GOVERNMENT COLLEGE KOTTAYAM

ENVIRONMENTAL AUDIT 2020-21

INTERNAL QUALITY ASSURANCE CELL (IQAC)

1. INTRODUCTION

The campus environmental audit is a common tool that many colleges and universities have employed in recent years. A campus environmental audit is both a summary and a report card for a campus and a way to evaluate where and how resources are being used. An environmental audit is also the first step in being able to quantify whether or not current and future environmental efforts are actually making a difference. As such, an environmental audit is the beginning of the sustainability planning process. The results can be used to quantify what kind of impacts the campus community has on the environment and what steps the college can take to reduce these impacts.

The information from an environmental audit can be a starting point for researching pollution issues at any institution. An assessment of waste generation and energy consumption can highlight areas for potential intervention and provide a baseline for comparing subsequent increases or decreases in a specific waste stream. Performing an audit can also help facilitate the intervention process.

Government College Kottayam is situated in a beautiful campus on the outskirts of Kottayam. The college is located in a 15-acre campus in the Nattakom ward of Kottayam Municipality. The Internal Quality Assurance Cell (IQAC) of Government College Kottayam has ventured to undertake an environmental audit of the college with the following objectives.

- To collect baseline environmental data about the college campus
- To study and document the current practices regarding solid waste management, wastewater management and e-waste management
- To study the power consumption of the college
- To document water usage and conservation practices.
- To document the environmental friendly practices of the college
- To promote environmental awareness among faculty and students

2. BASIC INFORMATION

Name of the institution	Government College Kottayam
Year of establishment	1972
Campus area	15.5 acres
Location	Nattakom – Ponkunnath Kavu temple road, Nattakom
District and state in which the campus is situated	Kottayam, Kerala
Name of local body in which the campus is situated	Kottayam Municipality
Coordinates	09.556 N 76.511 E
Average height of campus above sea level	18 m
Access	Road – About 100 m from NH183/SH1/Main Central Road Train – About 6 km from Kottayam railway station Air – About 90 km from Kochin International Airport Water – About 500 m from Nattakom inland port
Total built up area	10200 sq. meters
No. of programmes of study	15 Undergraduate – 10 Post graduate – 05
Total Number of students (sanctioned)	1052
Total number of teaching staff	70
Total number of non-teaching staff	33

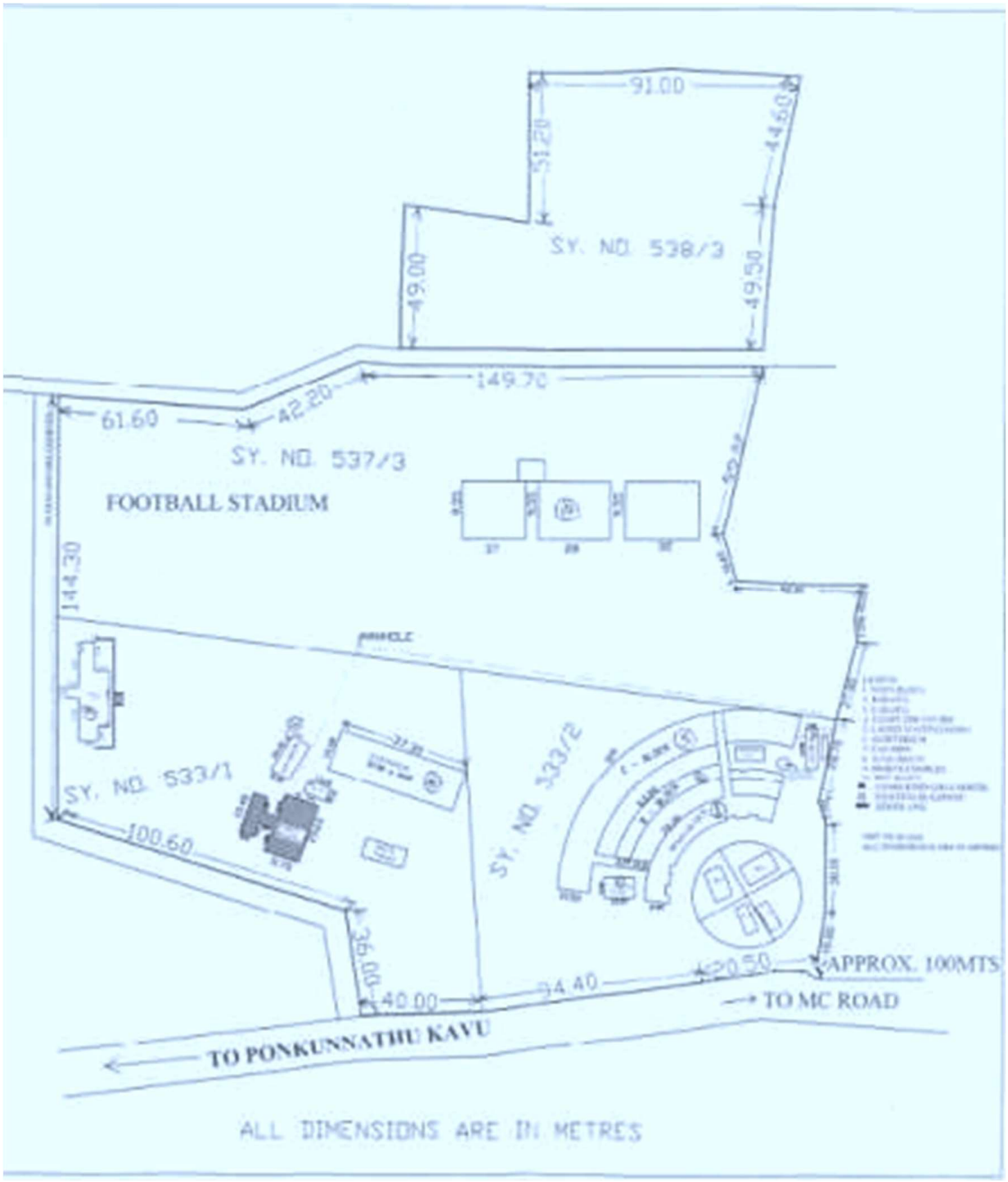
3. DETAILS OF BUILDINGS

Administrative and academic buildings	Main building (administrative cum academic) Three blocks- Main (A) , B and C Three floors D block (academic) Single floor
Hostels	Women's Hostel Inside the campus, two storeyed Inmates: 52 Men's Hostel In the campus of Govt. Polytechnic College, Nattakom (50 m from College campus), two storeyed Shared with Govt. Polytechnic college Inmates: 48
Auditorium	Seating Capacity: 400 Single floor
Canteen	Seating Capacity: 50 Single floor
Other	Continuing Education Cell classroom building (Single floor) Continuing Education Cell office building (Single floor) Aquarium building (Single floor) ASAP nodal centre (Single floor)

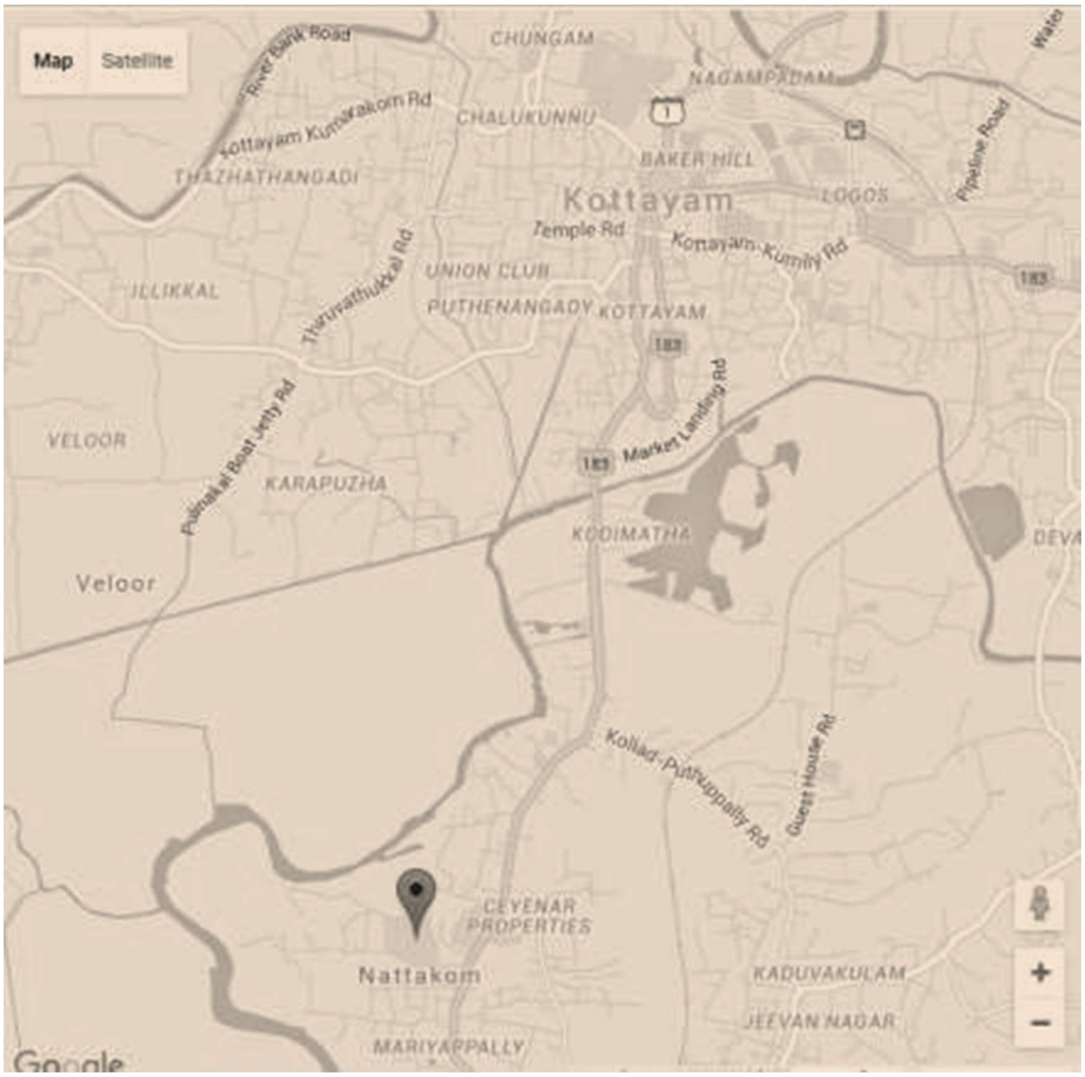
4. BASIC INFRASTRUCTURE FACILITIES

Rest room	Ladies rest room Boys Toilet
Sports	College ground – multipurpose Cricket net Volleyball court Basketball court Badminton court
Parking	Parking facility for staff Parking facility for students
Water resources	Open wells – 3 Bore wells – 2 Water harvesting facility – 1 tank of 1.25 lakh liters capacity
Other	Biogas plant Dust bins and waste disposal pit Water taps

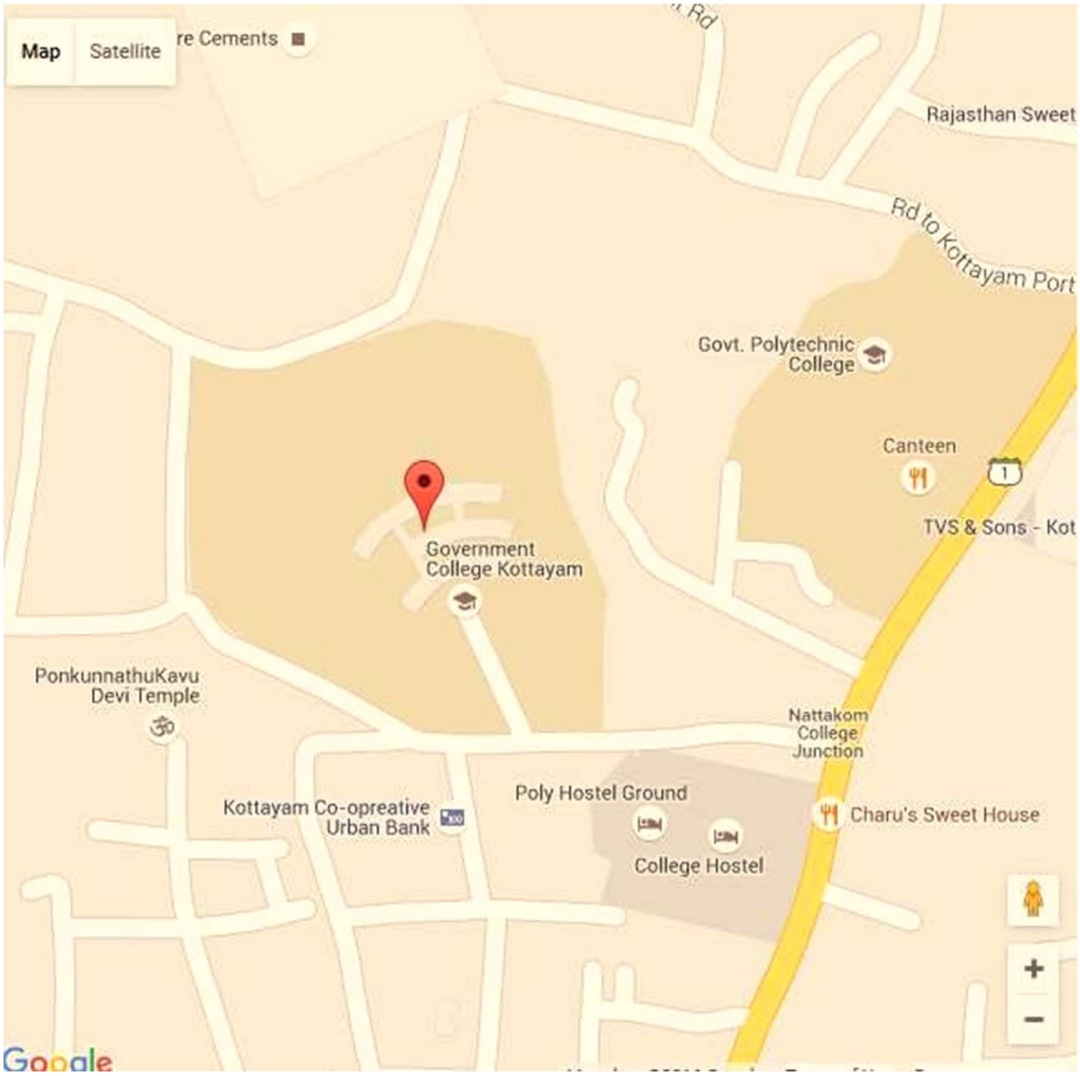
5. MASTER PLAN OF THE COLLEGE



6a. LOCATION MAP OF THE COLLEGE CAMPUS (COURTESY: GOOGLE MAPS)



6b. LOCATION MAP OF THE COLLEGE CAMPUS (COURTESY: GOOGLE MAPS)



6c. SATELLITE MAP OF THE COLLEGE CAMPUS (COURTESY: GOOGLE EARTH)

7. SOLID WASTE MANAGEMENT

7a. BIO DEGRADABLE WASTE

Main sources of bio-degradable waste in the campus	Food waste Waste paper, card board etc. Paper carry bags and cartons Yard waste
Amount of bio-degradable waste generated per day	22-33 kg
Methods for collection of bio-degradable waste	Waste bins have been placed in various sites in the campus such as class rooms, laboratories and corridors. Waste pits have been constructed to collect food waste from students. Sweepers and sanitation workers have been employed. A waste disposal pit has been constructed in the canteen
Measures taken for disposal of bio-degradable waste	A bio-gas plant has been constructed near the canteen which is utilized for the treatment of bio-degradable waste. The bio gas produced in the plant is used for cooking purposes in the canteen Waste paper, cartons etc. are auctioned as per Govt. rules Yard waste is used in the botanical garden and in organic farming Solid waste is disposed by land filling Students are instructed not to throw away solid waste in campus
Whether bio-degradable waste is disposed in the campus itself	Yes
Methods of disposal for bio-degradable waste	Biogas generation Organic Farming

inside the campus	Pit composting
Whether bio-degradable waste is disposed outside the campus	No
Methods of disposal for bio-degradable waste outside the campus	NA

7b. NON-BIODEGRADABLE WASTE

Sources of non-biodegradable waste in the campus	Plastic carry bags Plastic bottles Packing materials of equipment purchased Waste chalk, pens, pencils and other stationery Chemicals and consumables from laboratories
Amount of non-biodegradable waste generated per year	60-90 Kg
Methods for collection of non-biodegradable waste	Waste bins have been placed in various sites in the campus such as class rooms, laboratories and corridors. Sweepers and sanitation workers have been employed.
Measures taken for disposal of non-biodegradable waste	Packing material, stationery etc. are auctioned as per government rules Sanitary napkin incinerators are installed in the ladies rest room Chemical waste is disposed as per existing regulations Use of plastic carry bags are minimized Use of non-degradable cups and bottles are discouraged
Whether recycle mechanism available for non-biodegradable waste	No
Whether any hazardous chemical or biological waste is produced?	No
Whether hazardous chemical and biological waste is properly disposed?	NA

7c. E-WASTE

Sources of e-waste in the campus	Unserviceable computers, UPS, printers etc. Consumables such as cartridges, toners etc. Electronic components from laboratories Damaged keyboards, monitors etc. Replaced electronic boards of equipment Renovation waste of electric wiring
Methods for collection of e-waste	E-waste is collected separately
Measures taken for disposal of e-waste	Old computers are used for hardware training by the Continuing Education Cell Old electronic equipment and computers are made available for physics students for study purpose As far as possible old cartridges and toners are taken over by the service firms Old electronic scrap is auctioned as per government rules Electronic components are reused in labs as far as possible
Whether e-waste is disposed in the campus itself	No
Whether e-waste is disposed outside the campus	No
Whether recycle mechanism available for e-waste	No

8. WATER AND WASTEWATER MANAGEMENT

8a. WATER RESOURCES

Water resources available inside the campus	Open wells Bore wells Rain water harvesting system
Whether the college depends on external water resources?	No
Whether water is available round the year?	Yes
Whether water resources are cleaned regularly?	Yes
Whether water quality has been analyzed?	Yes
Major findings of water quality analysis?	Iron content of water sample is high and the water is moderately turbid during summer season.
Whether purified drinking water is available in college, hostels and canteen?	Yes
Methods used for water purification	Commercial purifying systems have been installed for drinking water
Whether the college makes use of bore wells?	Yes
Whether the water usage pattern of the college causes depletion of ground water?	No
Whether water harvesting system is installed?	Yes
Capacity of water harvesting system	1.25 lakh litres

8b. WATER USAGE

Daily water requirement of the campus (excluding hostels)	2500-3000 litres
Daily water requirements of the campus (including hostels)	4500-5000 litres
Per capita water usage (yearly)	500-600 litres
Whether tap water is available round the clock in the campus?	Yes
Whether tap water is available round the clock in hostels?	Yes
Whether purified drinking water is available?	Yes
Number of water purifiers / coolers installed?	6
Whether water tanks are cleaned regularly?	Yes
Whether annual maintenance of water supply and water purifiers is undertaken?	Yes
Whether repair of water leakage is promptly undertaken?	Yes
Whether judicious usage water is practiced and ensured on the campus?	Yes

8c. WATER RESOURCE POTENTIAL

Average annual rainfall of the area in which the college is situated?	290 cm
Total roof area of buildings	4000 sq. m
Total installable capacity of water harvesting system	8 – 10 lakh litres
Capacity of water harvesting system installed	1.25 lakh litres
Percentage of total water requirements currently met by water harvesting system	10-15 %
Percentage of total water requirements that can be by water harvesting system if full potential is tapped	60 – 80 %
Potential for construction of check dam for water storage	No
Whether any natural bodies of water exist in the campus?	No

8d. DRAINAGE AND WASTEWATER MANAGEMENT

Whether drainage system is in place for the flow of rainwater?	Yes
Source of wastewater generated in the college	Student's washing area Wastewater from canteen Wastewater from ladies hostel Wastewater from toilets inside the main building and other buildings Waste water from laboratories
Methods adopted for the disposal of wastewater in the college	Septic tanks Underground sewage disposal pits
Whether wastewater flows through open drainage	No
Whether risk of drinking water sources getting contaminated by waste water exist?	No
Whether hazardous chemical or biological waste gets mixed with drainage?	No
Whether wastewater flows to the rainwater drainage system	No

9. ENERGY USAGE AND POLLUTION

9a. ENERGY USAGE

How does the college meet its energy requirements?	Electric connection from KSEB
Total connected power	~ 45 kW
Total electricity usage per month	~ 3800 kWH
Whether college has exclusive transformer in campus?	Proposal submitted to the Government of Kerala and KSEB is approved
Whether generator facility is available?	No
Details of UPS facility	UPS are installed in Office, departments and laboratories
Major power consumption equipment	Water pumps Laboratory instruments Fans and Lights AC Photocopiers and printers Computers UPS
Whether judicious usage of electricity is ensured?	Yes
Whether energy star rating is ensured in the purchase of equipment?	Yes
Whether LED lighting systems are used?	No
Whether any renewable source of energy is used?	No, Proposal submitted for the installation of solar panel
Potential for renewable energy usage	High potential for solar energy generation

9b. POLLUTION

Major sources of carbon footprint	Electricity Usage Canteen and Hostel Laboratories Vehicles
Average carbon footprint per year	~ 15 tons (accounting for generation of electric power used)
Does the college have enough green cover for carbon neutrality?	Yes (for carbon emission inside campus) ~ 45 % (accounting for generation of electric power used)
Percentage of staff using public transport	50 %
Percentage of students using public transport	>95 %
Whether any hazardous chemicals are emitted from laboratories and other facilities?	No
Whether usage of air conditioning is minimized?	Yes
Number of vehicles owned by the college	Nil
Whether any major polluting industries are situated in the area?	No

10. ECO FRIENDLY INITIATIVES

10a. CAMPUS ENVIRONMENT AND MAINTENANCE

Percentage of green cover of campus	~ 65 %
Does the campus have indigenous trees and plants?	Yes
Does the campus have indigenous fauna?	Yes
Whether steps are taken for conservation of trees and plants in the campus?	Yes
Whether comprehensive landscape management is in place?	Yes
Whether campus cleaning is conducted regularly?	Yes
Whether buildings, rooms, toilets etc. are cleaned on a daily basis?	Yes
Whether staff has been appointed for campus and building maintenance?	Yes
Whether annual maintenance of buildings is undertaken?	Yes
Whether repair of electric wiring and equipment is promptly undertaken?	Yes

10 b. ECO FRIENDLY PRACTICES

Eco friendly practices of the college	Most of the faculty members and non-teaching staff use public transport Almost all students use public transportation facilities Usage of plastic is minimized Trees have been planted in various places in the campus Students are made aware of the need for energy conservation. Students are instructed to keep the campus and classrooms clean Students participate in cleaning activities regularly Celebration of environment day, water day, earth day, forest day, wildlife week etc.
Clubs and organizations in the campus which have contributed to environmental awareness	NSS NCC Nature Club Bird's Club Science Forum
Inclusion of environment related topics in syllabus	Included Environmental Science, a new course as part of curriculum in all Under Graduate courses. Department of Chemistry offers an open course in Environmental Chemistry, which include Environmental management and impact assessment, Toxic effects of pollutants, Air, water and soil pollution Effluent and waste management
Programmes conducted for environmental awareness	NSS camps Observation of Environmental day Observation of earth hour Celebration of Vanamaholsavam Exhibition of Geological samples
Measures taken for ecofriendly resource usage and pollution control	Proper exhaust systems have been installed in the Chemistry lab Sewage is not allowed to contaminate water resources Re-wiring of laboratories has been done to save electricity The college ensures judicious use of electricity. CRT monitors were replaced by LCD monitors Consumables are taken back for recycling by suppliers thereby reducing the amount of e-waste produced.
Major eco-friendly initiatives	Organic farming without the use of chemical-based fertilizers, herbicides and pesticides Herbal garden Botanical garden Butterfly garden Aquarium Geology museum Plantation of trees and saplings

11. CONCLUSION

11a. IMPORTANT OBSERVATIONS

The environmental audit regarding solid waste management, water and wastewater management, energy usage, pollution and campus maintenance was conducted and the eco-friendly initiatives of the college were evaluated. The important observations follow.

- Solid waste management system is in place and the waste is disposed properly.
- E-waste is separately handled and efforts are made to reduce the e- waste generation.
- The college meets water requirements from sources in the college itself
- Drainage and sewage systems are in place in the college.
- The amount of air pollution generated by the college is minimal.
- The Rain water harvesting is initiated in the college.
- Topics related to environment are included in the curriculum.
- The college has initiated environment friendly practices.
- The college has a Botanical and Herbal garden with rare and endemic plant species.
- A good collection fish species is maintained in the aquarium.
- The college has potential for solar energy production.
- The geology museum has good collection of geological samples from different parts of the globe.

11b. Recommendations

Based on the above observations, the committee would like to make following recommendations. The committee has an impression that by systematically designing strategies on the basis of these recommendations, the college would become a completely environmental-friendly institution in future. The results presented in this audit will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as seed new initiatives and innovative practices.

- Recycling mechanism for solid waste may be installed.
- The capacity of the biogas plant may be enhanced.
- Proper management of chemical wastes has to be ensured.
- Usage of water from borewell may be minimized.
- A reverse osmosis plant may be installed for centralized water purification.
- Potential for rain water harvesting may be completely utilized by enhancing the capacity of the existing system.
- An electric transformer may be installed in the campus.
- LED lighting system may be introduced.
- Solar power generation and usage may be installed.
- Initiate the conservation of rare, endangered and endemic flora in the campus.
- Maintain and culture the rare, endangered and endemic fishes in the aquarium.
- A sewage water treatment plant may be constructed.

Name and signature of Environmental Auditors

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Name and signature of Coordinator, IQAC

Name and signature of the Principal

ANNEXURE

Botanical Garden

Herbal Garden

Organic Farming

Water Harvesting System

Bio-gas Plant