CHAPTER 136

Sustainable Educational Institute Development through Green Rating Systems

Ritiksha Rajkumari[1], Sonali Srivastava[1], Sparsh Chowdhary[1], Kshitija Mahesh Raje[1] and Shobha Ramalingam[2]

ABSTRACT

Sustainability is the need of the hour. As per India's 2030 sustainability target, India will be reducing 50% of its energy needs from non-fossil fuels. Many organizations are working towards achieving this goal, keeping this in mind, this paper explores various green rating systems. Similarly, NICMAR University Pune also has a mission to increase its energy efficiency and decrease its dependency on consumption of electricity from the main power grid. Therefore, this paper investigates the applicability of a suitable rating system for the institute to achieve its sustainability mission, promoting sustainable practices. The primary aim is to identify a suitable green rating system for transformation of the existing campus into a green campus. The required data was gathered through comparative analysis of the existing green rating systems around the world. On comparing the Indian green rating systems, i.e., GRIHA and IGBC, it was finalized that IGBC criteria were the most suitable for this campus.

Keywords: Green rating systems; Green campus; Sustainability; Educational institute; Energy efficiency.

1.0 Introduction

The world is facing increasing environmental challenges, there is an exigency of mitigating climate change emphasizing the requirement for sustainable practices. Conferences around the world starting from the first Stockholm conference i.e. United Nations Conference on Human Environment, to the Kyoto Protocol, Paris Agreement, G20 Summit and many more, have all led to an awakening for the requirement of sustainable development across various sectors, ensuring a quality life on our planet. India's commitment under these global conferences and agreements have led to constitutional provisions, amendments and legal frameworks such as incorporating Corporate Social Responsibility, several energy and climate laws leading the right to a healthy environment ensuring sustainable development in a structured approach. India's vision for 2030 is aimed to develop an environmentally sustainable nation aligning with Global Sustainable Goals. Their key focus areas being renewable energy, climate action, sustainable growth including quality education and health care (United Nations, n.d.).

[1]*School of Construction, NICMAR University, Pune, Maharashtra, India*
[2]*Corresponding author; School of Construction, NICMAR University, Pune, Maharashtra, India (E-mail: sramalingam@nicmar.ac.in)*

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Keeping up with the changing trends, educational institutions in India are adopting various strategies and sustainable practices to minimize their ecological footprint. The integration of sustainability in educational infrastructure enhances the quality of education, human health and the climate. This further develops a culture of responsible sustainable behaviour. Creating a scope for discussion of the same among students and faculty alike, further influencing their respective fields. Green rating systems are the key drivers in implementing and promoting sustainable practices. These frameworks set clear standards which encourages resource efficiency and drives environmentally responsible construction. Two major green rating systems are followed in India, Indian Green Building Council i.e. IGBC and Green Rating for Integrated Habitat Assessment i.e. GRIHA. Each framework establishes clear guidelines to enhance energy efficiency, water conservation, waste management, and overall environmental impact in institutional buildings (IGBC, 2017; GRIHA, 2019.). GRIHA Focuses on government led initiatives while IGBC is an industry driven approach with international recognition offering more flexibility. This study concludes IGBC Green Campus Rating as a more suitable framework as per the comparative analysis done in this paper, for the assessment of an educational Institute because of its adaptability for both new and existing campuses. Despite the growing adoption of green rating systems, limited research exists on the comparative effectiveness of IGBC Certified educational campuses in India and even lesser are the comparative analysis-based studies on these green rating systems.

2.0 Green Rating Systems

2.1 Sustainability in educational institutes

Educational Institutes and similar public spaces are one of the significant consumers of energy due to their revolving occupancy patterns. With the growing environmental challenges, there is a need for these institutions to adapt sustainable practices to reduce their environmental impact.

2.2 Importance of green campuses

One of the stepping stones for any infrastructure setup to move towards sustainable development is to follow a Green Rating System. These certifications provide a detailed framework of requirements to be fulfilled to obtain their certification. These systems also encourage environmentally responsible constructions and reduction of energy consumption to reduce the carbon footprint generated from the infrastructure. Similarly educational institutions in India are opting for green building certifications.

2.3 Green rating systems around the world

These rating systems are designed frameworks that evaluate and assess building infrastructure based on their sustainability, energy efficiency and the overall impact on the environment. Some of the most prominent green rating systems followed worldwide are (see, Table 1):

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Table 1: Rating Systems around the World, Used for this Study

Sr. No	Rating System	Country of Origin	Established Year	Summary
1	LEED	USA	1993	Evaluation of buildings on energy efficiency, water efficiency, indoor environment quality, materials and environmental impact.
2	BREEAM	UK	1990	Measures sustainability across the building life cycle including energy consumption, waste management, water efficiency, transportation efficiency, land use, material use, health and well-being.
3	GREEN STAR	Australia	2003	Aiming to enhance a building's overall environmental performance and occupant health. Evaluates energy efficiency, water efficiency, material selection and indoor environment quality.
4	WELL	USA	2014	Focusing on human health and wellness in built environment by assessing air quality, water quality, lighting efficiency, movement, thermal comfort, sound, nourishment, mind and community (well-being and community).
5	Green Globes	US and Canada	2000	Interactive user-friendly online platform evaluating a building's energy and water efficiency, resources, indoor environment, emission reduction and project management.
6	GRIHA	India	2007	Tailored for residential buildings' sustainability. Evaluates energy efficiency, water efficiency, site planning, waste management and occupant health.
7	IGBC	India	2001	Provision of Guidelines for building types such as residences, offices, education facilities, commercial buildings and others. Focusing on site selection, energy efficiency, water efficiency, material usage, indoor environment quality and design innovation.

Source: Compiled by authors

2.4 India's sustainability mission

India being an active participant of the sustainable development movement has made a commitment to achieve sustainability by implementing national policies and participating in global agreements. Starting from the first United Nations Conference on the Human Environment in Stockholm Declaration, 1972 to the 3rd edition of India Energy Week, 2025.

2.5 Importance of green rating systems in India

Green Rating Systems serve as essential tools in promoting sustainable infrastructure. Various States such as Pune and Hyderabad i.e. Pune Municipal Corporation and Greater Hyderabad Municipal Corporation offers 10% property tax rebate for certified buildings under

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IGBC and GRIHA (Pune Municipal Corporation [PMC], n.d.; Eco-Business, 2012). Further the Maharashtra Energy Development Agency gives subsidies for rooftop solar installations in campus buildings (Maharashtra Energy Development Agency [MEDA], n.d.). Sweetening this deal Maharashtra State Electricity Distribution Company Ltd. (Maharashtra State Electricity Distribution Company Limited [MSEDCL], 2023). Also offers benefits on adopting solar power by providing net metering which further reduces the institution's electricity cost.

2.6 Green rating systems in India

All organizations should have green campuses and environmental impact reduction policies since they enhance well-being of their occupants (Rajalakshmi *et al.*,2022). And acquiring green certifications could help a building become a leading example for sustainable development in the country (Kshetri *et al.*, 2021). A comparative analysis can be done for selecting such sustainability rating systems for campuses and evaluating sustainability indicators to identify challenges faced by Indian institutions for green certification. (Parvez & Agrawal, 2018). Green rating systems such as GRIHA and IGBC can be used in an existing campus for enhancing the prevailing systems in the campus for assessment of areas to be improved and increment of green practices or efficiency (Sharma *et al.*, 2024).

2.7 Research gap

Absence of detailed research based on the effectiveness of different green rating systems for educational campus buildings and their applicability on educational institutions, addressed region-specific measures for India.

2.8 Research question

Conduct a comparative analysis on different green rating systems to find their applicability in educational campuses, across India.

2.9 Scope and methodology

This paper will investigate the applicability of a suitable green rating system for a Maharashtra based educational institute. Further dwelling into the requirements and green rating categories to achieve the sustainability mission where data will be collected through a comparative analysis of existing green rating systems, around the world.

3.0 Comparison of the selected green rating systems

After listing out green rating systems around the world this study narrows down two rating systems applicable for Indian infrastructure. IGBC and GRIHA that are suitable for the Indian context as these align with our country's climate, available resources and sustainability goals (see, Table 2).

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Table 2: Narrowing Down to IGBC and GRIHA Rating Systems

Sr. No	Suitability Factor	Reasons
1	Adapting to the Indian climatic conditions	Different from other global rating systems these two are tailored for Indias diverse climate, temperature and composite regions. Emphasizing on passive cooling water efficiency, thermal comfort and climatic impact suitable for the Indian environment.
2	Focuses on resource efficiency	Prioritizes efficient water fixtures, rainwater harvesting and renewable energy integration to meet increasing energy demand and water scarcity in India.
3	Alignment with Government regulations and recognition	Validated by the Indian Government. These also align with level incentives, tax benefits and national policies such as Energy Conservation Building Code (ECBC).
4	Accessibility and affordability	Compared to International systems, these offer cost effective certifications, considering locally available resources, materials, green technology and affordable native construction practices.
5	Comprehensive sustainability	These two systems incorporate a holistic approach to sustainable development, including energy efficiency, waste management practices, biodiversity conservation and socio-economic impacts like livelihood generation.
6	Results	Since these are climate responsive, cost effective, nationally recognized rating systems, they are adaptable to Indian buildings without relying on foreign technologies, which makes them more affordable, practical in addressing India's sustainability goals.

Source: Compiled by authors

To understand these two rating systems a comprehensive study of their parameters, guidelines and requirements was conducted for educational campus buildings and addressing region-specific measures for India. The following table is the summary of this study (see, Table 3). Further the most suitable option for NICMAR University Pune campus, among the two rating systems IGBC and GRIHA will be chosen. This decision has been made by performing the following SWOT analyses (see, Table 4 & Table 5).

Table 3: Comparison of IGBC and GRIHA Parameters and Sub-parameters for Existing Campus Buildings

Sr. No	Sustainability Parameters	IGBC	GRIHA
1	Site Planning	Site Planning and Management 1. Requirement of green buildings within the campus. 2. Requirement of soil erosion control 3. Site preservation 4. Green Cover and vegetation 5. Heat Island reduction, non-roof. 6. Outdoor Light Pollution Reduction.	Site parameters: 1. Accessibility of Basic Services 2. Microclimatic Impact
2	Transportation	Sustainable Transportation: 1. Pedestrian Network 2. Bicycle	NIL

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		Lanes Network 3. Access to Sustainable Transportation	
3	Water	Water Conservation: 1. Rainwater Harvesting 2. Landscape Design 3. Management of Irrigation Systems 4. Wastewater Treatment and Reuse 5. Optimise Water Use for Construction 6. Water Metering	Water: 1. Water Footprint 2. Reduction in Cumulative Water Performance
4	Energy	Energy Efficiency: 1. Energy Efficiency in Infrastructural 2. On-site Renewable Energy 3. Off-site Renewable Energy 4. Energy Metering	Energy: 1. Energy Efficiency 2. Renewable Energy Utilization
5	Material and Resource Management	Material and Resource Management: 1. Segregation of Waste, Post-occupancy 2. Organic Waste Management, Post occupancy 3. Handling of Waste Materials, During Construction 4. Local Materials	Maintenance and housekeeping: 1. Maintenance, Green procurement and Waste management 2. Metering & Monitoring
6	Health	Health & Well-being: 1. Tobacco Smoke Control 2. Basic Amenities 3. Health & Well-being Facilities 4. Universal Design 5. Basic Facilities for Construction Workforce	Human health and comfort: 1. Achieving Indoor Comfort Requirements 2. Maintaining Good IAQ (Indoor Air Quality)
7	Social Awareness	Green Education: 1. Green Education 2. Green Campus Guidelines	Social Aspects: 1. Universal accessibility & Environmental Awareness
8	Innovation	Innovation in Design: 1. Innovation in Design Process 2. IGBC Accredited Professional	Social Aspects: 2. Bonus Points for adoption and implementation of innovative strategies.

Source: Compiled by authors

4.0 Conclusion

Through the comparative analysis, it was established that both IGBC and GRIHA are suitable rating system choices for India-specific projects. It was also found that IGBC has a more detailed set of certification guidelines. After the SWOT analysis of the above-mentioned green building rating certifications, it was also established that IGBC provides more tax rebates, direct incentives, lower certification costs, quick implementation time and flexible upgradations. Therefore, IGBC is more suitable for NICMAR University Pune to help facilitate its sustainability mission, for the transformation of the existing campus into a green campus. However, choosing a suitable green rating system is based on institutes' requirements, financial capabilities, time limitations and other project specifications (see, table 6).

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Table 4: IGBC SWOT Analysis

Strengths	Weakness
Fast environmental clearances: Certified green campuses receive fast approvals for modification and expansions (MPCB, 2023).	High Initial Investment: Institutions have to invest in high replacement costs to undergo retrofitting which can be difficult in case of limited budget. (IGBC, 2017)
Water saving benefits: IGBC aligns with Jal Shakti Abhiyan in Maharashtra by promoting rainwater harvesting and wastewater recycling (MoJS, 2023).	Lack of skilled workers: It is difficult to find trained working professionals to implement sustainability and IGBC guidelines. (TERI, 2022)
Energy Savings: IGBC certified buildings that have retrofitted electrical fixtures can save up to 30% to 50% payment on electricity bills also which enhances financial sustainability (TERI, 2022).	Limited Recognition: IGBC is recognized within India but for an international collaboration it lacks global recognition. (USGBC, 2021).
Adherence to Waste Management: IGBC has guidelines aligning with Maharashtra Pollution Control Board Regulations (MPCB, 2023)	Difficulty in Maintenance: Continuous monitoring and reporting is required for IGBC certified buildings that increases complexity in daily operations. (IGBC, 2017)
Property Tax Incentives: Maharashtra State Government provides property tax discounts for IGBC certified buildings, to encourage institutions to practice sustainability. (MEDA, 2023)	Limited area for rainwater harvesting: There is a limited scope for implementation of rainwater harvesting systems due to lack open of spaces in existing campuses. (MoEFCC, 2023)
Opportunities	**Threats**
Smart Campus Development funds: Maharashtra State Government offers funding for transforming campuses into a green campus under the smart city initiative. (MoHUA, 2022)	Revised Government Policies: Adjustments in Maharashtra's green building incentives may influence the economic viability of IGBC certifications. (MEDA, 2023)
Promotion of Renewable Energy: IGBC supports solar energy incentives by MSEDCL promoting institutions to implement net metering policies. (MSEDCL, 2023)	Competition with other rating systems: Institutions might opt for GRIHA for government projects or LEED for global partnerships over IGBC. (USGBC, 2021)
Carbon Credits: Institutions can earn carbon credits through IGBC certification which lets them generate additional revenue. (IGBC, 2017)	Slow ROI: Due to initial budget: constraints institutions may be reluctant in implementing IGBC's long term advantages. (TERI 2022)
Circular Economy Integration: IGBC guidelines encourage recycling, reducing landfill waste and promotes waste to energy innovations. (MoEFCC, 2023).	Absence of Sustainability Monitoring: Inadequate sustainability monitoring may prevent the newly certified institutions in achieving intended sustainability goals. (IGBC, 2017)
Student Awareness and Engagement in Sustainability Practices: IGBC certifications create a green learning environment which enhances student involvement in sustainability programmes. (TERI, 2022)	Climate Challenges: Increasing unforeseen heat waves and flood risks in Maharashtra requires additional preventive measures beyond IGBC guidelines. (MoEFCC, 2023)

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Table 5: GRIHA SWOT Analysis

Strengths	Weakness
Government Recognition: Suitable for government institutions since it is endorsed by the Ministry of New and Renewable Energy (MNRE, 2023).	Complicated Certification Process: Involves detailed documentation and third-party audits making certification process time intensive. (GRIHA, 2019)
Climate Change: Passive design strategies such as natural ventilation and daylighting enables institutions to deal with hot and humid climate. (GRIHA, 2019)	Lack of International Recognition: It is recognized in India but lacks international recognition that limits global collaboration. (USGBC,2022)
Water Efficiency: Rainwater harvesting and water reusing practices in GRIHA align with water conservation goals of government of Maharashtra. (MoJS,2023)	High Initial Investment Costs & Slow ROI: The costs of retrofitting solar panels, water conservation systems and procurement of green materials can be high for some institutions. (TERI, 2022) Additionally the ROI of GRIHA certification is slower compared to IGBC which may discourage private institutions that expect a higher ROI. (MoHUA, 2022)
Energy Efficiency: Institutions can cut electricity cost by 40% by using GRIHA guidelines that aligns with the solar energy initiatives by Maharashtra government. (MSEDCL, 2023)	Shortage of skilled professionals: Unavailability of skilled and trained sustainability professionals and consultants specializing in GRIHA compliance. (MPCB, 2023)
Carbon Footprint Reduction: It encourages use of low carbon construction material, energy-efficient retrofitting to reduce greenhouse gas emissions. (MoEFCC, 2023)	Retrofitting challenges for Urban Campuses: There can be space limitation in cities like Pune and Mumbai that makes rainwater harvesting and renewable energy system implementation difficult. (MoHUA, 2022)
Opportunities	**Threats**
Aligns with National Policies: GRIHA guidelines align with the national education policy focused on sustainability, enhancing education standards. (MoE,2023)	Competition from other Rating Systems: IGBC and LEED provide quicker certification processes, making them more appealing to private institutions. (USGBC, 2022)
Integrates with renewable energy schemes: GRIHA certified campuses can take advantage of Maharashtra's MSEDCL solar incentives to facilitate solar panel installation. (MNRE,2022)	Changes in Policy: Shift in government sustainability incentives may impact funding for projects under GRIHA. (MEDA, 2023)
Smart & Sustainable Development: GRIHA encourages transformation of existing campuses into smart and sustainable institutions by integrating IOT based energy monitoring systems. (MoHUA, 2022)	Delays in Implementation: Involves complicated third-party verification processes which lead to delays in obtaining GRIHA certification. (GRHIA, n.d.)
Carbon Credits: Certified campuses can generate additional revenue through selling carbon credits. (MoEFCC, 2023)	Lack of Local Sustainable Material: GRIHA guidelines demand specific materials which may be required to be imported, leading to higher costs. (MNRE, 2022)
Enhances Student Engagement: GRIHA enables student engagement in sustainability practices increasing their well-being, productivity and making them environmentally conscious by spreading awareness. (TERI, 2022)	High Cost of Maintenance: Inadequate post certification management makes it challenging for institutions to maintain GRIHA standards, affecting long-term efficiency. (MPCB, 2023)

Source: Compiled by authors

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Table 6: Checklist of Criteria Requirement for IGBC & GRIHA Certifications

CRITERIA	IGBC	GRIHA
Minimal structural modifications	✓	X
Energy efficient and renewable systems	✓	✓
Rainwater Harvesting	✓	✓
Waste Management	✓	✓
Indoor Environment Quality	✓	✓
More tax rebates and direct incentives	✓	X
Lower Certification Cost	✓	X
Quick implementation time	✓	X
Flexible Upgradation	✓	X
NAAC accreditation	✓	✓

Source: Compiled by authors

5.0 Limitations and Future Scope

This study is limited to a comparative analysis of rating systems and does not dwell into the analysis of on ground sustainability measures taken by the university to promote sustainability practices.

6.0 Acknowledgement

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