

GREEN & ENVIRONMENTAL AUDIT REPORT OF



WAINGANGA COLLEGE OF ENGINEERING & MANAGEMENT

(2020-21)



SHREYAS QUALITY MANAGEMENT SYSTEM

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Executive Summary:

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institute which will lead for sustainable development.

Wainganga College of Engineering and Management, Wardha Road, Nagpur is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher learning, the college has initiated 'The Green Campus' program two years back that actively promote the various projects for the environment protection and sustainability.

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and Mapping of Biodiversity. With this in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the Green Policy. It can make a tremendous impact on student health and learning college operational costs and the environment. The criteria, methods and recommendations used in the audit were based on the identified risks.



INTRODUCTION:

Green and Environmental Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the ecofriendly ambience. Green and environmental audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

Objectives of the Study:

The purpose of Green and Environmental audit was to ensure that Green Policy is established, followed and implemented in the campus, across all departments, administrative bodies and students





Methodology:

The purpose of the green and environmental audit of Wainganga College is to ensure that the practices followed in the campus are in accordance with the Green Policy of the country. The methodology includes: collection of data, physical inspection of the campus, observation and review of the documentation and data analysis. In order to meet its objectives, this audit combined physical inspection with a review of relevant documentation and interviews with various stakeholders.

Review of the Documentation

Green Policy & ISO14001 requirements.

Interviews

Interviews were conducted with the Principal, and also faculties and students.

Physical Inspection

The audit team visited the college to inspect the campus and verify the Green initiatives.





Fig: Aerial view of the college site (Google Map)

About the College:

Wainganga Bahu-Uddeshiya Vikas Sanstha (WBVS) was established in the year 1990 by a Creative and Dynamic Visionary Personality, Honble Dr. Brahmanand B. Karanjekar with his strong will, commitment, strength, determination and support of Smt .Dr. Vrunda B. Karanjekar. Sanstha has flourished by running Seventeen schools-colleges including Engineering ,Pharmacy, Education, Physical education, Fire service Engineering, Arts Science colleges, Junior colleges, School & convent.



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Sanstha is actively engaged in social actives like Marathi Sahitya Sammelan, Social Service camp, Sports activities, Seminars, Health Camps, Conferences, Research Work, NSS camps & Academic fairs and exhibition etc. over the years. The Sanstha has successfully developed meritorious student and good citizens in the field of Engineering, Pharmacy, education and sport who represent Sanstha Nationally and Internationally.

Sanstha provides best infrastructure in all educational institutes with laboratories, libraries, and play grounds with well qualified, experienced and efficient staff.

In addition to Wainganga College of Engineering and Management Nagpur (Poly, BE, M.Tech., MBA). Our Sanstha runs many other educational institutes and imparts lower to higher levels of education. The various institutes run by our society are listed as below.

VISION

Dissemination of knowledge by offering best quality world class education for re-engineering of regional, social and economic system in light of dynamic global environment and contribution to national wealth through innovations.

MISSION

Promote competitive merit and excellence as the sole guiding criteria in overall development of students for producing skilled engineers, managers, researchers, entrepreneurs and responsible citizens while adding value to industry and society in general.



The college has also adopted the 'Green Campus' system for environmental conservation and sustainability. There are main three pillars i.e. zero environmental foot print, positive impact on occupant health and performance and 100% graduates demonstrating environmental literacy. The goal is to reduce CO2 emission, energy and water use, while creating an atmosphere where students can learn and be healthy. The 'Green Campus' has been active since last 2 years both as an assembly group of sub committees that actively promote the various projects. The college administration works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and Mapping of Biodiversity



Observations

In site visit it was noted that water is used at bathrooms, toilets, laboratory, garden, shower, and also for drinking. Leakages and over flow of water from overhead tanks was evaluated. The data collected from all the sections is examined and verified.



The water supply in the Campus is provided by Bore wells. This water is being used for all water requirements at the campus, such as for drinking, cleaning, in the labs, gardening and flushing the toilets. The data collected from all the departments is to be examined and monitored. No water meter is observed in any of the bore well to check the total quantity of water used by the college in one academic year.



Presently College is utilizing fresh water for all its water requirements. The management is considering the possibilities of plant based waste water treatment (STP) as part and will be accomplished when the funds will be available. Probably by 2021-22 a feasibility study and implementation of STP will be possible.

Possibilities for the storage of rain water is also under consideration by the College which can be utilized as fire extinguisher,, gardening purpose, primary treatment is required for the same needs to be provided as a project to civil engineering department student. Rain water harvesting to be carried out in the college.

College has a provision to use the rain water for gardening purposed directly. Taps available in colleges, toilets and hostel and in canteen with no leakage.



Recommendations:

Auditors recommend the College administration to adopt the good practices in conserving water such as regular plumbing services, regulating the water flow from top and old technology flushes in toilets be changed to water efficient flushes. If Waste Water Treatment Plant (WTP) is installed then recycled water can be utilized for the toilet flushing and gardening. It is not possible to estimate the exact quantity of water used by different departments, however the highest consumption of water is most likely happening in toilets, hostels, canteen, and in chemical lab. In view of the escalation of water scarcity in the region team recommend basic steps be carried out to optimize the water utilization at the college level, which will also contribute to reducing the related expense.



I. Putting up notices in all washrooms and near all water coolers about the need for saving water, and simple tips like ensuring all the taps are properly closed, leakages are immediately brought to the notice of the management, respective floor cleaning staff could be given the responsibility to keep a check on every floor if any taps are open or leaking.

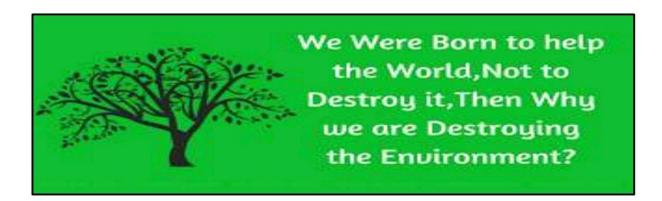


- II. Training to the cleaners in economical use of water for cleaning purposes and a system in place for immediate response when issues of water leakage are observed so that water losses are prevented.
- III. It was observed that the drinking water coolers are generally placed near washrooms; if possible drinking water coolers could be shifted to other places for aesthetic and hygiene point of view. Also regular monitoring of tank (which is provided for firefighting) to avoid any last moment inconvenience during any fire hazards.
- IV. Need of monitoring, controlling overflow is essential and periodically supervision drills should be arranged. In campus small scale/medium scale/ large scale reuse and recycle of water system is necessary.
- V. Minimize wastage of water and use of electricity during water filtration process, if used, such as RO filtration (Drinking Water) process and ensure that the equipment's used for such usage are regularly serviced and the wastage of water is not below the industry average for such equipment's used in similar capacity.
- VI. Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. are biodegradable and nontoxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.
- VII. Electrical fittings and plumbing kept in proper condition to prevent electricity leakage and water dripping. All water taps to be checked for its leakage particularly in toilet (Hostels).
- VIII. Identification of areas to be carried out such as compost making area, water harvesting tank, bore well used for water harvesting purpose, bore well used for consumable purpose, parking area of staff, students, hazard area etc.



- IX. Water meter to be installed in both the borewell available in the college and daily monitoring and record of water used to be kept as per the following;
- X. Cleaning schedule of water purifier to be made and followed.
- XI. Water consumption of the college to be monitored and graphs/table to be prepared.
- XII. Water to be tested from various sources including the potable water purifiers and in canteen.
- XIII. Maintenance of water purifier to be done including replacement of filters.

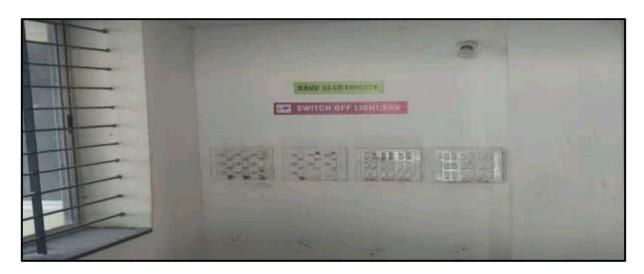






Energy Use and Conservation:

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. The college primarily uses energy in the form of electricity provided by MSEDCL. For proper analysis of energy consumption, we need to understand the electricity consumption over at least one academic year, and ideally three previous years. The data for the same needs to be collected and analyzed. Major use of the energy is at office and laboratories of different departments for lighting, practical and laboratory work. The main electric appliances in the college are mechanical workshop, fans, computers and LCD projectors, and computers, lifts, mechanical workshops and accessories Major energy consumption equipments are the high wattage electrical appliances such as Air conditioners, water coolers, geyser installed at boys and girls hostels, deep freezers, etc.





Good Practices:

All sections of campus lecture rooms, office rooms, laboratories etc are spacious voluminous and airy, having proper natural light and ventilation. Hence actual requirement energy consumption in lightening is minimal. The air conditioners in the management chamber or in Principal Chamber are rarely used and avoiding unnecessary use of the same is a part of the green practice in the College. Besides this, solar system is also installed in the campus for very limited capacity as an alternate renewable source of energy, It is suggested to enhance the capacity with plan and regular interval so that college become energy producer rather than user only.. Equipments like Computers are used with power saving mode. Also, campus administration runs switch—off drill on regular basis.





The College building has one lift which is very rarely used. Energy source utilized by all the departments and common facility center is electricity only. It is required to monitor and measure the electricity consumption on monthly basis and graph/table to be prepared as per the following information.

Total annual power requirement (in kWh):

Percentage of annual power requirement of the Institution met by the renewable energy sources: (In percentage):

Annual power requirement met by the renewable energy sources (in kWh):

Percentage of annual lighting power requirements met through LED bulbs:

Total power consumed by LED bulbs in kWh/Year:

Annual lighting power requirement (excluding LED)(in kWh):

Total Annual Lighting Power Requirements:

To reduce electricity consumption following practices must be followed in the college:

- 1. Don't leave electronic appliances on standby mode: It is a common tendency among the people to switch off their electrical appliances using the remote, leaving them on standby mode. They fail to realize that the device is still consuming 85% of electricity energy and wasting the valuable energy reserve. Instead, by switching off the main power button or by unplugging the socket, they can make a commendable contribution in saving electricity energy.
- 2. Avoid using electric tumble dryer: An electric tumble dryer consumes a large amount of electricity energy in a home. To save the exhaustible



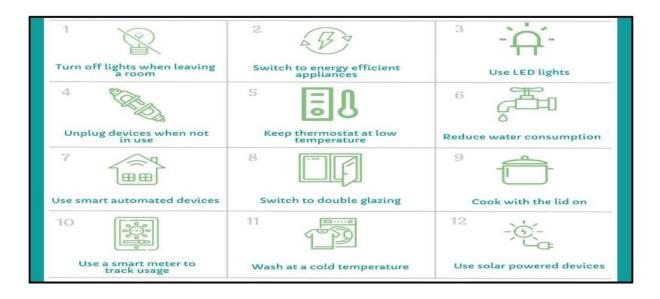
- electrical energy, user must switch over to the traditional method of linedrying the clothes.
- 3. Lighting: The traditional bulbs and tube lights consume a large amount of electricity energy, making a contribution of almost 10 to 15 percent in the electricity bill. In lieu of these outdated bulbs, one must prefer purchasing an energy saving bulb and the fluorescent tubes that glows brightly without consuming more energy.
- 4. Bring home solar garden lights: To lighten your garden and add grace to its look, one can easily bring home the highly efficient solar garden lights as they do not entail you to dig trenches or set up wiring connections. Users can easily arrange these fitting anywhere they desire and highlight the dark areas of their gardens. These lights get charged up during the day and illuminate the garden at night.
- 5. Check out the energy star label: While purchasing electronic appliances like air conditioner, refrigerator, microwave and other household appliances, one must make sure that the appliance has an energy star label on it that can help to cut almost 30 percent of the electricity bills.





Recommendations

- 1. All electrical loose wire to be dressed up properly.
- 2. Electrical Earthing of the college to be checked regularly.
- 3. Awareness for the use of electricity and paper to be developed in the college.
- 4. Instruction such as all electrical appliances (lights/fans/AC) shall be switched off when not in use or at the end of the day to be displayed.
- 5. College takes steps to purchase fans, refrigerators and air conditioners with low energy consumptions with maximum star ratings.
- 6. College has to replace resistance regulators with electronic regulators, CRT monitors with LED monitors and DOT matrix printers with Deskjet printer.
- 7. Use of Diesel generator to be avoided (to reduce the consumption of oil).
- 8. Total quantity used for diesel month wise to be prepared.
- 9. Enhanced renewable energy source capacity.
- 10. The display of the instruction boards/to be displayed on each classrooms/ lab for switching of the fans and lights when not required.
- 11. Switching to star rating electric appliances in phase wise manner.





Waste Generation

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus. The different solid wastes collected as mentioned above.

For Plastic and waste generated in the college there is a provision to dispose the same with waste collection vehicle of gram panchayat on daily basis under the swatch Bharat Abhyaan. The wastage from the canteen needs to be used in the composting purpose rather than disposing it through other sources.



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Also college encourage their staff and students for using the plastic bags of more than 50 micron or use clothes bags or paper bags makes with the waste paper through awareness training.



Observations

Various types of waste generated on the campus can be categories as: solid waste, liquid waste, construction waste and e-waste. The Solid waste comprises of dry & wet, dry waste includes plastic, glass, paper, clothes, metal, garden waste and others. The wet waste comprises of food waste (mostly from the lunch boxes, food labs and others). The liquid waste comprises of the chemical waste and the e waste comprises chips, bulbs, circuit boards, motherboards, computers, batteries, switches and others. It was not possible to get an exact amount of each categories of waste that is generated daily on the Campus. The total solid waste collected in the campus is approximately 10-15 Kg/day. Waste generation from tree droppings and lawn management is a major solid waste generated in the campus. The waste is segregated at source by providing separate dustbins for Bio-degradable and Plastic waste. Segregation of chemical waste generated in chemistry laboratories is also practiced along with the scrap generated in workshop during the practical is



segregated in separate bins. The waste generated through the construction work shall also be disposed of through proper mechanism. Single sided used papers reused for writing and printing in all departments. Important and confidential reports/ papers are sent for pulping and recycling after completion of their preservation period. Very less plastic waste (0.1Kg/day) is generated by some departments, office, garden etc but it is neither categorized at point source nor sent for recycling. Metal waste and wooden waste is stored and given to authorized scrap agents for further processing. The institute has identified a place for vermiculture composting in the college premises, and to be started immediately.

The e- waste generated in the college needs to be segregated and to collect in any identified place and disposed of though recognized e-waste recycling agency. The college has required to signed MOU with E-Waste recyclable vendors to dispose of their e- waste from college on time to time.

Recommendations:

- Reduce the absolute amount of waste that it produces from college staff offices.
- II. Provide sufficient, accessible and well-publicized collection points for recyclable waste, with responsibility for recycling clearly allocated.
- III. Single sided papers to be used for writing and photocopy
- IV. Important and confidential papers after their validity to be sent for pulping.
- V. Solid garbage (building debris, unused building materials is to be removed from the college campus.
- VI. Waste paper, iron waste to be sold to vendor used for recycling.
- VII. Different types of bins to be made available in the cafeteria particularly for dry and wet disposal.



- VIII. Use of Plastics (Polythene, Thermocole, PVC etc.) is minimized and waste plastics are recyclable.
 - IX. The college building kept clean by washing and cleaning. Waste to be disposed of as per the guideline set.
 - X. Identification of vermicomposting area and work to be started in dynamic way.
 - XI. It is highly desired that sanitary napkin incinerators to be installed in the girls resting room. Also team recommends periodical awareness sessions with demonstrations on their importance and functions on regular basis in the college.
- XII. The wet and dry waste awareness posters to be placed in the college premises, canteens and in hostels.
- XIII. The chemical waste generated during the chemical practical needs to be collected in different tanks rather than leaving it into open drains.
- XIV. End products from each practical needs to be listed.



E-Waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic



components contain cadmium, lead, mercury, and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

Observations:

E-waste generated in the campus is very less in quantity. The cartridges of laser printers are refilled outside the college campus. Administration shall conducts the awareness Programmes regarding E-waste Management with the help of various departments. The E- waste and defective item from computer laboratory is being stored properly. The institution has to sign MoU with approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

Recommendations:

- 1. Recycle or safely dispose of white goods, computers and electrical appliances to be given only to recommended E-Waste Vendor.
- 2. Always purchase recycled resources where these are both suitable and available.







Green Area/Faunal Diversity:

Wainganga College is within the geo-position between Latitude: 20° 59′ 25.19″ N and Longitude: 79° 01' 26.40" E, Dongergaon, Nagpur, India. It encompasses an area of about 88 Acres. The area is immensely diverse with a variety of tree species performing a variety of functions, Sprawling lawn/ garden and large area (3nos.). Most of these tree species are planted in different periods of time through various plantation Programmes organized by the authority and have become an integral part of the college. The trees of the college have increased the quality of life, not only the college fraternity but also the people around of the college in terms of contributing to our environment by providing oxygen, improving air quality, climate amelioration, conservation of water, preserving soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Many spices of birds are dependent on these trees mainly for food and shelter. Nectar of flowers and plants is a favorite of birds and many insects. Leaf – covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species display a seemingly endless variety of shapes, forms, texture and vibrant colors. Even individual trees vary their appearance throughout the course of the year as the seasons change. The strength, long lifespan and regal



stature of trees, enormous variety of flowering plant, give them a monument – like quality. They also remind us the glorious history of our institution in particular. We often make an emotional connection with these trees and sometime become personally attached to the ones that we see every day. A thick belt of large shady trees in the periphery of the college have found to be bringing down noise and cut down dust and storms This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards This also helps in ensuring that Environmental Policy is enacted, enforced and reviewed using various environmental awareness Programmes.

Observations:

Campus is located in the vicinity of approximately 80 types (species) trees. Various tree plantation programs are being organized during the month of July and August at college campus and surrounding villages through NSS unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute. **The plantation program** includes various types of indigenous species of ornamental and medicinal wild plant species. It is also required to observed and identified the various species of fauna is present and visiting the garden premises on regular basis. Some of the faunal Diversities observed in the campus are as below;





Common Bank Myna, House Sparrow , House Crow, Cuckoo, Snake s, Butter Fly Common Wood shrike Red-Vented Bulbul, etc.





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Recommendations

- 1. Reviews periodically the list of trees planted in the garden, allot numbers to the trees and keep records. Give scientific names to the trees.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.
 Create awareness of environmental sustainability and takes actions to ensure environmental sustainability.
- 3. Establish a College Environmental Committee that will hold responsibility for the enactment, enforcement and review of the Environmental Policy. The Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.
- 4. Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.
- 5. Celebrate every year 5th June as 'Environment Day' and plant trees on this day to make the campus more Green.
- 6. It is necessary to increase their land under vegetation, since there is lots of scope if the land is filled then use the gram panchayat nearby areas needs to



- be identified and proper green activity/zone to be developed with authorize permission.
- 7. Plantation of some medicinal trees to be done in the premises such as neem, aloevera, Tulsi, eucalyptus, arjun etc.
- 8. List of faunal diversity to be done in the college premises.

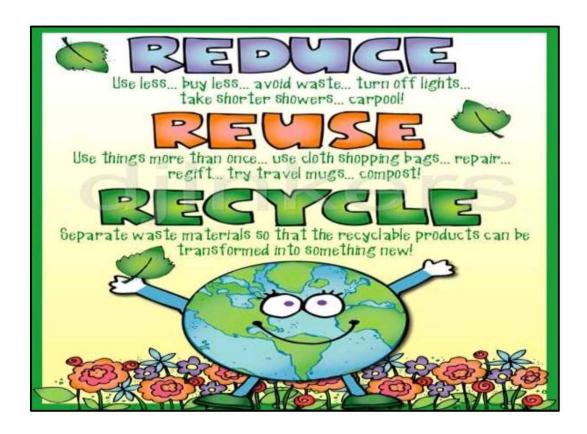


Some Other Recommendations:

- 1. Environmental Policy and Objectives to be defined displayed at prominent Location and make the staff and student aware of it.
- 2. Save environment related poster to be displayed everywhere in the college.
- 3. Use of electricity related awareness amongst the staff and student to be enhanced by displaying the poster.
- 4. Identification of areas to be carried out such as compost making area, water harvesting tank, bore well used for water harvesting purpose, bore well used for consumable purpose, parking area of staff, students, hazard area etc.
- 5. College shall strongly ban the use of plastic bag.



- Environmental committee to be formed which may include the students of various departments, teaching, non-teaching staff and if possible some local interested people.
- 7. Separate container to be provided for sanitary napkin disposal.
- 8. Use of tobacco, smoking or chewing in campus shall be banned and instruction to be displayed at various places.
- 9. Cafeteria shall have proper food license from the competent authority.
- 10.Person working in the cafeteria shall have proper medical check-up certificate.
- 11. College takes the step to sensitize the students and staff for the environment, energy conservation, and pollution hazard.
- 12. Pollution certificate of vehicles entering into the college to be ensured.





Conclusions:

Considering the fact that the institution is predominantly an undergraduate college, there is significant environmental research both by faculty and students. The environmental awareness initiatives are substantial. The installation of solar panels, paperless work system and vermicomposting and water harvesting activities are practiced. Besides, environmental awareness Programmes initiated by the administration shows how the campus is going green. Few recommendations are added to curb the menace of waste management using ecofriendly and scientific techniques. This may lead to the prosperous future in context of Green Campus & thus sustainable environment and community development.

As part of green and environmental audit of campus, we carried out the environmental monitoring of campus. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. The college needs to provide the training to the teaching, non-teaching staff, students to maintain the green culture in the premises and day to day life of the individual.



Its Beginning.....