

Identifying Sustainability Assessment Elements: The Case Study of Campus Sustainability Assessment Elements for Universiti Kebangsaan Malaysia

Mengenal pasti Unsur Penilaian Kelestarian: Kajian Kes Kampus Universiti Kebangsaan Malaysia dalam Menilai Elemen Kelestarian

ZUHAIK FIKRI FADZIL, HALIMATON SAADIAH HASHIM, ADI IRFAN CHE ANI & SARAH AZIZ

ABSTRACT

Sustainability Assessment Frameworks for any area must be unique to its characteristics. This study identifies campus sustainability assessment (CSA) elements for Universiti Kebangsaan Malaysia (UKM) or National University of Malaysia by examining established CSA frameworks, then adopting, and adapting suitable elements, thus avoiding starting from zero. The study explores CSA approaches and frameworks and then narrowed down to two approaches which are most comprehensive, namely the Campus Sustainability Assessment Framework (CSAF) and the Sustainability Tracking and Assessment Rating System (STARS). The study examines key aspects and elements in these frameworks, and then identifies relevant elements for the UKM CSA framework. This study finds that CSAF and STARS are most comprehensive and suitable. Their dimensions and aspects are different from UKM's but their elements can match the Sustainable UKM Programme, thus suitable to be adopted and adapted by UKM. CSAF and STARS do not focus much on physical development as key aspects and elements. This is different from the UKM programme which gives a stronger focus on physical development. However most of the CSAF's and STARS' assessment elements are suitable for UKM. Using CSAF and STARS as a base for developing UKM's sustainability assessment framework is regarded as appropriate as they are the most comprehensive methods and hence avoid starting from zero.

Keywords: Sustainable campus; sustainability; benchmarking; sustainability assessment; campus sustainability assessment

ABSTRAK

Rangka kerja Penilaian Kelestarian untuk mana-mana bidang haruslah bersesuaian dengan ciri-cirinya yang unik. Kajian ini mengenal pasti unsur-unsur Penilaian Kelestarian Kampus (PKK) untuk Universiti Kebangsaan Malaysia (UKM) dengan menyemak rangka kerja PKK, lalu menerima pakai serta menyesuaikan unsur-unsur yang sesuai agar tidak perlu dihasilkan dari mula. Kajian ini meneroka pendekatan rangka kerja PKK dan diperhalusi kepada dua pendekatan yang paling komprehensif iaitu Rangka Kerja Penilaian Kelestarian Kampus (RPKK) dan Sistem Penarafan Pengesanan dan Penilaian Kelestarian (SPPPK). Kajian ini mengkaji aspek dan unsur utama dalam rangka kerja ini dan mengenal pasti unsur yang relevan untuk rangka kerja PKK UKM. Kajian ini mendapati bahawa RPKK dan SPPPK merupakan pendekatan yang paling komprehensif dan sesuai. Dimensi dan aspek kedua-dua pendekatan ini berbeza daripada UKM tetapi unsur-unsur yang digunakan boleh menyamai Program UKM Lestari. Oleh itu, program ini sesuai untuk diterima pakai dan disesuaikan oleh pihak UKM. RPKK dan SPPPK kurang tertumpu kepada pembangunan fizikal sebagai aspek dan unsur utama berbanding dengan program UKM. Walau bagaimanapun, kebanyakan unsur penilaian RPKK dan SPPPK adalah sesuai untuk UKM. Pelaksanaan RPKK dan SPPPK sebagai asas untuk membangunkan rangka kerja penilaian kelestarian UKM dianggap sesuai kerana menggunakan kaedah yang paling komprehensif dan tidak perlu dihasilkan dari mula.

Kata Kunci: Kampus lestari; kelestarian; penanda aras; penilaian kelestarian; penilaian kelestarian kampus

INTRODUCTION

Sustainability assessment is described as a process in which implications of initiatives for sustainable development, which can include policies, plans, programmes, projects, part of the law, or activities and practices are assessed (Pope et al. 2004). Sustainability indicators will help initiatives to

be quantitatively and qualitatively evaluated. The application of the concept and implementation of sustainable development is in the activity to be supported by an appropriate performance assessment system. The established assessment system will be able to monitor, evaluate and report performances of the objectives set (IISD 1992). Sustainability assessment can be done for countries, regions, states,

cities, universities or planning and development documents. Sustainability assessment of urban or rural areas use different elements and indicators and their performances will provide indications of the level of sustainability of the targeted areas, to determine next courses of actions.

Chapter 40 of Agenda 21 (Information for Decision-Making) includes aspects of information and decision-making processes which emphasize on sustainable development indicators to be the basis of decision-making at all levels (UNCED 1993). It recommends that efforts should be made by each country to implement the monitoring of environmental initiatives and progress towards sustainable development (Pring 2000). However, the Brundtland report (WCED 1987) which developed the sustainable development concept does not provide any plan of action to any country or sector to implement it. Therefore, a good understanding of the concept of sustainable development must be explored by each country, city or university campus, according to its own situation. This paper presents the procedure of identifying sustainability assessment indicators for Universiti Kebangsaan Campus at Bangi, an example of an approach that can be undertaken in a 'short cut' manner.

As a source of knowledge and research institution, universities around the world must implement sustainable development in the management of its campuses. The university campus is to become a sustainable development entity that can serve as a guide for its own community development and also as a model to their counterparts and local communities, as well as other global communities. Various initiatives have been implemented by local or international university campuses as evidence of support for sustainable development. The most significant initiative is the Talloires Declaration initiative that was to promote the concept of sustainability in teaching, research, operations and outreach at colleges and universities. The University Leaders for a Sustainable Future (ULSF) is the secretariat responsible for the success of this declaration which contributes towards the establishment of sustainable campuses all over the world. By May 2012, over 440 universities had signed this declaration to apply the idea of sustainability in their university systems (ULSF 2012).

Universities are much guided by the Sustainable Development Action Plan for the Implementation of Sustainable Development, or Agenda 21. Chapter

36, in particular, entitled Promoting Education, Public Awareness and Training, promotes education towards sustainable development and increases public awareness of sustainability (UNESCO 2007). The United Nations Educational, Scientific and Cultural Organization (UNESCO) has also played an important role by establishing the United Nations Decade of Education for Sustainable Development (2005-2014) which seeks to emphasize the aspect of education to implement the concept of sustainable development in society (UNESCO 2007).

Malaysia is not far behind in the adoption of sustainable development in its campuses. Universiti Kebangsaan Malaysia (UKM) for example, as one of the research universities in Malaysia, has implemented several initiatives. Foremost was the establishment of the Institute for Environment and Development (commonly known as *LESTARI* which is the Malay word for sustainability) on October 1, 1994, only two years after the Rio Summit in Rio. *LESTARI* conducts research and training activities in the field of sustainability science, environmental sciences and governance for sustainable development. A major breakthrough by UKM in its transition towards a sustainable campus is the launch of the Sustainable UKM Charter and the UKM Sustainability Programme in 2007. The programme began with research activities by three research groups, namely the Sustainable Community Research Group, the Sustainable Ecosystem Management Group and the Sustainable Physical Development Research Group (earlier known as the Sustainable Design Research Group). The three research groups are coordinated by the Sustainable Campus Research Cluster, thus making the sustainability research programme more coordinated and integrated. Beside academic research, the three groups also promote sustainable development practices through capacity building activities for awareness raising and knowledge dissemination of sustainable development practices.

CAMPUS SUSTAINABILITY ASSESSMENT

In its transition towards being a sustainable campus by 2020, UKM needs a campus sustainability plan that is based on current information and status. Information on the sustainability status of the campus can provide the basis and impetus for the improvement of the campus. Based on literature review, the researchers find that

none of the world bodies set and coordinate the implementation aspects and elements of a campus sustainability assessment framework to be used by each campus. UKM is currently developing a campus sustainability assessment framework for its campus. Sustainability assessment that is focused on land use, building design assessment and water management assessment have been developed, but a comprehensive assessment of the campus is still under construction. If there is a campus sustainability assessment framework as a whole, with complete information on its current campus sustainability, then UKM's goal of having a sustainable campus is nearer.

UKM's current study, conducted as part of a bigger research by its Sustainable Community Research Group, aims to develop an approach and framework for sustainability assessment of its campus. Sustainability assessment is needed to form the basis for mainstreaming the interdependence of economic, social and environmental concerns into policy, planning, legislation and projects, in order to complement and extend sustainable decision-making in the campus as a whole (Cole 2003b).

Shriberg (2002) states that each campus needs to develop and assess its own methods and then compare their work with other institutions to find out whether or not they are moving in the right direction. Institutions that wish to achieve environmental sustainability should have a mechanism to monitor the progress of campus sustainability. Cole (2003a) and Shriberg (2002) outlined several key criteria for campus sustainability assessment indicators which are; i) based on real-time data that are available and accessible; ii) can be calculated and compared; iii) identification of key issues in the campus environment; iv) relevant to consumers, decision-makers and take into account local and global sustainability challenges; v) easy to understand by the university and community; vi) take into account factors of time and geography; vii- have a clear goal; and viii- reflect the ability to perform changes in the university.

Twenty-four campus sustainability assessment approaches that fit these indicators have been developed (Cole 2003a; Saadatian et al. 2011; Shriberg 2002) They are; i) An environmental audit in University California Los Angeles Approach (1988); ii) Campus Ecology (1993); iii) Greening Campuses (1996); iv) Environmental Workbook and Report (1998); v) Grey Pinstripes with Green Ties (1998); vi) Environmental performance survey

(1999); vii) Higher Education 21's Sustainability Indicators (1999); viii) Maclean's Annual Magazine Guide to Canadian University Approach (1999); ix) Sustainability Assessment Questionnaire (SAQ) (1999); x) EMS Self-Assessment (2000); xi) Penn State Indicators Report Approach (2000); xii) Alternatives Missing Pieces Reports I, II, III Approach (2000); xiii) National Wildlife Federation's State of the Campus Environment (2001); xiv) Campus Sustainability Selected Indicators Snapshot and Guide (2001); xv) Draft List of Environmental Performance Indicators Approach (2001); xvi) Campus Sustainability Assessment Review Project (CSARP) (2001); xvii) Good Company's Sustainable Pathways Toolkit (2002); xviii) An Environmental Assessment Method for Community (2002); xix) Campus Sustainability Assessment Framework (CSAF) (2003); xx) Knowledge for Sustainable Development Assessment in McGill (2005); xxi) Sustainability Assessment Framework for Waterloo University (2005); xxii) Multi-Criteria Analysis (MCA): A Tool for Sustainability Approach (2007); xxiii) Auditing instrument for sustainability in higher education (AISHE) (2008); xxiv) Sustainability Tracking and Assessment Rating Systems (2010).

Saadatian et al. (2011) conducted a detailed study to identify strengths and weaknesses of several approaches in the context of sustainability assessment in higher-education institutions. The techniques used are archival research, content analysis and interviews. Through archival research technique which looked at literature between (1998- 2010), 17 frameworks of comprehensive campus sustainability assessments across the world were identified. Next, content analysis was carried out on these frameworks. The main criteria for the assessment of the sustainability assessment frameworks were; i) A comprehensive approach; ii) A popular approach; iii) Novelty; iv) Comply with the theory of Triple Bottom Line (TBL), and v) Avoid a subjective evaluation. Next the interview technique was used to confirm the initial findings from the two techniques.

Saadatian et al. (2011) concluded that the Sustainability Tracking Assessment and Rating Systems (STARS) and the Campus Sustainability Assessment Framework (CSAF) reached the highest position in which the elements of concern in campus sustainability assessment frameworks are more comprehensive than in other approaches. The method used is acknowledged as sound in scientific research and studies, and the results could be adopted as the

basis for the beginning in the development of UKM's campus sustainability assessment framework. As a result, this study's researchers consider it desirable to carry out further research to examine key aspects and elements outlined by CSAF and STARS to develop an appropriate campus sustainability assessment framework for UKM.

MATERIALS AND METHOD

The UKM study encompasses four processes that begin with a literature review on campus sustainability and campus sustainability assessment approaches, followed by content analysis of CSAF and STARS. Having found and verified that the CSAF and STARS are two of the most comprehensive approaches, this study examines the key aspects and elements in the CSAF and STARS frameworks, and the last process is the selection of relevant CSAF and STARS elements for possible identification and integration in the UKM campus sustainability assessment framework.

This stage of the UKM study does not select and integrate indicators, sub-elements and criteria. These are done in a later stage. The identification, matching and integration exercise of elements is conducted by analyzing and comparing the Sustainable UKM Programme with the CSAF and STARS frameworks. The objective is to look for the most appropriate elements of the CSAF and STARS that could be selected and integrated within the Sustainable UKM Programme. The researchers take the approach that the adoption and adaption of CSAF and STARS aspects and elements for the Sustainable UKM Programme will produce an effective basis for the most comprehensive assessment. When used properly, these elements will be an effective basis for a most comprehensive campus sustainability assessment for UKM.

CAMPUS SUSTAINABILITY ASSESSMENT FRAMEWORK (CSAF)

CSAF is the product of a Masters' thesis by Lindsay Cole and the work of 15 co-researchers who are experts in campus sustainability, and more than 130 others who helped out with advice, input and ideas along the way (Cole 2003b). The Sierra Youth Organization Coalition (SYC) is the body responsible for coordinating the CSAF. SYC is a Non-Governmental Organisation (NGO) in Canada with the aim of striving towards sustainable ecological and social prosperity. Through grassroots initiatives, SYC empowers the community to take a variety of solutions-based approaches that encourage simple lifestyle, sustainable communities and education for sustainability (ULSF 2012).

The CSAF has two-dimensional sub-systems: the human dimension and the ecosystem dimension. This is a good division as a good ecosystem can affect the human system to do well. In each sub-system or dimension, there are five aspects that represent the key issues identified in campus sustainability. The ecosystem dimension contains five aspects: air, water, land, materials, and energy. The human dimension also contains five aspects: knowledge, community, economy and wealth, governance, and health and wellness. These aspects are further broken down into elements and sub elements to achieve the level of indicators of a sustainable campus. In short, the CSAF campus sustainability assessment framework outlines two dimensions (human system and ecosystem), 10 aspects, 32 elements and 33 sub-elements. It is shown in Figure 1 as here.

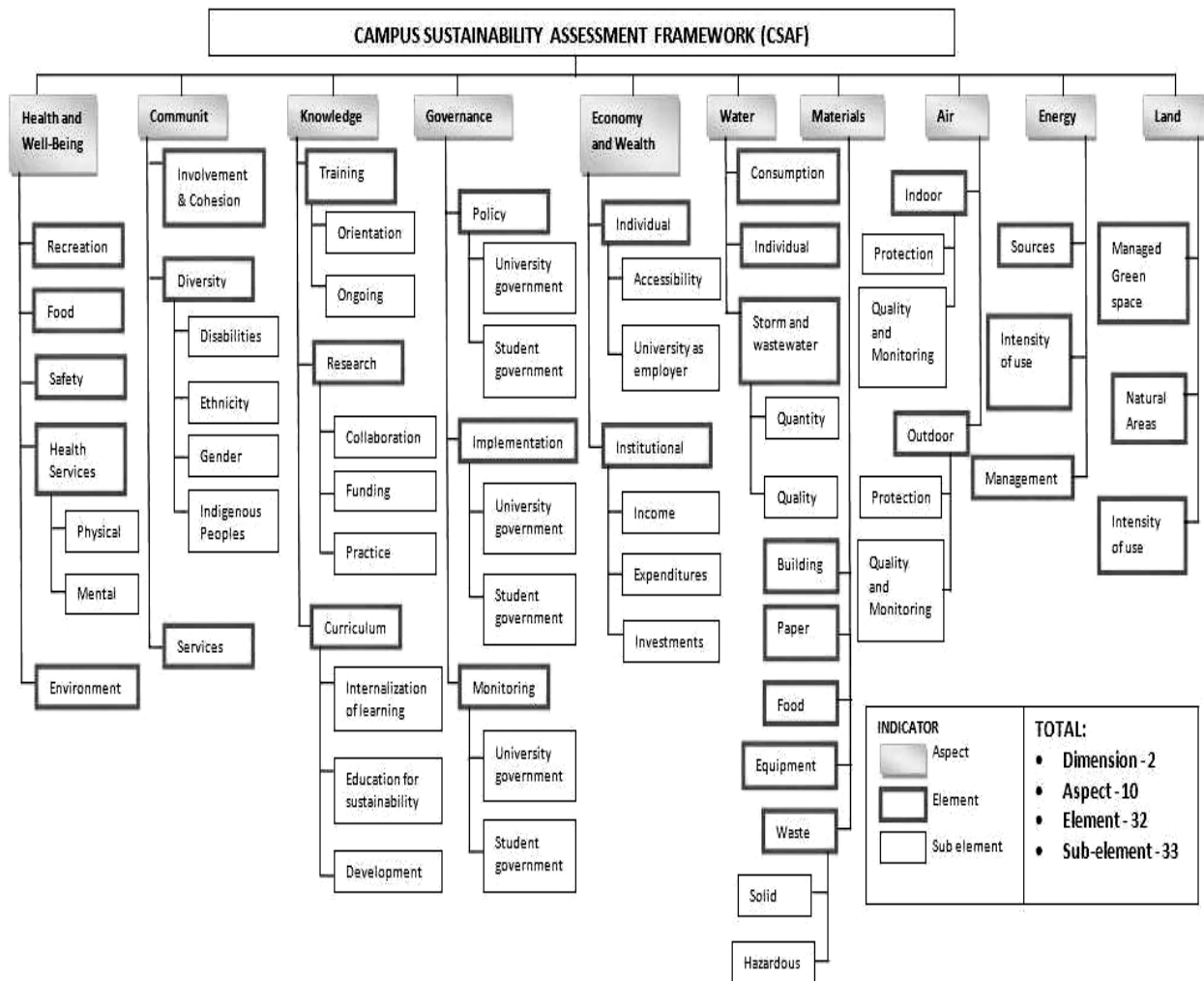


FIGURE 1. CSAF Sustainability Assessment Framework

**SUSTAINABILITY TRACKING,
ASSESSMENT AND RATING SYSTEM
(STARS)**

STARS was established in 2006 as a project coordinated by The Association for the Advancement of Sustainability in Higher Education (AASHE). AASHE is an association of colleges and universities in the United States and Canada which seek to build a sustainable future. STARS is a self-reporting framework for recognizing and acknowledging a university or college’s performance in sustainability. Its mission is to promote sustainability in higher

education institutions in various sectors, from governance and operations to curriculum and outreach, through education, communication, research and professional development (AASHE 2011). The STARS framework outlines three main categories which are; i) Education and research; ii) Operations; and iii) Planning, administration and communication. It has 17 credits and 65 criteria which are used to assess the campus level of sustainability (see Figure 2). It is noted that the criteria are similar to the elements used in CSAF and hence taken as such in this study.

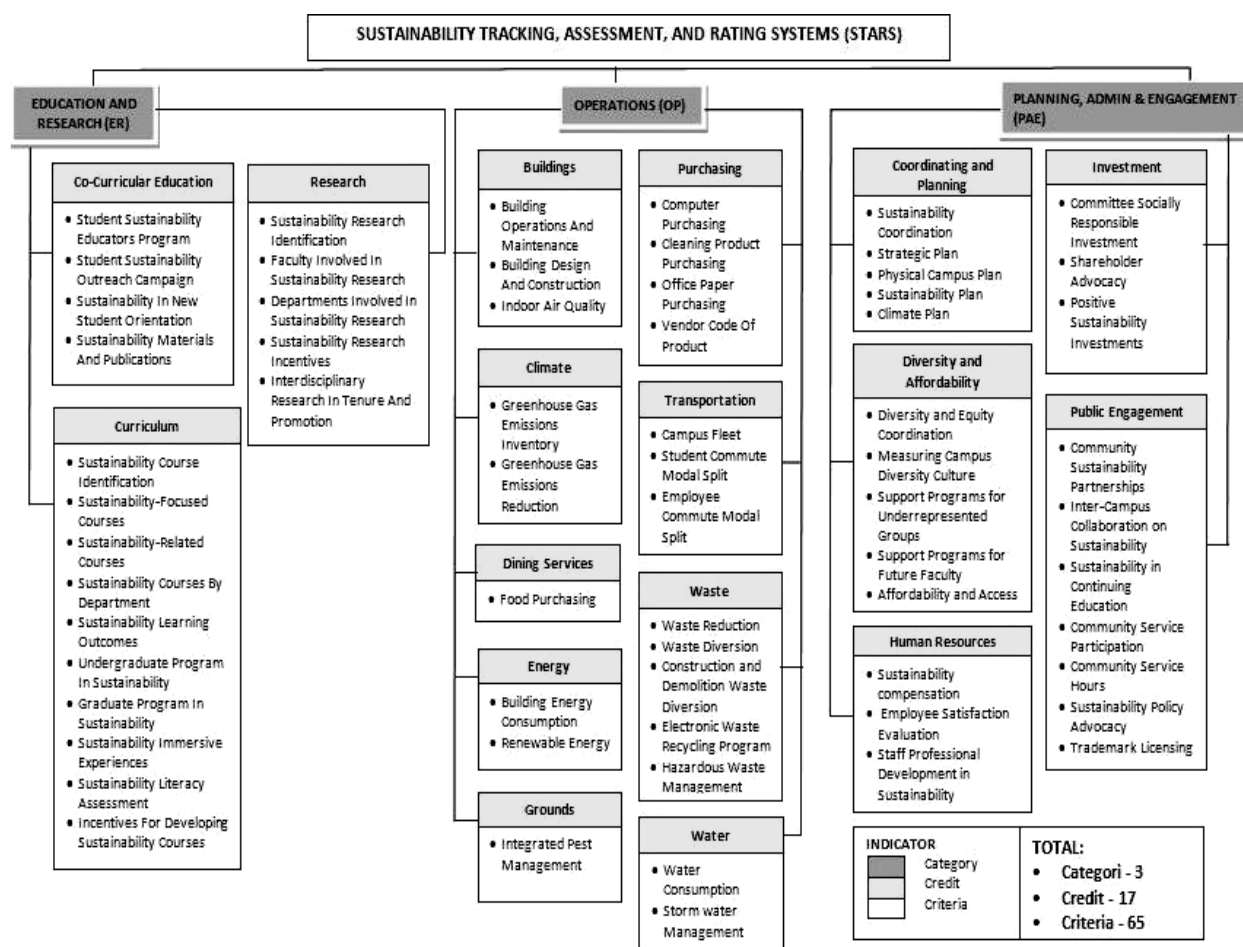


FIGURE 2. STARS Sustainability Assessment Framework

SUSTAINABLE UKM PROGRAMME

UKM's efforts towards sustainable development is further strengthened by the establishment of the *Sustainable UKM Programme*. The Sustainable UKM programme was launched on June 21, 2007. The establishment of *the programme* aims to coordinate research and activities for sustainable development by faculties, institutes and departments at the university. The programme also aims to serve as a model for other institutions in line with the UKM's

motto, 'Sustainable UKM for Malaysia and the World'. To implement this programme smoothly and effectively, the Sustainable Campus Research Cluster was established in 2008, dividing the tasks into three main research groups: the Sustainable Community Research Group, the Sustainable Ecosystem Management Research Group and the Sustainable Physical Development Research Group. Figure 3 shows the research areas under the programme.

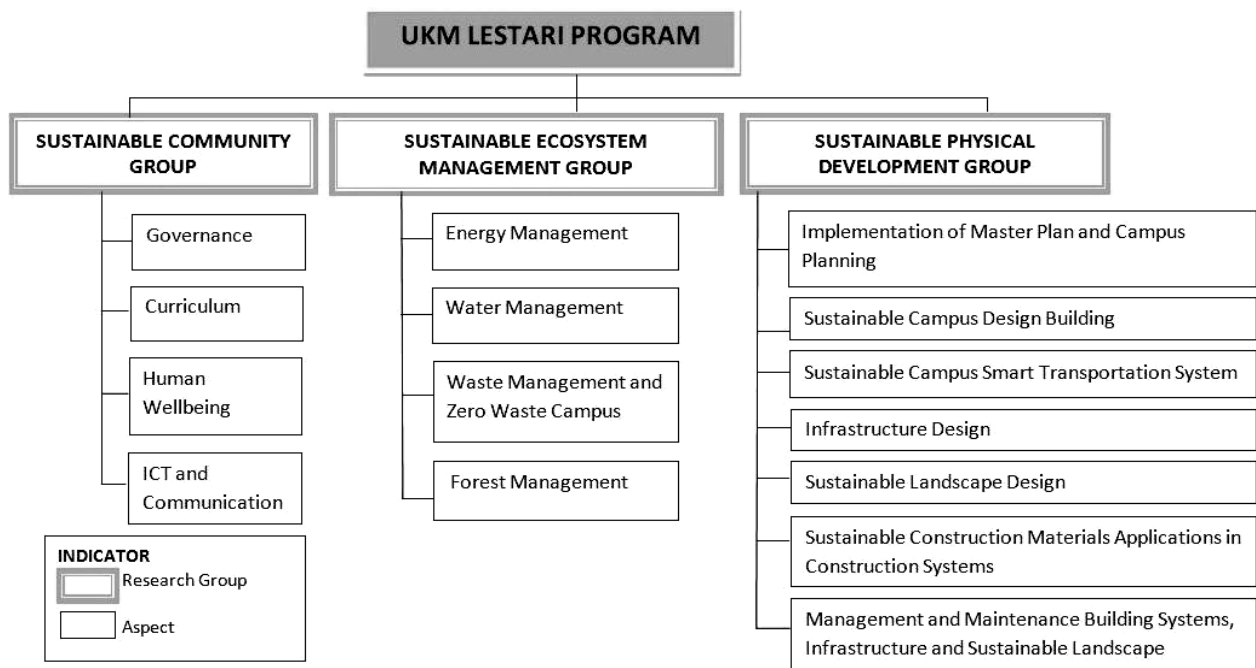


FIGURE 3. Main Aspects of UKM’s Sustainable Campus Research Programme

RESULTS AND DISCUSSION

UKM plans to develop its campus sustainability assessment framework built on the Sustainable UKM Programme. A comparison of the UKM programme, CSAF and STARS discover that the aspects and elements of the the latters are comparable with those of UKMs and therefore can be adopted and adapted. Sustainability assessment elements from CSAF and credits from STARS frameworks are assessed and selected in terms of their suitability to be placed under the main aspects of the Sustainable UKM Programme. The integrated results are shown in Figure 4. The result shows that CSAF and STARS do not include much focus on physical development or the construction industry as major elements of assessment. Some aspects of Sustainable UKM Programme are not positioned as aspects or key elements in the CSAF and STARS, such as communication and ICT, infrastructure design and building a sustainable campus. It is also found in general, the CSAF and STARS elements tend to have more aspects of communities and ecosystems than on physical development.

Efforts and measures taken by UKM in identifying and integrating sustainability assessment elements from CSAF and STARS within its sustainable development research programmed can be considered as an intelligent and efficient move because it avoids the unnecessary task of reinventing the wheel to

identify its elements from zero. The research aspects are retained while the appropriate assessment elements are integrated under them. These research groups will continue to provide the framework for UKM’s campus sustainability assessment as a whole. Responsible stakeholders would be identified to determine indicators and other techniques that would be part of UKM’s Campus Sustainability Assessment Framework. UKM itself needs to select its own methods and then compare its work with other institutions to find out whether or not it is moving in the right direction. This is in line with the principle that institutions that aim to develop its own environmental sustainability expert should have a mechanism to monitor the progress of its campus sustainability (Shriberg 2002). The selection and integration of sustainability assessment elements into the Sustainable UKM Programme will be the basis for the development of a campus sustainability assessment framework for UKM. It is to provide the impetus for stakeholders to act on the right track for the future. This study tries unlocking the approach taken by the CSAF and STARS as a preliminary study to develop a campus sustainability assessment framework for UKM.

The analysis shows that CSAF and STARS emphasize more on community and ecosystem components than on physical development. This could be due to the fact that most physical

development components are already assessed by measuring instruments such as Leadership in Energy and Environmental Design (LEED). Thus, physical development is seen to be less important to be considered as the main component in the CSAF and STARS. Two main aspects are outlined in CSAF: Natural systems and Human systems. Three main aspects are outlined in STARS: i) Research and learning, ii) Operation, and iii) Planning, management and communication. The situation is different with the Sustainable UKM Programme which has placed physical development as the key aspect beside other aspects of community and ecosystem. These three aspects are deemed appropriate for UKM since they include aspects on skills, needs and environment of the UKM campus at this time.

Figure 4 shows that more elements from CSAF and STARS are identified under the Sustainable Community Group and the Sustainable Ecosystems Group, compared to the Sustainable Physical Development Group. Elements of CSAF and STARS show higher commitment to aspects of ecosystem and community on campus. However the lack of elements that are related to physical development does not mean

that CSAF and STARS do not emphasize on physical development. With rapid physical development that has been carried out before the emergence of sustainable development concept, the development in developed countries like Europe is said to have reached the maximum level. However, to a smaller extent it is rather accurate to say that European countries have achieved the development levels of developed countries that emphasize less on physical development. Instead of the exploitation of nature and forest resources with rapid physical construction, developed countries tend to think more about the importance of conserving the environment and for sustainable development. Therefore in developed countries more focus is given to the welfare of the community and ecosystem. In contrast in Malaysia which is classified as a developing country, aspects of physical development are still prominent, in line with the requirements of rapid urbanization and development which is taken to be indicative of the progress of a country. That could explain the importance of physical development being attached to campus development.

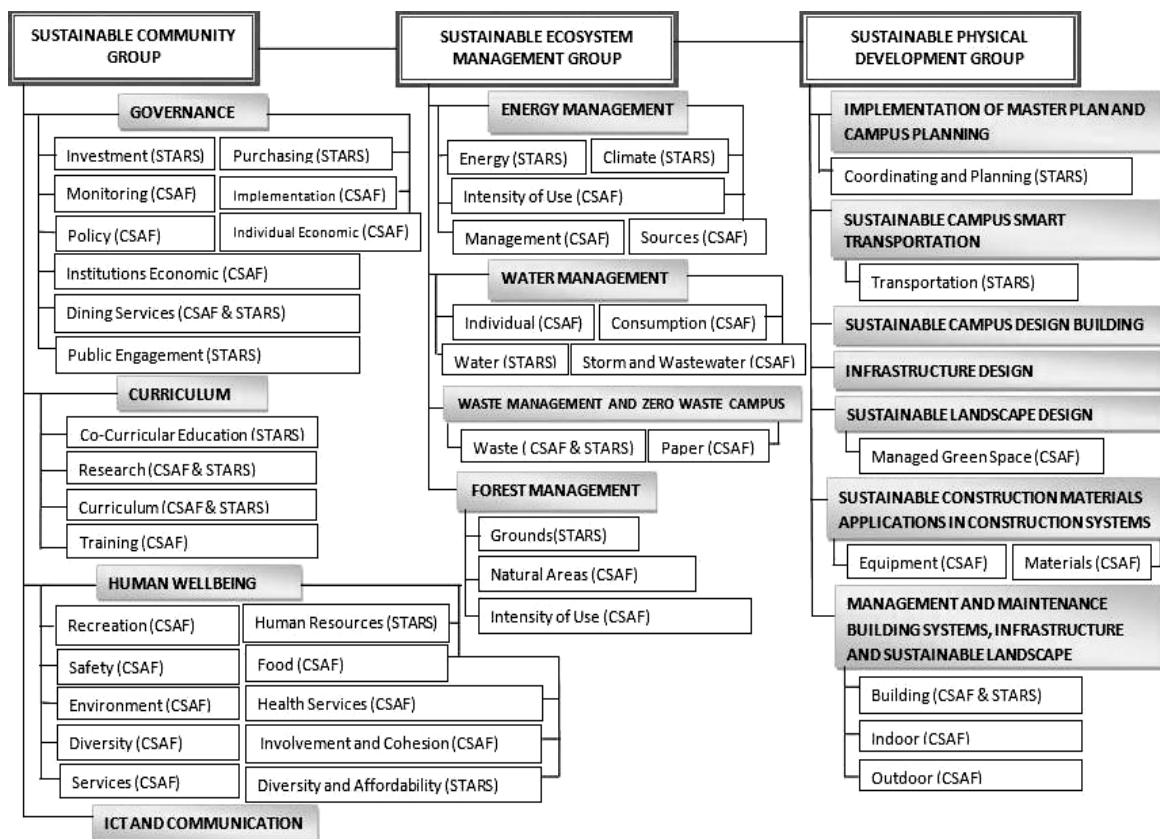


FIGURE 4. Elements from CSAF and STARS placed under aspects of the Sustainable UKM Programme

CONCLUSION

The Sustainable UKM Programme initiatives that are unique to UKM are appropriate for the UKM campus environment. Nevertheless, the CSAF and STARS sustainability assessment approaches can be used as basis and guides for the development of UKM's campus sustainability assessment framework. Although the elements outlined in the CSAF and STARS frameworks do not overlap entirely with the aspects outlined in the Sustainable UKM Programme, efforts towards sustainability go hand in hand but in a different way. The main priority is an ongoing effort to meet sustainable development objectives and how each university campus as a whole is responsible for ensuring sustainable development in its own way. Campus sustainability frameworks at the global level need to be adapted, not just adopted, according to local contexts and values of the campus and local communities.

Further work on the development of UKM's campus sustainability assessment framework that is adapted to the needs and sustainability principles that are specific to UKM is needed. Stakeholder input through consultation activities in the selection of elements, measurements and indicators will ensure that the campus sustainability assessment framework of UKM is a practical and effective one.

To chart the way forward towards sustainable development, cities, regions and countries have to perform sustainability assessment. Different approaches can be used, depending on their characteristics, targets and indicators. This case of the UKM campus sustainability assessment is only an example that is suitable for its area.

ACKNOWLEDGEMENT

The authors would like to thank the Sustainable Development and Regional Development: Transition towards a Sustainable Campus (UKM-AP-PLW-04-2009/1) and UKM Sustainable Community

Research Group (OUP-2012-059) for sponsoring this research.

REFERENCES

- AASHE (Auditing instrument for sustainability in higher education). 2011. *STARS Technical Framework version 1.1*. Administrative Update One. Association for the Advancement of Sustainability in Higher Education AASHE XI.
- Cole, L. 2003a. Assessing Sustainability on Canadian University Campuses: Development of a Campus Sustainability Assessment Framework. MA Thesis, Environment and Management. Canada: Royal Roads University.
- Cole, L. 2003b. *Campus Sustainability Assessment Framework (CSAF) appendix v*. Royal Roads University Canada.
- IISD. 1992. *Business Strategy for Sustainable Development: Leadership and Accountability for the 90's*. Winnipeg: International Institute for Sustainable Development.
- Pope, J., Anadale, D. and Morrison-Saunders, A. 2004. Conceptualizing sustainability assessment, *Journal of Environmental Impact Assessment Review* 24: 595–616.
- Pring, G.W. 2000. *International Law and Mineral Resources*. A series papers prepared for the United Nations Conference on Trade and Development (UNCTAD), Geneva: UNCTAD.
- Saadatian, O., Kamariah, D., Elias, S. and Osman, M.T. 2011. Identifying strength and weakness of sustainable higher educational assessment approaches, *International Journal of Business and Social Science* 2(3): 137-146.
- Shriberg, M. 2002. Institutional assessment tools for sustainability in higher education: strengths, weaknesses, and implications for practice and theory, *Journal of Higher Education Policy* 15: 153-167.
- ULSF (University Leaders for a Sustainable Future). 2012. *The Talloires Declaration: 10 point action plan*. Retrieved July 20, 2012, from <http://www.ulsf.org/pdf/TD.pdf>
- UNCED (United Nations Conference on Environment and Development). 1993. *Agenda 21: The United Nations Program of Action from Rio*, New York: United Nations Conference on Environment and Development.
- UNESCO (United Nations Educational Scientific and Culture Organization). 2007. *The UN Decade of Education for Sustainable Development (DESD 2005-2014): The First Two Years*. Retrieved July 20, 2012, from <http://unesdoc.unesco.org/images/0015/001540/154093e.pdf>
- WCED (World Commission on Environment and Development). 1987. *Brundtland Report*. Retrieved August 14, 2010, from <http://www.un.org/documents/ga/res/42/ares42-187.htm>

Zuhair Fikri Fadzil
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-mail: zuhairfikri@gmail.com

Halimaton Saadiah Hashim
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-mail: drhalimoton@gmail.com

Sarah Aziz
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-mail: saziz@ukm.edu.my

Adi Irfan Che Ani
Faculty of Engineering and Built Environment (FKAB)
Universiti Kebangsaan Malaysia
E-mail: adiirfan@ukm.edu.my

Received: 01 August 2015
Accepted: 04 March 2016