

Overcoming the Obstacles to Green Campus Implementation in Indonesia

Mia Wimala, Emma Akmalah, Ira Irawati, M. Rangga Sururi

Abstract—One way that has been aggressively implemented in creating a sustainable environment nowadays is through the implementation of green building concept. In order to ensure the success of its implementation, the support and initiation from educational institutions, especially higher education institutions are indispensable. This research was conducted to figure out the obstacles restraining the success of green campus implementation in Indonesia, as well as to propose strategies to overcome those obstacles. The data presented in this paper are mainly derived from interview and questionnaire distributed randomly to the staffs and students in 10 (ten) major institutions around Jakarta and West Java area. The data were further analyzed using ANOVA and SWOT analysis. According to 182 respondents, it is found that resistance to change, inadequate knowledge, information and understanding, no penalty for any environmental violation, lack of reward for green campus practices, lack of stringent regulations/laws, lack of management commitment, insufficient funds are the obstacles to the green campus movement in Indonesia. In addition, out of 6 criteria considered in UI GreenMetric World Ranking, *education* was the only criteria that had no significant difference between public and private universities in generating the green campus performance. The work concludes with recommendation of strategies to improve the implementation of green campus in the future.

Keywords—Green campus, obstacles, sustainable, higher education institutions.

I. INTRODUCTION

DESPITE the advantages that the technology and modern industry has taken the human beings to a convenience way of living, there are also some disadvantages accompanying this level of success. Environmental imbalance is one of the biggest disadvantages that gradually has posed a serious threat to all living things in this Earth in many ways. Over the decades, climate change and global warming, a form of the environmental imbalance has shown some impacts such as sea level rising, abnormal storms, hurricanes and flooding, severe heat waves, increased earthquakes, growing serious health risks, extinction of plant and animal species, just to name a few. The biggest cause of these environmental imbalances was the result of human activities in modifying the environment to fulfill their needs, and therefore, it is our responsibility to take action to minimize the imbalances [1]. The synergy among all elements of the society will determine

the success of environmental conservation and preservation efforts. Campus is no exception.

Green campus is a concept to help diminishing the impact of global warming by promoting and performing the environmentally sustainable practices in educational institutions. Aside from focusing only on educational institutions, the significant difference between the two concepts is the *education* indicator. Green campus has brought many benefits in terms of financial as well as environmental benefits [2]. Among others are energy saving, GHG emissions reduction, less operational and maintenance cost, higher productivity, improved health and safety, increased research grants and collaborations among institutions/corporates, and rising employment. With the concept of green campus, higher education institutions are expected to become a community leader in thinking the solutions of the current environmental problems [3]. Campus plays a major role as a leader to create a green community, starting by producing the intellectual and qualified human beings that will bring a great influence to the surrounding community in the future. Moreover, campus is a place to conduct research and innovation to improve the quality of the environment that is independent, with no political, business and other boundaries. The commitment of higher education institutions to sustainability is extremely important in establishing new standards, developing new approaches, as well as preparing the community to the future changes [4].

Since its establishment in the turn of the 20th century, higher education institutions in Indonesia have played a significant role in shaping and empowering the community [5]. According to Indonesian Directorate General of Higher Education – DIKTI (2016), 4,265 higher education institutes, consisted of 363 public institutes and 3,902 private institutes, with approximately 5 million students have been recognized by the Indonesian government [6]. These figures indicate that higher education institutions are potential to be included in addressing the environmental issues. Unfortunately, an increase in the number of higher education institutions in Indonesia is not offset by the increase in the number of green campus. Only 0.92% of the institutions were listed as green campuses, issued by UI GreenMetric World Ranking 2015 [7]. In order to meet the green campus development in Indonesia, this research aims to identify the obstacles encountered by the higher education institutions in the implementation of green campus and to recommend strategies to minimize those obstacles.

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II. GREEN CAMPUS IN INDONESIA

According to Director of Education and Student Affairs - DIKTI, Illah Sailah, green campus movement in Indonesia was started around nine years ago, with a special program developed by DIKTI back in 2007 to 2009 [8]. The program was running smoothly for three years. However, DIKTI has asked the campuses to keep running the green campus program without any funding from the Ministry of Research and Technology of the Republic of Indonesia. Another big approach done by the government, through Ministry of Environment of the Republic of Indonesia, were shown by appointing five public universities as pilot projects of green campus in 2013, and they are Universitas Pattimura (Unpatti), Universitas Sebelas Maret (UNS), Universitas Hasanuddin (Unhas), Universitas Cendrawasih (Uncen), and Universitas Diponegoro (Undip). The aim of this program was to integrate *Tri Dharma Perguruan Tinggi*, which is three pillars of tertiary education – higher education, research and community service in preserving and protecting the environment. In general, the government through various agencies has also issued several regulations and laws to support the sustainable development in Indonesia. Meanwhile, other supports from non-government organizations have also been increasingly emerging for the last few years, and one of them is done by the La Tofi School of Corporate Social Responsibility (CSR), which was established in early 2010. Since then, the La Tofi School of CSR, supported by Ministry of Environment of the Republic of Indonesia, Ministry of Industry of the Republic of Indonesia, and Indonesian Regional Association for Sustainable Development, has been throwing an annual *Indonesia Green Awards* program to acknowledge and appreciate the efforts made by a number of parties for their commitment, initiatives, innovations and high awareness in environmental protection and conservation. *Water Resources Reservation, Sustainable Energy Use and Development, Biodiversity Development, Pollution Prevention, and Integrated Waste Management Development* are 5 (five) criteria being considered in Indonesia Green Awards [9]. Later on, the awards are given to different categories for corporates, projects, persons, property services, provinces, cities, schools, and campuses. The La Tofi School of VSR is also active in organizing seminars and workshops on sustainable development [9].

Number of higher education institutions in Indonesia have also begun to embrace the green campus concept in various ways by themselves. Universitas Indonesia (UI) as one of the pioneers, for example, has successfully issued a UI GreenMetric - World University Ranking in April 2010, an online world ranking to portray the current campus sustainability efforts, including the programs and policies in campus all around the world. 6 (six) main categories, i.e. *Setting and Infrastructure (15%), Energy and Climate Change (21%), Waste (18%), Water (10%), Transportation (18%), and Education (18%)* are taken into account in the assessment of UI GreenMetric. It aims mainly to encourage universities in the world to look and self-assess their policies and direction in relation with the effort to combat global climate change [10].

In 2015, a total of 407 universities from 65 countries, located on the dynamic and diverse Asia, Europe, Africa, Australia, America and Oceania, have participated in this program.

Up to now, several other higher education institutions in Indonesia, both public and private, have started the green campus movement by developing the strategic plan (Renstra) which was developed to formulate the vision, mission, objectives, strategies, policies, programs and activities in accordance with sustainable development on each campus. Moreover, the institutions have also done various approaches such as green open space, solar panel for lighting system, campus public transit, bicycle-friendly access, green campus community, waste water management, sustainable topics in the curriculum, recycling center and programs, socialization of green campus practices inside and outside the campus, ecological-friendly sanitation, no-smoking area, green seminars, etc. Such approaches can be seen mostly in several campuses, i.e. Universitas Indonesia (UI), Institut Teknologi Bandung (ITB), Institut Pertanian Bogor (IPB), Institut Teknologi Sains Bandung (ITSB), Universitas Surabaya (Ubaya), Universitas Sebelas Maret (UNS), Universitas Diponegoro (Undip), just to name a few.

III. RESEARCH METHODOLOGY

The research began with literature review on concept, standards, and implementation of green campuses around the world, especially in Indonesia. To achieve the objective of this research, a set of questions for questionnaire was developed to understand the details about the green campus movement, and identify the obstacles encountered by the higher education institutions in the implementation. The questionnaire was designed into four (4) parts, namely: (1) respondent's profile, (2) general knowledge and perception about green campus, (3) green campus practices, based on criteria used by UI GreenMetric World Ranking, and (4) obstacles to green campus implementation. A 5 (five) point-Likert scale was mostly used to determine how much the respondent agree or disagree with a particular statement as elaborated in the questionnaire. The respondents targeted for this questionnaire were staffs and students in 10 (ten) major higher education institutions around Jakarta and West Java area. The institutions consisted of 4 (four) public institutions and 6 (six) private institutions. They are Universitas Indonesia, Institut Teknologi Bandung (ITB), Institut Pertanian Bogor (IPB), Politeknik Bandung (Polban), Universitas Katolik Parahyangan (Unpar), Universitas Kristen Maranatha (Maranatha), Universitas Pasundan (Unpas), Universitas Islam Bandung (Unisba), Institut Teknologi Sains Bandung (ITSB), and Institut Teknologi Nasional (Itenas).

In order to gain deeper insight and understanding of the green campus practices on each institution, semi-structured interviews were also conducted with the campus building management. All the data were then used statistically for the analysis in this research using Analysis of Variance (ANOVA) and Strengths, Weaknesses, Opportunities and Threats (SWOT). ANOVA was used to test for significant differences between public and private institutions in generating the green

campus performance, based on 6 (six) criteria of UI GreenMetric World Ranking. Meanwhile, the SWOT analysis was conducted to develop new strategies for minimizing the identified obstacles for future use.

IV. OBSTACLES TO GREEN CAMPUS IN INDONESIA

Out of the 250 questionnaires distributed, 182 completed copies were received at the end of November 2015. The respondents were divided into 36% respondents with age up to 20 years old, 50% with age from 21-30 years old, 12% with age from 31-40 years old, and the rest, with age above 40 years old. As for occupation, the majority of respondents were students with 78%, academic staffs with 5.5%, and non-academic staffs with 16.5%. The results revealed that, UI and ITB had better knowledge on green campus concept than the other institutions. However, although all of respondents are familiar with basic knowledge, less number were shown in terms of green campus practices in everyday life. The Likert scale used for this part of assessment was Very Good (81-100), Good (61-80), Fair (41-60), Poor (21-40), and Very Poor (0-20). The result for the second and third part of the questionnaire can be seen in Table I.

TABLE I
LEVEL OF KNOWLEDGE AND GREEN CAMPUS PRACTICES

Name	Basic Knowledge	Green Campus Practices					
		SI	EC	WS	WT	T	E
Public Institutions							
UI	84	79	77	79	80	76	65
IPB	71	66	71	63	79	63	50
ITB	81	77	80	79	84	68	54
Polban	66	68	42	48	72	46	49
Average	75.5	67.3					
Private Institutions							
Itenas	69	58	57	50	67	47	48
Unpas	72	71	61	57	84	40	47
Unisba	72	71	69	64	81	45	51
Unpar	68	65	64	60	88	49	49
ITSB	66	81	78	64	89	27	43
Maranatha	77	69	73	68	79	56	47
Average	70.7	61.6					

Note SI: Setting and Infrastructure, EC: Energy and Climate Change, WS: Waste, WT: Water, T: Transportation, E: Education.

In terms of green campus practices, of all criteria, UI held the first rank with an average of 76 point, followed by ITB on the second with 74. The third rank were shared between IPB and Maranatha with 65. Furthermore, the fourth rank went to ITSB and Unisba with 64. Unpar held the fifth rank with 63, and Unpas with 60 on the sixth rank. Meanwhile the seventh and the last rank were held by Itenas with 55, and Polban with 54.

As a result of the last part of the questionnaire, the obstacles encountered by the institutions during implementation can be summed up as follows (see Fig. 1):

1. **Resistance to change** was considered by 75% of the respondents to be the biggest obstacles in the implementation of green campus. Apart from the possible environmental impact resulting from the old practices, the respondents still felt reluctant to undertake the new practices which are more environmentally friendly due to low awareness. The respondents thought that practices such as separating the organic and non-organic waste, commuting by public transportation or bicycle or even walking to campus, smoking only in the designated space, bringing their own shopping bag and water bottle were still inconvenient to do.
2. **Inadequate knowledge, information and understanding** was experienced by 73% of the respondents as the second issue. Although the result from the second part of the questionnaire proved that the respondents were familiar with the green campus concept, they admitted that they still need more information about it. The respondents expressed their doubt about the benefits of green campus practices as they could not see the benefits immediately. In terms of understanding, according to the survey, most of them did not realize that the daily activities that they already did, like taking the stairs rather than using the elevator, using email and social medias rather than papers for exchanging information, reporting leaking taps and running toilets for repair, sorting wastes, and using air conditioner (AC) with the right temperature were considered as green campus practices. It shows that there is still lack of understanding from the respondents about the whole concept.
3. The third obstacle encountered by 70% of the respondents was **no penalty for any environmental violations**. In general, all the institutions merely provide an encouragement or warning, at the worst, to any violation. So far, only Universitas Indonesia that have implemented a penalty to smokers on campus. Anyone who violate the rules will be subjected to a Rp. 100,000 (approximately USD 7.5) fine. The respondents admitted that sometimes they saw other people smoking or littering on campus. However, they could only give a reminder to them mainly because no rules governing the punishment to the violators.
4. Related to the previous obstacle, **lack of reward for green campus practices** was also considered by 68% of the respondents to be another obstacle. They felt that there was no difference between those who made the efforts on supporting the green campus implementation and the wrongdoers. So far, the reward of green campus practices was only obtained in the form of recognition, i.e. an award and/or with a prize money from non-government organizations, and UI GreenMetric World Ranking. Especially for private universities, this kind of recognition was not also easy to obtain, mostly due to limited funds which further led to many unfulfilled requirements of a green campus, i.e. green open space, environmentally friendly materials, ecological sanitations, mass transportation, green building on campus, etc.
5. **Lack of stringent regulations/laws** was another obstacle according to 64% of the respondents. Up to present, no particular stringent regulations/laws for any institutions,

both public and private, regarding the green campus, and its implementation. The current regulations that are in force now in Indonesia, i.e. Ministerial Regulation of the Minister of Public Works and Public Housing No. 02/PRT/M/2015 on Green Building, and Jakarta's Government Regulation (Jakarta's Decree) No. 38 Year 2012 on Green Building, address more to green building, rather than green campus in particular. Although these regulations/laws were intended to legally bind all the parties involved in green building implementation, no enough explanation about the procedure, reward and penalty, as well as the detailed measurement of a green building in general. The same thing can be seen in the regulations issued by each institution involved in this research.

6. 63% of the respondents opined that **lack of management commitment** contributed to the slow movement of green campus in Indonesia. Although most of the institutions have expressed their commitment towards the implementation of a green campus, but in reality, it could somehow be different. For example, in some institutions, the campus management ignored the existing smoking ban regulations/laws by allowing people to do such activity without any punishment. The respondents who were composed of staffs, and mostly students also expected the management to perform acts towards effective implementation of green campus, as follow: improving the facilities and infrastructures to be more environmentally friendly, setting up the green information center, providing designated smoking spaces or even banning smoking on campus, providing more sorting waste bins, using more green products, such as ecological sanitations, eco-AC system, LED bulbs/lamps, and solar system lighting, providing fare free campus shuttles and access for bicycle and walking, placing reminders of green practices on campus area, implementing the reward and penalty system, performing regular maintenance, improving supervision, organizing and supporting events related to green campus, such as a green campus day, green community, seminars, training, etc.
7. Without a doubt, **insufficient funds** is one of the factors restraining the success of a green campus movement. It was experienced by 55% of respondents. The government has asked the higher education institutions in Indonesia to carry out the green campus practices without expecting any support from the government. In the implementation, the private institutions suffered the impact of this issue more than the public institutions. In most cases, the available funds were preferably used for educational activities. Private institutions demanded the same treatment as given by the government to several public institutions in terms of financial support.

Despite the obstacles, 85.3% of the respondents still wanted to contribute to the success of green campus movement by educating themselves through workshop, seminar, and other environmental activities. The reasons that motivated them to continue doing so were the benefits to the health and comfort

(80% of the respondents), energy saving which helps reducing the environmental impact (79.2% of the respondents), higher productivity (37.5% of the respondents), and a sense of belonging of the beloved campus (16.4% of the respondents).

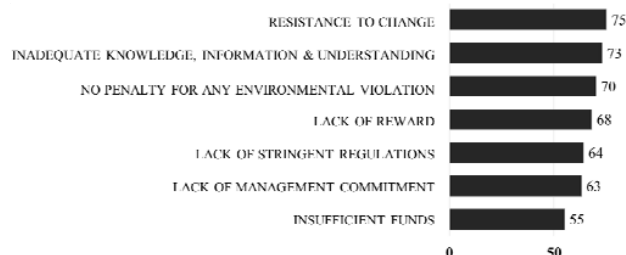


Fig. 1 Obstacles to green campus implementation in Indonesia

V. ANALYSIS AND RECOMMENDATION

According to the data shown in Table I, it can be concluded that the public institutions have performed better than the private ones in terms of knowledge and green campus practices. Based on this fact, ANOVA was further performed to see if there is any significant difference between the two types of institutions on the level of knowledge and green campus practices in generating the performance of green campus. As the result, the criterion of *education* did not produce any significant difference in the two types of institutions in generating green campus performance, whereas other criteria produced the opposite results. The existence of financial support from the government, more stringent regulations and laws, stronger commitment from the campus management, higher awareness and longer experience of the staffs and students regarding the green campus practices are some of the reasons that apply exclusively to the public institutions that may cause the higher performance.

The next analysis was carried out using SWOT analysis to identify the strengths and weaknesses (i.e. internal factors according to the respondents in each institution), and opportunities and threats from point of view of other stakeholders of green campus movement in Indonesia. Table II shows the summary of SWOT analysis based on the survey, which further used to formulate some improvement strategies towards the success of green campus movement. In this research, the recommended strategies will be developed by the management in each institution for the implementation.

The strategies are as:

1. **Upgrade comprehensive education and socialization programs to university employees and students.** It is needed to deepen the knowledge and understanding on the concept of green campus, and to raise people awareness. Various ways can be done by the management in relation to this matter, such as by incorporating sustainability issues into curriculum, establishing green community on campus, and setting up a distinctive website and information center to facilitate the dissemination of green information, organizing green campus programs in regular basis.

2. **Improve institutional commitment on goals, policies and rules, work team/organization, funds, programs, supervision, and reward and penalty scheme.**
- **Goals, policies and rules.** Based on the goals of green campus implementation in each institution, the management should establish the targets, strategic plans, as well as to set up the policies and rules to support the implementation. The criteria of green campus performance should be elaborated in detail to facilitate all the parties involved in meeting the requirements.
 - **Work team/organization.** The management should establish an effective organizational structure and team to manage and coordinate the implementation of green campus in each institution. The team preferably consists of representatives of the management, academic and non-academic staffs, and students to facilitate opinions and feedbacks for an effective implementation of green campus.
 - **Allocation funds.** Funding allocations should be planned by the management on regular basis to support the implementation of green campus programs. The management should also give the fund allocation for green campus a high priority, alongside to one for academic needs.
 - **Programs.** Green campus programs such as seminars, workshops, competitions, study tours, awareness campaigns, research grants, collaborations are some approaches that can be considered by the management.
 - **Effective Supervision.** The management should perform effective supervision on green campus implementation, based on the predetermined rules and policies. Supervision should not only be done by the management, but also by staffs and students. With effective supervision, people will be more likely to respect and abide by the rules and policies, and to continue doing the green campus practices.
 - **Reward and penalty scheme.** This reward and penalty system should be performed by the management for a successful implementation of green campus. Anyone who has made an effort will feel appreciated with the reward. It can be in any form, such as incentive, scholarship, award, recognition, or just by knowing that the deserving penalty is strictly given to any environmental violation. Moreover, the penalty can cause a sense of deterrence against offenders for future benefits.
3. **Enhance research and collaborations on sustainability issues among academic staffs, students and outsiders.** Shortage of research in Indonesia is one of the reasons to the slow green campus movement. Besides being able to raise awareness of environmental issues, research can also be used as a means to prove and expose the benefits that could be gained as results of implementing green campus approaches. Moreover, research can help the industry to further increase the presence of local products at more affordable prices.

TABLE II
STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS - SWOT

Strengths	Weaknesses
<ul style="list-style-type: none"> - Higher interest on global warming issues - Increased knowledge on the concept of 3R (reuse, reduce and recycle) - Motivation to contribute to the success of green campus movement due to benefits to health and comfort, energy saving, higher productivity and a sense of belonging of the beloved campus - Enthusiasm on educating themselves through workshop, seminar, and other environmental activities 	<ul style="list-style-type: none"> - Resistance to change - Inadequate knowledge, information and understanding - Lack of awareness - No penalty for any violations - Lack of reward - Lack of stringent regulations/laws, and no particular ones for green campus - Lack of management commitment - Insufficient funds - Lack of research regarding the environment and/or green campus conducted by the lecturers and students - Inadequate facilities and infrastructures associated with the concept of green campus. - Lack of socialization approaches
Opportunities	Threats
<ul style="list-style-type: none"> - Rising energy price - Changes in the needs of students and staffs regarding healthier and more productive life (growing demand of green campus) - The commitment by the government in addressing the environmental problem - The presence of regulations/laws supporting the green campus practices - Increased public awareness and concern for the environment - Support from the public, non-government organizations, and media to combat the global warming. - No differences in the educational aspects between public and private institutes in generating the green campus performance 	<ul style="list-style-type: none"> - Increased competition among universities in creating an environmentally friendly campus. - Entry of foreign competitors in local construction industry - Indonesian commitment to reduce the CO₂ emission by 26% in 2020 - High price of green products - Differences green practices conducted between public and private universities, in terms of setting and infrastructure, energy and climate change, water, waste, and transportation criteria.

VI. CONCLUSIONS

The findings revealed that the obstacles to green campus implementation in Indonesia can be classified into two types of obstacles. The first one is the obstacles that came from the users themselves, and the second is the obstacles generated due to the role of the management. Therefore, in this case, all parties involved in green campus implementation, i.e. management, staff, and students play a vital role. The staffs and students are encouraged to actively involve in green campus programs inside and outside their own campus to reduce the negligence and raise awareness on environmental issues. On the other hand, full supports should also be provided by the management in order to achieve the successful implementation of green campus. As a main result of this research, the strategies recommended to the management are by increasing education and socialization programs to staffs and students of each institution, improving institutional commitment, as well as increasing research and collaborations related to environmental issues. In the end, only with the synergy of efforts of all parties, the successful implementation of a green campus in Indonesia will be achieved.

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