

GREEN AUDIT - 2019-20



DON BOSCO COLLEGE

Mannuthy, Thrissur

Kerala

EXECUTED BY



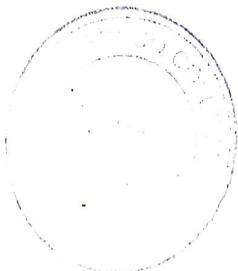
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March 2020




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DON BOSCO COLLEGE
THRISSUR, KERALA

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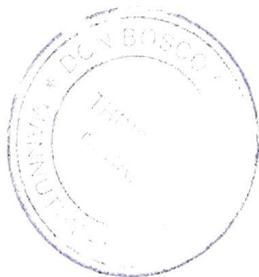



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PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability. Hence an evaluation is needed to understand where it stands in the path to be an environment friendly, talent nurturing educational institution. This Green Audit was done with the aim to assess and rate the sustainable nature of the campus. The college vision is "to enlighten and empower women in rural and suburban society and enable them to act as agents of social transformation and acquire knowledge of self and surroundings and to make the world a better place". And in the **social goals**, it is written as "**to make the students aware of the pressing global issues and the moral responsibility to handover to the coming generation an eco-friendly life style and an earth free from pollution, filth, bigotry and corruption**". It was observed by us from the students' participation during the green audit.

This report is compiled by the Certified GRIHA rated Professional along with the project engineers who are experienced in the field of energy, environment and management. The student volunteers made a mammoth contribution with data collection and preparing an initial skeleton for the report.

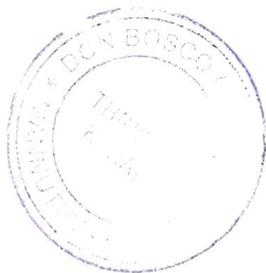



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KNOWLEDGEMENTS

We express our sincere gratitude to the **Don Bosco college, Mannuthy** for giving us an opportunity to carry out the project of Green Audit. We are extremely thankful to all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Green audit.

- | | | |
|---|---------------------------------|---------------------|
| 1 | Fr. Raju Chakkanattu SDB | Principal |
| 2 | Mr. Antony P James | IQAC coordinator |
| 3 | Fr Sumon Jose SDB | Administration head |

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

GREEN AUDIT TEAM

1. **Mr. Ashok K M P**
Registered Energy Manager of Bureau of Energy Efficiency (BEE - Govt. of India)
Certified GHRIHA rated Professional, Energy Manager No - EA 25612
2. **Mr. Harikrishnan K**, Project Engineer

Yours faithfully



Managing Director
Athul Energy Consultants Pvt Ltd

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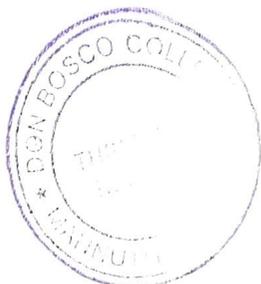


EXECUTIVE SUMMARY

- The entire campus having area of 3.72 acre having sufficient open space as ground
- Don Bosco College Mannuthy developed an ecological design in the building construction to maintain minimum negative impact to ecology and surrounding nature. There is sufficient air ventilation and natural lighting in the three main buildings in the campus.
- Vegetable garden is created and maintained
- Having fish tank and pet and birds are nurtured in the college
- Water requirement for the Don Bosco college Mannuthy is met by well and rain water collection tank the tanker supply mainly for emergency requirements

Suggestions for Improvement

- Install water meter in main supply and provide sub metering in other usage areas.
- Display boards are to be made on trees and other areas such as vegetable garden, Herbal Garden, Vegetable garden etc. Silent, biogas plant etc.
- Install vertical garden or indoor plants in pots in the veranda or side which will increase the aesthetic of college
- Indoor plants such as Snake plant, Aloe Vera, Money plant, orchids and areca palm etc has to be planted in college in pots which are maximum suppliers throughout 24 hrs.
- Vegetable garden to be created in the college in larger size which will increase the self-confidence of students
- Japanese model of small forest MIYAWAKI which will initiate at least 1 acre of land and which will grow within 18 months' time. The importance of this is Don Bosco can demonstrate in larger manner it is located nearer to main high way.
- The maximum oxygen suppliers such as Njaval, Neem, Curry Veppu, Sarpagangthi and Bamboo are supplying 30% more oxygen than the normal tree to the atmosphere by absorbing carbon dioxide from nature.
- Ground water recharging pit has to be created in the behind the college. The water from the science block is used for this pit.



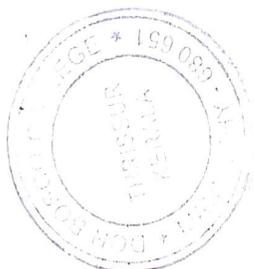

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BASIC DETAILS

The general details of the Don Bosco college are given below in table based on the data availed from the college.

SL. NO	PARTICULARS	DETAILS
1	Name & Address of college	Don Bosco College Mannuthy, Thrissur Kerala-680651
2	Contact person	Mr. Antony P James , IQAC coordinator Ph: 9496349308 Mail: dbciqacmty@gmail.com
3	Location: Latitude & Longitude	1052895N, 76.25698E
4	No. of Teaching staff	38
6	No. of Non-Teaching staff	15
7	No of students	712
8	Building area	4259.7 m ²
9	Land area	3.72 acres
10	Department nos	05
11	Under graduate program	06
12	Post graduate program	02
13	Hostel numbers	NIL
14	Number of electricity connection	03 nos
15	Total connected load (As per KSEBL)	75.812 kW
16	Average electricity consumption	1684 kWh/ month
17	Average annual working days	245 days
18	DG Set	100 kVA - 1 no
19	Solar power plant installation	20 kW inverter
20	Average annual exported power to the grid	22,464 kWh

TABLE 1 BASIC DATA SHEET



DON BOSCO COLLEGE
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INTRODUCTION

Vision statement of the college

To form globally integrated persons who champion the cause of justice, truth, peace and respect. To groom intellectually competent, morally upright, psychologically, integrated, physically able, and socially responsible persons through holistic and innovative education.

Our students should be capable of championing the cause of justice, love, truth and peace in order to develop our nation. They equip themselves to be in the forefront to create a just and human society that respects human dignity and promotes religious harmony. They are prepared to shoulder the responsibility of fostering national integration, and the cultural heritage of the country. They are empowered to stand on their own feet, facing bravely and successfully, this world of acute competition.

Our mission

We, at Don Bosco College, Mannuthy, believe that education should help people to lead better lives, earn better income, and take their position in the higher echelons of society. It should give them the strength to understand and cope with the hard realities of life, thus paving the way for fulfilment in life. With this end in view, Don Bosco College leads the students, regardless of the programme selected, through an integrated programme of scientific formation and personality development.

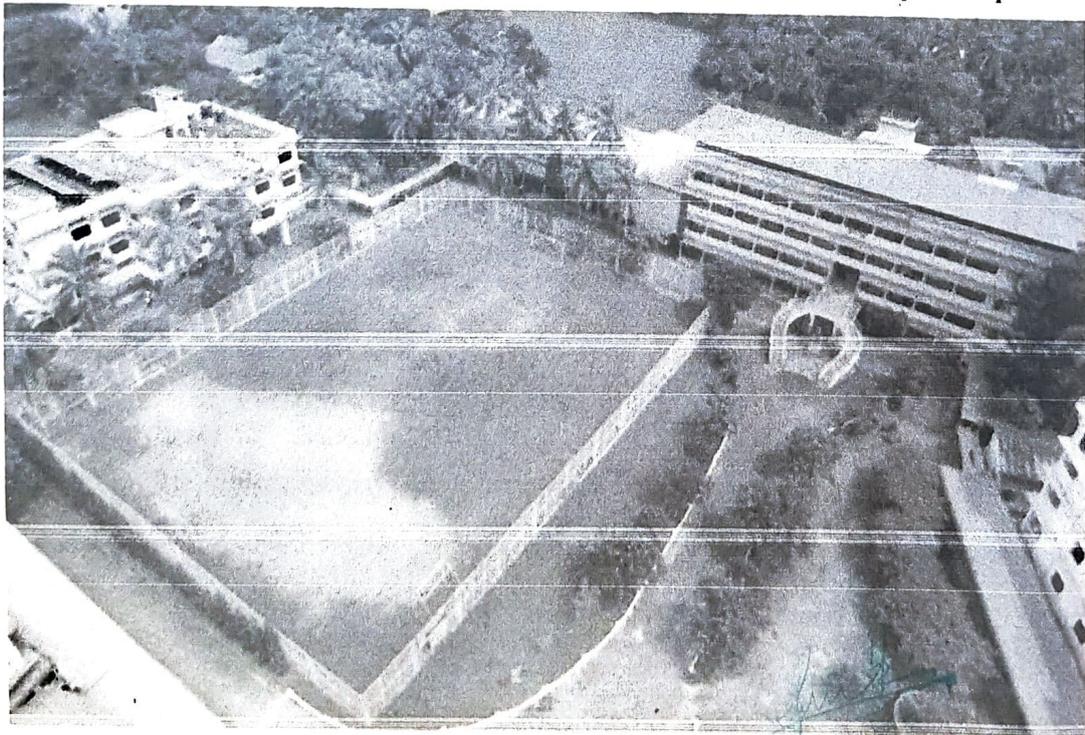


FIGURE 1: CAMPUS VIEW



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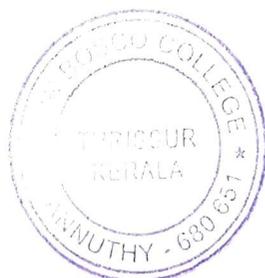
GREEN AUDIT

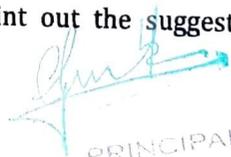
The whole world is on the road to a sustainable development, and the environment conservation is the top priority among the list as every human activity has its effect on their surroundings, which is the environment. Hence be it a house, a commercial building, an Industrial building, or any other construction will disturb the balance of the environment. Engineers are increasingly expected to play leadership roles when it comes to sustainable development, working to solve global challenges such as the depletion of resources, pollution, ecosystem damage, and the effects of rapid population growth. It is very important to do a detailed study about the effects on the environment. This is conducted under the name of *Green Audit*, which can be defined as *the official examination of the effects a company or other organization has on the environment, especially the damage that it causes.*

The objectives of the green audit can be listed as follows:

- Including participants from every section of the organization in the auditing process.
- Understanding the environment by drawing a simple sketch of the total area.
- Identifying the activities in the premises and listing them.
- Calculating the resource consumption like the land and water.
- Assessing the waste management and disposal.
- Study the energy usage pattern.
- Identify the good practices.
- Suggest the viable solutions to improve the sustainable nature of the organization.
- Compile the report with the above-mentioned details.
- Conduct a walkthrough audit to check the suggestions implemented by the institution and suggest for further improvements
- Verify all the points with actual measurements is it is meeting the performance and gave suggestions for improvement

Demands for energy, drinking water, cleaner air, safe waste disposal and transportation issues are increasing day by day. This needs new infrastructure development for protecting the environment. Students have a critical role to play for this sustainable development. In this audit we aim to identify the areas of positive development done by the college and to point out the suggestions for improvement s.




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CAMPUS ENVIRONMENT

The environment in and around the college campus plays an important part in maintaining a healthy atmosphere in nurturing talents. Trees are the major source of the oxygen we breathe, and receiver of the carbon dioxide we exhale. The sustainability of an ecosystem depends on the number of plants and trees in and around the surroundings. The campus building is located in with ample free space. The main building and other buildings have ample ventilation.

Ultimately the campus is some natural equilibrium with trees, birds and water bodies along with human interactions.

A human breathes about 9.5 tonnes of air in a year, but oxygen only makes up about 23% of that air, by mass, and we only extract a little over a third of the oxygen from each breath. That works out to a total of about 740kg of oxygen per year. Which is, very roughly, seven or eight trees' worth. The importance of green campus is to convey this message to the aspiring young generation about the sustainability.

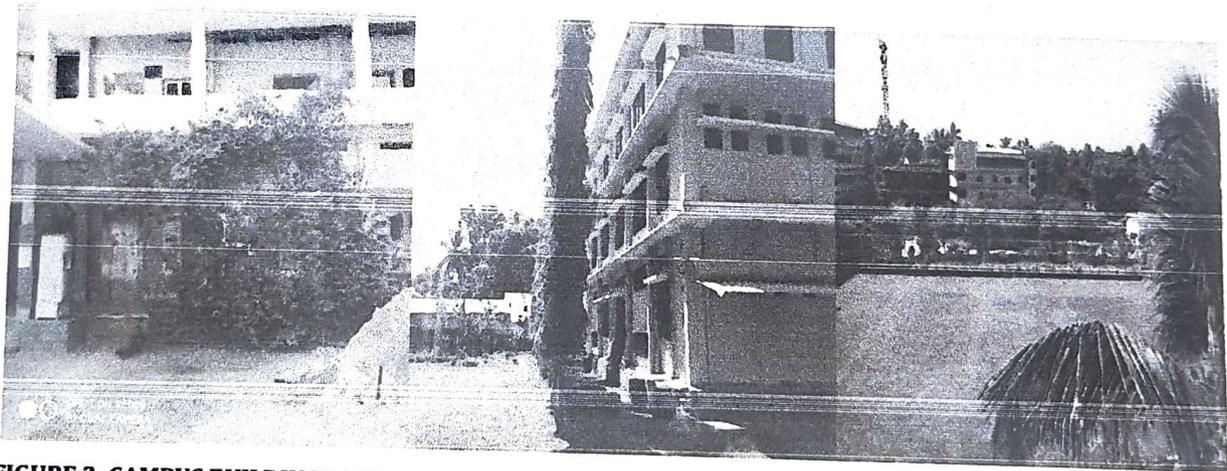


FIGURE 2: CAMPUS BUILDINGS SCIENCE BLOCK, ARTS BLOCK BACK SIDE

Scientific studies are proved that the nature can able to cure any diseases and this will reduce the stress among students during their studies and also increase the compassion among them and to nature. Ultimately the campus is maintaining natural equilibrium trees, birds and water bodies with human beings. Gardens and landscapes are an aesthetic delight and it promotes attentiveness of students. Persons exposed to plants have higher level of positive feelings (pleasant, calm) as opposed to negative feelings (anger, fear).

The construction of all buildings of Don Bosco College Mannuthy have ample ventilation and air flow and keeping a silent atmosphere to the students. The air flow from open atmosphere create a distress atmosphere in the college and maintaining the harmony with nature.



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SUSTAINABLE CONSTRUCTION OF BUILDINGS

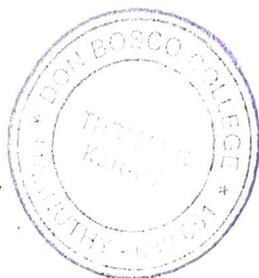
Energy consuming devices installed to achieve the comfort levels for the occupants of the building gives rise to heat generation which adversely affects the environment within the building and in the surrounding. Buildings are thus the major pollutants that affect the urban air quality and contribute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

Don Bosco College, Mannuthy has developed an ecological design in their buildings and adopted minimum negative impact on ecosystem. Their approach to the constructional activities consciously is to conserve energy and ecology and avoid the adverse effects of ecological damage.

Don Bosco College, Mannuthy management constructed the building to optimum utilisation of land and classrooms and with abundant light and natural ventilation. Maximum day light ingress and natural ventilation increases the indoor air quality and avoid the sick building syndrome. The whole facility and buildings are designed to maximum and optimum utilisation of land is done.



FIGURE 3: SUSTAINABLE BUILDINGS WITH TREE COVE AND OPEN SPACE.




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There are major buildings in the campus. The purpose and the built-up area of the buildings are given below. All these buildings are placed have sufficient ventilation and natural sun light. The masterplan **Don Bosco college, Mannuthy** has been drawn to ensure and sustain harmonious blend of human and environmental well-being. Accordingly, spaces for academic, administrative and recreational areas are delineated in harmony with the topography to ensure an eco-friendly campus.

Particulars		Purpose
1	Main block	Adm. office, Class rooms, Dept. rooms
2	Science Block	Class rooms, dept. rooms and office
3	Arts Block	For seminars
4	Auditorium	For general functions
5	Youth Centre	Day care
6	Toilet Block Boys	Toilet
7	Chapel	Chapel
8	Toilet for gents	Toilet
	Toilet for women's	Toilet

TABLE 2: BUILT UP AREA

VENTILATION AND CARBON DIOXIDE LEVELS

Ventilation moves outdoor air into a building or a room, and distributes the air within the building or room. The general purpose of ventilation in buildings is to provide healthy air for breathing by both diluting the pollutants originating in the building and removing the pollutants from it. The college is designed to provide maximum natural ventilation with abundant flow of light into class rooms. Due to this natural ventilation in lush green campus reducing the sick building syndrome and stress generated from the study by abundant supply of fresh air.

Air quality is a major area of concern inside a building. The percentage share of oxygen and carbon dioxide should be such that the occupants are able to perform their tasks without any discomfort. This is generally done through a provision of fresh air duct for the air conditioning systems or by providing windows. Numerous factors need to be considered for the design and fabrication of the fresh air supply system like the number of occupants, weather pattern and air quality of the location, and so on. For the human comfort, production of carbon-dioxide (CO₂) within a building space is the prime area of consideration. This is associated with respiration which produces CO₂. As a result, the carbon-dioxide levels will increase if ventilations are not provided.

As per various standards (like the ASHRAE Standard 62.1-2016), indoor CO₂ concentrations up to 1200 ppm is considered acceptable. For a typical outdoor condition, this value may change from 300 to 500 ppm.

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



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Sl. No.	AREA	Measured CO ₂	Standard CO ₂ level (Range)	Remarks
1	Administration Block inside	600	300-500	Good
2	Dept of Accounts	425	300-500	Good
3	Computer science	600	300-500	Good
4	Computer lab	650	300-500	Good
5	Dept. of English	340	300-500	Good
6	Auditorium	390	300-500	Good
7	Library	350	300-500	Good
8	Class room	390	300-500	Good
9	Canteen	550	300-500	Good
10	Electronics lab	450	300-500	Good

TABLE 3: CARBON DIOXIDE LEVELS

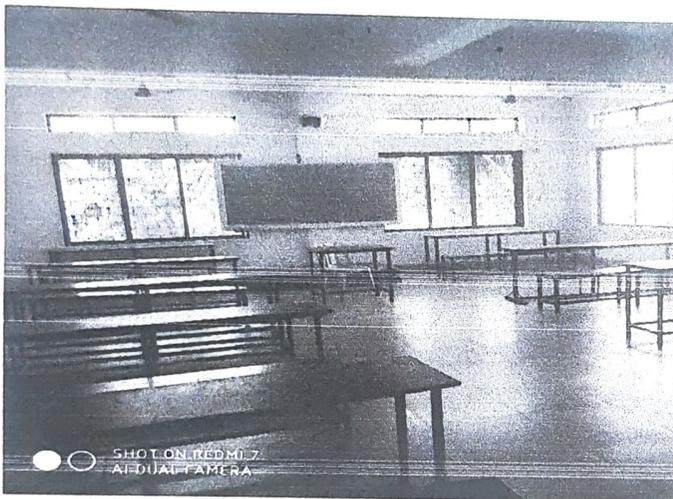


FIGURE 4: NATURAL LIGHTING BAND AMPLE VENTILATION IN CLASS ROOMS.

Acoustics in Buildings

Building acoustics is the science of controlling noise in buildings. This includes the minimisation of noise transmission from one space to another and the control of the characteristics of sound within spaces themselves. It is very hard for students to learn in noisy class rooms. Building Acoustics are an important consideration in the design, operation and construction of most building and it has significant impact on health, wellbeing, communication, and productivity and learning capabilities. The building acoustics influenced by many factors such as geometry and volume of buildings, reflection and absorption of surface of materials used for buildings, air born noise etc. While designing class rooms the building should have low reverberation time and thus it will not produce echo or noise for sound

Acoustics and indoor plants are playing vital role while designing buildings for office and educational institutions. In addition to aesthetics the indoor plants provide the calmness and stress-free

atmosphere to the students. The comfort level is increased by proper ventilation, oxygen level, less noise and soothing atmosphere.

Recommendation

We strongly recommend to provide indoor plants as vertical gardens or green pots in the college will change the atmosphere of college.

1. AESTHETICS

Aesthetic quality is an aspect of all activity, perception, and intelligent thought, aesthetic education helps students discover new ways of looking at, listening to, moving in and speaking of their everyday experiences. Aesthetes have important role to develop a student and it improves the interpersonal relationship and gave it broad outlook.

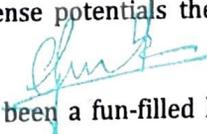
Recommendation

- ❖ The aesthetics of college and inmates as students and staff will change by set up an indoor plants or flowering pots in the college veranda or in class rooms. The suitable indoor plants are Snake plant (*Sansevieria trifasciata*), Money Plant (*Epipremnum aureum*), Aloe vera , Areca Palm (*Dyopsis lutescens*) . These indoor plants are in C4 category which will generate maximum amount of oxygen from photosynthesis.
- ❖ By providing beautiful paintings in the class rooms entrance or department rooms will change attitude of students and also aesthetic look of the college

2. HERBAL GARDEN

The literal meaning of Ayurveda is "science of life," because ancient Indian system of health care focused on views of man and his illness. It has been pointed out that the positive health means metabolically well-balanced human beings. Ayurveda is also called the "science of longevity" because it offers a complete system to live a long healthy life. It is an interactive system that is user-friendly and educational. It teaches the patient to become responsible and self-empowered. It is a system for empowerment, a system of freedom, and long life. A significant part of knowledge and tradition is currently being eroded due to modernization, acculturation and availability of alternatives. Therefore, it is urgent to inculcate young minds to realize the fascinating knowledge and tradition associated with these resources and help them understand the immense potentials the Kerala medicinal plants possess for the future.

The "Promoting Herbal Gardens in Schools and colleges" has been a fun-filled learning activity for the students where they got the opportunity to learn about the medicinal plants by


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actually planting the medicinal herbs and watching them grow in their gardens, and by exploring information about them from various sources.

The task of making the garden itself has been enriching in terms of making students realize the importance of teamwork such as detailed planning, and allocation of tasks within a team. For the teachers, herbal garden project has been useful in terms of ease with which they could integrate the concept with other subject matter activities, such as writing essays, poems and stories, making posters, drawing and painting, making herbariums, and even preparing food recipe using some of the culinary herbs students have planted in their gardens. Kerala Government is also making lot of initiatives to developing and inculcating the herbal gardens in schools and colleges.

There is few trees in the **Don Bosco College, Mannuthy** having medicinal properties in the college which is protected by the college NSS club and the management. By preserving and nurturing the nature beauty of college, the management sends the message to society as its commitment to the environment. The students also get a practical experience in their academic life for the adaptation of green engineering in their future carrier life.

Recommendation

We strongly recommend to initiate a herbal garden in the college campus with the help of students. This will give an idea of trees around them having medicinal values and it is basis of Ayurveda and nature treatment.



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3. VEGETABLE GARDEN

It is a garden that exists to grow vegetables and other plants useful for human consumption. Gardening can provide students with hands-on learning opportunities while increasing environmental awareness and vital experience in problem-solving. The school gardens are changing the eating habits of the students

Gardens are a wonderful way to use the college campus as a classroom, reconnect students with the natural world and the true source of their food, and teach them valuable gardening and agriculture concepts and skills that integrate with several subjects, such as math, science, art, health and physical education, and social studies, as well as several educational goals, including personal and social responsibility. They gain self-confidence and a sense of "capableness" along with new skills and knowledge in food growing — soon-to-be-vital for the 21st century students become more fit and healthy as they spend more time active in the outdoors and start choosing healthy foods over junk food.

Recommendation

We strongly recommend to marked area for cultivating a vegetable garden in the college campus with the help of students. This will provide a sense of ownership among students.

4. TREE COVERAGE AROUND CAMPUS

Don Bosco College, Mannuthy surrounded by mashie land the total area of 3.72 acres of land only few areas are covered with trees and it is well protected by management. Educational institutions serve as important incubators for developing a 'green 'sense among students and teachers and create a new generation of professionals to drive the future change. Green sense is the sensitivity towards environment that is addressed in our decisions, practices and general lifestyle. In Don Bosco College teaching sustainability and environment not in books but it is demonstrated in the campus

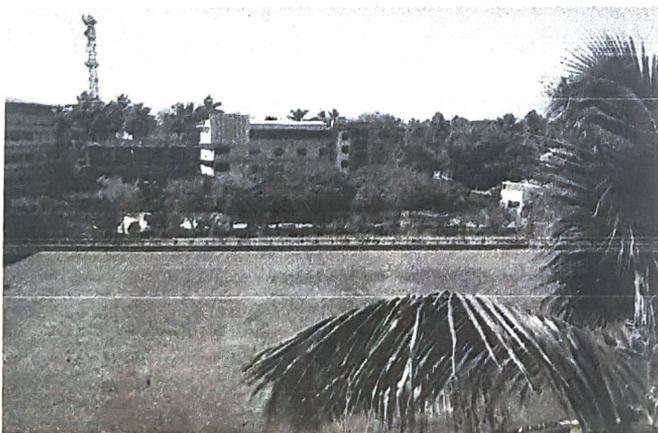
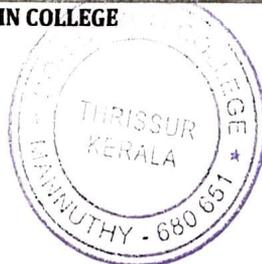


FIGURE 5: TREE COVERAGE IN COLLEGE



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Such a place can have following benefits to the ecosystem.

1. **Maintain the equilibrium of air and food:** Humans and animals need food and oxygen and excrete carbon dioxide and water. The plants, algae, etc, in the forest use carbon dioxide and water and release or produce oxygen and food.
2. **Filter and store water, and drastically reduce storm-water runoff:** Forests filter and regulate the flow of water. The litter over the forest floor acts as a sponge which filters, stores and gradually releases the water to natural channels and ground water.
3. **Conserve valuable topsoil and reduce soil erosion:** A forest is like a protective green cloth over Mother Earth's fragile body.
4. **Conserve biodiversity and balance ecology:** In a natural environment, the populations of species are balanced to an optimum minimum level
5. **Reduce pollution:** Plants can remove and/or Phyto remediate pollutants and contaminants from soil and water.
6. **Arrest or reverse global warming:** Global warming can cause extinction of species, tropical cyclones, extreme weather, tsunamis, abrupt climatic change, sea level rise, increased human stress resulting in violence, etc. These are just a few of its catastrophic effects. Plants can lock CO₂ in their bodies to save our planet and the life on it.
7. **Acoustics of the college will give comfort zone for academic purpose.** : Green coverage around the building reduces the sound by absorption by leaves thus the echo and reverberation of sound will come down.

Recommendation

College can initiate a MIYAWAKI forest in dense forest in the college as one acre or lesser than that. The new Japanese method for forest will develop within 18 Months in a location.

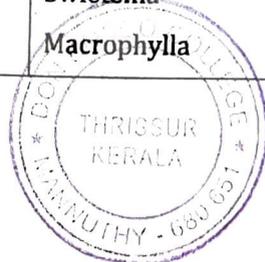



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3. LIST OF TREES AND CARBON SEQUESTRATION

Green space in the college where you can go for morning and evening walks, as well as for picnics. Oxygen Park is a location where we can rest and release all our stress by nature. In this aesthetic location with ample ventilation take us into heaven in the earth. His park is anything but regular with its many sections for picnic lovers, children, fitness enthusiasts, and just about anyone who wants to spend some quiet time amidst nature. Fitness enthusiasts, get here for some fresh air and undisturbed yoga sessions. Undisturbed nature along with water bodies enhances your creativity due to comfort feeling to mind along with abundant supply of oxygen.

SL No:	Local Name	Scientific name	No: of trees	CO2 sequestered	CO2 tons of storage
1	Laxmi tahru	Sinarouban Gcaauca	02	7.4	29.19
2	Coconut tree	Cocos nucifera	25	812.34	20.30841429
3	Maruthu	Terminalia Arjuna	01	25.2	1.8
4	Ungu	Pongamia Pinnata	09	114.2348304	0.914
5	Dividivi	Caesalpinia Coriaria	05	113.3	0.566
6	Badam	Terminalia catappa	01	67.69	0.067694714
7	Lanki	Cananga Odorata	01	63.46	0.063
8	Mandaram	Baughinia Odorata	04	7.5	0.030
9	Ilanji	Putranjiva roxburghii	11	51.83	0.570116422
10	Oak	Oilnam ental	02	21.15	0.042
11	Panjara Pazham	Muntinngia Calabura	01	32.7	0.032
12	Kanikkonna	Cassia fistula	01	28.60101679	0.029
13	Maavu		02	155.49	0.311
14	Arana Maram	Monoon Longifolium	45	110.568033	5.2
15	Muringa	Moringa oleifera	02	2.26	0.004512981
16	Puli	Garcinia gummi- gutta	01	6.35	0.006346379
17	Mahagani	Swietenia Macrophylla	05	246.8036458	0.742

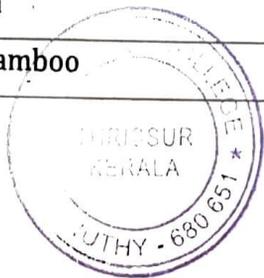


18	Pera tree	Psidium Guasava	03	9.03	0.027077886
19	Nelli	Phyllanthus Emblica	04	9.03	0.036103848
20	Capsicum	Capsium Annuum	41	0.211	0.0086
21	Brinjal	Solanum Melongena	23	0.414	0.0095
22	Pappaya	Carca Pappaya	08	76.01552292	0.608
23	Kaypa	Monordila Charantia	01	.5	0.00023
24	Banana tree		40	4.57	0.182775729
25	Mullatha	Annona Muricata	03	21.15	0.063463795
26	Jack Friut tree	Astrocarpus Heterophyllus	01	65.2	0.65
27	Ambazham	Spondias Mombin	01	11.28	0.056
28	Amara	Canvalia	01	0.23	0.000225649
29	Koval	Cocinia Grandis	01	.23	0.0034
30	Suppotta	Manilkara Sapota	03	1.97	0.003948858
31	Rambootan	Nephelium Lappaceum	01	384.5	0.384
32	Kari Veppu	Murraya Koenigi	01	18.28	0.037
33	Aatha Chakka	Annona Reticulata	01	0.581	0.00116
34	Chembakam	Michelia Champaca	01	57.8	0.0578
35	Cashew Nut Tree	Anacardium Dccidentale	01	72.2	0.1444
36	Nrakam	Citrus Limon	01	0.705	0.00071

TABLE 4: LIST OF TREES AND CARBON SEQUERESTATION

List of Ornamental Plants

SL No:	Local Name	Scientific name	No: of trees
1	Crotton Varities	Codiaeum Varigatum	37
2	Money Plant	Epireminum Aureum	15
3	Helicornia	Helicornia Psitiacorcim	500
4	Bamboo(Silver Bush Type)	Bamboos Bambuseae	01
5	Kolambi	Alamanda Cathartica	03
6	Red palm	Cyrtostachys Renda	05
7	Yellow Bamboo	Bamboos Bambuseae	01



8	Bogain Villa	Bougain Villea	12
9	Lawn Grass	Carpet Loan	Lumsum
10	Green Palm	Cyrtostachys Renda	19
11	Thulasi	Ocimum Sanctrum	
12	Pani koorka	Plectranthus Barbaatus	02
13	Oarchid varities	Dendrobium	65
14	Aglonima	Aglaonema Commutatum	03
15	Colyyancs varities	Cleus Scutellarioide	-
16	Chembaruthi	Hibiscus Rosa	14
17	Silver palm	Coccothrinax	04
18	Snake plant	Dracena Trifasciata	11
19	Sarpagandi	Rauvolfia Serpentina	01
20	Erukku	Calotropis Gigantea	05
21	Adalodakam	Justcia Adhatoda	01

KUTTIVANAM / GREEN ZONE

This Relaxation Area is designed to help students improve their emotional, mental and physical health. Spending time in green spaces with friends has indeed great psychological and physical impacts on the psyche of the students. This untouched forest cover one of the major oxygen supplier to the nature.

SILENT ZONE

Now a day's silent zones are getting important in academic institutions. The noise pollution leads to stress and other medical and neurotic problems to children's and also creativity and absorption capacity of knowledge is also going down. For reduction of academic stress level there is space for complete relaxation which gives the importance of silence zone. Don bosco college have aerated certain silent zones in the college itself. Church in the college is gives its spiritual acme to the students and also total silence is also keep there. Natural silence zones are also crated in the college campus where there is no sound other than natures sound.



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FIGURE 6: AREA FOR SILENT ZONE DEVELOPMENT

6. SUGGESTIONS

- ❖ Mark the trees around the campus, Display boards such as Oxygen park, herbal garden, , etc has to provided.
- ❖ Documentation to be done as list of trees, carbon sequestration by measuring its diameter, height, botanical name, medicinal importance etc. This list has to be updated in every 6 months.
- ❖ Initiate a zodiac garden in the college or row of trees around the ground depicting zodiac trees.
- ❖ Vegetable garden can be created open space available behind of college arts block.
- ❖ New Miyawaki forest can be created as a specimen for the students and the public. This will increase the attitude among others for creating a forest cover in a limited space.
- ❖ Following trees are to be provided in the college which is giving maximum amount of oxygen remittance as Njaval (Jamun), Asoka. Maruthu, Sarpagandi , Peral , Neem ,Karipatta, and Banyan Tree .

OXYGEN SUPPLIERS IN NATURE

Trees release oxygen when they use energy from sunlight to make glucose from carbon dioxide and water. Like all plants, trees also use oxygen when they split glucose back down to release energy to power their metabolisms. Averaged over a 24-hour period, they produce more oxygen than they use up; otherwise there would be no net gain in growth.

The following trees are giving 30% more oxygen as compared with other trees. The bamboo is considered as grass category but gave maximum amount of oxygen.



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Malyalam Name	English Name	Botanical Name	Importance
Aryaveppu	Neem	Azadirachta Indica	Ever green and suitable to us traditionally, Absorbs SO ₂ , and Nitrogen and other pollutants
Maruthu	Maruthu	Terminalia Arjuna	Important in Ayurveda, absorbs particulate matter along with CO ₂
Njaval	Jamun	Syzygium Cumini	In mythology India is called as Jamunadeep and absorbs SO ₂ , Nitrogen m particulate matter
Ezhilam pala	Sarpagandi	Alstonia Schol	Heavily attracted by honey bee and helping high pollination absorbs pollutants
Peraal	Banyan	Ficus Benghalensis	Highest oxygen supplier
Aal	Pipalva	Ficus Religiosa	In ficus family high oxygen supplier
Curry Veppu	Curry Tree	Murraya koenigii	Used in kitchen for helping digestion and toxic removal from air
Asoka	Asoka	Sarga Asoka	Absorbs particulate matter and suitable for most areas
Mula	Bamboo	Bamboos Bambooseae	Highest oxygen supplier, can be used as boundary or as cluster.

TABLE 5 OXYGEN SUPPLIERS

PETS AND BIRDS

Animals play an important role in many people's lives. Many studies indicated that pets will reduce the anxiety and blood pressure. Findings suggested that the social support to a pet provides a person feel more relaxed and reduction in stress. Pets develop great empathy, higher self-esteem, and increase of participation in social and physical activities. This attributes student's emotional development.

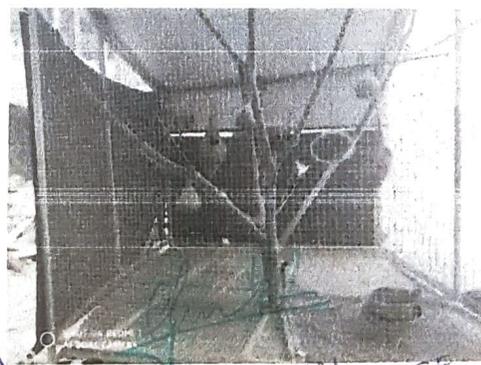


FIGURE 7: PETS AND BIRDS



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WATER RESOURCES AND CONSERVATION

Don Bosco College uses water mainly for latrines and gardening there are only one source of water supply to the college.

Open wells

There are 3wells are located in the college but two are mainly used taking water to college requirement. The well located nearer to parking area and the well behind the newly built hostel. The water is pumped into the tank located in arts block (5KL *2 Nos) and a tank located above the newly built hostel (5KL). The water used for drinking will be filtered water.




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WATER CONSUMPTION

The labs have the highest tap points whereas the toilet accounts for the major consumption. The water outlet points in the college campus and hostel are listed in the following table.

Area of Usage in college

Location	No: of water taps
Washing area	10
Toilets	52
Flush	18
Comfort room	10
College compound and garden	10
Total	100

Table 6: Water Taps

Inference

- i. The majority of the consumption is for lavatories and gardening purpose.
- ii. Actual consumption couldn't monitor due to the non-availability of water meters in the campus.

Suggestion

- i. Install water meter separately at the pipelines that supplies water to each location
- ii. Record this measurement once in a week so that the college can understand the usage pattern vs the functioning of the building and can initiate the reduction in consumption, such as, automatic urinal flusher using sensors and automatic water taps using motion sensors in toilets of main buildings and other higher consumption areas.
- iii. Drip irrigation can be used for watering the garden plants.



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7. GROUND WATER RECHARGING

Depletion of vegetation cover, pollution of water, from different sources, soil erosion and recession of water table are impacting nature and environment. The nature has been generous in bestowing this region in the form of rain fall but with the absence of scientific management it is becomes waste. But proper collection, routing recharging and recycling of this water will increase the vegetation and increase ground water table level.

Rainwater harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). There are different methods for artificial rain water harvesting. Ground water recharging by different means and collection of rain water for direct use by installation of rain water collection tank. In this college rain water is collected in a tank which they are using as fish tank. All the water from the arts block is collected and feed into fish tank. The overflow water from fish tank is contours to collect in ground water charging pit for increasing the level of ground water.

The water collected from the science block is contoured to ground water recharging into ground on back side of arts block or nearer to open ground.



FIGURE 8: CONTOUR FOR GROUND WATER CHARGING



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CONCLUSION:

Green Audit is the most efficient & ecological way to solve such an environmental problem. Green Audit is one kind of professional care which is the responsibility of everyone who are the part of economic, financial, social, environmental factor. Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). The green audit reports assist in the process of attaining an eco-friendly approach to the development of the college.

The auditors observed during the campus visit and after the conversation with the staff and students of Don Bosco College Mannuthy that they have taken continuous and considerable effort in several years for nurturing and maintaining the green coverage over the campus which is being well appreciated by us. There is still opportunity to attain the perfection some of the identified suggestions are listed in the executive summary.




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ANNEXURE - I

GRIHA CP CERTIFICATE

CERTIFICATE



Ministry of New and Renewable Energy
Government of India



GRIHA Council



The Energy and Resources Institute

This is to certify that

Ashok K M P

of

Athul Energy Consultants Pvt Ltd, Thrissur

has qualified as

GRIHA Certified Professional

on

01st August 2018



Sanjay Seth
Chief Executive Officer
GRIHA Council

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



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

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