, and the extent of festivities with high emission levels.

Carbon Footprint Assessment Required:

The following activity related carbon footprints are to be assessed in Table – 4.1 based on data available from component audits in the previous chapters.

1. Carbon Footprint due to energy use
 - a) Electricity use including for water pumping, water purification, and waste water treatment.
 - b) Use of Fossil fuels like Diesel, Petrol, LPG, etc.
 - c) Use of Firewood.
2. Carbon Footprint due to production of Wastes
 - a) Food Waste.
 - b) Paper use & Paper waste.
 - c) Waste water.
 - d) Other wastes (e-wastes, hazardous wastes etc., if any).

-
3. Carbon Footprint due to Transportation needs
 - a) Day scholars commuting between home and college.
 - b) Staff & Students – weekly/quarterly travel to home and back.
 - c) Use of Cars & Taxis by Staff, Students, Parents, Management, and others.
 - d) Autorickshaws (3-wheelers) hired.
 - e) Bikes and Scooters (2 wheelers) – Students and Staff.
 4. Carbon Foot print due to Events and Festivals within the campus

Remediation Available and/or Created:

1. Due to increased use of renewable energy (RE)
 - a) Solar PV electricity
 - b) Solar Hot Water
 - c) Wind energy
 - d) Biogas
 - e) Micro Hydro Power & Other
2. Due to energy efficiency improvement
 - a) Replacement of old tube lights
 - b) Replacement of incandescent bulbs & CFLs
 - c) Replacement of Fans, Pump Motors, etc.
 - d) Up-grading of UPS network
 - e) 'Phantom load' reduction
 - f) Other means
3. Due to waste reduction, recycling, and waste-to-energy projects
 - a) Waste Reduction
 - b) Recycling
 - c) Waste to Energy
4. Due to innovations in transportation
 - a) Sharing of Vehicles
 - b) Adopting Means of low CF travel options
 - c) Others like introduction of electric vehicles/Solar autos, boats, etc.
5. Due to biologic means
 - a) Conservation of existing greenery
 - b) Tree plantation (new) & Biodiversity conservation
 - c) Gardening, including lawns and hedges
6. Due to 'Outreach' for Promotion of Green Living

The CF calculated by these considerations (T CO₂ eqvt.) has to be brought into a Balance Sheet with remediation available and see how far it will compensate for the damages. The uncompensated part will indicate the Carbon Footprint.

Carbon Footprint Calculation for AMC Group of Educational Institutions, Ottapalam for 2020-'21

Sl. No:	Source	Rate	Quantity x Days/year	Total Quantity	Annual Eqvt. CO ₂
1.a	Electricity use	0.82 kgCO ₂ /kWh (India in 2018)	0.84 MWh/m x 12	10.03 MWh	8.5 T CO ₂
1.b	Fossil fuel use	2.68 kgCO ₂ eq/kg 2.30 kgCO ₂ eq/kg		0.0 T	-- T CO ₂
1.c	Firewood	1.8 kgCO ₂ eq/kg		0.0 T	-- T CO ₂
2.a	Food waste	1.9 kgCO ₂ eq/kg	1.0 kg x 220*	0.22 T	0.4 T CO ₂
2.b	Paper waste	1.725 kgCO ₂ eq/kg	10.5 kg x 220	0.1 T	0.2 T CO ₂
2.c	Water waste	0.298 kgCO ₂ eq/kL	Nil	--	--
2.d	Plastic/Other	6.0 kgCO ₂ eq/kg	1.0 kg x 220	220 kg	1.3 T CO ₂
3.a	Bus/Train: Staff, Students daily travel	2.68 kgCO ₂ eq/L	380x6x220/200 (Incl. one College Jeep)	2.13 kL	6.0 T CO ₂
3.b	Student weekly trips	2.68 kgCO ₂ eq/L	(No hostel)	--	-- T CO ₂
3.c	Cars, Taxis	2.30 kgCO ₂ eq/L	Negligible	--	-- T CO ₂
3.d	Auto rickshaws	2.30 kgCO ₂ eq/L	--	LS	1.0 T CO ₂
3.e	Two wheelers	2.30 kgCO ₂ eq/L	70x6x220/50	18.0 kL	41.0 T CO ₂
4	Events, Festivals	Approx.	1000x3x1.2	LS	4.4 T CO ₂
5	Construction	Lump sum	--	Nil	0.0 T CO ₂
	Total				62.8 TCO₂

*No. of activity days assumed as in 220 days

Table 4.1: Calculation of Carbon Footprint Source-wise

Remediation for Carbon Footprint – AMC, Manisseri, Ottapalam for 2020 – '21

Sl. No:	Source	Rate	Quantity x Days/year	Total Quantity	Annual Eqvt. Saved CO ₂
1	1.a. Solar PV electricity 1.b. Solar Hot Water 1.c. Wind energy 1.d. Biogas 1.e. Micro Hydro Power, other	0.82 kgCO ₂ /kWh 1.34 kgCO ₂ /kg --	Nil Nil Nil Nil Nil	-- -- -- -- --	10.8 T CO ₂ 0.0 T CO ₂ 0.0 T CO ₂ 0.0 T CO ₂ 0.0 T CO ₂
2	2.a. LED tube lights 2.b. Replacing bulbs & CFLs 2.c. Replacing Fans, Motors 2.d. UPS Upgrading 2.e. Reduce Phantom load	0.82	Negligible None None None None	-- -- -- -- --	0.0 T CO ₂ -- -- -- --
3	3.a. Waste Reduction 3.b. Recycling 3.c. Waste to Energy	0.26 kgCO ₂ /kL	Limited No other	-- --	-- T CO ₂ -- --
4	4.a. Sharing of vehicles 4.b. Low footprint options 4.c. Electric/Solar vehicles		Limited None Nil	-- -- --	-- -- --
5	5.a. Greenery forest retained 5.b. Tree planting, Biodiversity 5.c. Gardens, Lawns etc. (per acre)	Nil 22 kg/yr 2200 kg	Per acre/yr. -- LS	-- 4.0 acre --	-- 5.0 T CO ₂ -- T CO ₂
6	6.Walking & bicycle use (1+21)	2.68 kg/L Avoided	Negligible	0.0 T	0.0 T CO ₂
7	7. Outreach activities	22 kg/yr	Limited	50%	0.0 T CO ₂
	Total				15.8 TCO₂

Table 4.2: Remediation for Carbon Footprints: available/created

The International Organization for Standardization (ISO) also provides some general standards for

- o *Greenhouse gas emissions at Organization level (ISO 14064 - 1) and*
- o *Greenhouse gas emissions at project level (ISO 14064 - 2)*
- o *Specifications to validate and verify relevant accountings are documented in (ISO 14064 - 3)*

AMC Group of Educational Institutions, Manisseri, Ottapalam, Palakkad, Kerala

Carbon Footprint Analysis and Evaluation

The actual per capita carbon footprint for the AMC Group of Educational Institutions, Manisseri, Ottapalam, Kerala is 75 kg (0.075 Ton) of CO₂ equivalent [62.8T/842 persons] (See Table 4.1), and a part of it (25% of it) is compensated by remedial routes adopted by the college. The net carbon footprint during 2020-'21 is thus [62.8-15.8 = 47 TCO₂ eq.]. **The effective CF is 47/842 or 0.056 T or 56 kg of CO₂ per capita [2020-.21]**

According to the Economic Survey of Govt. of India, the per capita emission for an Indian is 1.9 Ton CO₂ eq. per annum in 2020. The projection was that it will reach 2.0 – 2.5 T of CO₂ by 2020, and to 3.0 – 3.5 T of CO₂ by 2030 [as per evaluation in 2010]. In the year 2018, the actual assessed PC CF for India is 1.94 T. India's efforts for greening has luckily brought about a 5% reduction from the expected CF level.

For the year 2020-'21, for AMC Group of Institutions, Manisseri, Ottapalam, Kerala, the Carbon Footprint per capita at 0.056 T CO₂ equivalent, is very modest compared to other colleges in Kerala. This is as a result of the existing greenery in the property, and a too strict conservation strategy of the Trust that established the College.

The whole CF due to electricity use (10.8 T CO₂) is already wiped out due to the introduction of 8 kW solar PV power plant. By expanding the SPV installation, AMC can attain 'Net Zero' even during the next year, and in addition be proud of a net positive institution in the near future.

The campus can be treated as a 'low carbon footprint' institution, with potential to reach higher shades of GREEN as a College, even though there is need for increasing the water and energy use for improved well-being of the stakeholders.

CF Balance

The remediation gap between the assessed footprint and available remediation is 47 Ton CO₂ eq. On a closer look, the major contributor is Transportation – public plus personal vehicles like 2 wheelers adding 48.0 T of CO₂ pa.

The College may consider the remediation options judiciously. Being a college with low use of personal vehicles like scooters/bikes, and with a limited number of students take to walking, the number of bus users commuting daily has to be high, and this is unavoidable. Yet, in the case of AMC, the distance range for transportation happens to be much lower than even an ordinary city college.

The campus has a high greenery content and it is further viable for expansion. Renewable energy development like solar roof top is able to make a major difference. For the forthcoming academic year, after restoring normalcy, the college can consider going only for the options which are economic as per Life Cycle Cost analysis.

5. Future Directions

The Internal Quality Assurance Cell of the educational institution can turn the observations and recommendations in this report into action points after an internal discussion according to the factors indicated here as guidelines. A SWOT analysis on the institution's greening initiative is carried out and given in this report.

Strengths and Weaknesses:

- Human resources : Staff, Students, PTA, NGOs, Public
- Physical resources : Location, land, building, equipment
- Financial : Grants, projects funding, fees, and other sources
- Activities and processes : Green Protocol, programs, services rendered
- Past experiences : Learning tools, Reputation of the institution

Opportunities and Threats:

- Future trends : What is in the horizon or what is expected shortly
- The economy : Own, Trisha Trust, local, national, or other
- Funding sources : Own, donors, governments, subsidies, and incentives
- Demographics : Change of players – students + staff joining & leaving
- Physical environment : Sensitivities related to locality, public & political
- Legislation : Change in government policies, rules & regulations

Points for Consideration:

The college management should be given a strategic plan for making the campus greener than before and simultaneously for creating awareness among the students on the need for a determined local effort to bring down all the negatively weighing factors. For this,

- Decide on the directions to proceed that will be most effective
- Assess possibilities and limitations for the intended change
- Identify barriers that will force for limiting the objectives
- Find out new solutions to the problems in sight
- Re-look at plans to navigate the students and staff to get the best results

As both the internal and external environments are liable to change from time to time, it is necessary to review the scenario once again – just before implementing a project.

Future Directions and Search for **New Opportunities** are indicated in the chapters covering the component audits. The main thrust appears to be:

1. To increase the remediation, invest in roof top solar PV (with attractive returns too)
2. Conduct a more detailed energy audit, water audit, and transportation audit
3. Prepare a detailed register on bio-diversity of the campus (both flora and fauna)
4. Increase the biodiversity
5. Strengthen College Database. Keep all required data entered on a weekly or monthly basis, in Customized Registers/Computer Folders, assisted by students

SWOT Matrix
for a “Greener AMC” at Manisseri

S	W
<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> ➤ The college community practices a Green Protocol and the newcomers are groomed to follow it ➤ Students and Staff help in having a litter-free campus ➤ Rain Water Harvesting, and Waste reduction are already in practice with students’ support ➤ The College Club Green Guardians is established and activities started ➤ Community links for outreach activities are very strong 	<p style="text-align: center;">Weaknesses</p> <ul style="list-style-type: none"> ∞ Due to location inside a rural setting, several positives get delayed to access ∞ The students are available only during working hours (no hostel), limiting their contributions ∞ Non-availability of science streams limits the chances of integrating greening as a part of curricular work in the College. ∞ Sensitization and awareness creation have to be planned department-wise
O	T
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> ❖ There is ample opportunity for expanding the use of renewable energy, in turn for reducing or wiping off the carbon footprint gap ❖ There is still scope for improving energy efficiency in the campus ❖ Improvements to the rainwater harvesting set up through scientific planning can help in remarkable water management strategies ❖ Tree plantation with Biodiversity expansion is possible with the joint efforts from academia available in other colleges in Palakkad district t 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> ⚡ The majority of students remain in the campus only from 10 to 4 and only on working days. Continuous care and support is therefore very difficult ⚡ Repeating the campaigns and training annually is necessitated ⚡ Increasing two-wheeler use tends to boost the carbon footprint ⚡ The increase in the types and quantum of e-wastes, for which safe disposal is yet not in sight, is a threat to be tackled locally ⚡ Climate change impacts in Palakkad district tend towards water stress



Nature's Green Guardians Foundation

Trivandrum 695 043 India

Energy Audit Certificate

AMC Group of Educational Institutions

Manisseri, Ottapalam, Kerala for AY 2020-'21

Energy Audit for the period June 2020 to May 2021 has been conducted for AMC Group of Educational Institutions, Manisseri, Ottapalam, Palakkad, Kerala in accordance with the International Standards for ISO 14000 family of standards set by ISO TC 207 and its Sub-committees, Bureau of Energy Efficiency Standards, and stipulations under the Energy Conservation Act 2003 of Government of India, and other relevant mandates for maintenance of sustainable and healthy environment for education in the campus.

In our opinion, the Institution has presented true and up-to-date data on relevant activities to the audit team, and appropriate audit procedures have been completed for issuing this Audit Certificate and the Compliance Statement. The recommendations are based on verified data presented as they existed at the time of audit.

The inspection methodology did combine physical inspection of the campus, with analytical reviews of relevant documents and activities, as well as interviews with the Principal, and selected members of Staff and Students of the College.

Audit findings indicate that, of the 62.8 T CO₂ of carbon footprint of the institution for the year, the contribution from direct use of energy was 8.5 T CO₂. Transportation including public transport use (outside the campus) is at 48.0 T CO₂ – with 41.0 T CO₂ coming from the use of personal vehicles by staff and students. Wastes contributed 0.8 T CO₂, but renewable energy produced returned 10.8 T CO₂ (remedial measures). Effective awareness and training programs were conducted during the year and are planned for the future as well, to make all stakeholders aware of the need for individual efforts.

Prof. V K Damodaran

*Ex-UNIDO International Energy Expert
For NGGFn Audit Team, dated 30 October 2021*

I agree with the data presented in this report, as true, and further express my willingness to implement the recommendations of this audit report after internal review, even if any or many of them are in excess of the relevant mandates.

Dr. Byju K, Principal

*AMC Group of Educational Institutions, Manisseri, Ottapalam
Palakkad, Kerala.*

Date: 30/10/2021

Signature & Seal M.Com (Double), MBA, CWA, M Phil, PhD



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Green Audit – Environment Quality Certificate

**AMC Group of Educational Institutions
Manisseri, Ottapalam, Kerala for AY 2020-'21**

Environment Audit for the period June 2020 to May 2021 has been conducted for AMC Group of Educational Institutions, Manisseri, Ottapalam, Palakkad, Kerala in accordance with the International Standards for ISO 14000 family of standards set by ISO TC 207 and its Sub-committees, Environmental Protection Act 1986 (and its amendments) of Government of India, and other relevant mandates for maintaining sustainable and healthy environment for education in the campus.

In our opinion, the Institution has presented true and up-to-date data on the various aspects of working of this education institution, and appropriate audit procedures have been completed by the audit team for issuing this Audit Certificate and Compliance Statement. The recommendations are based on verified data presented on the situation as they existed at the time of audit.

The audit methodology did combine physical inspection of the campus on several occasions, with analytical reviews of relevant documents and activities, as well as interviews with the Principal, and selected members of Staff and Students of the College.

Audit findings indicate that, of the 62.8 T CO₂ of carbon footprint of the institution for the year, the contribution from Transportation and mobility including public transport use is at 48.0 T CO₂ – with the share of personal vehicles by staff and students at 41.0 T C O₂, and that out of Wastes is at 0.8 T CO₂. But, remedial activities contributed a relief of 15.8 T CO₂. The campus is maintained moderately clean, and intensively green. Environmental Quality in the campus is seen to be 'better' than many other institutions of the similar size.

Prof. V K Damodaran

*Ex-UNIDO International Energy Expert
For NGGFN Audit Team, dated 30 October 2021*

I agree with the data presented in this report, as true, and further express my willingness to implement the recommendations of this audit report after internal review, even if any or many of them are in excess of the relevant mandates.

Dr. Byju K, Principal

AMC Group of Educational Institutions, Manisseri, Ottapalam
Palakkad, Kerala.

Date: 30/10/2021

Signature & Seal

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Nature's Green Guardians Foundation
Trivandrum 695 043 India
Biodiversity - Green Audit Certificate
AMC Group of Educational Institutions
Manisseri, Ottapalam, Kerala for AY 2020-'21

This Green Audit including evaluation of Biodiversity conservation has been conducted for AMC Group of Educational Institutions, Manisseri, Ottapalam, Palakkad, Kerala, in accordance with the International Standards for ISO 14000 family of standards set by ISO TC 207 and its sub-committees, Bureau of Energy Efficiency standards, and stipulations under the Energy Conservation Act 2003 of Government of India and other relevant mandates for promotion of sustainable living and education in a healthy environment.

In our opinion, the Institution has presented true and up-to-date data on the various aspects of working of this higher education institution before the audit team, and appropriate audit procedures have been completed for preparing this report. The assessments and recommendations are based on data presented before the team at the time of audit.

The audit methodology did combine physical inspection of the campus on several work days and holidays, with analytical reviews of relevant documents and activities, as well as interviews with the designated Staff and students of the College.

This audit is conducted to ensure that a Green lifestyle is followed and implemented in the campus across all academic and non-academic departments, as well as the body of students undergoing studies in the College.

The AMC Group of Educational Institutions Green Audit 2020-'21 has found that the institution's per capita carbon footprint for the year is only 0.056 T CO₂ equivalent, a level well below the current national per capita average of 1.9 T CO₂, with potential to develop into a carbon neutral campus. All efforts are taken to conserve and protect the existing biodiversity and also to extend the efforts even beyond the college boundary through outreach, and further by implementing the Green Protocol, and having a commitment to continue its green practices to positively impact the society at large.

Prof. V K Damodaran

Ex-UNEP Expert

For NGGFn Audit Team, dated 30 October 2021

I agree with the data presented in this report, as true, and further express my willingness to implement the recommendations of this audit report after internal review, even if any or many of them are in excess of the relevant mandates.

Dr. Byju K, Principal

AMC Group of Educational Institutions, Manisseri, Ottapalam
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