

Dated: 16th Sep. 2022

CERTIFICATION FOR GREEN AUDIT

This is to certify that Eco Paryavaran Laboratories and Consultants (NABET, NABL and MoEF&CC approved for environmental management and testing services) has undertaken "Green Audit" for Central University of Himachal Pradesh (Dharamsala, Shahpur & Dehra Campus) in September 2022.

This green audit includes the enrollment of Functional Area Experts (NABET approved), testing laboratory (NABL and MoEF&CC accredited) and high end instrument/ equipment/ software (USEPA/TUV/CPCB certified).

We are thankful to the Management and Principal of the Institute for entrusting us to conduct their Green Audit.



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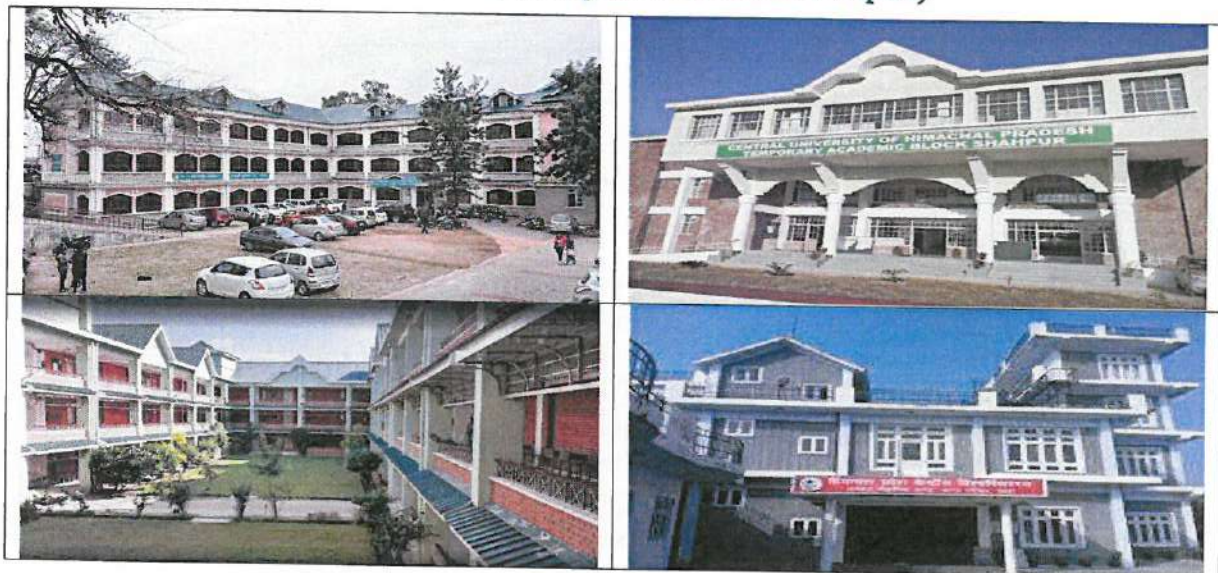
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Green Audit (Environment, Energy and Green Campus Management)
Report
for



Central University of Himachal Pradesh
(Dharamsala, Shahpur and Dehra Campus)



Prepared & Submitted By



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(September 2022)



Green Audit (Environment, Energy and Green Campus Management) Report
Central University of Himachal Pradesh
(Dharamsala, Shahpur & Dehra Campus)



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Executive Summery



Executive Summary

A Nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions now a day are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly.

To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. The activities pursued by institutes can also create a variety of adverse environmental impacts. To protect such situation Energy Audit, Green Audit and Environment Audit are required to be conducted in these institutions. Energy Audit pave the way to save energy consequently reducing Carbon Emissions. Environmental auditing is a process whereby an organization's environmental performance is tested against its environmental policies and objectives. Green audit is defined as an official examination of the effects a institute has on the environment. It must also be under stood that Energy Audit, Green Audit and Environment Audit are inter related to each other. If you save Energy, it will save Environment. If you save trees or plant trees, it will save Environment and energy. If you clean Environment, it will save human life and save energy.

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment. Waste minimization plans for the educational institute are now mandatory to maintain the cleanliness of the campus. To find out the environmental performance of the educational institutions and to analyze the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential.

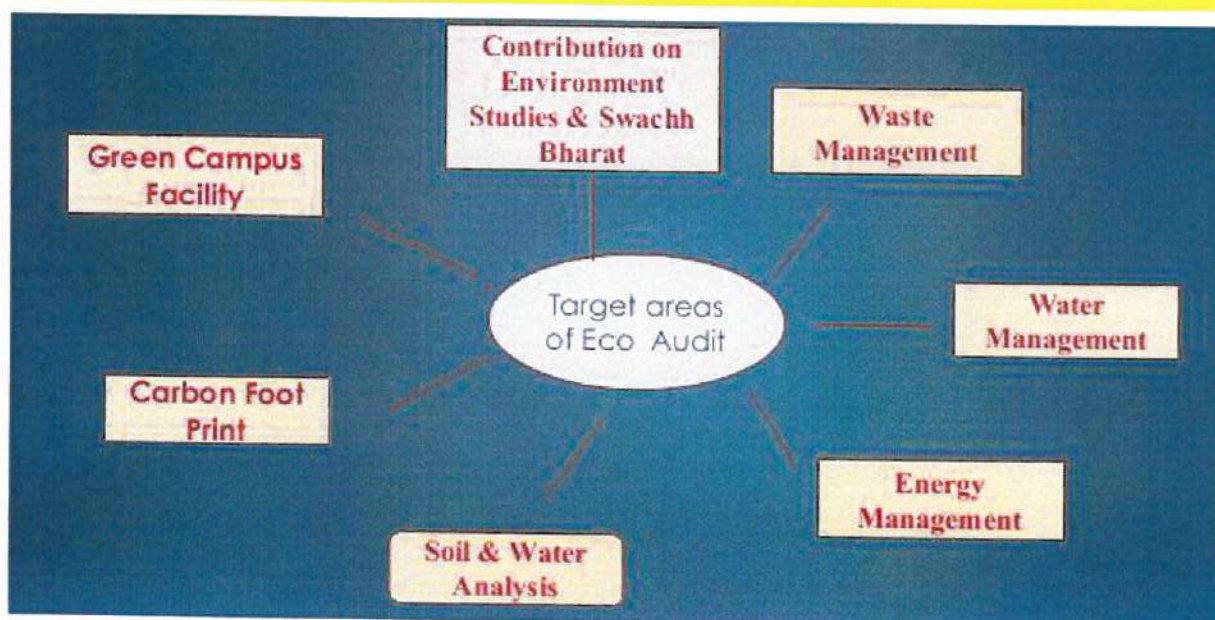
The green auditing of Central University, Himachal Pradesh enables to assess the life style, action and its impact on the environment. This is the first attempt to conduct Environment, Energy and green auditing of this campus. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil and water, vegetation, waste management practices and carbon foot print of the campus etc. Initially a questionnaire survey was conducted to know about the existing resources of the campus and resource consumption pattern of the students and staffs in the campus. In order to assess the environmental quality, the samples were collected from different locations of the university

campus and analyzed for applicable parameters. Finally, a report pertaining environmental management plan with strength, weakness and suggestion on the environmental issue of campus are documented.

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyze the environmental practices within and outside the institutional 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.

Thus it is imperative that the Central University of Himachal Pradesh 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.

Component of Audit





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About Central University of Himachal Pradesh



About Central University of Himachal Pradesh

The Prime Minister, in his address to the nation on August 15, 2007, announced the establishment of a Central University in each of the states that did not have a central university so far. Subsequently, 11th Plan provided for the establishment of 16 new Central Universities. Accordingly, the Central Universities Act 2009 (No. 25 of 2009) which received Presidential assent on 20th March 2009 provided for the establishment of Central University of Himachal Pradesh amongst others. The Central University of Himachal Pradesh is established under the Central Universities Act 2009 (No. 25 of 2009) enacted by the Parliament. The University is funded and regulated by the University Grants Commission (UGC). The University became functional with the assumption of charge by the first Vice Chancellor on 20th January 2010.

Location of the University

Headquarters of the University

The Headquarter of the University is located in Dharamshala, District Kangra, Himachal Pradesh. Dharamshala is a place with profile and is known worldwide. Serene Location, pleasant climatic condition, spiritual atmosphere of the location provides an attractive ambience conducive to academic pursuits.

Permanent Campuses

The University will have two distinct campuses located in Dharamshala and Dehra, both the Kangra District of Himachal Pradesh, as under

- **Beas Campus:** Located in Dehra, it will have such Schools/Departments/Centres as may be decided by the University and may have infrastructure for about 70 percent of the academic activities of the University.
- **Dhauladhar Campus:** Located in Dharamshala, it will have such Schools/ Departments/ Centres as may be decided by the University and may have infrastructure for about 30 percent of the academic activities of the University.

The Land for both the Campuses of the University, has already been identified and the proposal for clearance under the Forest Conservation Act (FCA), as approved by the Government of Himachal Pradesh, has a

ready been submitted to the Ministry of Environment & Forest, Government of India. Development and Construction of the Permanent Campuses shall commence as soon as the FCA Clearance is received and the land is formally transferred to the University. Temporary campuses Pending the development of its own infrastructure and permanent



campuses, the University is presently operating from its Temporary Campuses comprising the following facilities:

Camp Office

The Camp Offices, which presently serves as the Headquarter of the University is located in the Sanskriti Sadan (Writers' Home), at Dharamshala (Near International Cricket Stadium), District Kangra. The Offices of the Vice Chancellor, Registrar and Finance Officer are located in the Camp Office.

Students Support Facilities

Transport Facilities

The University has arranged transport facilities, on nominal charge, to ferry students of the University from Dharamsala and Kangra to the Temporary Academic Blocks at Shahpur & Dharamsala. Students residing in the hostels of the University are also covered by the transport facility from hostels to Temporary Academic Blocks at Shahpur & Dharamsala.

Health Care Facilities

The healthcare facilities are being provided through Government Hospitals and Government Medical College, Tanda to cater to elementary and emergency medical care of the students, faculty and staff. A regular Nurse with first-aid facilities has been stationed at Temporary Academic Block of University.

Halls of Residence

Men's Hostel: The University has hired a furnished building for Men's Hostel at Kangra. It is equipped with modern facilities having a capacity of accommodating about 110 students. The building is located in a beautiful and serene environment which is ideal for pursuing serious studies and research activities. The hostel has become functional from January 7, 2012. The facilities for both indoor and outdoor games like table tennis, badminton and volleyball, and a fully equipped gymnasium are being developed. It also has internet facility. The students run the mess of the hostel on cooperative basis having liberty to decide menu of their own choice. The University provides transport facility from hostel to Temporary Academic Blocks at Shahpur & Dharamsala. The inmates of the hostel are required to abide by the hostel rules.

Women's Hostel: The University has hired a furnished building for Women's Hostel at well-located place of Dharamsala. The facility may accommodate about 60 women students of the



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University. The University has arranged transport facility for the residents to commute between the Hostel and the Temporary Academic Blocks at Shahpur & Dharamsala.

Games & Sports Facilities

The official inauguration of the Sports Club of the Central University of Himachal Pradesh was done in November, 2012 by the Vice-Chancellor. The Sports Club is having facilities of both indoor & outdoor games including Badminton, Volleyball, Table-Tennis, Chess and Carom.



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About Green Audit



About Green Audit

Climate change and its impact, has brought into focus the need for environmental protection as a global agenda. It has emerged as the pillar for sustainable development of the world. The UN Sustainable Development Goals (SDG's) are an important step in ensuring nation's responsiveness towards environmental protection. The Legal and the policy framework of the country have incorporated many environmental measures, involving all stakeholders in the mission. In this context, the Educational Institution has been responsible and responsive in implementing green practices, such as green plantation, Rain water harvesting structures, Solid waste management, E-Waste Management, solar powered campus, Energy conservation etc.

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyze the environmental practices within and outside the institutional 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.

Thus it is imperative that the Central University of Himachal Pradesh 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.

Scope and Goals of Green Audit

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. It is necessary to conduct green audit in institute campus because students become aware of the green audit, its advantages to save the



planet and they become good citizen of our country. Thus Green audit becomes necessary at the institute level. Green 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. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promotes financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers.

Objectives of Green Audit

The main aim objectives of this green audit is to assess the environmental quality and the management strategies being implemented in University. The specific objectives are:

- To assess the quality of the water and soil in University
- To monitor the energy consumption pattern of the institute
- To quantify the liquid and solid waste generation and management plans in the campus.
- To assess the carbon foot print of the campus
- To assess whether the measures implemented by the University have helped to reduce the Carbon Footprint.
- To impart environment management plans of University
- Providing a database for corrective actions and future plans.
- To assess whether extracurricular activities of the Institution support the collection, recovery, reuse and recycling of solid wastes.
- To identify the gap areas and suggest recommendations to improve the Green Campus the institute.

Benefits of Green Auditing

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus



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- To enable waste management through reduction of waste generation, solid-waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the Institute and its environment
- Green audit is important criteria of NAAC (National Assessment and Accreditation Council) to get the institution as Grade A, B or C according to the scores assigned during the accreditation.

Target Areas of Green Audit

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency.

All these indicators are assessed in the process of "Green Auditing of this educational institute". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are

- Water,
- Energy,
- Waste,
- Green campus
- Environment (Outdoors & Indoors)
- Health and Safety
- Carbon footprint

Auditing for Water Management

Water is a natural resource; all living organisms depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the institute.

Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

Advantage of Water Audit

- Water audits provide decision making tools to utility managers, directors, and operators. i.e., knowing where water is being used in your system allows you to make informed decisions about investing resources such as time, labour and money.
- Water audits allow managers to efficiently reduce water losses in the system.
- Reducing water used at the source may even result in delaying or avoiding capital investments such as a new well, more treatment technology or additional water rights.
- Water audits also identify which water uses are earning revenue for the utility and which water uses are not. Thus, System personnel can increase revenue by institute ensuring all appropriate uses are being accurately measured and billed. This leads to more financial capacity in the water system, reduced cost per customer and better management of the water resource.
- Creating awareness among water users i.e., customers can see and understand that the utility is taking proactive steps to manage wasted water and save for the future.
- It is an effective educational and public relations tool for the water system.

Auditing for Energy Management

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Auditing for Waste Management

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Pollution from waste

is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Solid waste can be divided into three categories as bio-degradable, non-biodegradable and hazardous waste. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol. Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the institute. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable institute. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Auditing for Green Campus Management

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. So while you are busy studying and working on earning those good grades, all the trees in campus are also working hard to make the air cleaner for you.

Auditing for Carbon Footprint

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the institute is important.



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Methodology for Green Audit



Methodology Adopted for Green Audit

The methodology adopted for this audit has following step process comprising of

Data Collection

In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements.

Following steps were taken for data collection:

- The team went to each department, centres, Library, canteen etc.
- Data about the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.

Data Analysis

Detailed analysis of data collected include calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by Himachal Pradesh Electricity Board. Data related to water usages were also analyzed using appropriate methodology.

Recommendation

On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health.

The above target areas particular to the institute was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed.

Onsite Visit

Two-days site visit was conducted by the Experts of Green Audit Team of Eco Laboratory on 30th to 31st August 2022. The key focus of the visit was on assessing the status of the green cover of the Institution, their waste management practices and energy conservation strategies etc. The sample collection was carried out during the visits to assess the quality of environment. The samples air, noise, drinking water and indoor environment were taken from university campus. The sample collection, preservation, and analysis were done in the scientific manner as prescribed by the standard procedures.

Focus Group Discussion

The Focus Group discussions were held with the Club members, staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

Energy, waste management and Carbon foot print analysis Survey

With the help of teachers and students, the audit team has assessed the energy consumption pattern and waste generation, disposal and treatment facilities of the institute. The monitoring was conducted with a detailed questionnaire survey method.

Process for Environmental Audit

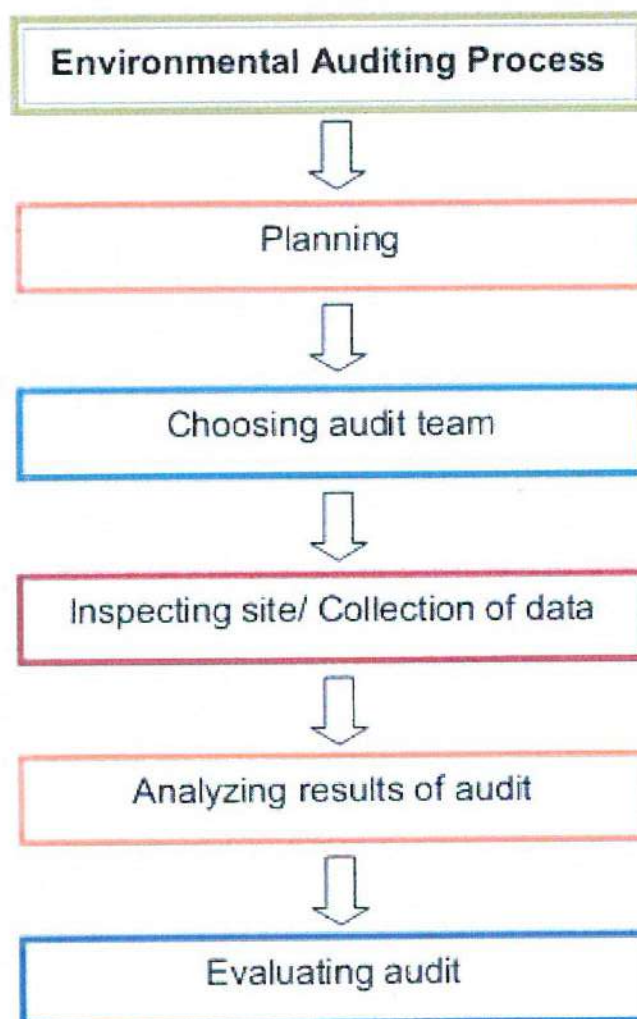


Fig.: Process adopted for Environmental Audit



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Auditing for Water Resource Management

Auditing for Water Resource Management



Fig.: Process adopted for Auditing of Water Resource Management

Source of Water

The institute is getting all required water from Jal Prabandhan Nigam Ltd. which is chargeable on monthly basis.

Baseline of Water Consumption

- In India, the design of water supply systems has been done using certain standards. Currently the standard being used is NBC, 2016. This specifies a consideration of use of the following:
- For communities with a population of between 20,000 to 100,000 @ 100 to 135 liters per head per day (Max. 135 lpcd has been considered).
- Persons working in normal working hours i.e. Staff @ 45 liters per head per day
- Visitors in the institute @ 15 liters per head per day

Population of Central University

The details of Persons coming in Day time are as per Table.

Day Time population in the Institute

Sl. No	Particulars	Nos
1	Students enrolled in University Campus	2079
2	Teaching Staff in University Campus	123
3	Non-Teaching Staff in University Campus	53
4	Daily visitors in University Campus	100
Total Daytime population		2355

The details of the residents living in Hostels (Hired buildings) outside the Campus are as per below Table.

Nos. of residents living in Hostels (Hired buildings) outside campus

Sl. No	Particulars	Nos
1	Nos. of residing Students	170
2	No of residing Staff	50
Total Residents Population		220

Thus total maximum permissible water Consumption as per Standards laid as per NBC, 2016 is given in below Table.

Total permissible water Consumption as per Standards laid as per NBC, 2016

Sl. No.	Particulars	Nos.	Maximum water consumption per Person per day (Liters)	Total Maximum water consumption Liters per Day
1	No. of Day time Population in campus	2255	45	1,01,475
2	No. of Visitors in campus	100	15	1,500
3	Nos. of residing population in hostels	220	135	29,700
Grand Total				1,32,675

An attempt was made as per NBC, 2016 to understand the demand of water supply and waste water generated.

- Actual Water Demand = 1,32,675 liters per day
- Waste Water Generation = 80% of total water consumption = 1,06,140 liters per day

The source of water requirement is municipal supply water and the wastewater generated as 1,06,140 liters per day is being discharged to municipal drainage.

The institute has no sewage treatment facility, hence recommended to install sewage and effluent treatment plants to treat the daily wastewater generated based on zero liquid discharge so that management and conservation of water resource can be done at institute level.

Rainwater Harvesting

Rainwater harvesting is the accumulation and deposition of rainwater for reuse on-site, rather than allowing it to run off. Rainwater can be collected from roofs, and in many places the water collected is redirected to a deep pit (well, shaft, or borehole), a reservoir with percolation. Its uses include water for gardens, livestock, irrigation, domestic use with proper treatment etc.

The harvested water can also be used as drinking water, longer-term storage and for other purposes such as groundwater recharge.

Rainwater harvesting provides an independent water supply during regional water restrictions and in developed countries is often used to supplement the main supply. It provides water when there is a drought, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable groundwater levels to be sustained. It also helps in the availability of potable water as rainwater is substantially free of salinity and other salts. Application of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution system, less generated storm water in sewer system, as well as a reduction in storm water runoff polluting freshwater bodies. Supplying rainwater that has gone through preliminary filtration measures for non-potable water uses, such as toilet flushing, irrigation, and laundry, may be a significant part of a sustainable water management strategy.

Though the institute has no rainwater harvesting system adopted at any campus and hotel buildings.

Recommendations

- The institute does not have waste/ effluent water treatment plant for management of waste water generated from laboratories, canteen and laundries. Waste/effluent water goes to drains.
- The institute does not have Sewage treatment plant for management of waste water generated from bathrooms and toilets. Sewage waste goes to municipal sewerage system.
- Separate STP and ETP plants need to be installed for water resource conservation and management.
- Display boards for water conservation and don't misuse of water are lacking.
- Lacking of water consumption monitoring system in the campus.
- Automatic switching system is not installed for pump sets used for overhead tank filling.
- Lacking of flushing and dual plumbing line systems to save the water resources.
- Rain Water Harvesting System need to be installed at each Building/ Block wise.
- Water quality in terms of drinking and domestic water and effluent discharges need to be checked periodically by NABL and MoEF&CC approved laboratory.



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Auditing for Waste Management

Auditing for Waste Management

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable institute. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

Quantity of Waste Generated

No data could be provided by the Institute regarding the quantity of waste (Biodegradable, Non-biodegradable and E Waste) generated in the Institute.

Generation of Solid Waste

Generation of Solid Waste

Sl. No.	Particulars	Nos.	Rate of solid waste generation (kg per person per day)	Total solid waste generation (kg/day)
1	No. of Day time Population in campus	2255	0.2	451
2	No. of Visitors in campus	100	0.2	20
3	Nos. of residing population in hostels	220	0.4	88
Grand Total				559

Disposal of Solid Waste generated

(A) Biodegradable Canteen waste

It was shared by the authorities that Canteen waste is being disposed to local Cattle Keepers to feed the waste to their animals.

Leaves and others:

Leaves and other wastes are collected by Municipal council.

Authorities are advised to collect, segregate and dispose the biodegradable waste in manure pits and resulting manure can be utilized in garden and plantation areas in the institute.

(B) Non-biodegradable

This type of waste including metals, bottles, plastics, cans, broken glass wares, tins etc., are collected by Municipal council. Authorities are advised to dispose the Non-biodegradable waste to only Government authorized Venders only and keep proper accounting.

(C) E-Waste

E Waste is collected and disposed by Municipal council. Authorities are advised to dispose the E Waste to only Government authorized Venders only and keep proper accounting.

Solid Waste Management System

No specific data could be provided by the institute regarding the quantity of solid wastes generated in the campus however the solid waste is collected by Municipal council.

At Dehra campus, waste material is deposited in pits located on back side of the campus so as to get it decomposed and later it can be used as manure.





Recommendations

- Solid waste management systems established are insufficient.
- Waste bins in the class rooms, veranda, canteen and campus are inadequate.
- The institute should have proper communication with the local body for regular collection of solid waste from the campus apart from biodegradable waste.
- Bio degradable waste is to be managed in-house by use of mechanical composter and manure generated can be utilized in gardening purposes within the Institute.
- Implementation of sustainable projects to attain set environmental goals is not in place.
- Proper waste segregation and management by recycle and reuse of waste with zero discharge can be adopted to manage resources and prevent environmental degradation.



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Auditing for Environmental Management

Auditing of Environmental Management

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.

a) Outdoor Environment

Air Quality Index (AQI)

Air Quality Index (AQI) transforms complex air quality data of criteria pollutants into a single number (index value), with nomenclature and colour. AQI was launched on 17 October 2014 in India to disseminate information on air quality in an easily understandable form for the general public. AQI has six categories of air quality which are defined as Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe. AQI is considered as 'One Number- One Colour-One Description' for the common man to judge the air quality within his vicinity. The formulation of the index was an initiative under **Swachh Bharat Mission (cleanliness Mission)**, based on the recommendations of IIT Kanpur and the Expert Group formed in this regard. The earlier measuring index in this regard was limited to three indicators, while the current measurement index had been expanded with five additional parameters. The measurement of AQI is based on following pollutants, namely

- Particulate Matter (size less than 10 μm) or (PM_{10}),
- Particulate Matter (size less than 2.5 μm) or ($\text{PM}_{2.5}$),
- Nitrogen Dioxide (NO_2),
- Sulphur Dioxide (SO_2),
- Carbon Monoxide (CO),
- Ozone (O_3) and
- Ammonia (NH_3),

AQI Index values and their associated health impacts

AQI	Associated Health Impacts
Good (0-50)	Minimal Impact
Satisfactory (51-100)	May cause minor breathing discomfort to sensitive people.
Moderately polluted (101-200)	May cause breathing discomfort to people with lung disease such as asthma, and discomfort to people with heart disease, children and older adults.
Poor (201-300)	May cause breathing discomfort to people on prolonged exposure, and discomfort to people with heart disease

Very Poor (301-400)	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases.
Severe (401-500)	May cause respiratory impact even on healthy people, and serious health impacts on people with lung/heart disease. The health impacts may be experienced even during light physical activity.

Methodology of AQI

The ambient air quality has been assessed through scientifically designed ambient air quality monitoring network. The monitoring network was designed based on the following considerations:

- Meteorological conditions
- Topography
- Likely impacts and sensitive receptors

Ambient air quality monitoring network was established as per CPCB guidelines in triangular method @120-degree orientation of three sampling locations. Ambient air quality monitoring was done on 24 hourly bases at each of identified air quality locations simultaneously for a day on 20th March 2020.

Parameters & Methods of Air Quality Monitoring

Test methods for determining Various Air Quality Parameters are described in below **Table** as

Test methods for determination of Air Quality Parameters

S. No.	Test Parameter	Test Method
1.	Particulate Matter (PM ₁₀)	IS:5182 (P-23) 2006 RA 2017
2.	Particulate Matter (PM _{2.5})	Lab SOP EL/SOP/AAQ/01
3.	Sulphur Dioxide (SO ₂)	IS:5182 (P-2) 2001 RA 2017
4.	Nitrogen Dioxide (NO ₂)	IS:5182 (P-6) 2006 RA 2017
5.	Ammonia (NH ₃)	Lab SOP EL/SOP/AAQ/02
6.	Ozone (O ₃)	IS:5182 (P-9):2006 RA 2014
7.	Carbon Monoxide (CO)	IS 5182 Part-10:1999, RA 2014

Sampling Procedure

Particulate samples for PM₁₀ were collected on Whatman glass fiber filters using respirable dust sampler (AAS 217NL, Ecotech) whereas samples for PM_{2.5} were collected on Whatman Quartz filter papers (47 mm diameter) using fine particulate sampler (AAS 127Mini, Ecotech). During sampling a laminar flow was maintained as 16.7 liters per min (1.0 m³ per hr) for PM_{2.5} and 1.13 m³ per minute for PM₁₀. The air sampling was done on 24 hourly basis at a nominal sampling height of 3 meter at each location. Gaseous sampling was done using Thermoelectrically cooled Gas sampler (AAS 109TE, Ecotech) whereas CO was collected in tedler bag for the analysis by NDIR CO Analyzer (APMA-370, Horiba) and Benzene was collected in activated carbon absorber tubes for GC analysis.

Construction of Air Quality Index (AQI)

- Based on the measured ambient air concentrations, corresponding standards and likely health impact (known as health breakpoints), a sub-index is calculated for each of the pollutants.
- A sub-index is a linear function of concentration e.g. the sub-index for PM_{2.5} will be
 - ✚ 51 at concentration 31 µg/m³,
 - ✚ 100 at concentration 60 µg/m³, and
 - ✚ 75 at concentration of 45 µg/m³
- The formula for calculating a sub-index is as follows:

Sub Index for a pollutant = Upper limit of the previous AQI category to which the pollutant's current reading would have fallen + [(current reading - upper limit of the previous reading category of the pollutant) * (width or interval of the AQI category for the current level of reading / width or interval of the current reading category of the pollutant)]

Eg. Sub-index for PM_{2.5}

If concentration is 150 µg/m³, the sub index would be = $300 + [(150 - 120) * 100 / 130] = 323$

If concentration is 45 µg/m³, the sub index would be = $30 + [(45 - 30) * 50 / 30] = 75$

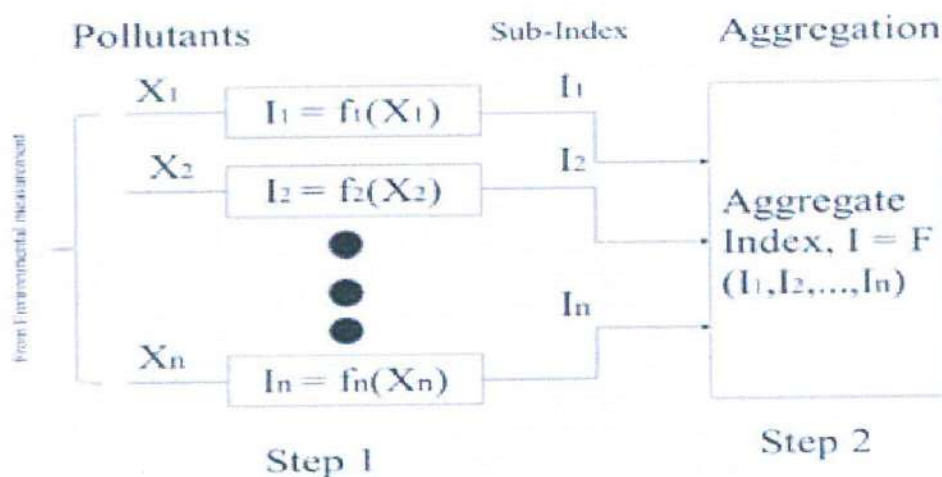


Fig. 7: Index and Sub-index of Pollutants

- Primarily two steps are involved in formulating an AQI: (i) formation of sub-indices (for each pollutant) and (ii) aggregation of sub-indices to get an overall AQI.
- Formation of sub-indices (I_1, I_2, \dots, I_n) for n pollutant variables (X_1, X_2, \dots, X_n) is carried out using sub-index functions that are based on air quality standards and health effects. Mathematically;

$$I = f(X_i), i=1, 2, \dots, n \quad [\text{Eq. 1}]$$

- Each sub-index represents a relationship between pollutant concentrations and health effect as the functional relationship between sub-index value (I_i) and pollutant concentrations (X_i).
- Aggregation of sub-indices, I_i is carried out with some mathematical function (described below) to obtain the overall index (I), referred to as AQI.

$$I = F(I_1, I_2, \dots, I_n) \quad [\text{Eq. 2}]$$

- The aggregation function usually is a summation or multiplication operation or simply a maximum operator.

Sub-indices (Step 1)

- Sub-index function represents the relationship between pollutant concentration X_i and corresponding sub index I_i . It is an attempt to reflect environmental consequences as the concentration of specific pollutant changes. It may take a variety of forms such as linear, non-linear and segmented linear. Typically, the I - X relationship is represented as follows:

$$I = aX + \beta \quad [\text{Eq. 3}]$$

Where, a = slope of the line, β = intercept at $X=0$

- The general equation for the sub-index (I_i) for a given pollutant concentration (C_p); as based on 'linear segmented principle' is calculated as:

$$I_i = \{[(I_{HI}-I_{LO})/(B_{HI}-B_{LO})]*(C_p-B_{LO})\}+I_{LO} \quad [\text{Eq. 4}]$$

Where,

B_{HI} = Breakpoint concentration greater or equal to given concentration.

B_{LO} = Breakpoint concentration smaller or equal to given concentration.

I_{HI} = AQI value corresponding to B_{HI}

I_{LO} = AQI value corresponding to B_{LO}

I_p = Pollutant concentration

Aggregation of Sub-indices (Step 2)

- Once the sub-indices are formed, they are combined or aggregated in a simple additive form or weighted additive form:

Weighted Additive Form

$$I = \text{Aggregated Index} = \sum W_i I_i \quad (\text{For } i = 1, \dots, n) \quad [\text{Eq. 5}]$$

where,

$$\sum W_i = 1$$

I_i = sub-index for pollutant i

n = number of pollutant variables

W_i = weightage of the pollutant

Root-Sum-Power Form (non-linear aggregation form)

$$I = \text{Aggregated Index} = [\sum I_i^p]^{(1/p)} \quad [\text{Eq. 6}]$$

where,

p is the positive real number >1

Root-Mean-Square Form

- $I = \text{Aggregated Index} = \{1/k (I_1^2 + I_2^2 + \dots + I_k^2)\}^{0.5}$ [Eq. 7]
- Finally; $AQI = \text{Max} (I_p)$ (where; $p = 1, 2, \dots, n$; denotes n pollutants)
- The AQI values and corresponding ambient concentrations (health breakpoints) for the identified eight pollutants are as follows:

AQI Category, Pollutants and Health Breakpoints

AQI Category (Range)	Categories for various readings of pollutant based on health breakpoints/health impacts						
	PM ₁₀	PM _{2.5}	NO ₂	O ₃	CO	SO ₂	NH ₃
	24-hr	24-hr	24-hr	8-hr	8-hr	24-hr	24-hr
Good (0-50)	0-50	0-30	0-40	0-50	0-1.0	0-40	0-200
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400
Moderately polluted (101-200)	101-250	61-90	81-180	101-168	2.1-10	81-380	401-800
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	801-1200
Very poor (301-400)	351-430	121-250	281-400	209-748*	17-34	801-1600	1200-1800
Severe (401-500)	430+	250+	400+	748+*	34+	1600+	1800+

***One hourly monitoring (for mathematical calculations only)**

Calculator for Air Quality Index (AQI)

- For manual monitoring stations, an AQI calculator is developed by CPCB wherein data can be fed manually to get AQI value.
- The excel sheet for calculating AQI, as uploaded by CPCB

Interpretation of Air Quality Index (AQI)

- The worst sub-index reflects overall AQI

For instance, if the sub index of PM_{2.5} = 75, SO₂ = 63, NO₂ = 38 then the AQI will be 75 which is the same as the value of the sub index of PM_{2.5}.

- The Sub-indices for individual pollutants at a monitoring location are calculated using
 - ✓ 24-hourly average concentration value (8-hourly in case of CO and O₃)
 - ✓ Health breakpoint concentration range (e.g. AQI at 6 am on a day will incorporate data from 6am on previous day to the current day).
 - ✓ AQI is calculated by eight pollutants however, overall AQI can be calculated with available data for minimum three pollutants out of which one should necessarily be either PM_{2.5} or PM₁₀.
 - ✓ Minimum of 16 hours' data is considered necessary for calculating sub index
 - ✓ AQI index values can vary depending on the time of the day.
 - ✓ AQI reflects the status of the worst pollutant in that city. i.e. higher reading in one city can be due to high concentration of PM whereas in some other city it may be due to SO₂.
 - ✓ If one pollutant out of eight is in the "poor" category, then AQI will be in "poor" category.

For manual monitoring stations, data were fed manually in AQI calculator developed by CPCB to get AQI value. The AQI calculation has been depicted as

Air Quality Index (AQI) Calculator

Air Quality Index (AQI) Calculator					
Date	DD-MM-YYYY	INPUT	Station	NSIT	
Pollutants	Duration	Conc. in µg/m3 (CO in mg/m3)	Sub-Index	Check	AQI
PM ₁₀	24-hr avg	85	85	1	81
PM _{2.5}	24-hr avg	45	75	1	
SO ₂	24-hr avg	11	14	1	
NO ₂	24-hr avg	22	30	1	
CO	max 8-hr	0.43	32	1	
O ₃	max 8-hr	19	19	1	
NH ₃	24-hr avg	24	6	1	
Concentrations of minimum three pollutants are required; one of them should be PM ₁₀ or PM _{2.5} . The check displays "1" when a non-zero value is entered					

Interpretation of Air Quality Index (AQI)

Air Quality Index

Indicators & Categories of Air Quality Index

Good (0-50)
Satisfactory (51-100)
Moderately polluted (101-200)
Poor (201-300)
Very Poor (301-400)
Severe (401-500)

AQI Result

Test Results of Air Quality Index

Air Quality Index	Air Quality Status
81	Satisfactory (51-100)

The Air Quality Index (AQI) is observed as 81 that indicates the ambient air quality is Satisfactory at university campus and safe for human health.

b) Indoor Environment

Indoor environment was monitored for visual comfort, thermal comfort, ventilation and noise levels in each university campus blocks.

Visual and Thermal Comfort

Visual comfort was monitored using Lux monitor and thermal comfort was monitored by Heat stress analyzer for temperature and humidity levels.



Fig.: Photographic view of Indoor Environmental Monitoring

Indoor environment in respect to visual comfort, thermal comfort, noise levels and ventilation was found to be satisfactory in each block of university campus.

Practices for Environmental Management

Department of Social Work, Central University of Himachal Pradesh, Dehra campus has created a proper framework and action plan for improving facilities at Sapt-Sindhu Parisar-II in the areas of sanitation and hygiene, waste management, vermin-compost plant at adopted villages, water management, energy conservation, plantation for green and sustainable environment and conservation of natural resources.

Dehra campus has Adopted Ten Villages Under Unnat Bharat Abhiyan with the motto

- To promote, create awareness and opportunities for Community development and Eco friendly environment.
- Empowering the rural community in terms of socio- economic, cultural transformation and Greenery contributes



The university functionaries are aware of the various environmental issues and the various green measures to be adopted in office as well as in their houses. A course on Environmental Studies is compulsory for all under graduate students. Further, university conducts plantation drives in the campus during Environment Day, 15 August and during other important events in the university. Further, university has also adopted nearby villages for environmental awareness activities, health camps and other community programmes being conducted through their participation.

Plantation drives are regular activities in the campus, and usually in all important occasions, plantation activity is taken up. The department of Social Work at Dehra campus has maintained a adopted garden at Kuru Snot Village in which different ornamental plants have been raised.



3R's (Reduce, Reuse and Recycle)

These three 'R' words are an important part of sustainable Living



Cope-up with the local villagers for Environment Management Activities

- Awareness about innovative smart agriculture and climate resilient agro technologies.
- Facilitate quality raw materials and infrastructure
- Manufacturing Eco-friendly Products



Natural Resource Management

- Constructing / Rejuvenation of Rain Water Harvesting pits and traditional water bodies.
- Activates and recharging dry bore-wells & water tables.

Establishment of Vermi-compost Units to enhance organic Farming at Snot Village



Rain water Harvesting Structure

- Demonstration on Percolation Tanks in Micro Shed for recharging underground water table.
- Maintenance of existed water bodies like Babries, Khatries and community Ponds

Environmental Conservation practices adopted at Dehra campus

- Carpooling by the faculty members to attend any meetings in Dharamsala or any other purposes.
- There has been a common culture of taking double side print outs

- Some limited communications are also done through emails. Even many meetings such as Board of Studies (BoS), Ph.D & Master's Viva-voce were allowed to be conducted through online mode, especially during the COVID period.

इतिहास विभाग द्वारा वर्ष 2021-2022 में अनेक कार्यक्रम पर्यावरण संरक्षण पर्यावरण पर जन चेतना जाग्रति, जल संरक्षण स्वच्छता आदि के लिए आयोजित किये गये है एवं पर्यावरण के प्रति जागरूकता बनाये रखने के लिए विभाग के संकाय सदस्य एवं छात्र-छात्राओं ने जागरूकता अभियान के साथ निम्नलिखित कदम उठाये

1. विश्वविद्यालय परिसर एवं ग्राम सनोट (पोस्ट-देहरा) में वृक्षारोपण कार्यक्रम किया गया जिसमे
 - I. 13 पेड़ (2-अवला, 2-नीम, 2-पीपल, 1-शीसम एवं 3 आम, 1- तुलसी, 2 अलोएवेरा) लगाये गये | ये सभी वृक्ष औषधी के रूप में भी कार्य करते है |
 - II. सजावटी पौधो के रूप में एरिका पाम, पाइन प्लांट, मनी प्लांट के पोधे लगाये गये|
 - III. बागवानी के रूप में 5 पेड़ (गुलाव, गेदा, केल, अशोक आदि के) लगाये गये है |
2. विभाग की ओर से पर्यावरण जागरूकता हेतु रंगोली कार्यक्रम का आयोजन किया गया।
3. विभाग की ओर से जल संरक्षक एवं स्वच्छता बनाये रखने के लिए जागरूकता अभियान देहरा क्षेत्र के झुग्गी झोपडी एरिया में चलाया गया |
4. विभाग के संकाय सदस्य किसी प्रकार की सिंगल यूज प्लास्टिक का प्रयोग नहीं करते है |
5. विभाग में 6 संकाय सदस्य , 22 शोधार्थी एवं 70 छात्र-छात्राये है जो 3 कार एवं 8 मोटर साईकिल का प्रयोग करते है विभाग के छात्र सार्वजनिक हिमाचल प्रदेश बस के माध्यम से एवं पैदल विश्वविद्यालय परिसर आते है
6. परिषर में विभाग की भौगोलिक स्थिति सूर्य प्रकाश के समुख होने के कारण प्रकाश के लिए किसी प्रकार के विजली उपकरण का प्रयोग अति आवश्यक होने पर ही करते है | जिससे बिजली बचाव के रूप में विभाग अपना योगदान देता है।
7. भू एवं जल संरक्षण हेतु झीलों के आस पास पेड़ लगाए गए |
8. विभाग के छात्रों ने पर्यावरण के उपर जन जागरण हेतु रेली व मार्च का आयोजन किया |





*Green Audit (Environment, Energy and Green Campus Management) Report
Central University of Himachal Pradesh
(Dharamsala, Shahpur & Dehra Campus)*



Auditing for Health and Safety

Auditing for Health and Safety

a) Fire Safety



Fig.: Fire Safety Measures in UNIVERSITY

Fire safety appliances were in place in some departments/Sections however few departments/Sections / floors lacking these systems. However, few of them were outdated which need to be refill freshly on immediate basis.

It is recommended to install fire safety measures at each departments/Sections floor wise and building wise. The institute has adopted fire safety measures which has been verified by Directorate of Fire Services Himachal Pradesh as per verification report enclosed.

b) Health Safety



Fig. Health Safety Measures in UNIVERSITY Campus

Health safety measures were reported in place as per requirements in each building/block wise in respect to safe and potable drinking water supply with RO systems. Drinking water sample was tested for the purpose of portability and suitability of water quality. The available water quality was found to be safe for domestic and human consumption. Health community center is operational in campus for primary health checkups and treatments in case of any medical emergency or medical requirements.

c) Traffic & Parking Area



Fig. Management of Traffic in CUvCampus

The campus has lacking designated parking area in place that are not sufficient to manage daily traffic fleet in the campus due to non-availability of concerned space, a common problem in hilly areas. Vehicles were kept here and there on main roads in front of each department that causes nuisance and accidental risks to students, staff and visitors coming to the campus.

Designated parking areas as multistory or multi-parking to be provided to manage daily traffic movement and to avoid nuisance and accidental risks in the campus.

Sanitation, hygiene & meditation under Ribbon club

- Dehra campus organized awareness programmes for better sanitation practices like using the toilet, hand washing, health & hygiene awareness and garbage disposal etc
- Conducted surveys and door-to-door meetings to drive behavioral change with respect to sanitation behaviour
- Created awareness about the benefits of Yoga in our precious life.

Water Conservation Sensitization Programme

A sensitization programme was organized by the of Department of Sociology and Social Anthropology under 'Swatch Bharat Abhiyan' on 1st Sept. 2019. The Programme aimed at creating awareness among the students of Government School Lanjhani, at village Lanjani, Dharamshala (HP), regarding the need to conserve water and prevent its contamination by human beings. In the programme a skit was performed by students of Department of Sociology and Social Anthropology to portray the difficulties faced on shortage of drinking water, followed by rural-urban clashes and inter-community clashes over water sources and their utilizations. During the sensitization programme, the poems were also recited by the students and they also shared their lived experiences regarded water fetching and conservation. Students of school enthusiastically attended and participated in the programme and took oath to save and conserve water at their personal fronts in their lives.







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Auditing for Green Campus Management

Auditing for Green Campus Management

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress. The University is nestled amidst tall and lush green trees as Deodars, Oats, Pines and Rhododendrons.



Outdoor Plantation



Indoor Plantation



Medicinal use of Plantation



Fruit Plantation

List of plantation to be managed at Dehra campus

- | | |
|----------------------------|----------------------------------|
| 1. तुलसी श्याम (02) | 18. लोंगाट (2) |
| 2. तुलसी राम (01) | 19. निम्बू (5) |
| 3. चन्दन (1) | 20. केले (10) |
| 4. जामुन (2) | 21. तुडा (1) |
| 5. बिल (1) | 22. पीपल (1) |
| 6. भेड़ा (1) | 23. अशोका वृक्ष (3) |
| 7. आहड़ (3) | 24. सिल्वररॉक (5) |
| 8. आमला (2) | 25. मौसमी सब्जियाँ प्रत्येक सीजन |
| 9. अमरुद (3) | 26. शीशम (1) |
| 10. आम (5) | 27. डॉगफ्लोवर (1) |
| 11. नीलकंठी (1) | 28. गुलाब (2) |
| 12. सागवान (2) | 29. खेर (5) |
| 13. गन्दला कड़ी पत्ता (10) | 30. बसुन्ति (1) |
| 14. संतरा (5) | 31. इलायची (1) |
| 15. मौसमी (5) | 32. रातरानी (1) |
| 16. दालचीनी (1) | 33. अम्ब्रेलाट्री (1) |
| 17. नीम (3) | 34. शहतूत (5) |

Tree plantation program at Dehra Campus



Tree plantation and distribution program organized by Dehra Campus

Activities for Greenery

A few activities were planned and implemented based on the 3R's Reduce, Reuse and Recycle.

- To fulfil the Institution's responsibility towards reducing carbon footprint. Use both side paper for prints and contribute to environmental protection.
- The Department of Social Work promote Environmental Consciousness and Responsibility among students.
- To implement green practices consistently and effectively towards creating a sustainable at Sapt Sindhu Dehra Parisar-II at CUHP.
- To monitor and evaluate the Green practices, towards building a sustainable campus
- To generate innovative green practices, promoting the spirit of eco-innovation among students and scholars specially at adopted villages.
- Interaction with selected Panchayat, representatives, Anganwadi & ASHA workers for Reduce-Reduce



Green belt with sufficient tree cover is managed by the campus but following short coming were observed for effectiveness of the management of plant biodiversity in the campus as

- Tagging on plants with nomenclature (Botanical / general name and species) is lacking for effective plant management practices.
- Plant counting and numbering record is not managed for the effective plant management program at campus.

Medicinal plants at Dehra Campus

The plants play a critical role in the development of human cultures around the whole world. Consequently, the use of medicinal plants is well encouraged around the Dehra campus of Central University of Himachal Pradesh. Consequently, one can see lots of medicinal plants here. Few Medicinal Plants below are mentioned below

1. shyam Tulsi तुलसीश्याम (*Ocimum Tenuiflorum*) (02)
2. Ram Tulsi तुलसीराम (*Ocimum Gratissimum*) (01)
3. Chandan चन्दन (*Santalum Album*) (1)
4. jamun जामुन (*Syzygium Cumini*) (2)
5. बिल/बिल्व, बेल (*Aegle Marmelos*) (1)
6. भेड़ा/बहेड़ा (*Terminalia Bellirica*) (1)
7. आहड़ (*Leptadenia Pyrotechnica*) (3)
8. आमला(आमला) *Phyllanthus Emblica*
9. गन्दलाकड़ीपत्ता(*Murraya koenigii*) (10)
10. दालचीनी Dalchini (*Cinnamomum verum*) (1)
11. नीम Neem (*Azadirachta indica*)
12. निम्बू (*Citrus limon*)(5)
13. तुड़ा (1)
14. खेर (*Senegalia catechu*) (5)
15. बसुन्ति (1)

16. इलायची (Elettaria Cardamomum) (1)

17. शहतूत (Morus Alba)(5)

Ornamental plants at Dehra Campus

1. नीलकंठी (Anagallis Arvensis) (1)
2. सागवान(Tectona Grandis) (2)
3. अशोकावृक्ष ((Saraca Asoca) (3)
4. सिल्वररॉक (Grevillea Robusta) (5)
5. शीशम(Dalbergia Sissoo) (1)
6. डॉगफ्लोवर(Dalbergia Sissoo) (1)
7. गुलाब (Rosa Centifolia)(2)
8. रातरानी (Cestrum Nocturnum) (1)
9. अम्ब्रेलाट्री (Schefflera Actinophylla) (1)

House Keeping

Being the part of Swatchha Bharat Abhiyan, the Central University of Himachal Pradesh, Dehra Campus ensures neat and clean environment. Consequently, buildings are kept clean and sanitized on regular basis on all working days.

Recommendations

- All trees in the campus should be named scientifically and numbered with track record
- Make tagging on all plants with nomenclature (Botanical / general name and species) and manage the plant counting and numbering records
- Create automatic drip irrigation system during summer holidays
- Beautify the institute building with maximum use of oxygen generating indoor plants
- Encouraging students and conducting competitions among departments for making the campus green.