St. Aloysius Degree College ,Sarvajna Nagar, Cox Town, Bengaluru 56005

GREEN AUDITING

Definition Green auditing is a means of assessing environmental performance (Welford, 2002). It is a systematic, documented, periodic, and objective review by regulated entities of facility operations and practices related to meeting environmental requirements (EPA, 2003). It is otherwise the systematic examination of the interactions between any operation and its surroundings. This includes all emissions to air; land and water; legal constraints; the effects on the neighbouring community; landscape and ecology; the public's perception of the operating company in the local area. Green audit does not stop all compliance with legislation. Nor is it a 'green washing' public relations exercise. Rather it is a total strategic approach to the organisation's activities (CBI, 1990).

1. Audit is a systematic approach.
2. Audit is conducted objectively.
3. Auditor obtains and evaluates evidence.
4. Evidence obtained and evaluated by the auditor concerns assertions about economic actions and events.
5. Auditor ascertains the degree of correspondence between assertions and established criteria. 6. Goal, or objective, of the audit is communicating the results to interested users.

ACKNOWLEDGEMENT

We would like to thank our Principal, Dr. Sr. Sagaya Mary B SADC for her consent to conduct this audit. We would like to sincerely thank all the Departments, students, teaching and nonteaching staff for their kind cooperation with us during this survey. We would also like to specially thank the Laboratory Assistants who helped us a lot in furnishing this information.

Objectives of this green audit

1. Verifying compliance: Verifying compliance with standards or best available techniques.

2. Identifying problems: Detecting any leakage, spills or other such problems with the operations and processes.

3. Formulating environmental policy: Formulating the organisation's environmental policy if there is no existing policy.

4. Measuring environmental impact: Measuring the environmental impact of each and every process and operation on the air, water, soil, worker health and safety and society at large.

5. Measuring performance: Measuring the environmental performance of an organisation against best practices.

7. Confirming environmental management system effectiveness: Giving an indication of the effectiveness of the system and suggestions for improvement.

8. Providing a database: Providing a database for corrective action and future plans.

9. Developing the organization's environmental strategy: Enabling management to develop its environmental strategy for moving towards a greener corporate and performance culture.

10. Communication: Communicating its environmental performance to its stakeholders though reporting will enhance the image of the company.

General steps

1. Systematic and comprehensive data collection
2. Documentation with physical evidences
3. Independent periodic evaluation with regulatory requirements and appropriate standards
4. Systematic and comprehensive improvement and management of existing system

The audit process:

The present audit is a Preaudit to collect the details required for external auditing. Preaudit activities The preaudit activities include the following:

1. The sites / area /division that are to be audited need to be determined and selected.

2. The auditee were informed of the date of the audit enabled them to adjust and become used to the concept.

3. The audit scope were identified. The auditee were consulted when establishing the scope.

4. The audit plan was designed in such a way that it accommodated changes based on information gathered during the audit and effective use of resources.

5. Audit team and assignment of responsibility were established.

6. The chosen working papers were collected. This facilitated the auditors' investigations on the sites.

7. The background information on the facility including the facility' organisation, layout and processes, and the relevant regulations and standards, were collected.

8. The background information on the site's historical uses, and the location of soil and groundwater contamination were collected.

9. The preaudit questionnaire was informed to auditee (Humphrey and Hadley, (2000).

Onsite audit activities

The onsite audit includes:

1. The opening meeting is the first step between the audit team and auditee.

In this meeting the purpose of audit, the procedure and the time schedule were discussed.

2. Site inspection is the second step for onsite activity. In this step the audit team discovered matters which are important to the audit but which were not identified at the planning stage.

3. Onsite phase of the audit developed a working understanding of how the facility manages the activities that influence the environment and how any EMS, if there is one, works.

4. Assessed strengths and weaknesses of the auditee's management controls and risks associated with their failure were established.

5. Gathering audit evidence ie, collecting data and information using audit protocol.

6. Communicated with the staff of the auditee to obtain most information.

7. Evaluated the audit evidence against the objectives established for the audit .

8. An exit meeting to explain the audit findings. (Humphrey and Hadley, 2000).

9.The audit team:

The audit team included the following members:

Dr. Sr. Sagaya Mary, The Pricnipal, St. Aloysius Degree College

Rev.Fr.Vinoo Fabian, The Vice-Principal, St. Aloysius Degree College

Mrs. Swathi, Professor, Department of Computer Science

Fr. Prashanth, Manger, St. Aloysius Group of Institutions

Mr. George, Supervisor, St. Aloysius Degree College

Green audit team of St.Aloysius Degree college

PROCEDURE FOLLOWED

The students were divided into four groups, and under the guidance of the teaching staff of the Department of computer science Mrs. Swathi and Sr. Sagaya Mary, each group collected data on the assigned topics. The assigned topics were as follows :

1.Analysis of Air Quality and Biodiversity

2.Analysis of Water quality and usage

3.Analysis of Energy consumption and costs

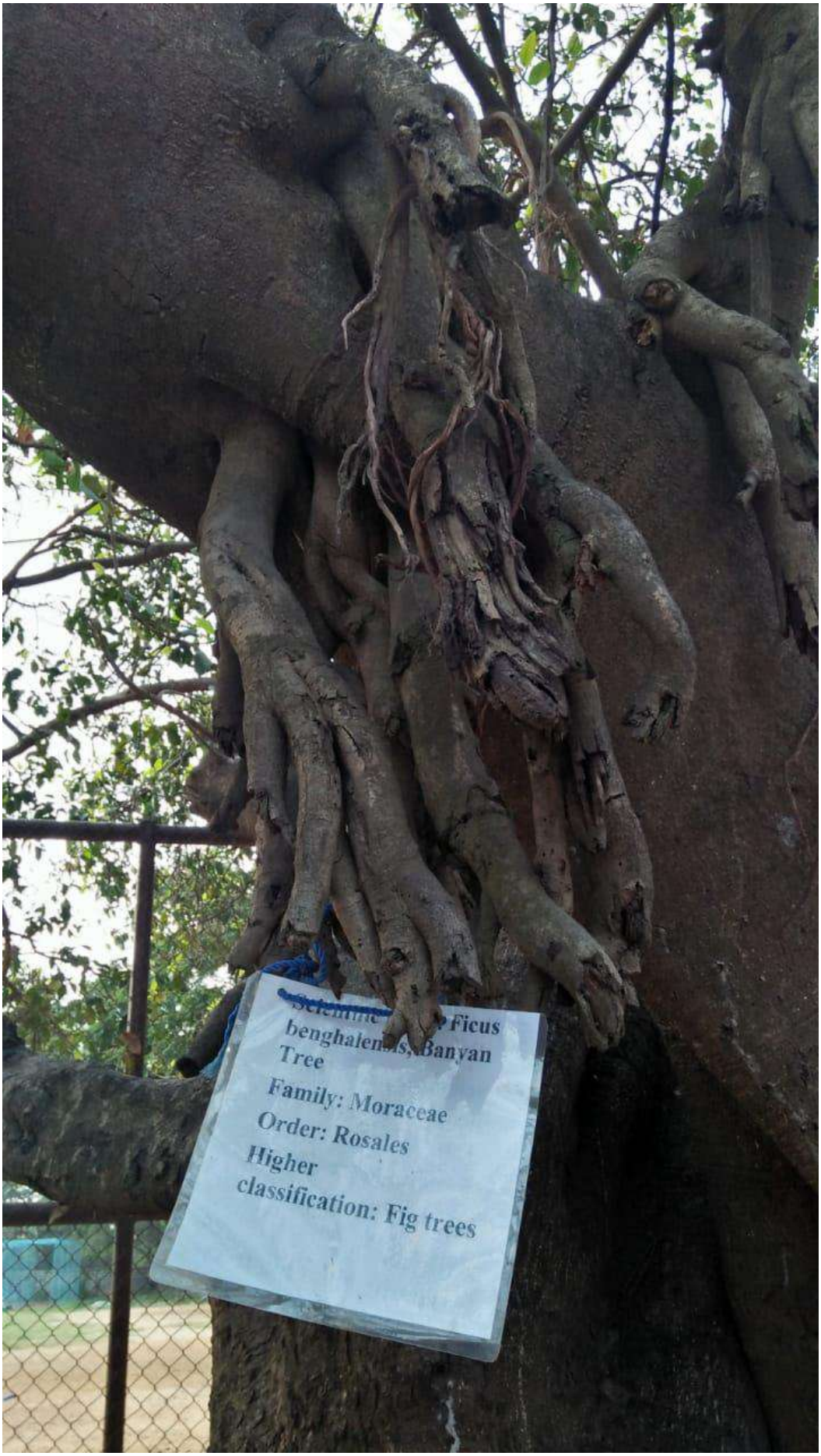
4.Analysis of waste generation and disposal All the data were united and based on these, a report was formulated.

REPORT

1. Analysis of Air quality and biodiversity

In total, based on our data collected, there are plants in the college campus. In this, 249plants are trees, 429 are plants are shrubs , 39 creepers, 10 medicinal plans and innumerable small plants. So, 729 major plants in our college

contribute to the Oxygen supply that we utilize. Some of the trees that are found in the large number in our campus are Indian silver oak *Grevillea robusta,* Bottle brush *Callistemon*, Christmas tree ***Araucaria columnaris,*** **Mahogany** ***Swietenia macrophylla***, Ashoka tree *Saraca asoca*, and a big banyan tree *Ficus benghalensis.* There are also variety of croton species, Hibiscus shrubs, creepers and Bamboo bush near the PG Block.


Ficus
benghalensis, Banyan
Tree
Family: Moraceae
Order: Rosales
Higher
classification: Fig trees

A row of Christmas trees in the college grounds


Scientific name: Araucaria
columnaris, Christmas tree
Conservation status: Least
Concern (Population stable)
Division: Pinophyta
Family: Araucariaceae

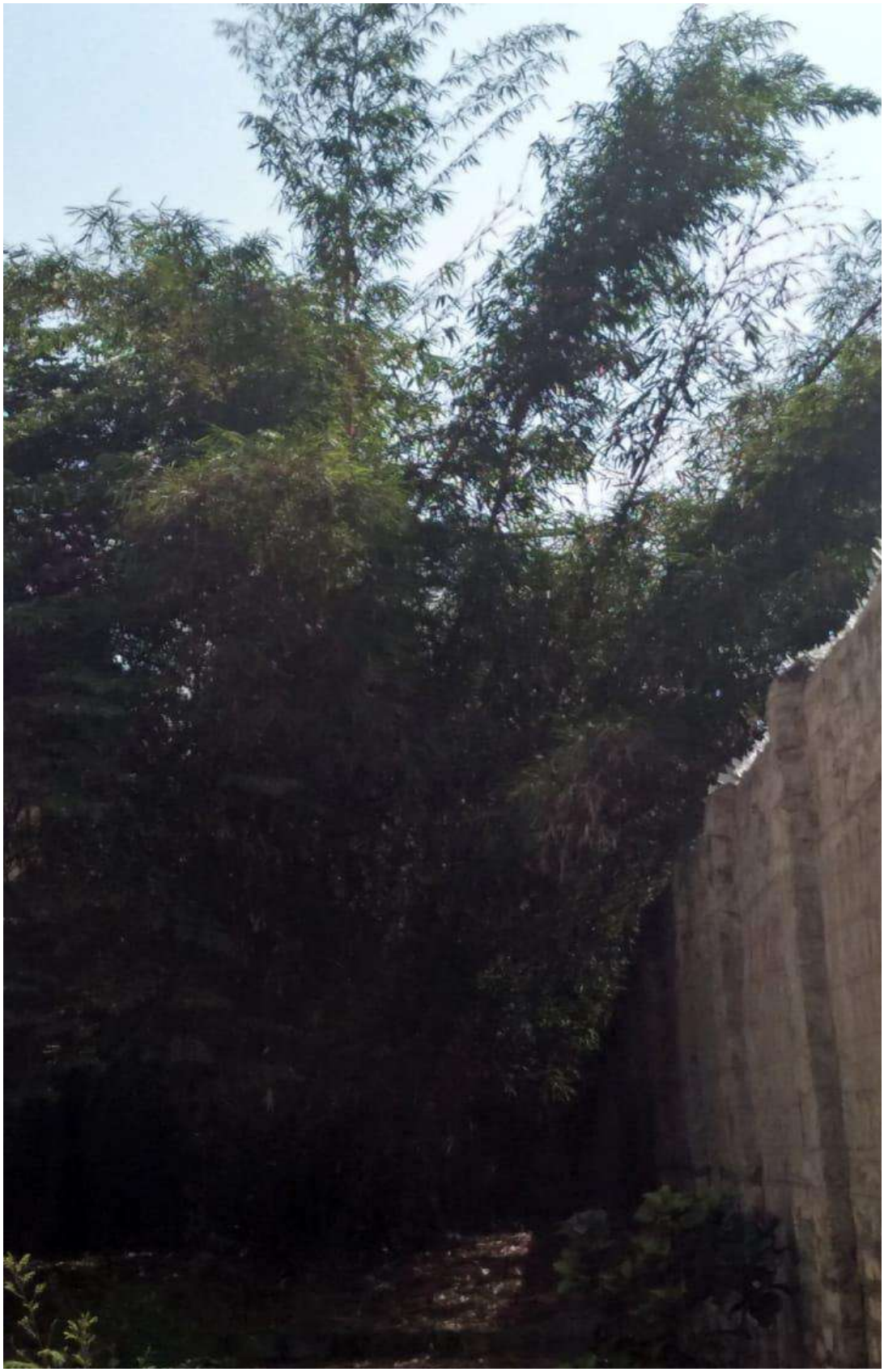

Family:Myrtace
Genus:Syzygium
Specis:S. Cumini,
Nerale Tree


Scientific name: Epipremnum aureum, Money Plant
Family: Araceae
Kingdom: Plantae
Order: Alismatales


Scientific name: Pentas
Higher classification: Madder family
Rank: Genus
Family: Rubiaceae
Kingdom: Plantae


Acalpha wilkensiana,


Paarijatha, Night
Flowering
Jasmine
Family: Oleaceae
Order: Lamales



Bamboo Plant near PG Block

Medicinal Plant Garden

Each Plant species botanical name is displayed on the plant along with the common name. There is a separate section of medicinal plants near the PG Block. Being situated in the urban area, our college is exposed to various atmospheric pollutants from vehicles passing on the Assay Road, as well as by other external means. Based on our calculation, the different sources of carbon dioxide emitted to our college are:

1.Vehicles 2.Refrigerator

Vehicles On the days of data collection, there were 8 cars, 7 bikes and 22 scooters in our campus, which in turn proves us that these vehicles may contribute to high carbon dioxide emission. There are 2 refrigerators. The students, teaching and nonteaching staff and the visitors also contribute to carbon dioxide emission. There is a ring near the corner of the ground where all the food papers are collected from the classes are used in the bio manure plant which are degraded by the action of earth worms.. Plastic wastes and papers to recycle are collected by an NGO Swachha Eco Solutions for recycling.

2. Analysis of Water quality and usage

The source of water for the college campus is the two borewell water and the Kaveri water from the BWSSB. The college campus possesses many water outlets. Our students have counted the total number of taps, rain water harvesting plants, and well. We have found that in total, there are 108 taps, 6 rain water harvesting plants worth 20,000 litres and a well. Out of these, The 1 leaking tap leads to water wastage.

Hostel drinking water filter plant

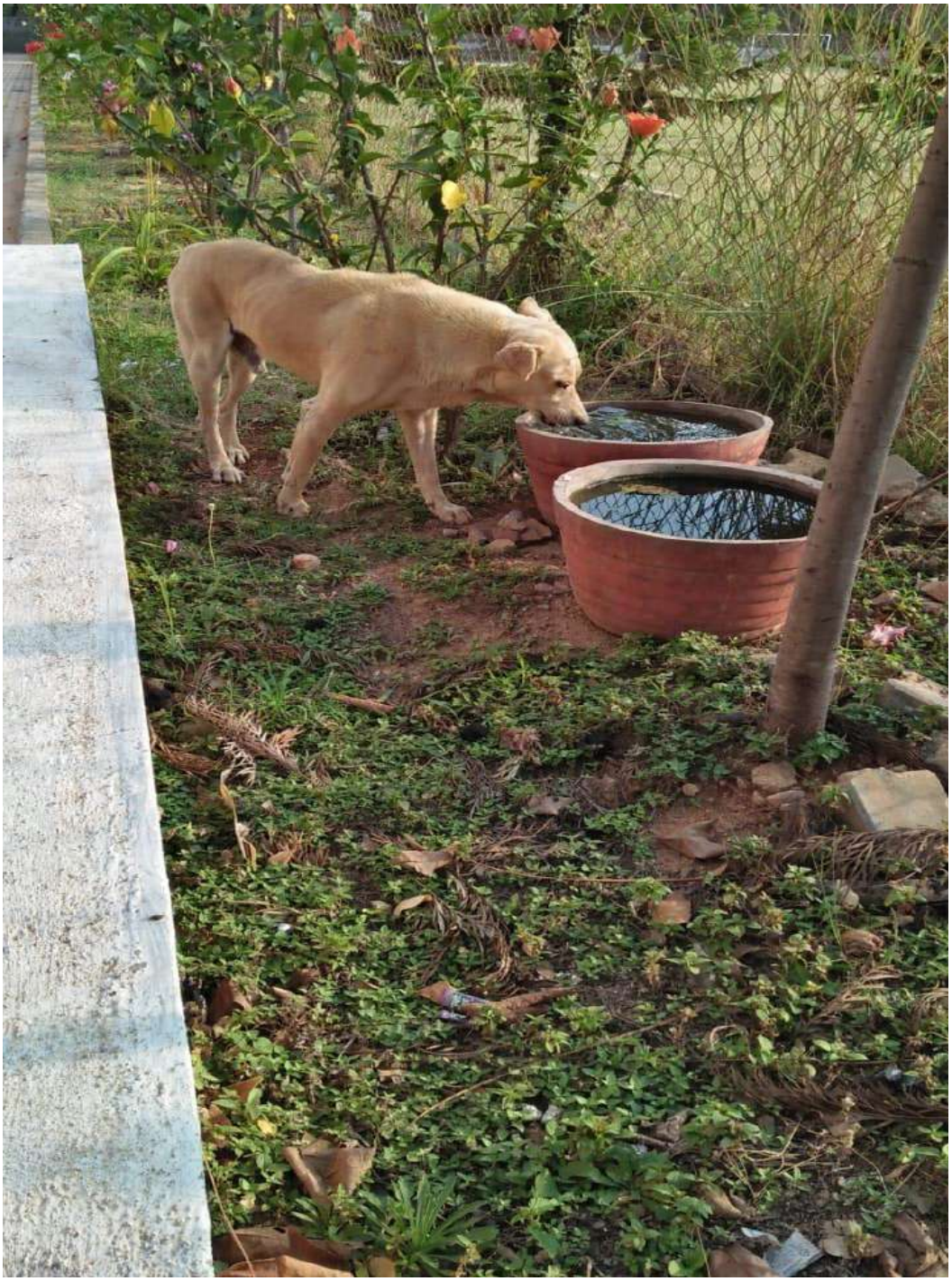
College drinking water filter plant

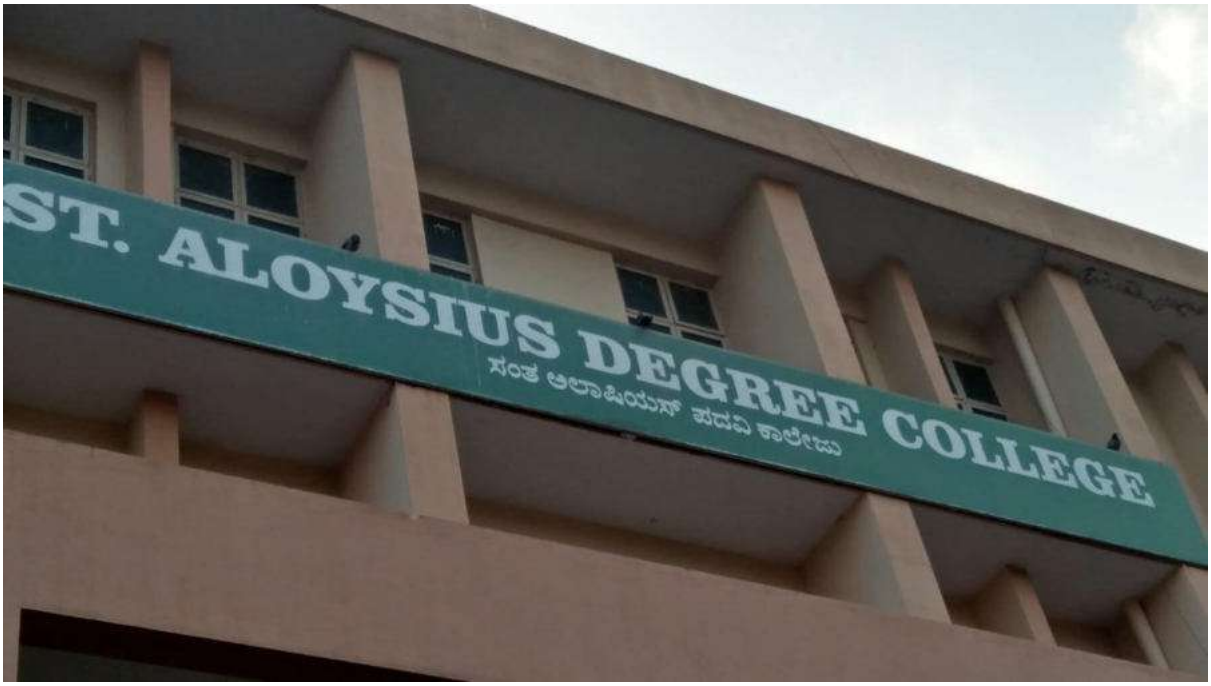
Hand Wash Taps near the canteen

The college also has a water point for animals and birds. The rainwater is harvested in the College and the hostel. There are 4 rain water harvesting ponds in the campus. They are each 10 feet deep and these water is used for the garden plants and for recharging the ground water. There are verities of birds the live in the college campus .Largest number of them are Indian eagles *Clanga hastata,* Crows, *Corvus splendens* , Indian Peigions, *Columba livia,* sparrows, *Passer domesticus* , bats, *Pteropus giganteus* and Indian Honey bees *Apis cerana indica*

Honey comb on college building

The college also has two stray dogs which have been living in the campus Mr.and Mrs.Chintu.They are friendly with students. All these animals use the water points for their water needs kept in front of the hostel.





pigeons on the college building

pigeons quenching their thirst

Rain water harvesting pond near the main door of the college

Rain water harvesting pond near the main door of the Hostel

Rain water harvesting pond near the main door of the Hostel

Rain water harvesting pond near the main door of the Hostel

3. Analysis of Energy consumption and costs

The college is well equipped with electricity supply. Each department possess computers, printers, fans, plug points, tube lights, bulbs, etc. In addition to these equipment, our college also has 1. A water purifying and distillation 2 standing fans, 212 ceiling fans , 20 UPS, 7 audio visual projectors, 10 telephones , 8 mikes, A bell , A Sound system, 8 big speaker box, 40 class room speakers , 2 xerox machine, 1 electric stove,101 Computers, 10 Laptops, 16 CCTV Cameras and 10 LCD Projectors.. Hence total electrical energy consumption of the degree college is 769 Kw per month. The hostel has also 100 Litres capacity solar water heater.

The solar water heater on the hostel building

The solar water heater on the hostel building

4 Analysis of Waste generation and disposal

Wastes cannot be avoided in any environment. Wastes can be classified as Biodegradable and Non- biodegradable wastes. Biodegradable wastes include food wastes; which can be easily decomposed by the bacteria in soil. But nonbiodegradable wastes are those which cannot be degraded by any organism and remain as such for many years. Much amount of waste is generated from the college campus. The biodegradable waste manure pit which is dug in the hostel garden which is situated behind the hostel, is very useful natural compost for the growing plants.

Bio manure pit in the hostel garden

Bio manure pit in the hostel garden

Dry leaves used as manure for palnts

The waste segregation bins in the campus

Plastic segregation for the NGO Swachha Eco Solutions

Segregation of wet waste and dry waste

1. CANTEEN – The food waste generated from the canteen is collected and used for the bio manure pit in the hostel garden. The dried leaves , the paper waste is thus modified as bio manure is used for to grow vegetables in the hostel garden.

Hostel Garden

Hotel Garden

Production of greens from the garden

Beans produced from the garden

Use of bio manure for garden palnts

2. Plastic waste is generally less generated from the canteen. The plastic waste generated is used by an NGO Swachha Eco Solutions .

2. LIBRARY - The most generated waste is paper waste. It is taken for recycling.

3. OFFICE- Paper waste generated are recycled and reused.

4. GARDEN-Plastic and paper waste is comparatively less.

5. AUDITORIUM -The wastes are collected after each programme and are segregated and recycled.

6. CLASSROOMS-Paper Wastes are collected in the waste basket and recycled.

7. College and Hostel premises-Plastic waste generated is usually less. But paper waste is generated in a larger amount.

OBSERVATIONS

1.On analysing the air quality, we could assess that there are many pollutants in our environment (either in micro quantities or macro quantities), from the vehicles of the road. But, there are many plants in our campus that purify the polluted air and supply enough oxygen for us. The air quality is so good that often we have honey combs built by honey bees over college building.

2. Likewise, there are sufficient water outlets for the students and for the departments. But it is essential to check whether all these are working or not and whether the taps are leaking or not.

3. Energy consumption is yet another component that is to be taken care of. The tube lights that are used in the college and hostel are the LED bulbs which are low energy consumers than the ordinary tube lights.

4. Waste generated is recycled as bio manure. Fortunately, the nonteaching staff of the college is available to clean the college.

SUGGESTIONS

a. Air Quality : More plants need to be planted. More of shade trees to be planted inside the college campus.
b. Water Quality: Taps needed to be repaired.

c. Energy Consumption: Energy consumption could be reduced. Unnecessary lights and fans could be switched off. During daylight, lights can be switched off. Energy conserving methods like usage of LED and CFL bulbs is appreciated. The use of Separate baskets for biodegradable and nonbiodegradable wastes is highly appreciated and should be continued. Vermicomposting plant and bio manure plant should be continued. Agencies or individuals should be available to transport wastes from the college premises

CONCLUSION

We, the Department of computer Science, believe that we have successfully completed the analysis of various environmental components. We hope that the suggestions put forward by us would be considered by the college and implemented as soon as possible.

Post audit activities (to be conducted)

Post audit activities begin with the preparation of a draft report. The draft report should be reviewed by the facility personnel directly involved in the audit. The final report should be derived from it and it should then be distributed to all interested parties within the organisation. Humphrey and Hadley (2000) confirm that it is important for management to follow-up the report and develop an action plan to implement those audit findings.