

# Challenges of Introducing Sustainability in Curricula of the Built Environment Courses in Developing Countries: Evidence from Tanzania

S.M. KONGELA\*

---

## ABSTRACT

Comprehensive sustainability education is paramount for success in the adoption of sustainable practices in the built environment. It is however a fact that sustainability education is generally accorded marginal importance in the curricula of higher learning institutions in the developing countries. Drawing evidence from Tanzania, this study looks at the challenges of introducing sustainability aspects in the curricula of the built environment courses offered by higher learning institutions. The study entailed a critical review of curricula of the various higher learning institutions offering courses in the built environment discipline. In addition, a questionnaire was administered to some researchers and heads of selected academic units of the higher learning institutions. The findings reveal that, sustainability education in Tanzania is more popular with courses related to natural resource management and agriculture, rather than those related to the built environment. There are no higher learning institutions which offer courses with comprehensive treatment of sustainability aspects in buildings. With the present curricula, it is clear that students in the built environment courses complete their studies without the necessary knowledge of sustainability. Lack of commanding knowledge and skills on contemporary sustainability aspects in buildings amongst academicians, lack of reading and teaching materials, bureaucratic curricula review process, misconceptions of sustainability concepts and budgetary constraints are some of the main reasons noted to be posing a challenge in incorporating sustainability in the built environment courses curricula. Lack of coordination between experts in different components of sustainability between and within institutions is another main reason for not incorporating sustainability in the curricula. Identification of the key aspects to be included in the curricula which fit the Tanzanian settings and which emanate from within and across disciplines is a prerequisite to the success of education for sustainability in the built environment.

**Key words:** Sustainability education, built environment, higher learning institutions curricula

---

## INTRODUCTION

Sustainability in the built environment is a way of building which aims at reducing negative environmental impacts caused by the construction process or by buildings (du Plessis, 2005). Sustainability considers three spheres namely: environmental, social, and economic issues (CIB, 1999; Brundtland, 1987; Glavic, 2006). Comprehensive sustainability education is paramount for success in the adoption of sustainable practices in the built environment. To enhance sustainability practices many authors insist on

mainstreaming sustainability aspects in the university curricula (UNEP, 2007; Everett, 2008; Hayles and Holdsworth, 2008; Jucker, 2002; Tinkler and Burt, 2004; Chen and Jones, 2008; Stephens *et al.*, 2008; de Rebello, 2003; Malhadas, 2003; Otieno, 2005; Wright, 2004; Wright, 2002; Anderberg, 2009; Mata and Siege, 2009). However, there are many challenges facing institutions of higher learning institutions in developing countries in mainstreaming sustainability in their curricula. This study investigates challenges of incorporating sustainability aspects in curricula of the built environment courses with a particular reference to the institutions of higher learning in Tanzania.

---

\* Dr. S.M. Kongela is a Senior Lecturer, Department of Real Estate Finance and Investment, Ardhi University, Tanzania. Her contact address is P.O. Box 35176, E-mail Sophia@aru.ac.tz

## LITERATURE REVIEW

### Sustainable Development and Educational Institutions

Current trends and patterns of resource-use, coupled with a rapidly changing, increasingly unequal, complex and interconnected societal structure and rapid technological change, are impacting human-environment interactions in critical and unsustainable ways (Stephens *et al.*, 2008; Junyent and Geli, 2008). Sustainability issues and problems cut across all disciplines and sectors of human life. The broad sectors are culture, socio-economic, politics, education, and many others. There is a complex relationship between education and sustainable development; the two are inextricably linked, as influenced by the quality of education in terms of curriculum (content), pedagogy (the manner in which it is delivered) and outcomes (the end result) (Koda, 2007). In many developing countries this relationship is hardly acknowledged and developed (*Ibid*).

Institutions of higher education have a particularly interesting potential in society to facilitate societal responses to the plethora of sustainability challenges facing communities around the world (Stephens *et al.*, 2008; Cortese, 2003). There has been growing international interest in the role of higher learning institutions in fostering sustainability. UN, UNESCO, and other relevant international organisations issue declarations, reports, partnership agreement and also conduct numerous conferences, meeting and seminars on the importance of higher learning institutions to undertake the leading role in sustainable development. UN Decade of Education for Sustainable Development (DESD: 2005-2014), The World Summit on Sustainable Development Johannesburg, 2002, Agenda 21 (Chapter 36, 2002), The Dakar Framework of Action, 2000, United Nations Literacy Decade, 2003, World Declaration on Higher Education for 21 Century, Paris 1998; Global Higher Education for Sustainability Partnership (GHESP), Lueneburg Declaration 2001, The Ubuntu Declaration on Education and Science and Technology for Sustainable

Development, 2002, and Talloires Declaration, 1990 recognize the value and usefulness of sustainability and put emphasis on education as central for achieving sustainable development worldwide.

Based on the plan of implementation agreed on at the World Summit on Sustainable Development held in Johannesburg 2002, the United Nations declared the period 2005–2014 as the Decade of Education for Sustainable Development. As a result of this, different countries have adopted different approaches to mainstreaming education for sustainable development. For instance, African countries are working on the ‘Mainstreaming Environment and Sustainability into African Universities Partnership’. On 28 November 2008 in Nairobi, African countries, among other strategies for achieving education for sustainable development, agreed on (a) developing approaches to teaching and research that are community engaged and that have community level outcomes (b) focus on teachers education (c) focus on professional learning opportunities for university lectures, managers and policy makers to make an impact in the education system so that they take ownership of education for sustainable development objectives (d) develop green universities and education institutions that create change they would like to see in the world. However, there is a varying degree of success among countries, with a reported number of challenges facing individual countries.

It is the institutions of higher learning education which lead the sustainability efforts in society (Cortese, 2003). These institutions have unique attributes that make them natural leaders. They play a central role within the overall process of achieving sustainable development (de Rebello, 2003). Du Plessis (2005) also insists that presence of functioning institutions enablers (e.g. universities, professional councils, policy, educational programmes, and financial mechanisms) is necessary for introducing sustainable building and construction in developing countries. This shows that among other sustainability players, institutions of higher learning play a leading

role towards the global challenge of achieving a state of sustainability.

### **Overview of Education for Sustainability in Tanzania**

It should be noted that there is a distinction between education about sustainability and education for sustainability. Education about sustainable development is a theoretical exposure of what sustainable development entails while education for sustainable development is focusing on the use of education as a tool to achieve sustainability in development endeavor (Tilbury, 2004; Koda, 2007; Hopkins and McKeown, 2002). In Tanzania, the growing interest has been on teaching about environmental sustainability, which is only one aspect of sustainability.

Despite the fact that many educators focus on content knowledge when giving environmental and sustainability education (Barrett *et al.* (2005), the teaching emphasises on the relationship between the society and the environment and its associated problems. Though it is a challenge, Tilbury (2004) calls for the combination of education ‘about’ and ‘for’ sustainable development in order to provide people with not just the knowledge and understanding to engage with sustainable development issues but also the skills and capacity to plan, motivate and manage change towards sustainability within an organisation, community or industry.

So far environmental education is an important component in the curricula of the institutions of higher learning in Tanzania. However, the level of incorporation of environmental education aspects in the curricula varies across various study disciplines. Whereas some offer it as an independent subject, others treat it as a theme in various programmes. The current education system tends to provide some parts of environmental education rather than a whole. Under this situation, graduates tend to be theoretically knowledgeable but lack the skills, attitude, motivation and values for practicing sustainability at their work place and in the normal life. McKeown (2009) insists that, higher learning education is important to sustainable development due to its immediate interface with employers where

graduates go into work where the sustainability issues faced by society are met on a daily basis. Tilbury (2004) and Junyent and Geli (2008) emphasise that all students have to be trained in their respective fields in combination with environmental and sustainable criteria and values, so that in the future they can approach their professional activities from the sustainability viewpoint. This shows the necessity to re-orient the current education system so as to enhance the state of sustainability in the built environment in Tanzania.

Curriculum review by some higher learning institutions which offer courses in the built environment in Tanzania i.e. Ardhi University, University of Dar es Salaam, Sokoine University of Agriculture, Dar es Salaam Institute of Technology; College of Engineering and Technology and various research institutions clearly highlight the representation of environmental education across different disciplines. However, many curricula show that, sustainability education in Tanzania is more popular with courses related to natural resource management and agriculture, rather than those related to the built environment. There are no higher learning institutions which offer courses with comprehensive treatment of sustainability aspects in buildings.

A few sustainability courses which are currently offered in the built environment are either under inter-university partnership programmes with some universities in developed countries. Such programmes are short-lived or dwell on only few elements of sustainability (e.g. renewable energy and sustainable design). For instance, the University of Dar es Salaam under the College of Engineering and Technology (CoET) together with other two African universities was in an international cooperation project with four European Universities and the International Solar Energy Society (ISES) in offering courses on the integration of renewable energy in buildings. The project which was known as PREA (Promotion of Renewable Energy in Africa) involved masters programme together with series of workshops to

the policy makers, decision makers and implementers, regulatory agencies and senior members of academic institutions. PREA project, which was started in 2006, was scheduled to run for three years. The project was meant to have a long lasting impact on the development of a new energy consciousness in Africa. CoET under NORAD's Programme for Master Studies (NOMA) also offers an MSc. in Renewable Energy. NOMA was meant to be a four year project starting in 2006 but it has been extended to 2014.

An overview of education for sustainability shows that little has been done by higher learning institutions in Tanzania. Sustainability courses which are currently offered only touch certain aspects of sustainability and are offered under specific donor funded projects. Generally, there is no holistic approach to the built environment sustainability education in the country

### **Existing Curricula and the State of Built Environment**

There is a concern that the built environment in cities and towns in Tanzania lack realities concerning local and climatological features, life style, material etc. (Lemmens and van Tassel, 2005). Most of modern buildings in the cities and towns portray European architecture with the extensive use of glass and imported construction materials; these seem to put pressure on the environment and resources as the changing of the built environment does not follow sustainable paths.

A review of various curricula for degree programmes offered at various higher learning institutions indicated that no comprehensive sustainability training is offered for many degree courses in the built environment. Few subjects were noted to have their curricula covering some aspects of sustainability. Most of the subjects are in architecture related degree programmes such as Bachelor of Architecture (B.Sc. in Landscape Architecture, B.Sc. in Interior Design and postgraduate programmes in Architecture. Some degree programmes in physical planning also touched some aspects of sustainable development. In addition to that a master degree in renewable energy is offered in engineering programmes and master degree in sustainable resource use is offered in the agriculture related programmes. However, it should be noted that

sustainability is more than renewable energy, sustainable design or resources use. With the existing curricula, it is unlikely that graduates in real estate related fields will have adequate mastery over sustainability issues.

### **METHODOLOGY**

The first phase of this study relied on the review of curricula of various higher learning institutions offering degree programmes on the built environment disciplines. The aim was to explore how sustainability features in the curricula of the respective institutions. The second phase entailed collection of quantitative data using semi-structured questionnaire which was distributed to 50 respondents randomly. There were two sets of questionnaires; one was administered to the deans of schools/faculties and heads of departments in order to examine the institutions' capacities in terms of human and non-human resources within curriculum review process and the challenges of incorporating sustainability aspects in the built environment courses. The other questionnaire was administered to the members of academic staff and researchers with the aim of capturing information on the key interested sustainability aspects, their involvement in the curriculum review process and also to get their views on the challenges of incorporating sustainability aspects in the built environment courses. Data analysis was carried out using the Statistical Package for Social Science (SPSS).

The questionnaire also sought to understand the field of study for each respondent for the purpose of investigating the relationship between field of study and the level of emphasis given to sustainability. It should be noted that, considerable body of knowledge consider intra, inter and trans disciplinarity as a very important prerequisites for achieving state of sustainability (Malhadas, 2003; Stephens *et al.*, 2008; Everett, 2008; Hayles and Holdsworth, 2008; Cortese, 2003; Jucker, 2002; McKeown, 2009; Blewitt, 2004; Bart *et al.*, 2007). In order to capture the aspect of multi-disciplinarity, the questionnaire also sought to understand the involvement of the stakeholders and professionals in the curriculum review process. Table 1 shows the sample size and distribution of respondents according to their field of study/discipline.

**Table 1: Sample Size and Disciplines of Respondents**

Discipline/Status	No. of Respondents
Architect	2
Land economy surveyor	5
Environmental engineer	4
Quantity surveyor	4
Physical Planner	7
Engineers (mechanical, civil and geotechnical)	7
Researcher in housing	2
Researcher in forest and natural resources	3
<b>TOTAL</b>	<b>34</b>

As shown in Table 1, out of the 50 questionnaires distributed, 34 questionnaires (68%) were completed and returned. The diversity of disciplines that took part in this study enabled the collection of data which is rich in the concept of sustainability in the built environment courses.

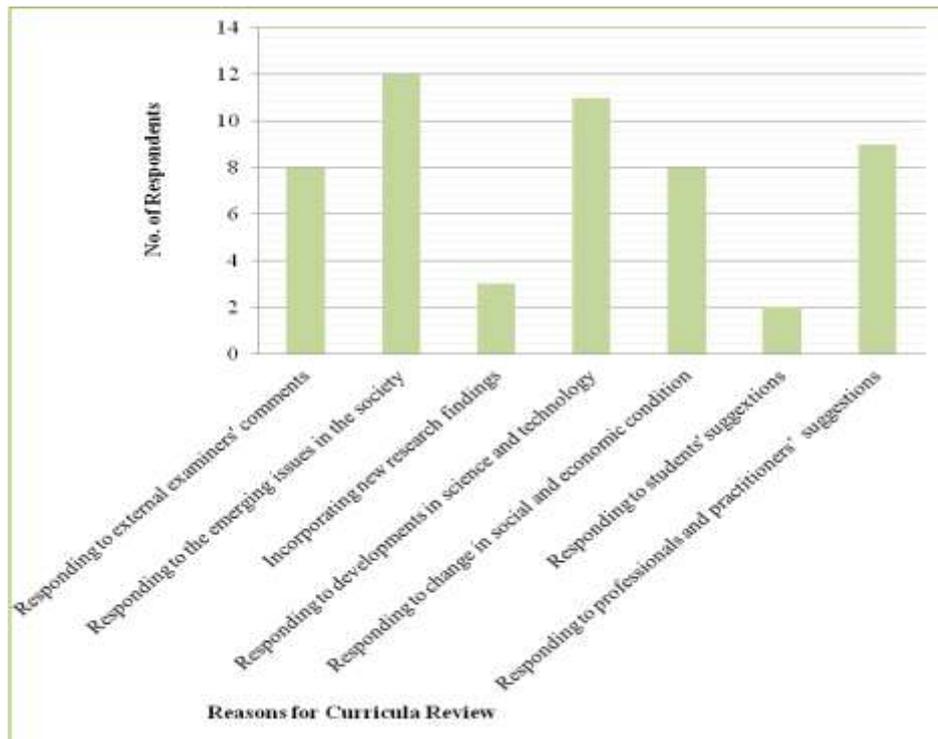
## RESULTS AND DISCUSSION

Generally it has been observed that sustainability has not been accorded due weight in the curricula of higher learning institutions offering programmes in the built environment in Tanzania. Also there is very limited evidence on the ground suggesting existence of concerted efforts in facilitating successful implementation of sustainability programmes in the built environment. There are many challenges in introducing sustainability curricula in the built environment programmes. The discussion below sheds a picture on the challenges faced by higher learning institutions and the important aspects that have to be looked into in mainstreaming sustainability aspects in the built environment programmes in Tanzania.

### Curricula Review Process

It was noted that the process of curriculum review differs from one institution to the other. With the exception of very few respondents (i.e.

5.9%), 94.1% of the respondents had been involved in curriculum review in their respective institutions. All institutions had mini and major curricula reviews. Mini review was normally done after 2 years while major review was done after 5 years. It was also observed that for some institutions, all academic members of staff were involved in the curricula review process, in others there was a curriculum review committee in place. In only one institution, the Ministry of Education was involved in the curriculum review process. Some institutions incorporate suggestions of the professionals and practitioners in the built environment when reviewing their curricula. Only 15.4% of the respondents indicated that a tracer study is done before any major review of curricula. In many institutions which had curriculum review committees, the committees convene meetings from time to time to evaluate the existing curricula and seek opinions from academic staff members and students. Each member of staff was then requested to provide opinions on his/her area of competence. The proposed change is first tabled in the departmental meetings, before proceeding to the school/faculty meetings, board meetings and finally to the Senate for approval. Different reasons for curricula review are as presented in Figure 1.



**Figure 1: Reasons for Curricula Review**

In response to the question on why curriculum review is done, all respondents mentioned a number of reasons. Figure 1 shows that to a large extent, change in curricula was done responding to the emerging issues in the society. Some of the issues mentioned include the current agenda of sustainable construction, sustainable materials and resources, and improvement of indoor environment. Responding to developments in science and technology was also mentioned by many respondents. Responding to professionals and practitioners' suggestions, responding to external examiners' comments and responding to change in social and economic conditions were noted to be equally significant. Incorporating new research findings and responding to students' suggestions were seen to be the reasons when reaching a decision on reviewing curricula of higher learning institutions.

### **Involvement of Other Stakeholders in Curricula Reviews**

This study also sought to understand how stakeholders such as professionals, practitioners and policy makers are involved in the curricula review process. With regard to the first question on the involvement of professionals and practitioners in curricula review; 53.8% of the respondents stated that 'always' professionals

and practitioners are involved, 38.5% stated that 'often' professionals and practitioners are involved and 7.7% stated that they are 'rarely involved'. When asked the additional question on how professionals and practitioners are involved; about 76.9% maintained that they are involved by providing their views during curricula reviews in the workshops and meetings, while 23.1% were of the opinion that sometimes professionals and practitioners' opinions were not incorporated in curricula reviews. Generally, the answers given by some respondents did not place much weight on the importance of involving professionals and practitioners in the curricula review. It should be noted that, strands of literature on sustainability (Mata and Siegel, 2009; Everett, 2008; Stephens *et al.*, 2008; Geli and Filho, 2006) are rich with the suggestions of not only recognise the arrays of different stakeholders but also acknowledging the complexity of competing interest in the curricula review.

In response to the question of whether policy makers should be involved in curriculum change/review, about 26.5% insisted that involvement of policy makers in sustainability education is 'extremely important'; the other 70.6% were of the opinion that their involvement is 'very important' and only one respondent (i.e.

2.9%) was of the opinion that policy makers involvement is 'not necessary'.

About 55.9% of the respondents were of the opinion that reviewing curricula for sustainability education will be a straight forward procedure and it can be initiated by institutions of higher learning without any government bureaucracy. The remaining 44.1% were of the opinion that there would be bureaucracy on the part of the government. Regarding the government support on sustainability curricula review, about 67.6% of the respondents were of the opinion that there is a guaranteed government support if education for sustainability is to be introduced while 32.4% were not certain if the government would provide the necessary support.

40% of the respondents argued that enough funding from the government to the institutions of higher learning institutions is very necessary for introducing sustainability aspects in curricula. The other 60% were of the opinion that funding from the government is not an issue. These findings are contrary to many strands of literature which insist on the need for active role of the government if education for sustainability is to be successful (Stephens *et al.*, 2008; Kaluarachchi and Jones, 2008; UNEP, 2007). The finding of this study may suggest little understanding on the importance of some key stakeholders in inducing education for sustainability in the country.

### **Sustainability Awareness in the Institutions of Higher Learning**

Respondents were asked in the survey on the extent of sustainability awareness in the built environment. With the exception of only three respondents (8.8%) who were 'not aware at all'; about 31 (91.2%) indicated being 'aware' of the built environment sustainability. Out of that, 52.9% indicated that they were 'very aware', the remaining 38.3% indicated that they were 'aware'. However, it was observed from all respondents that sustainability aspects are curricula specific i.e. each curriculum is biased towards a certain discipline. Each discipline tends to value certain sustainability aspects as more important than others. For instance, engineers consider renewable energy as the most important aspect of sustainability thereby disregarding other aspects such as sustainable water, sustainable construction materials etc. Although it has been common for each discipline to concentrate on its own area of expertise, it

should be remembered that sustainability efforts call for transdisciplinary approach.

Hopkins and McKeown (2002) insist that each discipline involved in sustainability education should develop its own subject areas, each with its own perspectives, strengths and skills then transdisciplinarity approach should take place. There is no one discipline or group of people who can implement education for sustainability alone since education for sustainability entails concerted effort from many disciplines and sectors of the education community (Hopkins, 2002; Malhadas, 2003; Tilbury, 2004; Everett, 2008).

### **Comprehensiveness of the Existing Curricula**

The deans of schools/faculties, heads of departments, academicians responsible for curricula review and researchers (i.e. first category) were asked to describe the comprehensiveness of the current curricula in addressing sustainability issues in the built environment. Only 15.4% were of the opinion that the curricula are 'very comprehensive', 53.8% maintained that they are 'comprehensive' while 30.8% were of the view that the curricula are 'not comprehensive'. From the responses it is clear that there is confusion in the interpretation of the terms education 'about' and education 'for' sustainability. Education about sustainability is so far offered by almost all higher learning institutions in the country.

When asked on the adequacy of the curricula in treating sustainability aspects, the academic members of staff like the first category, were of the different opinions. Only 4.8% stated that the curricula are 'very adequate', about 38.1% stated that they are 'adequate', the other 47.6% stated that the curricula are 'not adequate' and the remaining 9.5% stated that they are 'not adequate at all'. It is clear from these findings that generally the current curricula are not adequate in addressing sustainability issues.

### **Improving the Effectiveness of Sustainability Education**

#### **(i) Sustainability Literacy to Academicians**

It was a concern from all respondents in this study that academicians should be educated on sustainability. Whereas 61.8% were of the opinion that sustainability education is 'extremely important' to the academicians, the

rest 38.2% maintained that it is ‘very important’. This is consistent with many strands of literature on sustainability which insist that academicians should be educated first (Malhadas, 2003; Hayles and Holdsworth, 2008).

A recent study on real estate sustainability in Tanzania reveals that there is lack of education among key real estate professionals (Kongela and Kusiluka, 2009). This has also been a problem in many countries and has been cited by many authors (Chen and Jones, 2008).

Training, seminars, workshops and conferences were mentioned by 26.5% to be ‘extremely important’ in gaining sustainability literacy, about 67.6% mentioned it to be ‘very important’ and the remaining 5.9% had no opinion on that aspect. Apart from formal education, many other informal education routes could be used to impart sustainability literacy to academicians. This could be done for example, through symposia, public lectures, professional meetings, media awareness campaigns, environmental mass

mobilization programmes etc. The informal education emphasised here is also referred by Lipscombe *et al.* (2008) to as ‘extra-curricular’. The authors insist on its use as another means to advance education for sustainable development.

#### (ii) Sustainability-Oriented Research

Emphasis on sustainability-oriented research was supported by all respondents. Whereas 44.1% of the respondents agreed to it as ‘extremely important’, the other 55.9% were of the opinion that it is ‘very important’. There was strong interest in sustainability in the built environment amongst all respondents. However, the interest varied depending on the respondent’s discipline of study. Figure 2 shows the research areas of interest for the different respondents. Research has also been mentioned in many studies to have positive contribution in getting better understanding of sustainability (Wright, 2004; Hayles and Holdsworth, 2008; Stephens *et al.*, 2008; Everett, 2008; Fien, 2002; Wright, 2002; Kaluarachchi and Jones, 2008).

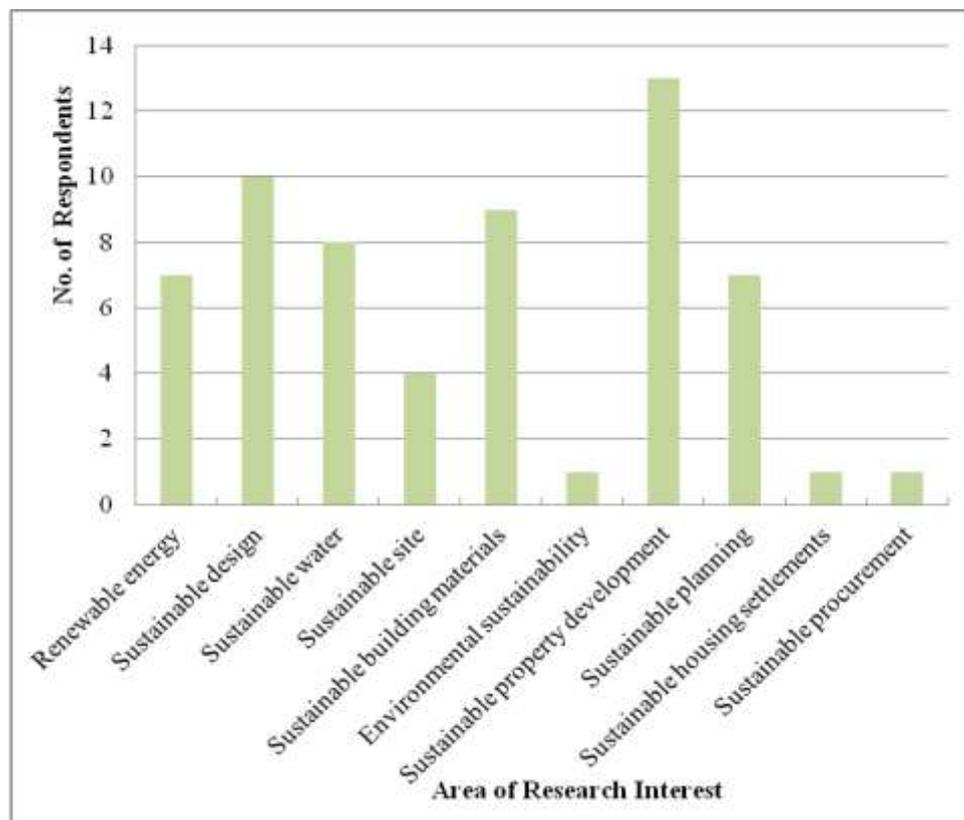


Figure 2: Respondents’ Sustainability Oriented Research Areas of Interest

As seen in Figure 2, many respondents mentioned a number of sustainability oriented research areas of interest with sustainable

property development being the most preferred research area. This is probably due to the current movement towards sustainable buildings (green

buildings). A considerable number of respondents was interested in sustainable design, sustainable building materials, sustainable water, and sustainable planning. Although not accorded considerable weight, sustainable sites, environmental sustainability, sustainable housing settlements and sustainable procurement were also seen to be sustainability-oriented research areas of interest.

### **(iii) Availability of Books and Teaching Materials**

Respondents placed high importance on availability of books, teaching materials and other reading sources on sustainability. A large number of respondents (ie. 61.8%) were of the opinion that teaching and reading resources are 'extremely important' for enabling institutions of higher learning to advance in sustainability education. The other 29.4% considered teaching resources to be 'very important'. Surprisingly, the remaining 8.8% opined that sustainability education could be undertaken without teaching and reading resources. This might be an indication of poor understanding of the subject matter by the respondents.

Due to the consequences and impacts that the built environment poses on the environment, there has been a move to introduce sustainability courses in all disciplines from elementary school to the higher education (Rebello, 2003; Malhadas, 2003; De Guerrero and Bleiber, 2009; UN Decade of Education for sustainable Development, 2005-2014). There was only one respondent (i.e. 2.9%) in this study who mentioned the idea of introducing sustainability courses in all disciplines from the elementary level to the highest level of education institutions.

### **(iv) Presence of Case Studies**

It is a fact that sustainability is a new phenomenon especially in the developing countries. To gain understanding on what it actually means, respondents in this study insisted on the presence of case studies as one of the approach of providing the actual meaning of sustainability. Whereas 23.5% of the respondents regarded case studies to be 'extremely important', the other 70.6% regarded it to be 'very important'; the remaining 5.9% had no opinion on that. Hayles and Holdsworth (2008); McKeown (2009) also underscore the use of case studies in demonstrating sustainability concepts.

## **Challenges of Incorporating Sustainability Aspects in Curricula**

### **(i) Sustainability Literacy among Higher Learning Academicians**

Although all of the respondents shared interests in sustainability, it was observed that sustainability literacy among academicians was still a challenge. About 61.7% of the respondents agreed that there was still a challenge on developing curricula that incorporate sustainability aspects in the built environment due to absence of knowledge/skills on the subject. The other 32.4% considered the level of knowledge/skill to be enough for developing sustainability curricula; the remaining 5.9% had no opinion. Though developing countries suffer the most for the lack of sustainability literacy, it should be noted that education for sustainability is still a problem in many developed countries (Chen and Jones, 2008; Tilbury, 2004).

### **(ii) Lack of Current Reading and Teaching Materials**

Absence of current reading and teaching materials was mentioned by 55.9% to be a challenge on introducing sustainability courses in the built environment. About 38.2% of the respondents were of the opinion that sustainability courses could be introduced regardless of the availability of reading and teaching materials. Out of all respondents, 5.9% had no opinion on that. Although sustainability is taken to be a global agenda, it is a fact that developing countries are lagging behind. It is also a fact that reports and different publications on sustainability are not available in many developing countries' libraries. For instance, the famous reports on sustainability such as Brundtland report, Agenda 21, Agenda 21 for sustainable construction in developing countries which could be obtained online are not easily available in Tanzanian's libraries due to undeveloped e-business infrastructure. UN, UNEP and other international organisations have a number of publications on sustainability which could have positive impact if distributed to developing countries like Tanzania.

### **(iii) Misconceptions about the Concept of Sustainability**

It was observed that respondents had a slightly different perception as to what sustainability entails. Sustainability is a broad concept but each respondent in this study defined it according to

his/her own discipline. The response to some questions could clearly tell the variations in the understanding of the concept of sustainability. Many respondents insisted that the current curricula are comprehensive in treating sustainability aspect. One of the respondents argued that if sustainability does not increase monetary return on the buildings then it was of no importance. Some of the contentions listed by respondents are evidence of lack of understanding of the concept of sustainability in the built environment.

#### **(iv) Lack of Financial and Human Resources**

Respondents in this study stated that there should be more funding to the higher learning institutions if curricula that incorporate sustainability aspects are to be introduced. Upon close examination of the local conditions and review of various strands of literature, the implementation of sustainability education requires not only financial resources but also human resource. There is evidence from a number of reports and a considerable body of knowledge on sustainability which insist that if sustainability objectives are to be achieved worldwide, developing countries should be assisted (Malhadas, 2003; Mata and Siege, 2009). Similarly, Stephens *et al.* (2008) observe that, financing of any particular higher education system or institution has a direct implications on the potential for the institution to advance in sustainability education.

#### **Change of Curricula and its Impact**

About 61.8% of respondents were of the opinion that change/review of curricula would enhance sustainability literacy. Some respondents (9.5%) noted that an important means to progress in the built environment sustainability is to focus on the local context. Review of various strands of literature on sustainability clearly indicates that understanding a local context brings positive impact on the curricula that incorporate sustainability aspects (de Rebello, 2003; Malhadas, 2003; Hayles and Holdsworth, 2008; Hopkins and McKeown, 2002). It should be noted that the objectives of sustainability education is the same worldwide but approaches for enhancing it do differ from one context to another. It is also a fact that one discipline's curriculum cannot include all sustainability issues and there is no universal model of education for sustainability. Successful

sustainability studies in the built environment require deep understanding of the local context, which will guide the selection of a few locally relevant issues to be included in the curricula in Tanzania.

#### **CONCLUSION**

Education for sustainability is still a challenge to many developing countries. However, sustainability in the built environment requires a transformation in approach especially in the teaching and learning process in Tanzania and other developing countries. With the current curricula of most higher learning institutions in Tanzania, the global objective of attaining sustainability in the built environment cannot be achieved. Addressing the challenges that built environment pose in the environment require diverse educational backgrounds to work out the solutions together. Additionally, sustainability requires interactions with built environment professionals, stakeholders, policy makers and the industry at large.

Although incorporation of sustainability issues into undergraduate programmes is a key opportunity for institutions to achieve sustainability, achieving sustainability in the built environment in Tanzania has a long way to go. Institutions of higher learning in Tanzania require deep understanding of the concept, human and non-human resources and team spirit amongst built environment professionals and other stakeholders and not just the integration of sustainability concepts in the curricula. Built environment industry is complex, the industry must provide all necessary support towards the change for sustainability, otherwise the knowledge acquired by the graduates will not provide the expected changes. The change for sustainability must be supported within and across disciplines, beyond the academy and the community at large. Change towards sustainability practices is not just by integrating sustainability concepts within the curricula; there must be a clear understanding or vision for sustainability among different disciplines. The change also requires innovation and changes in the built environment industry as a whole.

There should be efforts to understand the local context to be able to identify the key aspects to be included in the curricula. Academicians should acquire the necessary education and skills and value the involvement of all stakeholders in the built environment industry. As observed by

Alabaster and Blair (1996) academicians are often ideologically resistant to curriculum changes that emanate from outside the bounds of their disciplines. Stakeholders and professionals are more aware of what is actually needed in practice which is important to be incorporated in the curricula of the higher learning institutions. The outcome of this research indicates that more research on sustainability is required in Tanzania and other developing countries so as to enhance sustainability literacy in the built environment. More courses in a mode of partnership should be introduced in all institutions offering courses in the built environment to enhance capacity building efforts. It should be noted that, change toward sustainability is a long process; which requires preparedness among higher learning institutions and all other stakeholders. Sustainability knowledge acquired by graduates will help them change the mindsets in their places of work, hence adoption of sustainability. The UN Decade of Education for Sustainable Development (DESD: 2005-2014) should ensure that higher learning institutions in developing countries are assisted more to take part in the move towards sustainability.

## REFERENCES

- Alabaster, T. and Blair, D. (1996), "Greening the University", In: Huckle, J. and Sterling, S. (eds.) *Education for Sustainability*. London, pp. 86-104.
- Anderberg, E., Norden, B. and Hansson, B. (2009), "Global Learning for Sustainable Development in Higher Education: Recent Trends and Critique". *International Journal of Sustainability in Higher Education*. Vol. 10(4), pp. 368-378.
- Barrett, M.J., Hart, P., Nolan, K. and Sammel, A. (2005), "Challenges in Implementing Action Oriented Sustainability Education", In: Filho, W.L. (ed.) *Handbook of Sustainability Research*. Peter Lang, Frankfurt am Main, Vol. 20, pp. 505-534.
- Bart, M., Godemann, J., Rieckmann, M. and Stoltenberg, U. (2007), Developing Key Competencies for Sustainable Development in Higher Education. *International Journal of Sustainability in Higher Education*. Vol. 8(4), pp. 416-430.
- Blewitt, J. (2004), "Introduction", In: Blewitt, J. and Cullingford, C. (eds.): *The Sustainability Curriculum: The Challenge for Higher Education*. Earthscan, UK and USA.
- Chen, D. and Jones, W.J. (2008), *Adding Green to the Curriculum: An Examination of Integrating Green and Sustainable Building Practices into the Construction Curriculum from Customers' Viewpoints*. Paper presented at NAIT Conference, Nashville (Tennessee), 18-22 November, 2008.
- Cortese, D.A. (2003), "The Critical Role of Higher Education in Creating a Sustainable Future". *Planning for Higher Education*. Vol. 31(3), pp. 15-22.
- De Rebello, D. (2003), *What is the Role for Higher Education Institutions in the UN Decade of Education for Sustainable Development?* Paper presented at the International Conference on Education for a Sustainable Future: Shaping the Practical Role of Higher Education for a Sustainable Development, Karolinum, Prague, 10-11 September, 2003.
- De Guerrero, K.J. and Bleiber, N. (2009), *Education for All-ESD Dialogue: Creating Synergies and Linkages for Educating for Sustainable World*, Proceedings in the UNESCO World Conference on Education for Sustainable Development Bonn, Germany, 31 March–2 April, 2009.
- du Plessis, C. (2005), "Action for sustainability: Preparing an African Plan for Sustainable Building and Construction". *Building Research and Information*. Vol. 33(5), pp. 405-415.
- Everett, J. (2008) "Sustainability in Higher education: Implications for Disciplines". *Theory and Research in Education*. Vol. 6(2), pp. 237-251.
- Fien, J. (2002), "Advancing Sustainability in Higher Education: Issues and Opportunities for Research". *International Journal of Sustainability in Higher Education*. Vol. 3(3), pp. 243-253.
- Geli, A.M. and Filho, W.L. (2006), "Education for Sustainability in University Studies: Experiences from a Project Involving European and Latin American Universities", In: *International Journal of Sustainability in Higher Education*. Vol. 7(1), pp. 81-93.

- Glavic, P. (2006), "Sustainability Engineering Education". *Clean Technologies and Environmental Policy*. Vol. 8(1), pp. 243-30.
- Hayles, C.S. and Holdsworth, E.S. (2008), "Curriculum Change for Sustainability". *Journal for Education in the Built Environment*. Vol. 3(1), pp. 25-48.
- Hopkins, C. and McKeown, R. (2002), "Education for Sustainable Development: An International Perspective", In: Tilbury, D., Stevenson, R.B., Fien, J. and Schreuder, D. (eds.) *Education and Sustainability: Responding to the Global Challenge*. Commission on Education and Communication, IUCN, Gland, Switzerland and Cambridge, pp. 13-24.
- Jucker, R. (2002), "Sustainability? Never heard of it!": Some Basics we shouldn't ignore when engaging in education for sustainability. *International Journal of Sustainability in Higher Education*. Vol. 3(1), pp. 8-18.
- Junyent, M. and Geli, A.M. (2008), "Education for Sustainability in University Studies: A Model for Reorienting the Curriculum", *British Educational Research Journal*. Vol. 34(6), pp. 763-782.
- Kaluarachchi, Y. and Jones, K. (2008), "Accelerating Innovation in the Built Environment by Research and Education in UK", in: Haigh, R. and Amaratunga, D. (eds.) *Building Resilience, CIB International Conference on Building Education and Research*. Heritage, Kandalam, Sri-Lanka, 11-15<sup>th</sup> February, 2008.
- Koda, B. (2007), *Education for Sustainable Development: The Experience of Tanzania*. Paper Presented at the UniPID-EADI Symposium on Accessing Development Knowledge-Partnership Perspective. Helsinki, 19 April, 2007.
- Kongela, S. and Kusiluka, M. (2009) *Sustainable Property Development in Tanzania: Opportunities and challenges*. Paper presented at the 16th Annual European Real Estate Society Conference, Stockholm, 24-27, June, 2009.
- Lemmens, B. and van Tassel, D. (2005), *Finding the Fruits of Modern Architecture in Urbanising Dar es Salaam*. ArchiAfrika Conference Proceedings: Modern Architecture in East Africa around Independence, Dar es Salaam, 27-29, July, pp. 159-172.
- Lipscombe, B.P., Burek, C.V., Potter, J.A., Ribchester, C. and Degg, M.R. (2008), "An Overview of Extra-Curricular Education for Sustainable Development (EDS) Interventions in UK Universities". *International Journal of Sustainability in Higher Education*. Vol. 9(3), pp. 222-234.
- Malhadas, Z.Z. (2003), *Contributing to Education for a Sustainable Future through the Curriculum by Innovative Methods of Education and other Means*. Paper presented at the International Conference on Education for a Sustainable Future: Shaping the Practical Role of Higher Education for a Sustainable Development, Karolinum, Prague, 10-11 September, 2003.
- Mata, A. and Siege, H. (2009), *From the Margins into the Centre: Establishing ESD in Education Plans and Curricula*. Proceedings in the UNESCO World Conference on Education for Sustainable Development Bonn, Germany, 31 March-2 April, 2009.
- McKeown, R. (2009), *The Role of Higher Education and Research in ESD*. Proceedings in the UNESCO World Conference on Education for Sustainable Development Bonn, Germany, 31 March-2 April, 2009.
- Otieno, D. (2005), *Towards Developing an Education for Sustainable Development Strategy for Kenya: Experiences and Perspectives*. Paper presented at Education for Sustainable Future International Conference, Ahmedabad, India, 18-20, January 2005.
- Stephens, C.J., Hernandez, E.M., Roman, M., Graham, C.A. and Scholz, W.R. (2008), "Higher Education as a Change Agent for sustainability in Different Cultures and Contexts". *International Journal of Sustainability in Higher Education*. Vol. 9(3), pp. 317-338.
- Tilbury, D. (2004), "Rising to the Challenge: Education for Sustainability in Australia". *Australian Journal of Environmental Education*. Vol. 20(2), pp.103-114.
- Tinkler, A. and Burt, R. (2004), "Greening the Construction Curriculum". *International Journal of Construction Education and Research*, Vol. 9(2), pp. 26-33.

UNEP (2007), *Building and Climate Change: Status, Challenges and Opportunities*. United Nations Environment Programme Publication.

Wright, T. (2002), "Definitions and Frameworks for Environmental Sustainability in Higher Education". *International Journal of Sustainability in Higher Education*, Vol. 3(3), pp. 203-220.

Wright, T. (2004), "The Evolution of Sustainability Declarations in Higher Education", In: Corcoran, P.B. and Wals, A.E.J. (eds.) *Higher Education and the Challenge of Sustainability: Problematics, Promise and Practices*. Kluwer Academic Publications, Netherlands.