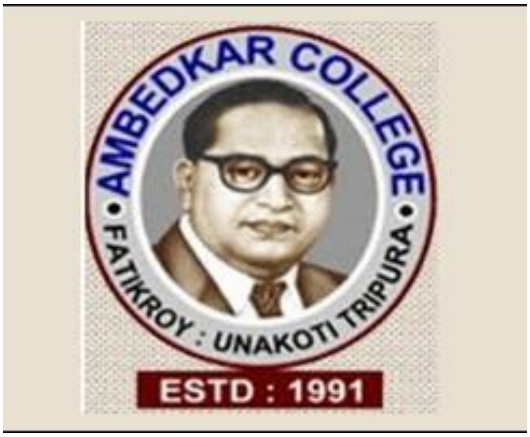
GREEN AUDIT

2023-2024



Ambedkar College

A Govt. Degree College under DHE, Govt. of Tripura Affiliated to Tripura University

(A Central University)

UGC 2f &12B recognized and Accredited by NAAC with 'B+' Grade
Fatikroy, Unakoti, Tripura – 799 290

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1. Executive Summary:

Rapid urbanization and economic growth have led to significant environmental and ecological problems globally. Ambedkar College, Fatikroy, recognizes the importance of adopting the "Green Campus" concept to promote sustainable development. The college strongly believes in taking immediate action to combat these issues. To ensure that the campus operates in an environmentally responsible manner, an audit was conducted. This audit was aimed to verify that the campus practices align with environmental policies. It focused on key aspects of a "Green Campus," such as efficient waste management, water conservation efforts, tree planting initiatives, the reduction of paper usage, the use of alternative energy sources, and more.

The audit's primary objective was twofold:

- To assess the college's adherence to relevant environmental laws, regulations, and standards.
- To evaluate the effectiveness of the college's management systems in supporting environmental sustainability.

2.1 Introduction

A green audit is a systematic process of identifying, measuring, and analysing the environmental impacts of an educational institution. This involves examining both internal and external environmental policies to assess their impact on the campus's eco-friendliness. The primary aim is to identify and address any organizational activities that could harm the environment or human health. The success of a college's green campus initiatives is evaluated through various criteria, many of which are assessed during a green audit. This audit provides valuable insights and recommendations for improving environmental conditions.

2.2 About the College

Ambedkar College, situated in Unakoti District, Tripura, is a renowned educational institution of the state. Its 10.34-acre campus which is located 4 kilometres from Kumarghat town, boasts of modern facilities which includes classrooms, administrative offices, an auditorium, a well-equipped library, computer and language labs. The college actively engages in community service through its N.S.S. and N.C.C. units, organizing events like blood donation camps, tree-planting initiatives, health check-ups, and personality development programs. The N.S.S. unit has adopted Rajnagar village, where they collaborate with villagers and local authorities to conduct awareness campaigns, sanitation drives, tree-planting programs, and anti-addiction initiatives.

3. Objectives of the Study:

Green audits in college campuses aim to foster environmental stewardship. They help identify, measure, and rank the campus's environmental sustainability efforts, ensuring their alignment with relevant rules and best practices.

Key goals of the audit include:

- **Educating students:** Raising awareness about environmental issues and the importance of sustainability.
- **Protecting the environment and human health:** Analysing how campus resources are used to minimize environmental impact and potential risks.
- **Establishing a baseline:** Gathering data to track future sustainability progress and proactively address environmental challenges before they become costly to resolve.
- **Improving environmental compliance:** Providing a report on the campus's adherence to environmental regulations.

4. Observations and Recommendations

4.1 Water Use:

This indicator is aimed to assess current water consumption practices, identify areas for improvement, and recommend sustainable water management strategies.

(a). Methodology:

- Conducted physical inspections of facilities, interviewed campus stakeholders, and analyzed relevant policies and practices.

(b). Observations:

- **Water Metering:** Currently, there's no system to track water consumption for individual buildings or departments, making it difficult to pinpoint areas of high usage.
- **Infrastructure:** Leaky faucets or broken taps are not a significant issue. The college has taken a positive step by installing push-button taps in administrative and academic buildings to minimize water waste.
- **Behaviour:** Students and staff are generally aware of the importance of water conservation.
- **Landscaping:** Inefficient irrigation techniques, such as watering the garden during the hottest parts of the day, can lead to significant water loss.
- **Rainwater Harvesting**: The institution has two rainwater harvesting systems (24KL and 15KL capacity) in place, offering a valuable opportunity to reuse collected rainwater.

Recommendations:

Infrastructure:

- **Monitor water usage**: Install individual meters to track water consumption in different buildings and departments.
- **Reduce water wastage**: Equip taps and urinals with automatic shut-off sensors.

Behavior:

- **Educate students**: Launch awareness campaigns, especially for science students, emphasizing responsible water use.
- **Engage students**: Organize workshops and competitions to promote water-saving practices.
- **Promote transparency**: Display water consumption data publicly to encourage behavioral change.

Landscaping:

- **Optimize irrigation**: Implement drip irrigation systems for efficient water delivery to plants.
- **Choose drought-resistant plants**: Prioritize native plant species that require less water.
- **Retain moisture**: Use mulch around plants to minimize water evaporation.

Policy and Planning:

- **Establish a water management plan**: Develop a comprehensive policy outlining conservation goals and practices.
- **Allocate resources**: Secure funding for water conservation initiatives and infrastructure improvements.
- **Track progress**: Conduct regular water audits to monitor progress and identify areas for improvement.
- **Integrate water conservation into education**: Involve students in water conservation efforts through curriculum and extracurricular activities.

(d). Conclusion:

By implementing these recommendations, Ambedkar College Fatikroy can substantially decrease water usage. This will not only conserves this vital resource but also fosters a sense of environmental responsibility among the college community. The initial investment in water-saving technologies and educational programs will lead to lasting advantages. These include cost savings on water bills, a reduced environmental footprint, and a more sustainable campus environment for everyone.

4.2 Energy use and Conservation:

This indicator focuses on the indicator of **Energy Use and Conservation**. The audit aims to identify areas for improvement, quantify potential savings, and recommend actionable steps to reduce energy consumption and promote conservation practices within the college campus.

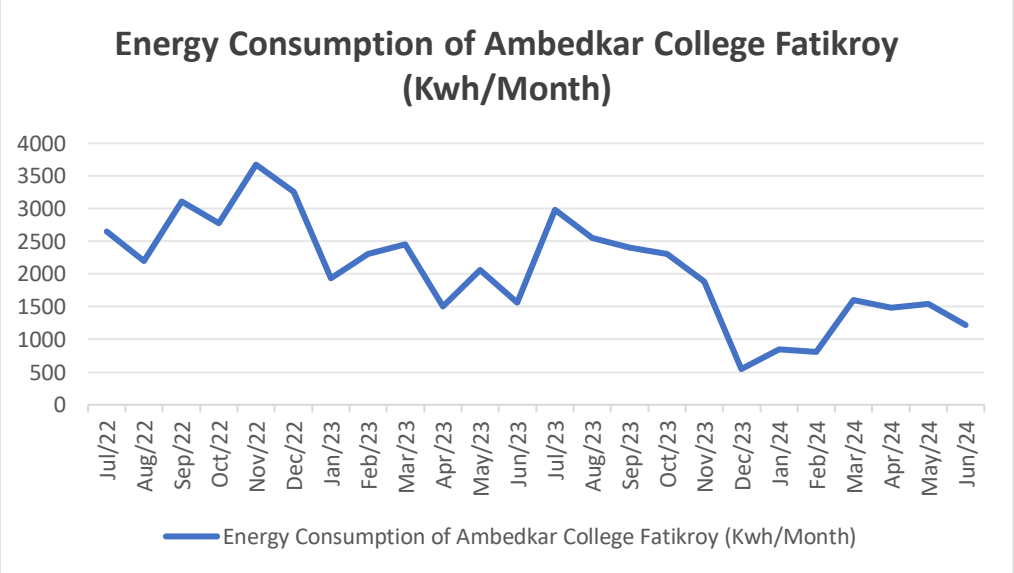
(a). Methodology:

The audit employed a combination of approaches, including:

- **Data collection:** Reviewing past energy bills, analyzing existing infrastructure and equipment, and conducting physical inspections of buildings and facilities.
- **Interviews:** Engaging with faculty, staff, and students to understand their energy-related behaviourand practices.

(b). Observations:

- The energy consumption trend of the college is displayed below in graphical form for the period of 24 months i.e from July 2022 to June 2024:



The gradual declining trend in energy consumption over a period of two consecutive academic sessions (i.e session 2022-23 and session 2023-24) can be attributed to the various steps that have been undertaken by the college administration to promote judicious usage of electricity as listed below.

- **Lighting**: The campus primarily uses energy-saving LED lights.
- **Daylight**: Classrooms and offices are designed to maximize natural light, minimizing the need for artificial lighting and fans during the day.
- **Efficient Use**: Electronics and equipment are switched off when not in use to conserve energy.

- **Awareness**: Faculty, staff, and students are knowledgeable about energy-saving practices.
- **Renewable Energy**: The installation of 10 solar-powered streetlights demonstrates a commitment to using renewable energy sources.

(c). Recommendations:

·**Energy-Efficient Infrastructure:**

- **Lighting Upgrades:** Switch to energy-saving LED lights throughout the campus, and install sensors that automatically turn lights off when rooms are unoccupied.
- **Renewable Energy:** Install solar panels on rooftops to generate clean energy and reduce reliance on the grid.
- **Equipment Upgrades:** Replace outdated equipment with newer, more energy-efficient models.

·**Operational Efficiency:**

- **Proper Maintenance:** Implement and maintain regular maintenance schedules for all equipment to ensure optimal energy performance.
- **Feasibility Studies:** Conduct thorough research to determine the feasibility and cost-effectiveness of integrating solar panels into the campus energy system.

·**Education and Awareness:**

- **Student Engagement:** Launch annual awareness campaigns for incoming students to educate them about energy conservation.
- **Workshops and Incentives:** Organize workshops on energy-saving practices and offer incentives to students and staff who actively participate in conservation efforts.
- **Curriculum Integration:** Incorporate sustainability education into the academic curriculum to foster long-term awareness and responsible energy use.

·**Monitoring and Evaluation:**

- **Energy Tracking:** Install energy meters to monitor electricity consumption patterns across the campus.
- **Data Analysis:** Invest in software tools to analyze energy data and track progress towards energy efficiency goals.

(d). Conclusion:

By following the suggested steps, the college can substantially decrease its energy usage, leading to lower operational expenses. This will also help create a more environmentally

friendly campus. The green audit process shouldn't be a one-time event. It should be regularly reviewed and assessed to guarantee ongoing improvements in energy efficiency and conservation efforts.

4.3 Waste Generation:

The indicator "waste generation" aims to assess the college's current waste management practices, identify areas for improvement, and recommend sustainable waste reduction and management strategies.

(a). Methodology:

- **Data collection**: This involves reviewing existing waste management practices, conducting waste composition analysis, observing waste disposal practices, and interviewing stakeholders like students, faculty, and housekeeping staff.
- **Data analysis**: Analysing the collected data to understand the types and quantities of waste generated, current disposal methods, and existing infrastructure.

(b). Observations:

- Landscaping and gardening activities produce the most significant amount of solid waste on campus.
- The campus generates a relatively small volume of plastic waste.
- Metal and wood waste is collected and responsibly disposed of by being sold to authorized recyclers.
- A system for creating organic fertilizer from waste materials is in place on campus through a Vermi Composting unit.
- The campus has implemented designated bins for different types of waste.
- The office and academic departments actively promote the use of double-sided printing and digital resources to minimize paper waste.

(c). Recommendations:

Minimize Waste Production:

- **Cut back on disposables:** Encourage the use of reusable items like water bottles, lunchboxes, and eco-friendly stationery.
- **Educate on mindful consumption:** Conduct workshops to teach about reducing waste and consuming responsibly.

Improve Waste Sorting:

- **Implement a clear system:** Use color-coded bins to separate different types of waste.
- **Provide clear instructions:** Ensure everyone knows how to properly dispose of their waste.
- **Raise awareness:** Regularly organize campaigns and competitions to promote proper waste segregation.

Boost Composting Efforts:

- **Train individuals:** Educate staff and students on effective composting techniques.
- **Utilize compost:** Use the generated compost to fertilize campus gardens or sell it.

Increase Recycling:

- **Collaborate with local recyclers:** Partner with local businesses to recycle paper and plastic.
- **Make recycling easy:** Place easily accessible recycling bins throughout the campus.
- **Educate on the benefits:** Teach students and staff about the importance of recycling.

Build Capacity and Knowledge:

- **Train housekeeping staff:** Educate them on effective waste management practices.
- **Promote sustainable living:** Conduct workshops for students and faculty on sustainable living.
- **Integrate waste education:** Include waste management education in the curriculum.

(d). Conclusion:

By following these strategies, the college can dramatically decrease the amount of waste it produces and improve its overall waste management system. This will create a more sustainable campus environment. It is essential to continuously monitor, evaluate, and gather feedback to make sure these waste reduction and management efforts are successful.

4.4 E-waste generation:

This indicator presents a green audit of e-waste generation and highlights key observations regarding current practices and offers recommendations for improvement.

(a). Methodology:

- Literature review of applicable e-waste regulations in India.
- Interviews with college administration, faculty, and students.
- Physical inspection of e-waste storage and disposal facilities.
- Data collection on e-waste types and quantities generated.

(b). Observations:

- E-waste generated in campus (e.g., computers, printers, batteries) is reasonable in quantity.
- E-waste and faulty equipment from IT labs, administrative offices, and academic departments are appropriately stored in a designated area, separate from other waste.

(c). Recommendations:

- **E-waste Management**: A comprehensive e-waste management policy should be implemented in accordance with Indian regulations.
- **Public Awareness**: Raise public awareness about e-waste through workshops, campaigns, and informative signage.
- **Data Security**: Establish clear procedures for securely wiping data from electronic devices before disposal.
- **Collection Centers**: Set up designated collection points for different types of e-waste.
- **Responsible Recycling**: Partner with authorized e-waste recyclers to ensure responsible and environmentally sound disposal.
- **Reuse and Refurbishment**: Explore options for reusing and refurbishing functional electronic equipment.
- **Innovation**: Encourage research and development in innovative e-waste management solutions.

(d). Conclusion:

By following these recommendations, the college can significantly reduce its electronic waste, promote environmental sustainability, and serve as a model for responsible e-waste management within the community.

4.5. Laboratory Waste Management

This indicator assesses the current practices, identify areas for improvement, and recommend measures to minimize laboratory waste generation and promote environmentally sustainable practices.

(a). Methodology

The audit utilized the following methods:

- **Document review:** Examination of existing waste management policies, procedures, and reports.
- **Site inspection:** Physical observation of laboratory practices, waste segregation, and storage facilities.
- **Interviews:** Discussions with laboratory staff, students, and administrators.

(b). Observations

Chemical and Reagent Management:

- **Segregation and Storage:** Current practices demonstrate proper segregation and storage of laboratory reagents.
- **Waste Minimization:** Techniques like virtual labs and microscale experiments are not currently implemented. This may be attributed to a lack of sufficient emphasis on these methods within the university's syllabus.
- **Waste Disposal:** There is no established system for the collection of chemical waste by authorized vendors.

(c). Recommendations

- **Waste Segregation**: Implement strict waste segregation by providing clearly labeled bins for different waste categories (organic, inorganic, solvents, sharps, etc.).
- **Waste Minimization**: Promote waste minimization through strategies like micro-scale experiments, solvent recycling, and the use of less hazardous alternatives.

- **Comprehensive Waste Management Policy**: Develop and implement a comprehensive waste management policy that outlines procedures for the segregation, storage, transportation, and disposal of all laboratory waste.
- **Enhanced Awareness**: Conduct regular training sessions for students and staff to raise awareness about waste minimization, proper segregation techniques, and safe handling practices.
- **Infrastructure Investment**: Invest in appropriate storage containers and other necessary infrastructure for effective waste management.
- **Partnerships**: Collaborate with authorized waste disposal agencies to ensure the safe and environmentally sound treatment of hazardous waste.
- **Continuous Improvement**: Regularly monitor waste generation, track progress towards waste management goals, and adapt strategies based on the results of these evaluations**.**

(d). Conclusion

To safeguard human health and the environment, minimizing laboratory waste is essential. This green audit highlighted several areas within the college's laboratories, particularly the chemistry lab, where waste management practices could be improved. By implementing the recommended actions, the college can substantially reduce waste generation, foster sustainable practices, and contribute to a healthier environment

4.6 Green Area:

This indicator analyses the greenery and environmental sustainability of the campus. This also helps in ensuring that the Environmental Policies are enacted.

(a). Observations:

- **Natural Setting**: The campus enjoys a scenic location near a river and is blessed with a diverse range of tree species, showcasing its rich biodiversity.
- **Eco-friendly Initiatives**: The college actively promotes environmental sustainability through tree plantation programs conducted by NCC and NSS units on various occasions. These initiatives not only enhance the campus's ecological balance by purifying air, providing shade, and supporting wildlife but also raise environmental awareness among the local community.
- **Benefits and Aesthetics**: The resulting green spaces significantly enhance the visual appeal of the institute, creating a more aesthetically pleasing and inviting environment. Moreover, these green areas contribute to the mental and emotional well-being of the campus community.

(b). Recommendations:

- **Biodiversity:** Introduce a variety of plant species and create diverse habitats within the campus.
- **Sustainable Practices**: Implement efficient irrigation, proper fertilization, and environmentally-friendly pest control methods.

- **Provide public access:** Create inviting pathways, seating areas, and informative educational signage throughout the campus.
- **Environmental Education:** Integrate environmental awareness into the curriculum across various subjects and encourage independent research projects on environmental topics.
- **Water Conservation:** Utilize rainwater harvesting, low-flow irrigation systems, and prioritize the use of native, drought-resistant plants.
- **Eco-friendly Practices:** Minimize pesticide use, opt for organic fertilizers, and compost yard waste to reduce environmental impact.
- Celebrate "Environment Day" and organize annual celebrations to raise environmental awareness.
- **Environmental Committee**: Establish a dedicated College Environmental Committee responsible for the development, implementation, and review of environmental policies.
- **Indoor Greenery**: Introduce indoor plantations, such as Bonsai trees, in academic buildings to foster student interest in nature and promote a healthy connection with the environment.

(c). Conclusion:

Green spaces significantly contribute to both environmental health and human well-being. By addressing the identified shortcomings and implementing the recommended actions, the green area can be enhanced to provide the greatest possible ecological, social, and aesthetic advantages.

5. Final Conclusion

Ambedkar College, Fatikroy actively promotes environmental awareness through numerous projects spearheaded by faculty and students. Significant environmental awareness programs are regularly conducted. The administration's initiatives clearly demonstrate the college's commitment to becoming more environmentally friendly. Further suggestions have been made to implement scientific and eco-friendly waste management methods. By embracing a "Green Campus" approach, the college can ensure a successful future while contributing to the development of sustainable environments and communities.