

Review of Campus Sustainability Rating Systems for Indian Campuses

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Abstract: Sustainable campus development is becoming universal with an increase in the number of campuses demonstrating leadership on pursuing sustainability. Even though there are various international campus sustainability rating and ranking systems but they are not completely utilized in India. The purpose of this study is to analyse and compare eight of these rating systems and prepare a comprehensive list of sustainability parameters and their indicators. Further, check the presence of these Indicators in Indian Institute of Technology Roorkee (IITR), India campus to lay the foundation of the problems faced by the Indian institutions while rating their campuses. Also, an attempt to rate the IITR campus has been made to identify the obstacles faced by Indian institutions for rating their campuses. Parameters of sustainable development are approximately same in all the campus sustainability rating /ranking systems. Indian institutions lack a measuring and monitoring system due to which they are unable to rate their campuses, leading to a situation where the institutions are unaware of the extent of sustainable development achieved on their campuses. This obstructs the comprehensive sustainable development of the campuses. This paper identifies a need to study sustainable campus development for higher education campuses in India.

Keywords: Sustainable development; Campus Sustainability Rating systems; Sustainability parameters and indicators; Indian campuses.

1. INTRODUCTION

A sustainable higher education institution is supported by the three pillars of sustainability and advances to protect them (Castro *et al.*, 2013). These are: (a) Environmental protection (b) Promotion of equity and social justice (c) Economic security (Alshuwaikhat and Abubakar, 2007). This sustainable initiative facilitates the campus and in the long run society at a regional and global level to attain sustainability (Velazquez *et al.*, 2006). Sustainable programs result from the “triple bottom line”- environmental, social and economy (Lozano, 2006).

In this paper eight rating/ranking systems for sustainable development of campuses have been studied. These systems measure all the sustainable activities on the campuses in addition to the building performance. Of all the discussed systems, most have originated in the U.S. emphasising on the high level of the sustainability initiatives and sustainable development of educational campuses in the country. This paper studies and evaluates the sustainability of the Indian Institute of Technology Roorkee (IITR) campus, established in 1847, that extends to 144.07 hectares in area (www.iitr.ac.in).

1.1 Evolution of Rating Systems

Sustainability was talked about for the first time in Brundtland commission in 1987. The Stockholm Declaration, 1972 is the first declaration in the international environmental law which recognized the right to a healthy environment (Alshuwaikhat and Abubakar, 2008). The Talloires Declaration, 1990 was composed in France by the university administrators, which made the first formal announcement about achieving sustainability in higher education (Lozano *et al.*, 2013). These charters and declarations led to the development of various rating and ranking systems. Rating and certification systems measure and assess a sustainability project (OECD, 2008). Higher education institutions are influenced and encouraged by assessment tools which give incentives to institutions for attaining sustainable development (Ferrer-Balas *et al.*, 2008). As per a study carried out by Shriberg (2002) on various campus sustainability assessment tools, the tools should be computable, comparable and all-inclusive.

Greener U- a company which collaborates with educational institutions to enhance sustainable development by providing sustainable solutions, developed the ranking of the top ten higher education sustainability rating, ranking and review tools. Out of these ten, six have been discussed along with Indian Green Building Councils' (IGBC) green townships. In order to have an overview of the rating systems that assesses the sustainable campuses, a description of their origin and association with remarks is given in table 1. Further, a comparative study has been carried out among these rating systems in this paper.

Table 1: Various rating and ranking systems used for the study

Name	Origin Country/ Year	Association	Web/Reference	Remarks
Sustainability Tracking, Assessment & Rating System (STARS)	U.S./2006	Association for the Advancement of Sustainability in Higher Education (AASHE)	(https://stars.aashe.org).	monitors continuous sustainable development; provides goals and incentives
College Sustainability Report Card (CSRC)	U.S./2005	Sustainable Endowments Institution (SEI)	http://www.greenreportcard.org/index.html , (Shi and Lai, 2013)	survey based system process includes selection, survey composition, data collection and verification and assessment.
Princeton Review Green Rating (PRGR)	U.S./2011	AASHE	https://www.princetonreview.com	basis -small survey for sustainable initiatives and achievements
Cool Schools (CS)	U.S./2007	Sierra club, STARS	http://vault.sierraclub.org	ranks according to the institutions' performance in sustainability
Campus Report Card (CRC)	U.S./2001	National Wildlife Federation	http://www.nwf.org	reviews the sustainability initiatives and progress and advancement in environmental performance of institutions
Greenopia College & University Rankings (GCUR)	U.S./2009		http://sustainability.uoregon.edu	rates the schools and provide a list of schools which are sustainable and environmentally conscious
Indian Green Building Council (IGBC)	India/2010	Indian Green Building Council (IGBC)	https://igbc.in/igbc	addresses problems of sprawl, automobile dependency and addresses social and environmental issues.
UI Green Metric WUR (UI)	Indonesia/2010	Universitas Indonesia	http://greenmetric.ui.ac.id	informs about sustainability programs on campus

2. OVERVIEW AND COMPARISON OF RATING SYSTEMS ACCORDING TO THEIR PARAMETERS AND INDICATORS

In table 2, an exhaustive list of sustainability parameters and their indicators is obtained by combining the indicators of all the discussed rating and ranking systems. Further, the presence or absence of these indicators is checked in each of these rating systems. Figure 1 shows the presence of various parameters in sustainability rating systems. It may be noted that IGBC is excluded from this graph as it is not a comprehensive campus sustainability rating system. This comparison clearly indicates the presence of operational parameters in all the rating systems which becomes an important parameter all across. Planning and administration parameters are not that widely covered, whereas engagement and academics are covered in most of them.

Table 2: Rating systems according to their parameters

Subcategory	Indicators*									
		STARS	CSRC	PRGR	CS	CRC	GCUR	IGBC	UI	
1. Academics	Academics									
	Academic Courses	Y	N	Y	Y	Y	N	N	Y	
	Sustainability Learning Results	Y	N	Y	Y	Y	N	N	Y	
	Sustainability in Undergraduate Program	Y	Y	Y	Y	Y	N	N	Y	
	Sustainability in Graduate Program	Y	Y	Y	Y	Y	N	N	Y	
	Holistic Experience	Y	Y	Y	Y	Y	N	N	Y	
	Assessment of Sustainability Knowledge	Y	Y	Y	Y	Y	N	N	Y	
	Motivation for New Courses on sustainability	Y	Y	Y	Y	Y	N	N	Y	
	On Campus Sustainable Experiments	Y	Y	Y	Y	Y	N	N	Y	
	Research									
Research on sustainability	Y	Y	Y	Y	Y	N	N	Y		
Support for Research on sustainability	Y	Y	Y	Y	Y	N	N	Y		
Access to sustainable Research	Y	Y	Y	Y	Y	N	N	Y		

Co-ordination, planning & governance	Sustainability Coordination	Y	Y	Y	Y	N	N	N	N	
	Sustainability Planning	Y	Y	Y	Y	N	N	N	N	
	Governance	Y	Y	Y	Y	N	N	N	N	
4. Planning and Administration	Diversity & affordability	Diversity and Equity Analysis and regulation	Y	N	N	Y	N	N	N	N
		Assessing Diversity and Equity	Y	N	N	Y	N	N	N	N
		Help for Underrepresented Groups	Y	N	N	Y	N	N	N	N
		Support for Future Faculty Diversity	Y	N	N	Y	N	N	N	N
		Affordability and Access to all	Y	N	N	Y	N	N	N	N
Health, well-being & work	Employee Compensation	Y	N	N	Y	N	N	N	N	
	Assessing Employee Satisfaction	Y	N	N	Y	N	N	N	N	
	Wellness Program	Y	N	N	Y	N	N	N	N	
	Health and Safety of Occupants on Campus	Y	N	N	Y	N	N	N	N	
Investment	Committee to Decide on Sustainable Investments	Y	Y	Y	Y	N	N	N	N	
	Sustainable Investment	Y	Y	Y	Y	N	N	N	N	
	Investment Transparency	Y	Y	Y	Y	N	N	N	N	
5. Innovations		Y	N	N	Y	N	N	Y	N	

Y-Present N- Absent.

* The indicators are adapted from STARS and other rating systems for comparison

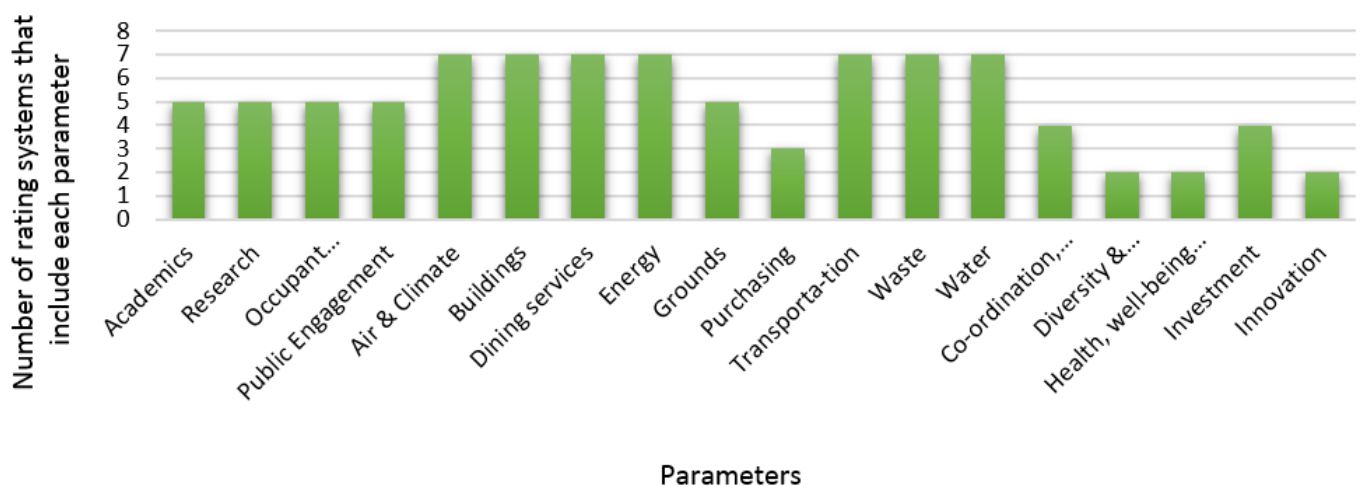


Figure 1: Graph shows the presence of parameters in sustainability rating systems. (source: Author)

3. INDIAN SCENARIO OF CAMPUS SUSTAINABILITY-A CASE STUDY OF IITR CAMPUS

Ministry of Human Resources Development (MHRD) of India has directed the educational campuses to achieve sustainable development (the newsletter for higher education, June 2013). In India there are some residential campuses which are making efforts in achieving campus sustainability, but there is a lack of comprehensive sustainable development (IGBC Green Townships, 2010; S. Bantanur et al, 2015).

IIT Roorkee (IITR) is a fully residential campus in India. IITs are autonomous public institutes of higher education governed by the Institutes of Technology Act, 1961 (Government of India, 2009). In IITR, Bachelor’s Degree courses, Postgraduate Degree courses and doctoral works are offered in Engineering, Applied Science and Architecture and planning. The campus has various departments, hostels, staff and faculty residences, recreational spaces, community spaces, sports area, commercial spaces, administrative spaces and a hospital.

Table 3 represents a checklist of presence and absence of various sustainability indicators, compiled in section 3, along with the extent of advances done in that particular indicator for IITR campus. The basis of the checklist is the survey conducted by the authors in the IITR campus. The survey inquired about the various indicators of sustainable development on the campus and was taken up to measure the indicators and collect all the information about them. The indicators in Table 3 are not directly adapted from the comparison but developed after the in-depth study of these indicators. Some

indicators are merged from the comparison whereas some are given new names. The meaning of all these indicators is explained in the remark section of the tables.

Table 3: Checklist for Rating of IITR Campus on Parameters and Indicators Derived from Comparison

Category	Indicators	Presence	Monitoring	Remarks (What has been done related to the indicator in IITR)
1. Administration	(i). Sustainable policies	YES	NO	Policies like- Green office, Green Master Plans, Bio-diversity, Water bodies, minimizing Carbon Foot print and Green Audit. No continuous monitoring of the policies.
	(ii). Administrative committees	YES	NO	A committee comprising of a chairman, coordinator and five members. No record kept separate for sustainability achieved.
	(iii). Sustainability staff	YES	NO	No separate staff; regular staff gets engaged. No continuous monitoring of all the sustainable activities.
	(iv). Office or department	YES	NO	Irrespective of a committee, no full time office or staff; No continuous monitoring of all the sustainable activities.
	(v). Website	YES	YES	Webpage named Green Campus Initiatives is developed which is monitored regularly.
	(vi). Green purchasing	NO	-	
	(vii). Employee outreach opportunities	NO	-	
2. Academics	(i). Academic Courses	YES	YES	Sustainability related courses as a part of the curriculum.
	(ii). Immersive Experience	YES	YES	Department of Architecture and Planning offers an immersive experience in the field of sustainable development.
	(iii). Sustainability Literacy Assessment	NO	-	
	(iv). Incentive for Developing Courses	NO	-	
	(v). Academic Research	YES	YES	No separate list for sustainable researches. It could only be obtained from the comprehensive list of all researches.
3. Transportation	(i). Campus motor fleet	NO	-	Type and number of motor vehicles is known but number of trips is unknown.
	(ii). Commute modal split	YES	YES	
	(iii). Support for Sustainable Transportation	YES	YES	No data about bicycles.
	(iv). Bicycle program	YES	YES	
	(v). Car sharing program	NO	-	
	(vi). Planning	NO	-	
	(vii). Greenhouse gas emissions inventory	NO	-	
4. Climate change and energy	(iii). Energy efficiency and conservation	YES	YES	Energy audit; policies- reduce electricity consumption and energy conservation, solar PVs, solar thermal power for cooking and water heating, LED based lamps on streets; Annual saving of Electricity is 12,36,150kWh (2012)
	(iv). Renewable energy generation	YES	YES	IITR Photovoltaic Solar Power Installation. Total-1812 Peak Power Output (kW)
	(v). Renewable energy purchase	NO	-	
	(vi). Greenhouse gas emissions inventory	NO	-	
5. Food	(i). Locally grown and purchased food	YES	YES	All the food products in the hostel mess is purchased locally and a record is kept of all the purchases.
	(ii). Organic and sustainably produced food	NO	-	

6. Waste	(i). Waste minimization	NO	-	
	(ii). Waste diversion	NO	-	
	(iii). Construction And Demolition Waste Diversion	NO	-	
	(iv). Hazardous Waste Management	NO	-	
7. Water	(i). Water Use	NO	-	
	(ii). Rainwater Management	NO	-	
	(iii). Wastewater Management	NO	-	
8. Green building	(i). Design and construction	YES	NO	All old buildings are climate responsive, but these buildings are not green certified.
	(ii). Adaptive reuse	YES	YES	Different classes are held in the same room at different times.
	(iii). Operations and maintenance	YES	NO	light sensors and green rating appliances; shift to energy efficient appliances; temperature regulation of AC; use of gas based stoves, etc.; no proper monitoring is done
	(iv). Indoor Air Quality	NO	-	
9. Grounds	(i). Landscape Management	YES	NO	Built, unbuilt; paved, unpaved area; etc. is unavailable. needs to be traced from the plans.
	(ii). Biodiversity	YES	NO	Only number of trees known. No information about fauna.
10. Student involvement/ campus engagement	(i). Student Educators Program	NO	-	
	(ii). New Student Orientation	YES	NO	No in person orientation about sustainable development policies and agenda of the campus.
	(iii). Student Life	NO	-	
	(iv). Outreach Materials and Publications	YES	NO	No monitoring at all of the availability of sustainability publications
	(v). Outreach Campaign	NO	-	
	(vi). Sustainability challenges and competitions	YES	NO	Different activities like workshops, seminars and competitions are organized in the campus from time to time but are not monitored.
	(vii). Employee Educators Program	NO	-	
	(viii). Employee Orientation	NO	-	
	(ix). Staff Professional Development	NO	-	

4. DISCUSSION

As indicated by the checklist in Table 3, out of all the 46 campus sustainability indicators only 22 indicators are being implemented on the IITR Campus, out of which only 11 are measured and monitored as shown in Figure 2. This accounts for less than 50 percent of the total list. Figure 2 represents the distribution of various sustainability indicators individually on the IITR campus. As per Figure 2 most of the indicators of operational parameters are present on the campus out of which some of them are monitored constantly. This emphasizes on the fact that Indian campuses are incorporating sustainable development in their campuses. However, comprehensive sustainable development is still not achieved. Even though initiatives for sustainable campus development has started, there is lack of measurability and verification of the extent of sustainable development achieved. The absence of monitoring mechanism creates a shortfall for the use of campus sustainability rating systems. The absence of certain parameters in Indian campuses can be related to the differences in the Indian campuses as it is still a developing country and most of the rating and ranking systems are formulated in the developed countries of the world except UI. All though the indicators of sustainable development are established, the benchmarks for their assessment and measurement in Indian campuses is still missing. Identification of these problems encountered while rating campuses will help the institutions to understand what are the primary barriers in achieving complete sustainable development, address this issue and come up with a solution which will in return catalyze the sustainable growth of the campuses.

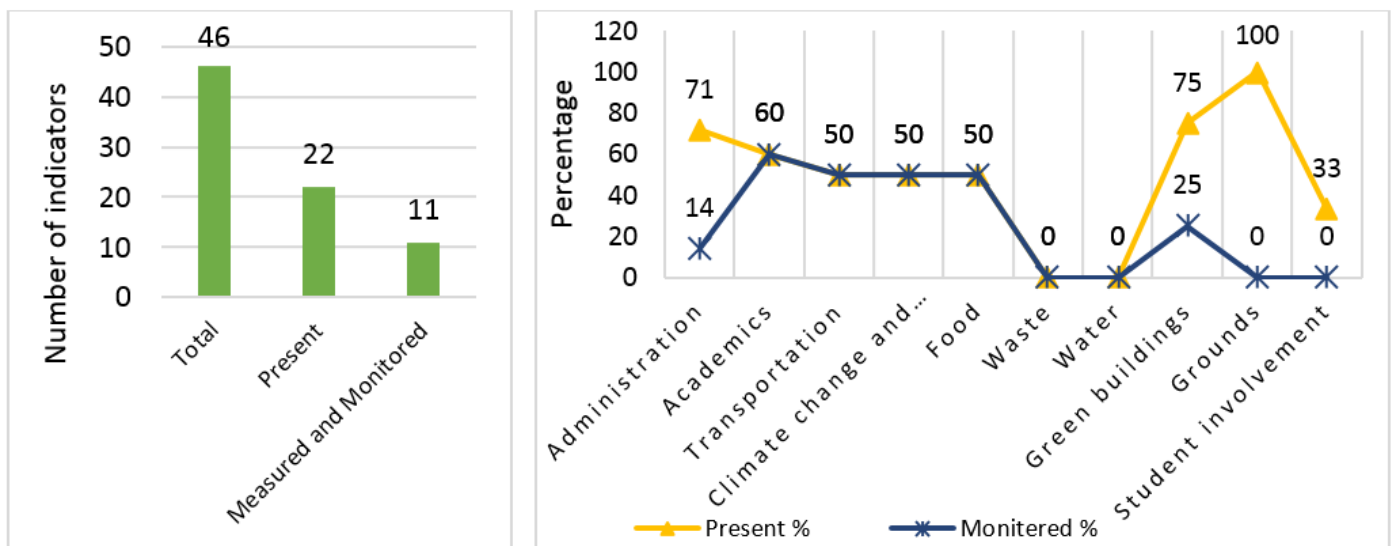


Figure 2: Graphs showing distribution of various indicators on IITR campus. (Source: Author)

5. CONCLUSIONS

The given comparison of the various campus sustainability rating and ranking systems outlines a comprehensive list of parameters and their indicators for sustainable campuses. This list is used to rate an Indian campus- IITR. However, IIT Roorkee campus still cannot be rated due to unavailability of measuring and monitoring mechanism. As IITR is a premier government Institute in India, similar will be the case of majority of Indian campuses. There are many reasons which contribute to the failure of the campus sustainability rating systems in India, majorly the following reasons enlisted below:

- All the parameters and their indicators are not considered. Only some parameters such as operations are targeted in India (Table 3, Figure 2).
- Most of the indicators which are present are not monitored, which expresses a lacuna in the monitoring and verification system to report achievement of sustainable development (Table 3, Figure 2). Measuring and monitoring of sustainability should be made mandatory in all the campuses by the government to ensure a comprehensive sustainable development.
- In the absence of a monitoring and verification system, Indian campuses could not be rated or ranked on any holistic rating or ranking system. Therefore, a special monitoring and verification system for Indian campuses should be designed.
- The inability to rate the campuses on any rating system leads to absence of information about the extent of sustainable development in Indian campuses. Thus, any benchmark cannot be defined for the Indian campuses. Since India is a developing country, its benchmark will be different from those of developed countries.

Indian campuses possess a tremendous opportunity to grow its sustainability initiative. The campuses will work in a more focused and informed way towards sustainable development if there are analysis and feedback in place to direct the overall efforts. There is a need to develop a monitoring and verification system for Indian campuses so that it helps them better determine how campuses are doing with sustainability and pinpoint areas where they can improve. And thus rate the campuses on any rating system available worldwide.

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