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Green Campus Initiatives at Holy Cross College: Advancing the SDGs through Sustainable Practices – A Case Study

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ABSTRACT

This paper examines the Green Campus Initiatives at Holy Cross College (HCC), highlighting how the institution integrates sustainability into its operations and aligns its efforts with the United Nations Sustainable Development Goals (SDGs). The study explores a range of sustainable practices implemented on campus, including energy conservation, waste management, water sustainability, biodiversity preservation, and awareness campaigns aimed at fostering an environmentally responsible culture.

By adopting a holistic approach to sustainability, Holy Cross College not only enhances its ecological footprint but also promotes SDG-oriented education and community engagement. This research provides insights into the challenges and opportunities associated with implementing green practices in higher education settings. It also underscores the critical role of such initiatives in equipping students, faculty, and staff with the knowledge and skills necessary to address global environmental challenges. The findings from this case study aim to inspire other institutions to adopt similar strategies, contributing to a collective global effort toward sustainable development.

Keywords: *Green Campus, Green Initiatives, Higher Education Institutions, SGDs, Sustainability*

Introduction

Sustainability has become a cornerstone of global development, with educational institutions playing a pivotal role in promoting environmental stewardship and achieving the United Nations Sustainable Development Goals (SDGs). Campuses are uniquely positioned to serve as living laboratories for sustainable practices, offering opportunities to implement, study, and refine approaches that address pressing environmental and social challenges.

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Holy Cross College has embraced this responsibility by implementing comprehensive Green Campus Initiatives aimed at integrating sustainability into its institutional framework. These initiatives seek to align the college's operations, infrastructure, and community engagement with the principles of environmental responsibility and social equity. Through efforts such as renewable energy use, waste reduction, water conservation, biodiversity preservation, and environmental education, Holy Cross College strives to minimize its ecological footprint while empowering students and faculty to become agents of sustainable change.

This case study examines how the college's sustainable practices contribute to advancing specific SDGs, particularly those related to clean energy, responsible consumption, climate action, and quality education. By documenting the strategies, challenges, and successes of Holy Cross College's Green Campus Initiatives, this research highlights the transformative potential of higher education institutions in fostering sustainability. It aims to inspire similar actions in academic communities worldwide, demonstrating how localized efforts can drive global impact in pursuit of a more sustainable future.

Need for the Study

The urgency of addressing global environmental challenges, such as climate change, biodiversity loss, and resource depletion, necessitates actionable solutions that can be implemented at all levels of society. Educational institutions, as hubs of innovation and knowledge dissemination, are uniquely positioned to lead by example in advancing sustainability. By integrating green practices into their operations and promoting environmental awareness, campuses can significantly contribute to the United Nations Sustainable Development Goals (SDGs) while shaping environmentally conscious global citizens.

Despite the growing emphasis on sustainability, there is a lack of comprehensive case studies that document the practical implementation of green campus initiatives and their alignment with the SDGs. Holy Cross College, with its proactive approach to sustainable practices, offers a valuable opportunity to analyze and share best practices that can serve as a model for other institutions. This study is needed to:

1. **Demonstrate Impact**: Evaluate how the college's initiatives contribute to specific SDGs, such as clean energy, responsible consumption, and climate action.
2. **Bridge Knowledge Gaps**: Provide actionable insights into the challenges, strategies, and outcomes of implementing sustainable practices in higher education.
3. **Inspire Replication**: Encourage other institutions to adopt similar strategies by showcasing the feasibility and benefits of green campus initiatives.

4. **Foster Policy Development**: Inform policymakers and educational leaders about the potential of integrating sustainability into institutional operations and curricula.

By addressing these objectives, this study highlights the transformative role of educational institutions in creating a sustainable future, reinforcing the need for collective action to achieve global environmental goals.

Related Works

The concept of green campuses has garnered significant attention in recent years, as educational institutions increasingly recognize their role in advancing environmental sustainability and contributing to the United Nations Sustainable Development Goals (SDGs). A review of existing literature provides insights into the theoretical frameworks, practical implementations, and outcomes of green campus initiatives across the globe.

Studies highlight the critical role of higher education institutions in promoting sustainability. The article [1] emphasises that universities serve as "living laboratories" for testing sustainable practices, fostering environmental consciousness among students, and contributing to community-wide sustainability efforts. [2] argue that sustainable campus initiatives are essential for reducing institutional ecological footprints while preparing future leaders to address global environmental challenges.

Literature underscores the alignment of green campus initiatives with specific SDGs, particularly SDG 7 (Affordable and Clean Energy), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). For instance, [3] document the integration of SDGs into higher education institutions' curricula and operational strategies, highlighting the importance of linking campus sustainability efforts with global goals to achieve measurable impacts. Educational programs and awareness campaigns are critical to the success of green campus initiatives. [4] emphasises the importance of sustainability education in equipping students with the knowledge and skills to address environmental issues, both on campus and beyond.

Case studies [5-10] from institutions such as the University of California, Berkeley, and the Indian Institute of Technology (IIT) Delhi demonstrate the impact of innovative green campus strategies on achieving sustainability goals. These examples provide a framework for replicating successful practices in other settings.

Despite their potential, green campus initiatives face challenges, including limited funding, lack of stakeholder engagement, and resistance to change. The discussions paper [11] identifies the need for strong leadership, cross-departmental collaboration, and community buy-in to overcome these barriers.

While the literature provides valuable insights, there is a dearth of comprehensive case studies on sustainability practices in smaller institutions, particularly in developing countries. This highlights the need to document and analyze localized efforts, such as those at Holy Cross College, to provide diverse perspectives on achieving sustainability in higher education.

This review of related works in literature establishes the foundational understanding of green campus initiatives and highlights the relevance of studying Holy Cross College's efforts to advance the SDGs through sustainable practices. It bridges existing knowledge gaps and sets the stage for the detailed exploration of this case study.

Key Areas of Green Campus Initiatives of HCC

Holy Cross College promotes a clean and sustainable campus by motivating students and staff to engage in eco-friendly initiatives, aiming to create environmental awareness and contribute to the protection of the planet locally and globally.

The institution is committed to developing eco-conscious professionals. Courses such as Eco Literature, Green Studies, Environmental Science, Biotechnology, and Nanoscience highlight the importance of preserving the Earth. Students are equipped through field projects, visits, exhibitions, workshops, and seminars focused on environmental conservation and sustainable practices. Initiatives like seed ball distribution and cleaning water bodies (riverbanks and seashores) help transform students into environmentally aware citizens.

1. Energy Efficiency and Renewable Energy:

Numerous studies, such as those by [12], advocate for the adoption of renewable energy sources and energy-efficient infrastructure as a critical component of green campuses. Such practices significantly reduce carbon emissions and promote sustainable energy use [13,14]. The Holy Cross College encourages the usage of public transit among students and its staff. In order to reduce air pollution and carbon foot prints, the college practices “Shuttle Free Day” once a semester and restricts automobile entry on campus to promote the use of bicycles and e-vehicles. Carpooling and Shuttle-Free Day are implemented to reduce the carbon footprint, accounting for approximately 0.52% (582.24 kg CO2) of the total greenhouse gas emissions.

The institution advocates transitioning to clean and green energy sources, such as solar power, to reduce reliance on non-renewable resources. As part of this effort, the Department of Physics, which has high energy requirements for laboratory purposes, is now fully solar-powered. The college is also committed to reducing energy consumption by

implementing sensor-based smart appliances and energy-efficient devices to minimize waste and improve efficiency.

2. Biodiversity Preservation:

Efforts to enhance biodiversity through tree planting, habitat creation, and green spaces are emphasized in studies like that of [15], which link these initiatives to improved campus aesthetics and ecological health. A Miyawaki forest has been established to promote biodiversity and ecological balance. The college also has a plant tissue culture unit dedicated to the cultivation and propagation of endangered plant species. The HCC actively promotes biodiversity by planting and maintaining medicinal, ornamental, and wild plants across its campus, which hosts over 100 species of Arthropods and rare birds. QR codes are placed to provide information and identification of species. With two-thirds of its 20-acre area covered in greenery, the campus enhances air quality, supports groundwater recharge, and maintains a healthy ecosystem. Tree-planting drives are regularly organized by NSS, NCC, and various departments, including Botany, Zoology, and the Eco-Club at HCC. A herbal garden and vermi-compost unit are also maintained, reflecting the college's commitment to environmental sustainability. Annual events like "International Plantation Day" and "World Environmental Day" further engage students in eco-friendly activities.

The college conducts a Green Audit and holds ISO certification to ensure compliance with sustainability standards, aiming to be a model for sustainable development without additional construction. The campus is home to a rich variety of flora and fauna, which are documented in publications, with students actively involved in data collection to raise awareness and understanding of biodiversity. The institution was awarded the INDIAN World Record for the longest human chain formed to promote environmental awareness. Additionally, green gifts are distributed to guests and resource persons.

3. Water Conservation:

Initiatives such as rainwater harvesting and water-efficient landscaping are widely discussed in the work of [16] for their role in addressing water scarcity and promoting sustainability. HCC employs rainwater harvesting to replenish and recharge groundwater levels, recognizing the value of every drop of water. To support this initiative, multiple pits have been created for collecting and storing rainwater. Rooftops are meticulously maintained to prevent debris from contaminating the rainwater as it flows into the wells.

4. Waste Management:

Research explores waste reduction strategies [17], including recycling programs and composting, as effective tools for minimizing waste generation on campuses.

The Holy Cross College follows the 3Rs - Reduce, Reuse, and Recycle, to promote sustainability. Paper waste generated on campus is collected, segregated, and recycled. Initiatives are undertaken to raise awareness among students on reducing packaged food consumption, reusing and recycling non-biodegradable items, and organizing workshops on solid waste management. As part of the Swachh Bharat mission, solid waste is categorized into biodegradable and non-biodegradable before being handed over to the Municipal Corporation. Dustbins are placed in all departments and classrooms to facilitate the segregation of dry and moist waste, ensuring a clean and eco-friendly campus environment.

The Department of Zoology operates a vermicomposting unit managed actively by students. Organic waste collected from the college grounds is deposited into a designated vermicompost tank. Vermin beds are prepared using a mix of broken bricks, coconut husks, dried leaves, organic waste, cow dung, and earthworms. Students collaboratively install the mixture in the tank and ensure proper irrigation. After eight weeks, the first batch of pure, odorless, granular vermicompost is produced. Students receive technical support for large-scale production. Excess water from the tank is collected as vermiwash, which can also be used as an effective natural fertilizer.

The vermicompost produced by the Department of Zoology is utilized as fertilizer for plants on the college campus, enriching the soil with nutrients and enhancing its fertility. This eco-friendly practice supports soil health without relying on chemical inputs. Additionally, the college has implemented an oxidation pond, which is located near the nursery garden. This pond is equipped with phyto-remediating plants, which help filter and treat wastewater from the hostel. These plants absorb and break down contaminants, purifying the water and making it safer for the environment. This process supports sustainable water management on campus.

Since its inception, the college has taken significant steps in managing solid waste responsibly. Committed to becoming a "Plastic-Free Campus," the college strictly prohibits the use of single-use plastics, aligning with the Government’s mandate to ban them due to their adverse effects. To reduce plastic bag usage, the "Manjappai – A Fabric Bag" initiative has been introduced, with awareness campaigns encouraging students and stakeholders to switch to cloth bags. The Department of Zoology and the Eco Club collect used plastic pens from classrooms and departments, ensuring their safe disposal through the Municipal Corporation. Additionally, all departments actively promote the use of fabric bags as part of conference kits during seminars and events.

Awareness programs on e-waste reduction and eco-friendly disposal methods are regularly conducted. The institution ensures proper disposal of waste, with e-waste sent to recycling shops. E-waste management is handled effectively at both departmental and institutional levels. Faulty computers, printers, and other equipment are disposed of as scrap, while printer cartridges are replaced, and UPS batteries are recharged. Adequate funds are allocated for system modernization to support these initiatives.

Findings out of the Study

The study on Green Campus Initiatives at Holy Cross College revealed several key insights into the college's efforts to advance the Sustainable Development Goals (SDGs) through sustainable practices. These findings underscore the institution's commitment to environmental stewardship and highlight areas for improvement to enhance the effectiveness of its initiatives.

1. Implementation of Sustainable Practices

Energy Efficiency: Holy Cross College has adopted energy-efficient practices, including the installation of solar panels and energy-saving appliances, reducing its dependence on non-renewable energy sources.

Waste Management: The college has established a comprehensive waste segregation and recycling program, minimizing landfill contributions and promoting a circular economy.

Water Conservation: Rainwater harvesting systems and efficient water use practices has been implemented, significantly reducing water consumption.

2. Alignment with SDGs

The college’s initiatives align with multiple SDGs, including:

SDG 7 (Affordable and Clean Energy):

Through the use of renewable energy sources by installation of solar panels.

SDG 11 (Sustainable Cities and Communities):

Carpooling and Shuttle-Free Day are observed to reduce carbon footprint.

SDG 12 (Responsible Consumption and Production):

By adopting sustainable waste management and consumption practices like use of Manjapai-a cloth bag.

SDG 13 (Climate Action) and **SDG 14** (Life Below Water):

The Holy Cross College in association with Pro-Vision (NGO) organized cleaning and awareness campaign to sensitize students and the community on sustainable practices and climate change mitigation.

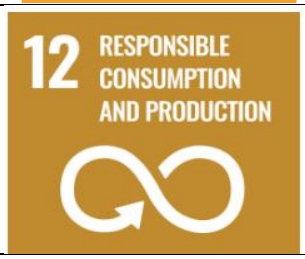
SDG 15 (Life on Land): Use of biodegradable cotton cloth bags inside campus.

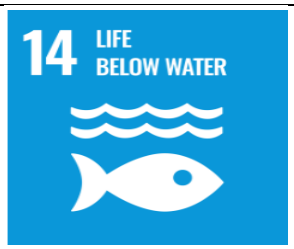
SDG 17 (Partnership for the Goals):

The initiatives followed in HCC educate the community on sustainable practices that enhance air, soil quality and these efforts collectively contribute to building a more sustainable and environmentally conscious community.

The table 1 gives an overview of the practices the Holy Cross College follows that align with the UN's sustainable development goals.

Table 1. Holy Cross College and its Alignment with SDGs

Sustainable Development Goals (SDGs)	Practices followed in Holy Cross College that aligns with the SDGs
	The HCC institution has installed four solar lights in Kattuvillai and Pozhikkarai. The Institution has installed a solar light in Thollavillai.
	HCC practice of Carpooling and Shuttle free day enhances air quality (approximately 0.52% (582.24166 kg CO2) of the total Green House Gas emission).
	Adopts sustainable waste management and consumption practices. Sustainable practices of HCC reduce waste generation and promote recycling and reuse.
	Awareness and Training on Bio-fertilizer- Pipe Composting and Vermi Composting were given to Students and people of Pozhikarai. The institution of Pipe Composting Unit by the institution. In an effort to reduce the institution's carbon footprint students under NSS, RUN and UBA participated in the shoreline cleaning activity at Pallam, Periyakadu, Muttom, Manakudy, Annai Nagar, Colachel, Rajakamangalam, Pozhikarai, Vaniyakudi and Puthenthurai.Plastic wastes collected from the shoreline were dispatched for recycling.

	The Institution's departments of Zoology and Botany observed World River Day and Van Mahotsav, eco-friendly initiatives, to clean riverbanks by eradicating parthenium weeds and other plastic wastes.
	The College initiated Meendum Manjapai (Use of Cloth bags) during 2022-2023. Participated in the INDIAN World Record for the longest human chain to promote the use of Cloth bags. A Manjapai vending machine is installed at the institution. Departments opted for Manjapai instead of plastic files for seminars/conferences. Students distributed cloth bags to the villages they visited for extension services.
	Wellness and Health Camps, Medical and Blood Donation Camps were organised regularly by the RRC, YRC, Rotaract Club and NSS of the institution. The sustainable practices followed by HCC educate the local community and in turn builds an environmentally conscious community.

3. Engagement and Awareness

Community Involvement: Students, faculty, and staff are actively involved in green initiatives through awareness campaigns, workshops, and participation in eco-friendly projects.

Curriculum Integration: Sustainability themes are embedded in the curriculum, fostering an environmental consciousness among students.

Collaborations: Partnerships with local organizations and government bodies have supported the implementation of sustainability projects.

4. Environmental and Social Impact

Biodiversity Conservation: The college has developed green spaces and biodiversity zones, preserving native flora and fauna.

Reduction in Environmental Impact: Significant reductions in energy use, waste production, and water consumption have been observed.

Positive Influence on the Community: The initiatives have inspired neighboring communities to adopt similar practices, amplifying the impact.

5. Challenges Identified

Resource Constraints: Limited funding and technical expertise pose challenges to scaling up sustainability projects.

Behavioral Barriers: Resistance to change among some stakeholders limits the full adoption of sustainable practices.

Monitoring and Evaluation Gaps: The absence of robust mechanisms for tracking the impact of initiatives hinders data-driven decision-making.

6. Recommendations for Improvement

Strengthen stakeholder engagement through enhanced communication and training programs.

Explore additional funding opportunities, including grants and corporate sponsorships, for expanding sustainability projects.

Establish monitoring frameworks to measure and evaluate the long-term impact of initiatives.

These findings demonstrate Holy Cross College's proactive role in fostering a green campus and advancing the SDGs. With targeted improvements, the college can further enhance its contributions to sustainability and serve as a model for other educational institutions.

Conclusion

The Green Campus Initiatives at Holy Cross College exemplify how educational institutions can play a pivotal role in advancing the United Nations Sustainable Development Goals (SDGs) through the adoption of sustainable practices. By integrating environmentally conscious strategies into campus operations, the college has successfully reduced its ecological footprint while fostering a culture of sustainability among students, faculty, and the broader community.

This case study demonstrates that comprehensive efforts, such as renewable energy use, waste and water management, biodiversity conservation, and sustainability-focused education, can significantly contribute to creating a greener and more sustainable future. While challenges such as resource limitations and stakeholder engagement persist, the innovative approaches and collaborative efforts at Holy Cross College provide a replicable model for other institutions aiming to align with global sustainability goals.

Ultimately, the initiatives underscore the transformative potential of higher education institutions as change agents in addressing environmental challenges, building sustainable communities, and inspiring global action for a better tomorrow.

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