

Green practices for sustainable education : An analysis of SFIMAR

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Abstract

This study tries to shed light on the sustainability practice in higher education, using SFIMAR, Mumbai, as the case institution. Drawing on Education for Sustainable Development, the whole-institution approach, and the triple-bottom-line framework, the study reviews initiatives across governance, curriculum, campus operations, and community engagement. Evidence was gathered through document review, observations, stakeholder interactions, surveys of 153 SFIMAR students, surveys of 147 students from other higher education institutions, and interviews with six sustainability practitioners. Results of the Regression analysis show that, the institutional approach and implementation challenges are important predictors of perceived sustainability outcomes. Overall, the findings point to gains in environmental awareness, student involvement, resource conservation, and institutional reputation, while also drawing attention to resource limitations, maintenance needs, behavioural change, and impact assessment.

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Keywords: Sustainability, Green campus, Higher education, Environmental practices, SFIMAR, SDGs.

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1. Introduction

Sustainability is now a shared global concern, built around the necessity to protect and preserve the environment, support social well-being, and pursue economic development without placing future resources at risk. Education has a direct role in this process because it shapes awareness, values, skills, and responsible action, as highlighted through the UN Sustainable Development Goals and the Education for Sustainable Development framework. At SFIMAR, Mumbai, this commitment is reflected in the way sustainability is linked with curriculum, governance, campus operations, and community engagement. Through CSR and ISR initiatives, and in line with NAAC, NBA, and AICTE expectations, the institution encourages environmental responsibility and prepares students for sustainable and socially responsible management practice [1], [2], [3], [4].

1.1 *Review of Literature*

The literature on sustainability has progressed from isolated environmental initiatives to integrated institutional approaches with respect to higher education. Recent studies identify governance, curriculum, campus operations, student engagement, and community partnerships as core dimensions of sustainable campuses. UNESCO IESALC [5] highlights higher education institutions as living laboratories for water conservation, energy efficiency, waste management, renewable energy, and community engagement. Ogbolu et al. [6] propose the Sustainability in Higher Education Institutional Maturity Matrix, emphasizing leadership, policy coherence, and institutional maturity. Sa'adi et al. [7] advocate a whole-institution approach integrating governance, operations, curriculum, research, and community engagement. Barnett-Itzhaki et al. [8] emphasize social, economic, educational, and mobility perspectives; UNESCO's "Beyond the Green Campus" article [9] and Green School Quality Standard [10] stress integrated campus sustainability; and India's UGC guidelines [11], [12] highlight institutional development and university-industry collaboration.

Indian quality frameworks reinforce these priorities. AICTE's Clean and Smart Campus initiatives and NAAC promote conservation of energy and water, management of waste, green practices at campus, and community engagement as indicators of institutional excellence [13], [14]. Sustainable Development Education develops critical thinking, systems

thinking, and responsible action, while institutional commitment, stakeholder collaboration, faculty development, and experiential learning are recognized as key enablers of sustainability [3], [15]–[17].

Various studies also point to recurring barriers in implementation. Fernández-Sánchez et al. [18] discuss fragmented execution and limited institutional capacity. Lozano et al. [19] underline the role of sustainability declarations and governance commitments. Shriberg and Harris [20] draw attention to student leadership and change-management skills, while Barth and Rieckmann [21] highlight the need for faculty development in curriculum transformation. Alshuwaikhat and Abubakar [22] present a cohesive model that connects environmental management, social responsibility, teaching, research, and public participation. In this context, SFIMAR adds a practice-based Indian case by showing how sustainability can be carried forward through institutional systems and student-centred engagement.

1.2 Research Gap

After reviewing the literature, certain research gaps are identified:

Much of the available work on sustainability in higher education is drawn from global contexts, and empirical evidence from Indian management institutes remains limited. Many studies also discuss curriculum, governance, campus operations, and student engagement as separate areas, while ignoring its operation within a whole-institution model. Students' experiences and the behavioural changes that follow participation in sustainability initiatives are not studied in sufficient depth. Similarly, fewer studies measure institutional gains such as resource conservation, accreditation readiness, stakeholder engagement, and reputation. The present study responds to these gaps by presenting an integrated case of an Indian management institute, covering sustainability practices, student perspectives, governance mechanisms, institutional outcomes, and future implementation priorities.

1.3 Theoretical and Conceptual Framework

The study is anchored in Education for Sustainable Development (ESD), the Whole-Institution Approach, and the Triple-Bottom-Line perspective. These frameworks explain sustainability through Awareness, Values, Responsible Behaviour, Governance, Curriculum, Infrastructure, Campus Operations, Community Outreach, and Environmental, Social, and Economic benefits [3], [4], [7], [22].

The study conceptualizes sustainability as a whole-institution approach, integrating governance, curriculum, campus operations, student participation, institutional challenges, and measurable sustainability outcomes.

2. Objectives of the Study:

1. To examine the green practices implemented at SFIMAR and analyse the institutional approach adopted for their effective implementation To evaluate the outcomes and impact of sustainability initiatives.
2. To identify the challenges faced during implementation.
3. To examine students' perspectives towards sustainability practices and identify the key institutional benefits of such initiatives.

3. Research Methodology:

This Research follows mixed-method design that brings together qualitative and quantitative evidence to understand sustainability initiatives at St. Francis Institute of Management and Research (SFIMAR), Mumbai. The analysis considers how green practices are implemented, what impact they create, and how selected sustainability indicators relate to student awareness and participation.

3.1 Research Design and Approach

The research followed a descriptive-cum-analytical design. Institutional records and field-level inputs were taken into consideration with quantitative analysis based on regression testing. A structured questionnaire were used to coollect Primary data from current students and students from the previous two batches. This helped the study combine contextual understanding with measurable evidence. Qualitative inputs captured institutional practices and stakeholder views, while quantitative data helped examine relationships among the selected variables.

3.2 Data Sources

Primary Data: A structured questionnaire was used to gather Primary data at three levels. One questionnaire was administered to institutional stakeholders using non-probability quota sampling. A separate 25-item

questionnaire, based on a 5-point Likert scale, was completed by 153 current and former students from the previous two years who have actively participated in green initiatives. The instrument showed excellent reliability (Cronbach's Alpha = 0.958) and strong construct validity (KMO = 0.931; Bartlett's Test: $\chi^2 = 3618.193$, $df = 300$, $p < 0.001$). To strengthen validation and understand implementation issues, the study also included 147 responses from students of other HEIs. Five experts from UNICEF and the University of Mumbai have also shared their responses through interviews.

Secondary Data: Institutional documents, including **ISO 9001:2015** records, **NAAC/NBA** reports, green audit reports, and ISR activity summaries, were reviewed to triangulate and support the primary data.

3.3 Operationalization of Variables

For reproducibility, variables for in-house student data were operationalized as follows: Types of Green Practices were measured through Q1–Q5; Institutional Approach through Q6–Q10; Sustainability Outcomes through Q11–Q15; Challenges through Q16–Q20; and Future Strategy Orientation through Q21–Q25. Responses were measured on a 5-point Likert scale which starts with Strongly Disagree to Strongly Agree.

3.4 Variables and Hypothesis

Independent Variables: Types of Green Practices (Q1–Q5), Institutional Approach (Q6–Q10), Challenges (Q16–Q20), Future Strategy Orientation (Q21–Q25).

Dependent Variable: Sustainability Outcomes (Q11–Q15).

Hypothesis 1 (H1): Types of green practices, institutional approach, challenges faced, and future strategic orientation together significantly predict the perceived sustainability outcomes at SFIMAR.

3.5 Data Analysis and Statistical Tools

The study employed qualitative thematic and content analysis alongside quantitative analysis using SPSS. Descriptive statistics (mean, standard deviation, and frequencies) summarized the data. Multiple linear regression tested the hypothesis and examined relationships between variables. Statistical significance was assessed at $p < 0.05$ to ensure reliable and valid findings for the in-house student data.

4. Types of Green Practices Implemented at SFIMAR

Table 1
Types of Green Practices Implemented at SFIMAR

Sr. No.	Initiatives	Practices	Outcomes
1	Awareness Activities	Conducted through Green Club, ISR Club, occasional and expert persons, displayed across campus	Enhanced awareness on green, energy conservation, hygiene, safety and sustainable infrastructure among students and staff
	(Green talks, awareness drives, public tours, fire safety awareness)		
2	Outdoor Activities	Organised with NGOs, teams and community partners, field visits to farms, plantations and school areas	Promoted civic responsibility, environmental stewardship and practical understanding of sustainability and social issues
	(Beach clean-up, rallies, field visits, conservation projects)		
3	Waste Management	Waste segregation drives, compost pit making, cartons to garbage waste; dustbin machine for in-campus waste recycling	Reduced waste, created organic manure for campus plants and encouraged responsible waste-handling practices
	(Waste segregation, recycling, composting)		
4	Water Conservation	Institutional water harvesting and storage; promoted use of 'WhyWaste' App to monitor personal water footprint	Improved water reuse for gardening and cleaning; raised awareness for personal water consumption
	(Rainwater harvesting, water recycling)		
5	Energy Conservation	Implemented LED bulbs, sensor lights, automatic switches and 125 kW solar power energy across campus	Energy savings and reduced carbon footprint; solar system generates about 530–635 kWh per day
	(LEDs, sensor-based systems, solar power)		

Contd...

6	Green Campaigns & Landscaping	Maintained nursery and landscaping areas; tree plantations during Environment Week and NSS drives	Increased biodiversity, improved green cover and created an aesthetic, healthy learning environment
	(Nursery development, tree plantation, butterfly garden)		
7	Curriculum Integration & Capacity Building	Syllabus on ESG, green operations, climate risk, sustainable finance added; in-house case studies and expert talks conducted	Transformed educational curricula, industry alignment and development of sustainability competencies
	(ESG, green subjects, case studies, green talks)		
8	Student Engagement & Clubs	Student participation in competitions, eco-bag making, awareness and community service projects	Built a culture of participation, leadership, youth empowerment and social responsibility among students
	(Green Club, ISR Club, CII, DNV, UNICEF events, eco-bag making)		
9	Environmental Audits	Conducted by external agency for energy and environment audits	Identified key improvements areas and ensured sustainability compliance and accountability
	(Green audit, energy & environment audit)		
10	Policies & Governance	Adopted ISO 14001 and ISO 9001 aligned sustainability policies and practices	Institutionalised eco-conscious governance and continuous improvement in green practices
	(ISO 14001, ISO 9001 & related practices)		

4.1 Current Focus Towards Green Practices

As environmental concerns become more visible, global and national frameworks are placing greater emphasis on Green Practices across sectors. Regulatory and quality bodies now review institutions on areas such as Conservation, of Energy and Water, Management of Waste, Green Campus Practices, and Community Engagement [11], [13], [14]. SFIMAR responds to these expectations through Paperless Administration, Waste Segregation, Energy-Efficient Infrastructure, Rainwater Harvesting, Green Landscaping, and structured Sustainability Awareness initiatives. One

major Energy Conservation measure is the 125 kW Solar Power System, which is expected to generate about 500 to 625 units (kWh) of electricity per day, or nearly 15,000 to 18,750 units per month.

4.2 Students' Perspective Towards Sustainability Practices and Key Institutional Benefits

Students view SFIMAR's sustainability practices as a way of connecting classroom learning with action on the ground. Activities through the Green Club, waste segregation drives, conservation initiatives, eco-drives, and community engagement help students see how environmental ideas are applied in day-to-day institutional life. Such participation builds awareness, responsible behaviour, resource conservation habits, and a sense of social responsibility. These initiatives also support a cleaner campus, better green cover, and closer alignment with accreditation and sustainability expectations. For the institution, they add value through reputation building, stakeholder engagement, and readiness for ESG-linked and responsible business practices. The findings suggest that long-term environmental and social outcomes depend on active student participation backed by clear governance and adequate resources.

5. Implementation Process

SFIMAR's sustainability and green campus initiatives are implemented through a planned process that connects institutional intent with day-to-day execution. The process supports continuity, academic linkage, institutional ownership, and periodic review through feedback and evaluation.

5.1 Conceptual Foundation for Executing Green Practices at SFIMAR

SFIMAR adopts a whole-institution approach by linking environmental and social responsibility with governance, academics, and campus operations. Institutional commitment is reflected through ISO 9001:2015 standards, policies, administrative framework and operational guidelines that support accountability and resource efficiency. The Green Club and Abhimaan ISR Club coordinate sustainability initiatives with the involvement of faculty, students, and administrative staff. Sustainability is also connected to the curriculum through courses such as CSR (Corporate Social Responsibility), Ethics in Business, and Socially Relevant Co-

curricular Activities, along with experiential learning opportunities. Green and Environmental Audits, stakeholder feedback, and student-led reviews help the institute monitor progress and improve practices. In line with NAAC and NBA quality standards, these initiatives strengthen governance, stakeholder engagement, regulatory compliance, and a sustainability-oriented institutional culture.

6. Primary Data Analysis

Hypothesis for Multiple Regression

DV: *Sustainability Outcomes (Q11–Q15)*

IVs: *Types of Green Practices (Q1–Q5), Institutional Approach (Q6–Q10), Challenges (Q16–Q20), Future Strategy Orientation (Q21–Q25)*

Hypothesis: H1–Types of green practices, institutional approach, challenges faced, and future strategic orientation together significantly predict the perceived sustainability outcomes at SFIMAR

Table 2
VIF value of the variables

Variable	VIF	Interpretation
Institutional Approach	2.79	Acceptable (no multicollinearity)
Challenges	2.85	Acceptable (no multicollinearity)
Future Strategies	1.61	Very low multicollinearity

Here in Table 2 all the VIFs are below 5, which means the predictors do not overlap too heavily, the model is statistically stable, and coefficients are reliable.

Table 3
Interpretation of CI values

Variable	Confidence Interval (CI)	Interpretation	Conclusion
Institutional Approach	[0.0984, 0.3903]	Entire CI is positive, indicating a consistent positive effect on sustainability outcomes.	Significant positive predictor.

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Challenges	[0.5633, 0.8596]	Strong and fully positive CI; reflects a robust positive contribution.	Strongest predictor in the model.
Future Strategies	[-0.0826, 0.1494]	CI crosses zero, indicating inconsistency in direction and a non-significant effect.	Likely to be removed first in backward regression.

Table 3 interpreted the predictors' importance on the basis of CI values.

Durbin-Watson Value Interpretation

DW = 1.854, where the value is close to 2, which shows that there is no autocorrelation.

Model Conclusion

The results indicate that *Institutional Approach* and *Challenges* are strong and reliable predictors of the *Outcomes and Impact of Sustainability Initiatives*, explaining a substantial portion of the variation. The diagnostics (VIF, DW, Eigenvalues) confirm that the model is stable, free of multicollinearity, and has independent residuals.

7. Table 4 Content Analysis of Focus Group Interview Data of Experts:

Sr. No.	Interview Text Condensation	Code	Sub-Category	Category
1	Sustainability can be woven into every subject through classroom discussion and experiential learning.	Curriculum integration	Sustainability-oriented curriculum	Institutional Integration of Sustainability
2	Sustainability-related activities should support academics while building analytical, critical-thinking, and practical skills.	Competency-based learning	Applied sustainability education	

Contd...

3	Student participation improves when students are internally motivated and are given incentives, flexible choices, and peer learning opportunities.	Student motivation	Student engagement	Student Motivation and Behaviour
4	Green clubs and awareness programmes help build a campus culture where students participate actively in sustainability.	Green campus culture	Institutional initiatives	Institutional Support and Governance
5	Clear policies, implementation guidelines, and governance systems help institutions carry out sustainability initiatives consistently.	Institutional governance	Organisational support	
6	Green audits, feedback, and student involvement help improve campus management and operational efficiency.	Monitoring and audits	Continuous improvement	
7	Sustainability initiatives help reduce resource use, improve infrastructure, and create financial savings for the institution.	Resource efficiency	Operational benefits	Benefits to Institutions
8	Sustainability practices support accreditation, enhance institutional reputation, and open scope for collaboration with industry, NGOs, and communities.	Institutional recognition	Community engagement	
9	Participation in sustainability activities builds awareness, responsibility, and conservation habits both on campus and at home.	Behavioural change	Environmental responsibility	Behavioural Change Outcomes

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10	Hands-on activities, field visits, and community projects often create deeper learning than classroom teaching alone.	Experiential learning	Evidence-based learning	Effective Sustainability Strategies
11	Projects such as composting, rainwater harvesting, and renewable energy make the campus a practical learning space.	Campus demonstration	Living laboratory	
12	A sustainable campus environment can encourage long-term behaviour change and strengthen institutional commitment.	Sustainable campus	Institutional modelling	

The focus group interview data were analysed using thematic content analysis, resulting in six major categories: **Institutional Integration of Sustainability, Student Motivation and Behaviour, Institutional Support, Institutional Benefits, Behavioural Change Outcomes, and Effective Sustainability Strategies**, as mentioned in Table 4.

8. Discussion

The results suggest that sustainability outcomes improve when the institutional approach is clear, supported by governance, and followed through systematically. Operational challenges matter because they shape how resilient and practical the initiatives become. Future strategies, on their own, appear to have limited influence unless they are backed by resources, monitoring, and implementation support. The major challenges include funding constraints, behavioural resistance, infrastructure maintenance, impact assessment, and limited external collaborations. Responses from students of other higher education institutions also show a favourable view of sustainability and its academic, professional, and institutional value. This reinforces the need to place sustainability within institutional policies, curriculum, and campus operations.

9. Challenges, Mitigation Measures and Limitations

The challenges were managed through awareness programmes, phased implementation, student involvement, committee-based monitoring, and periodic review. Behavioural resistance was addressed through orientation sessions, Green Club activities, and awareness campaigns. Resource limitations were handled through low-cost measures such as paperless communication, LED lighting, recycling, and student-led drives, while larger initiatives can be strengthened through external partnerships. A limitation of the study is that the research adopted a cross-sectional design, capturing stakeholders' perceptions at a single point in time rather than measuring long-term behavioural or environmental outcomes.

10. Future Strategies and Priority Areas

Future priority areas include a formal sustainability policy, annual sustainability reporting, student-led green audits, digital tracking of resource use, stronger partnerships with external agencies, and deeper integration of ESG-related courses and project-based learning.

11. Conclusion

SFIMAR shows a clear commitment to sustainability by bringing environmental responsibility into institutional practices and management education. The study indicates that stronger governance, wider stakeholder participation, meaningful partnerships, and measurable monitoring can help sustain these efforts over time. These steps can also support scalable sustainability outcomes, quality education, and institutional excellence. □

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