

GREEN AUDIT REPORT (2020-2021)

Darjeeling Govt. College

Lebong Cart Road, Richmond Hill, Darjeeling

West Bengal-734101



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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. Darjeeling Govt. College is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy. The methodology included: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. 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 were 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 applicable regulations, policies and standards. 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.

1. Introduction

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Green audit is assigned to the criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India which declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

1.1 About the College

Darjeeling Government College is a co-educational government-funded college established in 1948 in Darjeeling, West Bengal, India. The College is situated at an elevation of 2134 meters. Its near Padmaja Naidu Himalayan Zoological Park and the Himalayan Mountaineering Institute.

It offers postgraduate courses in Botany, Zoology, English and Nepali and undergraduate courses in Nepali, English, Bengali, History, Hindi, Economics, Urdu, Modern Tibetan, Geography, Political Science, Philosophy, Physics, Chemistry, Mathematics, Botany, Zoology, Microbiology, Commerce and Computer Science.

2. Objectives of the Study

The main objective of the green audit is to promote the Environment Management and Conservation in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

- To introduce and aware students to real concerns of environment and its Sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use of the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requiring high cost.
- To bring out a status report on environmental compliance.

3. Methodology

In order to perform green audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summaries the present status of environment management in the campus:

- Water management
- Energy Conservation
- Waste management
- E-waste management
- Green area management

4. Observations and Recommendations

4.1 Water Use

This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. A water audit is an on-site survey and assessment to determine the water use and hence improving the efficiency of its use.

a) Observations

Being situated in a hilly terrain at an elevation of 2000 m water is very precious in Darjeeling. Thus, the optimal use of it without any wastage is of utmost importance. College strives to minimize its dependence on piped water supply from Darjeeling Municipality through year-round awareness campaigns among its stakeholders, reducing its water usage, reducing water wastages

through leakages and maximum use of rain water through rain water harvesting. The study observed that the Darjeeling Municipality connection and rainwater harvesting are major sources of water in college and the hostels. College has water harvesting tank of 27,184 liters capacity. Water is used for drinking purpose, toilets and gardening. The waste water from the RO water purifier is used for gardening purpose. Water usage depends on season – March-April (entirely with Municipality supply-30,000 ltrs/week approx.), April- August (Municipality supply 18000 ltrs/week -, and rest with Rainwater Harvesting), August-December (Municipality supply -20000 ltrs/week, rest Water Harvesting) and during winter (late December to late February-) college closes for winter vacation. Only College office remains open during winter and thus water usage from Municipality connection drops to 10,000 ltrs/week approx. During the survey, no loss of water is observed, neither by any leakages, nor by over flow of water from overhead tanks. The data collected from all the departments is examined and verified. On an average the total use of water in the college is 3,000 ltrs/day, which include 2800 lts/day for domestic, laboratory purposes and 200 ltrs/day for drinking purpose. Rain water harvesting units are also functional for both reuse of water and recharging ground water level as well.



Pic. 1 NSS volunteers Water Harvesting site cleaning under Campus cleaning program, beside Chemistry department .

b) Recommendations

- In campus small scale/medium scale/ large scale reuse and recycle of water system is necessary.
- Minimize wastage of water and use of electricity during water filtration process, if used, such as RO filtration process and ensure that the equipment's used for such usage are regularly serviced.

- Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. they are biodegradable and non-toxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.
- Gardens should be watered by using drip/sprinkler irrigation system to minimize water use.

4.2 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.

a) Observations

Energy source utilized by the campus is electricity only. Total average energy consumption is determined as 8333 KWH/month. The entire campus including common facility centers are equipped with LED lamps and LED tube lights, except at few locations. Computers are set to automatic power saving mode when not in use. Solar water heaters are installed in hostel buildings as to promote renewable energy. Also, campus administration runs switch-off drill on regular basis.

b) Recommendations

- In campus premises electricity should be shut down from main building supply after occupancy time, to prevent power loss due to eddy current.
- Support renewable and carbon-neutral electricity options on any energy purchasing consortium, with the aim of supplying all college properties with electricity that can be attributed to renewable and carbon-neutral sources.
- It is preferable to purchase electricity from a company that invests in new sources of renewable and carbon-neutral electricity.
 - Installation of LED lamps instead of CFL and replacing the old tube lights with the new LED tubes.
 - 5-star rated Heaters, refrigerators and CFLs should be used.
 - Cleaning of tube-lights/bulbs to be done periodically, to remove dust over it.

4.3 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.

A) Observations

1. Being located in a hilly terrain of 2000 meters elevation and fragile ecosystem, college always aware its stakeholders and strive to generate minimal waste. The idea of “*consume less to handle lesser waste*” is the moto with which College handles its waste problem. Plastics in particular is very detrimental to hilly regions and therefore use of plastics especially single use plastics is almost prohibited inside the campus. All the stakeholders are directed to use alternatives to plastics during events, programs and functions in the college. Still some number of plastics get into the campus which are collected monthly or bi-monthly by NSS volunteers and they prepare Eco-Bricks out of plastics and pet bottle collected.

Waste generation from dead tree leaves, 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. Single sided used papers reused for writing and printing in all departments and recently both side printing is carried out as per requirements. The waste generated by newspapers 70 kg/year, magazine 50 kg/year and of cartons is 20kg/year. Very less plastic waste (0.1Kg/day) is generated by the department, 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 solid waste is collected by the municipal corporation and disposed by their methods. Bio-degradable wastes are turned into manure through composting inside the campus area only.

a) Recommendations

- Reduce the absolute amount of waste that is produced from college staff offices.
- Make full use of all recycling facilities provided by City Municipality and private suppliers, including glass, cans, white, coloured and brown paper, plastic bottles, batteries, print cartridges, cardboard and furniture.
- Provide sufficient, accessible and well-publicized collection points for recyclable waste, with responsibility for recycling clearly allocated.
- Important and confidential papers after their validity to be sent for pulping.
- Vermicomposting should be adopted on at least 300 sq. ft. of land.

4.4 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.

a) Observations

E-waste generated in the campus is very less in quantity. Administration conducts the awareness programmes regarding E-waste Management with the help of various departments. The E-waste and defective item from computer laboratory are being stored properly. The institution has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner. In this connection, collage has collaborated with All India Women' s Conference (AIWC), Darjeeling which again are in Collaboration with HULLADEK (Hungry for waste) to collect E-waste from the campus and its stakeholders bi-annually and send to Hulladek, Kolkata. Hulladek, Kolkata is a CPCB certified vendors for safe recycling and disposal of E-waste.

b) Recommendations

- Recycle or safely dispose of white goods, computers and electrical appliances.
 - Use reusable resources and containers and avoid unnecessary packaging where possible.
- Always purchase recycled resources where these are both suitable and available.

4.5 Green Area

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 the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

a) Observations

Main Campus has a total area of 87120 sq. feet with 38,976 sq. feet built-up area. Thus, it has a green area of 55%. College campus is surrounded by protected forest of PNZP from three sides and thus has thick green both inside and in the vicinity. The campus has great variety of trees and plants. Every year Various tree plantation programs are being organized at college campus and surrounding villages through NSS (National Service Scheme) unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. The plantation program includes various type of indigenous species of ornamental, flowering, medicinal, wild orchids, climbers etc.



Pic 2. Darjeeling Govt. College campus being surrounded by thick green canopy of reserved forests of PNHZP from three sides (north, east and south).

List of medicinal Plants in the campus

(Need to be included)

- Taxus baccata

List of Trees in the campus

- Blue Pine
- Rhododendron
- Mapple
- Chhamp
- Cherry
- Texxa
- Birch

Climbers

- Wild orchids (Sunakhari)

Most notably college feels proud to purchase and install an Automatic Weather Station on its premises on 16.03.2021 (Pic.-3). Since then it is recording hours data of six weather parameters namely AirTemp.Avg, Humidity. Avg, Radiation. Avg, WindDir. Avg, WindSpd. Avg, rainfall. The weather station is installed with an objective to monitor the local weather phenomenon which

effects the physical elements both inside the campus and its surroundings. Dr. Sonam Lama, Assistant Professor, Department of Geography has been made In-Charge of weather station. He is responsible for data acquisition and dissemination to whoever asks for.



Fig-3 Automatic weather station installed on 16.03.2021.

b) Recommendations

- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records. Assign 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 take actions to ensure environmental sustainability.
- 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.
- Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.

- Celebrate every year 5th June as ‘Environment Day’ and plant trees on this day to make the campus Greener.
- Indoor plantation to inculcate interest in students
- Green library should be established.

5 Conclusions


Considering the fact that the institution is the oldest higher education institute of Darjeeling Hills, there is significant environmental research both by faculty and students. The environmental awareness initiatives are substantial. The installation of weather station and rain water harvesting system are noteworthy. 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 eco-friendly 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 audit of campus, we carried out the environmental monitoring of campus including Illumination and Ventilation of the class room. It was observed that Illumination and Ventilation is adequate considering natural light.



Pic-4 Ten Commandments of Sustainability


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