A REVIEW OF APPROPRIATENESS OF INTERNATIONAL ENVIRONMENTAL ASSESSMENT TOOLS FOR A DEVELOPING COUNTRY

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Keywords: Sustainable Building Assessment Tools, SBAT, assessment methods, rating tools

Summary

The World Green Building Council (WGBC) has 10 existing members including the United Kingdom, Taiwan, Australia and America. These members have adopted building rating systems, such as Building Research Establishment Environmental Assessment Method (BREEAM), Comprehensive Assessment System for Building Environmental Efficiency (CASBEE), Green Star and The Leadership in Energy and Environmental Design, respective in order to stimulate market demand for high-performance buildings.

The Green Building Council for South Africa (GBCSA) was established by the South African Property Owners Association earlier this year (May 2007) and aims to promote environmentally sustainable practices within the South African commercial and industrial property market.

As with the existing members, an appropriate rating system will be required by the GBCSA. The paper studies the implication of the use of any of the three aforementioned rating systems for South Africa's developing context and compares these systems against the South Africa's indigenous rating tool, Sustainable Building Assessment Tool (SBAT).

The paper suggests that the SBAT is a more appropriate tool for use within a developing country and presents findings for the study.

1. Introduction

The concept of sustainable development has been defined by the World Commission on Environment and Development (WCED) in their Brundtland Report as meeting the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). This was recognized as a balance between the environmental protection, economic growth and social development dimensions in 1992 at the Rio Declaration by the United Nations NGO Committee on Sustainable Development (UN, No date a).

According to Cole (2003) environmental assessments and labeling programs are currently undertaken on a voluntary basis, but are considered as having the potential to create market demand for green buildings.

Building environmental rating systems provide a way of showing that a building has been successful in meeting an expected level of performance in various declared criteria (Cole, 2003). Cole (2003) adds that it is in the adoption and promotion of such systems that contribute significantly to the shifting of the public's awareness and perceptions of what building quality is. This can be confirmed by the increasing number of people demanding information on environmental aspects of buildings, such as whether or not a building was good for their health or if it fit into a sustainable society (Carlson & Lundgren, nd) since the development of the very first building assessment tool, the Building Research Establishment Environmental Rating Assessment Method (BREEAM).

1.1 Relevance

Currently almost each European country, the United States of America, Canada, Australia, Japan, Hong Kong and South Africa have their own assessment tool (Silva, 2007). Da Silva adds that each of these tools shares a *"common goal to stimulate market demands for higher environmental performance levels"* and with "the remarkable exception of South Africa's SBAT," all of the existing tools *"deal exclusively with the environmental dimension of sustainability"* (Silva, 2007).

1.2 Scope of Research

The research focuses on the review of current literature and the review of the five rating tools used by the existing member countries of the World Green Building Council (WGBC).

1.3 Research Aim and Questions

The research aimed to review changes that have occurred globally within the sustainable development field.

In light of the changes found, the research questions derived are as follows:

- How do the global changes within the field of sustainability affect the SBAT?
- How does the SBAT compare with the international tools used by national GBCs used?

1.4 Structure of the Paper

The paper is structured under the following heading; background, methodology, literature review, assessment framework, discussion and conclusions.

2. Background

2.1 South African Context

The Republic of South Africa is considered to be the most developed and modern country on the African continent. Since 1994, when the first democratic government was elected, South Africa has had positive economic growth (Knight, 2006). However, on the other side of this positive aspect is a country which still has major social and economic problems including poverty, inequality, unemployment, HIV/Aids and property and personal insecurity (Beall et al, 2005).

2.2 SBAT framework

The SBAT was developed to support the development of a more sustainable built environment within South Africa's developing country context. The tool draws on international best practices and has been refined through use in South Africa that reflects the local context and policy. The tool provides a robust framework/methodology that assesses the sustainability performance of proposed designs and existing buildings. The framework/methodology includes five criteria in all three sustainability aspects, namely:

- Economic – local economy, efficiency, adaptability and flexibility, ongoing costs, capital costs;
- Environmental – water, energy, waste, site, materials and components; and
- Social – occupant comfort, inclusive environments, access to facilities, participation and control, education, health and safety (Gibberd, 2001).

Each of the 15 criteria has a set of five sub-criteria linked to indicators that are used to measure the sustainability performance of a proposed design or existing building (see Table 1). The SBAT has been used to assess commercial, residential buildings.

Table 1 The Structure of the SBAT

Sustainability aspect	Criteria	Sub-Criteria	Indicator
EC ECONOMIC	EC1 Local Economy	EC1.1 Local Labour	Use of local (from within 50km of the site) labourers
		EC1.2 Local Materials	Building material sourced from within the country
		EC1.3 Local Materials and Components	Material and components sourced from within the country
		EC1.4 Local Furniture and Fittings	Furniture and fittings sourced from within the country
		EC1.5 Maintenance	Maintenance and repairs can be undertaken by local SMMEs (turnover of <R5m)
3 Sustainability aspects in total	15 criteria in total	75 sub-criteria in total	75 indicators in total

Source: Sebake and Gibberd, 2008

3 Methodology

Literature of global commitments to sustainable development was reviewed. This led to the development of an assessment framework which will be used to assess the GBC rating tools.

4 Literature Review

4.1 Global Commitments to Sustainable Development

4.1.1 Global Monitoring Report [2007]

The development of the Millennium Development Goals (MDGs) derived from the Millennium Declaration in 2000, at the United Nations Millennium Summit. The MDGs consist of eight goals, and 18 concrete targets for development; which outline the shared responsibilities of *"developing countries to pursue poverty reduction and good governance and of developed countries to support the efforts of developing countries; by increasing aid, opening trade to exports from developing countries, and providing debt relief"*. The MDGs fall within the three spheres of sustainable development, namely economic (poverty alleviation, development of global partnerships), environmental (ensure environmental protection) and social (achieve universal primary education, promote gender equity, reduce child mortality, improve maternal health and combat HIV/Aids and other diseases).

The World Bank's Global Monitoring Report (GMR) 2007 is the fourth annual GMR. The report takes into account the progress taken toward the achievement of the MDGs. It further assesses the contributions of developing countries and other international institutions in their undertaking toward meeting the commitments.

The 2006 GMR (WB, 2006) showed that governance was needed as a core continuous part of the wider task of monitoring the progress of reaching the MDGs.

The current GMR highlights 2 areas that need more global attention, namely gender equity and fragile state (WB, 2007).

4.1.2 Global Reporting Initiatives third generation (G3) [2006]

A third generation of GRI Guidelines, G3, was released in October 2006 following several years of research, development, and consensus-seeking by multi-stakeholder technical working groups, each assigned to focus on different parts of the guidelines ending with a period of public participation and comment. The G3 replaces previous versions of the GRI Guidelines released in 2000 and 2002. The G3 Guidelines provide universal guidance for reporting on sustainability performance (including economic, environmental and social aspects). This means they are applicable to small companies, large multinationals, public sector, NGOs and other types of organizations from all around the world. It is the way that the guidelines are created (through the multi-stakeholder, consensus seeking approach) that enables them to be so broadly applicable. (http://www.globalreporting.org)

The guidelines provide a set of core indicators, which have been developed through GRI's multi-stakeholder participatory processes. Additional indicators represent emerging practice that may only be relevant to some organisations. (GRI, 2006)

4.1.3 The Living Planet Report [2006]

The World Wildlife Fund (WWF) published the first Living Planet Report in 1998. The report still shows the state of the natural world and the impact of human activity upon it. It has been published biennially since the late nineties. The current report developed in collaboration with the Zoological Society of London and the Global Footprint Network corroborates that humanity is using the planet's resources faster than they can be renewed – the latest data obtainable (for 2003) shows that humanity's Ecological Footprint has more than tripled since 1961. Humanity's footprint now surpasses the world's ability to regenerate by about 25 per cent (WWF *et al*, 2006).

In addressing sustainable development the report requires that the world, on average, meets at a minimum of two criteria, which are well known accounting tools for measuring progress toward sustainability in the areas of the socio-economic and ecological imperatives. The tools are the Human Development Index (socio-economic) and Ecological Footprints (ecological) (WWF *et al*, 2006).

4.1.4 Strategic Framework for Sustainable Development in South Africa

The strategy was developed DEAT to articulate South Africa's national vision for sustainable development and direct its planned participation to re-adjust South Africa's development path towards sustainability. It provides the basis for a long-term process of integrating sustainability as a key component of the development dialogue and shows South Africa's commitment to the principles developed at international summits, described above, and conferences in the economic, social and environmental fields

4.1.5 Johannesburg Securities Exchange [2004]

The Johannesburg Securities Exchange (JSE) has developed criteria to measure the 'triple bottom line' performance of companies in the FTSE/JSE All Share Index. In May 2004, it launched the first Socially Responsible Investment (SRI) Index, which is built on four pillars of sustainability, namely: corporate governance, the economy, the environment, and society (Figure 1. Source: Barron and Gauntlett (2002) and

Department of Environmental Affairs and Tourism (2006)). At present, only forty nine companies are listed on the SRI Index. For the reason that listing is voluntary, the sample population on which data are based is heavily weighted towards the leading performers in the field of corporate sustainability, and the results from a random sample of listed companies would produce lower, less positive results. It is known, however, that holding, property, and investment companies have extremely limited awareness of environmental impacts and issues and have no significant institutional structures in place to deal with them (DEAT, 2006).

Figure 1 Integrated Model representing sustainable development

Most companies dealing in the material economy (that is, those that handle, process, and transform materials/ substances) are addressing environmental concerns at some level and nearly three-quarters of the companies assessed on the SRI Index (71%) had protected environmental principles in a policy or formal mission statement. Only 55% of the companies listed, however, have formal policies in place to ensure that their suppliers are paying attention to sustainability, and there is little evidence that these policies are influencing supplier behaviour.

The majority of the businesses claim to have all the elements of environmental governance and management in place, but it was complex to assess their efficacy in practice. Of these businesses, 84% give responsibility for the environment to a senior executive and/or a board committee.

4.2 International Environmental Assessment Tools

In May 2007 the South African Property Owners Association (SAPOA) established a Green Building Council of South Africa (GBCSA). This was in order to promote environmentally sustainable practices in South Africa's commercial and industrial property industry (Creamer Media, 2007). Australia's Green Star was selected as a basis of a national rating system. The Australian rating system will be customised for South Africa (GBCSA, 2007).

South Africa is one of 17 countries in the process of forming a national Green Building Council. These national councils will be member countries of the existing World Green Building Council (WGBC) which was founded in 1999 following the prior existence of the United States Green Building Council. The goal of this world-wide council is to intensify the shift from convention to more sustainable practices within the global property industry.

The existing member countries include the United States, Australia, Emirates, Japan, Russia, Spain and United Kingdom. Table 3 presents the existing member countries and the rating systems used in each country. It is interesting to note that LEED and Green Star have been adapted for use in other countries and that the BREEAM, CASBEE and EEWH are only used nationally.

Table 2 WGBC Member Countries and the Rating Systems used

Country	Rating System Used
Australia	Green Star
Canada	LEED Canada N-C 1.0 (Adapted from GBC USA's rating system)
Emirates	LEED Green Building Rating System (Adapted from GBC USA's rating system)
India	LEED India (Adapted from GBC USA's rating system)
Japan	CASBEE
Mexico	LEED Green Building Rating System (Adapted from GBC USA's rating system)
New Zealand	Green Star NZ Adapted from GBC Australia's rating system)
Taiwan	Ecology, Energy saving, Waste reduction and Health (EEWH)
United Kingdom	BREEAM
United States of America	LEED

The rating systems used by the existing GBCs will be reviewed, together with the SBAT:

- The Building Research Establishment (BRE) developed BREEAM in 1990, which has been adapted for Canada, Emirates, India and Mexico (see Table 2). The method is available for offices, housing, courts, industrial units, prisons, retail and schools.

  BREEAM uses nine categories to assess building performance, including management, energy use, health and well-being, pollution, transport, land use, ecology, materials, water. (http://www.breeam.org/)

- The United States GBC (USGBC) developed the LEED (1993) tool, which has been adapted for Canada, Emirates, India and Mexico (see Table 2). LEED assessment tools are voluntary, consensus-based national rating system for developing high-performance, sustainable buildings.

  LEED uses six categories, including sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation. (http://www.usgbc.org/LEED/)

- Comprehensive Assessment System for Building Environmental Efficiency (CASBEE, 2002), a labeling tool based on environmental performance of buildings developed in Japan by the Japan Sustainable Building Consortium (JSBC). The tool evaluates new, existing or renovated offices, schools and apartments.

  CASBEE uses four primary categories: energy efficiency, resource efficiency, local environment, indoor environment. (http://www.ibec.or.jp/CASBEE/english/index.htm)

- Australia developed Green Star (2003), which has been adapted for use by New Zealand. This environmental rating scheme evaluates the environmental design and achievements of buildings. Green Star drew from existing rating systems including BREEAM and LEED, but it is tailored to the Australian marketplace and environmental context. The rating scheme is used to assess new and existing offices.

  Green Star uses ten categories including energy, management, water, indoor environmental quality, transport, ecology and use, emissions, materials, innovation. (http://www.gbcaus.org/)

- Ecology, Energy saving, Waste reduction and Health (EEWH) System, is a green building certification system in Taiwan. It was launched in 1999. No information was available regarding the building types and building lifecycle stages assessed.

  EEWH comprises nine indicators that fall into four categories - ecology, energy saving, waste reduction and health (Wikipedia contributors, 2008).

5 Assessment Framework

Table 3 Summary of Global Commitments to Sustainable Development

	Summary of UN Millennium Development Goals, ISO Framework for Environmental Assessment, Global Reporting Initiative Guidelines, The Living Planet Report	BREEAM	CASBEE	EEWH	Green Star	LEED	SBAT
ECONOMIC	Poverty eradication						■
	Develop Global Partnership						
	Employment						■
	Labour / Management relations						
	HR Investment and procurement policies						■
	Economic performance						■
	Market presence						
	Indirect economic impacts						
ENVIRONMENTAL	Ensure environmental sustainability	■	■		■	■	■
	Environmental impacts of buildings (materials)	■	■	■	■	■	■
	Environmental impacts of buildings (energy)	■	■		■	■	■
	Environmental impacts of buildings (water)		■		■	■	■
	Environmental impacts of buildings (waste)			■			■
	Environmental impacts of buildings (emissions)	■			■	■	■
	Environmental impacts of buildings (renewable resources)						■
	Environmental protection	■		■	■	■	
	Environmental legislation						
	Products and Services						
	Transportation	■			■		■
	Accessibility		■				■
	Adaptability	■	■				■

	Flexibility	■					■
SOCIAL	Training and education						■
	Quality of life						
	Diversity and equal opportunities						
	Health			■			■
	Public / stakeholder participation						■
	Public / stakeholder awareness						■
	Safety						■
OTHER	Durability	■					
	Maintainability	■					
	Indoor air quality	■			■	■	
	Indoor environments	■					
	Management				■		
	Design and innovation				■	■	

6 Discussion

Table 4 presents a summary of the literature reviewed. This finds that since the broadening of the scope of sustainability in the early 1990s, a number of organizations have followed suite (i.e. the GRI and the Living Planet).

The framework for assessing the performance of buildings developed by ISO has, however, continued to concentrate on the environmental performance. This focus on environmental aspects can also be seen in the assessment tools reviewed (see Table 2).

It is interesting to note that although the JSE requires listed companies to report on all aspects of sustainability, including non-financial ones (social and environmental), the newly formed GBCSA's focus is solely on environmental issues (as derived from the council's use of the environmental assessment rating tool, Green Star).

Table 4 Summary of the international and local activities related to Sustainable Development

Year	Economic	Social	Environmental
2004	Johannesburg Stock Exchange (JSE) Securities Exchange – the Socially Responsive Investment Index		
2005	Strategic Framework for Sustainable Development in South Africa		
2005			ISO: Framework for Assessment of Environmental Performance of Buildings
2006	Global Reporting Initiative third generation (G3)		
2007			Green Building Council of South Africa
2007	The Living Planet Report		

Cole (2003) stated that assessment methods would need to broaden *"the scope of discussion beyond environmental responsibility"* by embracing *"the wider agenda of sustainability"* which equates social and economic aspects with environmental ones.

7 Conclusions

There have been some activities within the sustainable development field since the SBAT was completed in 2003; however none of these activities negatively affect the SBAT framework.

In contract, they serve to confirm that the SBAT reflects the progress of the wider field of sustainability performance measurement, which seeks to broaden *"the scope of discussion beyond environmental responsibility" by embracing "the wider agenda of sustainability"* (Cole, 2003).

The SBAT is currently the only assessment tool which assesses all three aspects of sustainability; however, it has not maintained its potency through the release of updated versions as suggested by Cole (2003).

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