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Quality Education and Sustainable Development: What Can Ethiopian HEIs learn from other global Institutions to sustain itself and the planet at large? By Taye Alamirew, Federal Ministry of Ethiopia

Abstract

In an era of dramatic human-induced environmental problems and failing socio-economic and institutional systems, it is widely recognized that higher education has the legal, ethical and moral responsibility to transform itself to become a leading force in catalyzing societal changes for sustainable development (SD) by seriously threatening the well-being of current and future generations. The objective of this paper was to review how HEIs around the world are addressing SD principles and to draw lessons to Ethiopian Universities. Methodologically, the paper is a systematic review of study reports, international agreements, charters and declarations and practical University response case illustrations. Therefore; document analysis (content) of secondary sources that are published in scholarly journals, discussion papers, government working papers, declarations around the world were explored, sorted, classified and merged. Case syntheses show that numerous HEIs sector-specific sustainability agreements, charters and declarations have been created identifying areas which need to be addressed. Despite the action needs to be taken are voluntary and not legally binding, curricula, research, campus operations, community outreach, university collaboration and exchange, educating the educators, embedding SD in to the institutional framework and in daily campus experiences, transdisciplinary , assessment and reporting related issues are commonplace regarding addressing sustainability principles in HEIs. In Ethiopia, despite HEIs are responding to sustainability agenda specially in the area of agriculture, environment and resource management by addressing SD principles, institutional wide policy responses and practices are inadequate across disciples. Therefore; reorienting curricula, exercising progressive pedagogies, developing partnership and quality standards for SD, integrating SD in to research and development at university level, integrating SD in to the qualifications framework and learning outcomes, integrating SD into quality assurance systems are some of the lessons drawn from global experiences to be reconsidered in Ethiopian HEIs contexts.

Key words: sustainability, sustainable development, sustainable higher education

Introduction

Humanity is increasingly exceeding environmental limits (Rockström, 2009) and extreme poverty remains widespread (UNDP, 2008). "Business-as-usual" measures do not suffice for sustainable development to succeed. Far reaching system changes are needed, which challenge and fundamentally alter our prevailing ways of development, including our fundamental beliefs, values and assumptions regarding what constitutes development (Rees, 2010). The first essential and logical step should be to eliminate clearly unsustainable practices (Cairns, 2004). Historically, the issue of sustainability and sustainable development (SD) were driven by environmental concerns in mid 1960s which represented a response to the onset of rapid growth of population and production (Rohweder, 2007). The need to curb this negative side of development and

consequent depletion of natural resources has led to the publication of numerous documents such as *Silent Spring, Limits to Growth, Blue print for Survival, and Small is Beautiful*. SD was discussed for the first time on a global level at the UN Conference on the Human Environment, held in Stockholm in 1972. This meeting for the first time put environmental concern on the international political agenda. However; the shift from a concern for the environment to a concern for a SD was a result of the next milestone in 1987, when the UN World Commission on Environment and Development published a report entitled Our Common Future (also known as the Brundtland Commission; WCED 1987) defining:

> *"SD is development which meets the needs of the present without compromising the ability of future generations to meet their own needs".* In addition, the prologue argues that: *"The changes in attitudes, in social values, and in aspirations that the report urges will depend on vast campaigns of education, debate and public participation."*

During this meeting of government representatives and NGOs, quality education was identified as fundamental to the successful achievement of SD and a point that has been reiterated by numerous governments and practitioners in the intervening years. Since then, progress has been variable and generally unsatisfactory. However, a badly needed injection of urgency was administered in 2005 (UNESCO, 2005) when the UN adopted a Decade of Education for Sustainable Development (ESD). The goal of the ESD is to "integrate the principles, values, and practices of SD into all aspects of education and learning." The idea being that, such an input will "encourage changes in behavior that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations." Recognizing that human behavior can be altered to limit harmful effects on the environment, SD philosophy has evolved to include more than just recycling and constructing buildings with solar panels, but encompasses how individuals and communities behave and interact with the Earth. The ESD covers all levels of formal and informal education, but for this study formal higher education is chosen as the level of interest because of its influence on graduates who go on to become leaders in their communities, organizations and countries. In this regard, UNESCO (2004) identifies two unique opportunities for HEIs to engage in SD. First, "Universities form a link between knowledge generation and transfer of knowledge to society for their entry into the labor market. Such preparation includes education of teachers, who play the most important role in providing education at both primary and secondary levels. Second, they actively contribute to the societal development through outreach and service to society." Cortese (2003) seconds this notion, stating "HEIs bear a profound, moral responsibility to increase the awareness, knowledge, skills, and values needed to create a just and sustainable future. HEI often plays a critical but often overlooked role in making this vision a reality. It prepares most of the professionals who develop, lead, manage, teach, work in, and influence society's institutions." Thus, HEIs have a critical and tangible role in developing the principles, qualities and awareness not only needed to perpetuate the sustainable development philosophy, but to improve upon its delivery. In particular, Universities are expected to be part of ESD via their main functions of teaching, research and community engagement. Through teaching, universities are expected to teach students about sustainable development with a view to encourage them to make sustainable choices (Clugston and Calder, 2002). Through community engagement, universities have the potential to go beyond the university community to engage people in the community on sustainable development. The role of

universities in ESD is made more important by the fact that the students they teach are the decision-makers of the future. They are the future developers and managers of society's institutions. Universities also have great influence on industry and government policies and decisions. Investing in higher education is therefore essential to the production of the experts needed to address sustainability and other societal problems. So, how are higher learning institutions responding to sustain themselves and the planet at large? So, the principal aim of reviewing the contemporary literature related to sustainable development and higher education was to establish how higher educations in different national educational systems are responding and contributing to sustainable development agenda.

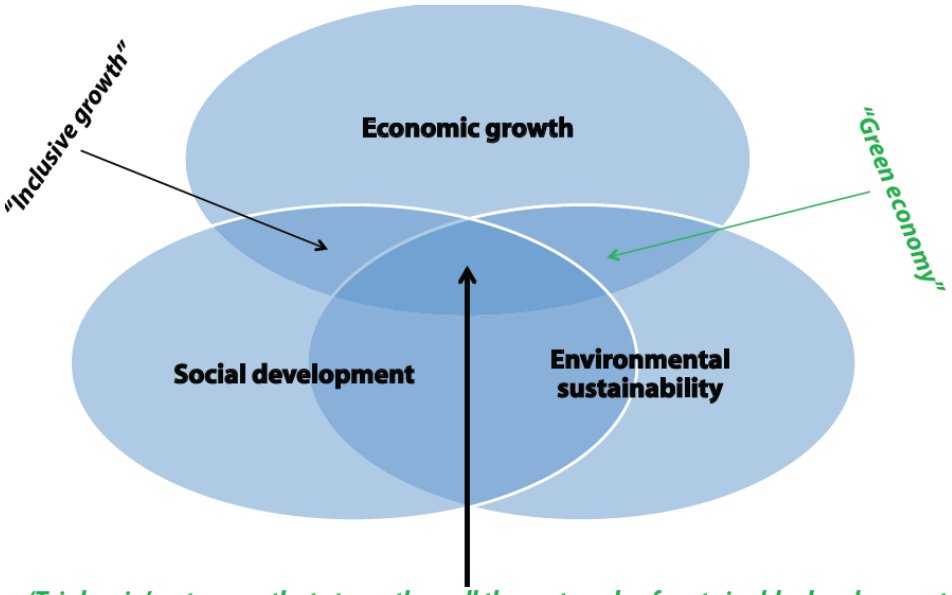
Theoretical frameworks, Concepts and Developments

Definitions and concepts: Sustainability and Sustainable Development

The idea of sustainability can be conceptualized as : sustainability as ideology and therefore political; sustainability as (socially constructed) reality (and as such a phenomenon to be taken seriously); sustainability as negotiated, the result of (on-going) negotiations; sustainability as contextual, its meaning is dependent on the situation in which it is used; sustainability as vision to work towards' sustainability as dynamic and/or evolving concept; sustainability as controversial and the source of conflict (both internal and with others); sustainability as normative, ethical and moral; sustainability as innovation or a catalyst for change; sustainability as a heuristic, a tool to aid thinking; sustainability as a (temporary) stepping stone in the evolution of environmental education and environmental thought etc (Wals and Jickling , 2002, pp. 226-227). So, sustainability is...the reconciliation of three imperatives: The ecological imperative (to stay within the biophysical carrying capacity of our planet); the economic imperative (to provide an adequate material standard of living for all) and the social imperative (to provide systems of governance that propagate the values that we want to live by).

Goal and Scope of SD

The overall goal of SD is the long-term stability of the economy and environment; this is only achievable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision making process. SD has three components: environment, society, and economy. The United Nations World Summit (2005) affirmed the concept of three 'pillars' of sustainability - the economic, social and environmental factors that need to be taken into consideration, and their cultural context. If you consider the three to be overlapping circles of the same size, the area of overlap in the center is human well-being. As the environment, society, and economy become more aligned, the area of overlap increase, and so does human well-being. The vision of sustainable human society resides in the simultaneous and synergistic creation of economic growth and equity, conservation of natural resources and the natural environment, and sustainable social development and social justice. It is often visually represented as follows:



'Triple win' outcomes that strengthen all three strands of sustainable development

There is increasing recognition that these three factors are interconnected, overlapping and interdependent.

Education for Sustainable Development (ESD) and Sustainable Higher Education

Education for Sustainable Development (ESD)

Formal education is a type of learning that is institutionalized and that aims at realizing defined learning competences (values/attitudes, skills and knowledge) for defined target groups. Learning is the result of continuous interaction of an individual or a group with its physical and social environment, and includes formal (e.g. the educational system), non-formal (e.g. training on the job), and informal learning (e.g. family life and leisure time) (Van Dam-Mieras, 2006).

Drawing on both the 1987 definition of SD and its 2005 recalibration, the present guidance defines ESD as follows:

> *ESD is the process of equipping students with the knowledge and understanding, skills and attributes needed to work and live in a way that safeguards environmental, social and economic wellbeing, both in the present and for future generations (UNESCO 2012).*

Moreover; ESD means working with students to encourage them to:

- consider what the concept of global citizenship means in the context of their own discipline and in their future professional and personal lives
- consider what the concept of environmental stewardship means in the context of their own discipline and in their future professional and personal lives
- think about issues of social justice, ethics and wellbeing, and how these relate to ecological and economic factors
- Develop a future-facing outlook; learning to think about the consequences of actions, and how systems and societies can be adapted to ensure sustainable futures.

Goal and Scope of ESD

The goal of ESD is to teach the main beliefs underlying sustainable development with the intention of making students more ethical and responsible (UNEP, 2006). This is expected to make learners

proactive and to develop among them skills to plan for and find solutions to *sustainable* development challenges. The thematic areas to be addressed by ESD were identified by UNESCO (2005). They are multi- and interdisciplinary and, in addition to natural environmental issues, include social, economic and even political issues like poverty, gender health, peace, culture, human rights and ICTs. Besides developing understanding, awareness and the skills to cope with these issues among students, education is also tasked with improving access to quality education and re-orienting existing educational programmes (ibid). Thus, in addition to basic education, secondary education, appropriate technical and vocational education, higher education, lifelong learning including adult and community education, are all vital ingredients of capacity building for a sustainable future. This applies to all modalities of education – formal, non-formal and informal education. Education for sustainable development is equally relevant and critical for both developed and developing countries.

Sustainable Higher Education (SHE) and SD

Why Should Higher Education Engage in Sustainable Development?

Sustainable higher education has emerged in response to calls for universities to lead society towards a sustainable future (Cortese, 1992) and is considered a distinct but interdisciplinary specialization of study and practice within sustainability science (Filho, 2005) and education for SD (Fien, 2002). The University Leaders for a Sustainable Future (ULSF), which was during the 1990s, a leading organization regarding sustainable higher education and the secretariat of the Talloires declaration states it this way:

> *Sustainable higher education implies that the critical activities of a HEI are ecologically sound, socially just and economically viable, and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally healthy and equitable society. The institution would function as a sustainable community, embodying responsible consumption of energy, water, and food, and supporting SD in its local community and region."*(ULSF, 2012*)*

Higher education is generally seen as a major (potential) catalyst to work towards SD (Allen, 2000; Waas, Verbruggen, and Wright, 2010). The urgent societal need and broad call for SD allow higher education to assume a fundamental and moral responsibility in contributing to SD (Cortese, 1992; Waas, Verbruggen, and Wright, 2010). Through their societal mandate of advancing knowledge, educating leaders, and furthering societal progress and engagement (Clundston, 1999), institutions of higher education should be moral visionaries and centers of sustainability innovation and excellence. As "learning laboratories" campuses are to provide the lived experience of sustainable communities (M'Gonigle, and Starke, 2006). Sustainable higher education requires a holistic and systemic approach for at least the following reasons: it targets the whole system at the macro level and at the micro/institutional level and it requires fundamental or deep system transformations going beyond "add-on" implementation and fragmentation. A whole-systems approach addresses the whole system, recognizes that higher education is composed of interdependent subsystems and implies that all subsystems and their inter linkages should be

considered together for sustainable higher education as a dynamic equilibrium to be achieved (Lozano, 2006; Koester, Eflin, and Vann, 2006).

The Elements of Sustainable Development at HEIs

"Sustainability" implies that the critical activities of HEIs are (at a minimum) ecologically sounded, socially just and economically viable, and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally sound and socially just society. The institution would function as a sustainable community, embodying responsible consumption of food and energy, treating its diverse members with respect, and supporting these values in the surrounding community. In order to measure SD, it is important to understand which elements to measure. Cortese, (2003) claimed the HE system has four dimensions: education; research; campus operations and; community outreach. Lozano et al (2010) stated there are five elements to SD at HEIs: collaboration between universities; trans-disciplinarity; implementing SD through campus experiences; incorporating SD into the day-to-day activities; "educating the educators" and including SD in the institutional framework where SD becomes the "golden thread" running through all activities. Lozano et al (in press) highlight ten elements of SD common throughout many HE international agreements and declarations. These are: curricula; research; operations; outreach and collaboration; collaboration between universities; assessment and reporting; trans-disciplinarity; embedding SD in the institutional framework; facilitating sustainable development through campus experiences and "educating the educators"

Universities as challenging places for sustainability

Sustainability continues to emerge as a marching banner for all walks of life and all types of organizations. Individual corporations, responding to emerging global issues of environmental degradation, social injustice, and changing economic realities, are examples of organizations that are successfully using sustainability principles and practices to influence their core business models (Volkswagen Group, 2008; Lubin and Esty, 2010). Institutions of higher education are different. While they have stakeholders, not shareholders, they are otherwise not immune to many of external drivers behind the corporate shift to sustainability (Bardaglio and Putman, 2009; Lubin and Esty, 2010; Wright, 2010). Yet, implementing sustainability practices across all walks of the

campus often proves to be considerably more challenging than in a corporate environment because campuses have additional pressures (Bardaglio and Putman, 2009; Walton and Galea,2005). For example: 1) Institutions of higher education are typically tasked with the trinity of education, research and service; these three and sometimes competing orientations may dilute a focused orientation and create competing priorities; 2) different constituents demand different services. Universities are largely comprised of four personnel bodies – students, faculty, staff and alumni – each of whom have varying, and sometimes competing, priorities in terms of Sustainability; 3) campuses face management challenges akin to small cities as they must provide an array of support services in an increasingly complex environment – thereby prompting a sprawling horizontal organization, sometimes with diffuse focus; 4) new domestic competition from for-profit enterprises increasingly commodifies educational products and cuts into market share; 5) the typical structure of universities – including power concentrated at several levels and a philosophy of protecting tradition and academic freedom – hinders sweeping change.

Failures to implement SD

Humanity is increasingly exceeding environmental limits (Rockström, 2009) and extreme poverty remains widespread (UNDP, 2008)]. "Business-as-usual" measures do not suffice for sustainable development to succeed. Far reaching system changes are needed, which challenge and fundamentally alter our prevailing ways of development, including our fundamental beliefs, values and assumptions regarding what constitutes development (Rees, 2010). The variety of barriers to implementing actions required to achieve various visions of a sustainable HEI may be more widespread than and are particularly common where new, non-incremental strategies are introduced (Rietveld and Stough, 2004). Implementation strategies can compound problems such as confusion surrounding SD (Velazquez *et al.*, 2005) and the spreading of funds too thinly due to the broadness of SD concepts (Chau, 2007). These could be exacerbated by common problems such as: little motivation or realism (Boks and Diehl, 2006); the belief by many that SD is radical (Lozano, 2006a); a lack of knowledge (Davis et al., 2003) and a lack of support from administrators (Velazquez, et al., 2005) in Radford (2012). These are all compounded if there is a lack of leadership development for HEI sustainability managers (Tilbury, 2011b; Lozano, 2007). This may be reflected in the lack of a common path towards sustainability by universities (Tilbury, 2011c; Ferrer-Balas et al., 2008) in Radford (2012). Smith (2000) identifies four areas of systemic failure which may help to explain aforementioned failures of implementation: provision and investment failures; transition failures; lock-in failures and; institutional failures. Reitveld and Stough (2004) categorize barriers into six categories: resource; institutional and policy; social and cultural; legal; side effects and physical and other barriers. Foxon and Pearson (2008) also identify three sources of barriers to implementation of sustainability strategies: the low priority granted to long-term social and environmental problems; the inter-related nature of these problems leading to uncertainties in projected costs and benefits and the variety of sustainability goals, and therefore what is needed to achieve them, is often contested.

Methods and procedures

Study approaches

This paper uses a *systematic review approach* in order to investigate HEIs response to SD principles. A systematic review is a literature review following a rigorous, transparent and reproducible process, which aims to identify, select, appraise, analyze and synthesize, in a

systematic and comprehensive way, research evidence on a specific research topic (Cook et al. 1997; Transfield et al. 2003; Moynihan 2004). Systematic reviews are nowadays widely considered as the least biased and the most rational way to synthesize research evidence, and a powerful tool to provide the best available knowledge for decision making (Fox 2005; Moynihan 2004). The basic steps for a systematic review include: 1) formulating an explicit research question, 2) fixing inclusion and exclusion criteria, 3) finding relevant studies, 4) selecting the studies according to the inclusion and exclusion criteria, 5) assessing the quality of retained studies, 6) summarizing and synthesizing study results, and 7) interpreting the review results (Alderson et al. 2004; Moynihan 2004; Transfield et al. 2003).

This systematic review on addressing SD agendas by HEIs sets out to answer the following research questions: 1) what are the good practices of HEIs in responding SD principles via teaching, research, community relations and institutional management? 2) What are the areas where policy solutions may be needed to support higher education's contribution to SD as a lesson to Ethiopian HEIs?

To be included in the review, a study should deal with 'sustainability', 'sustainable development', 'education for SD',' sustainable higher education development', and treat conceptually and/or operationally at least one of the two research issues (i.e., good practices and policy areas as a lesson). Peer-reviewed papers published, discussion papers, working papers, conventions, declarations etc between 1970 and 2015, as well as research reports were considered. Guided by these procedures, a Google search was made using the search phrase "Higher Education and Sustainable Development, pdf" displaying about 2,420,000 results (0.57 seconds) and "Higher Education response to Sustainable Development, case studies, pdf" displaying about 2,710,000 results (0.55 seconds). So, over 85 sources (journals, conference proceedings, discussion papers, book chapters and working papers) that fit for the purpose of the review were (purposive sampling) downloaded, evaluated, integrated and finally synthesized to inform readers.

Observations and Reflections: Findings

The sustainability movements and milestones in higher education began in the early 1970s with the Stockholm Conference on the Human Environment (1972) being the first to formally identify the role of higher education in progressing SD at the international level. This was followed by the Belgrade Charter (1975), the Tbilisi Declaration (1977) and the United Nations Conference on Environment and Development (1992) all acknowledging the importance of education and higher education in progressing this agenda.

Legal, Policy and practice Responses to SD agenda around the world

Declarations:

Demonstrating their commitment since the 1990s, and as a first step on the institutional level, HEIs worldwide have increasingly embraced the SD movement and more than 1000 institutions have signed international declarations towards implementing SD: Talloires Declaration (1990), Halifax Declaration (1991), Kyoto Declaration (1993), Swansea Declaration (1993), COPERNICUS Charter (1994), Thessaloniki Declaration (1997), Lüneburg Declaration (2000), Barcelona Declaration (2004), Graz Declaration (2005), Turin Declaration (2009) and Abuja Declaration (2009) (Lozano,

R., et al. (in press)). The major themes that occurred in these declarations include (Wright, 2002, p. 214-218; Wright, 2004, p. 13-17):

- Moral obligation: universities are morally bound to create change through preparing graduates to deal with environmental problems.
- Public outreach: universities should apply their knowledge in solving the problems of society in the communities in which they reside.
- Sustainable physical operations: greening the campus is considered a key component in becoming more sustainable.
- Ecological literacy: there is need for universities to aid the development of an environmentally literate people to help in understanding the functions of world, human impacts on the biosphere and translation of understanding to action.
- Develop interdisciplinary curricula: subjects studied should show a link to the environment to help students become more environmentally literate.
- Encourage sustainable research: encourage research that contributes to local, regional and global sustainability.
- Partnership with government, non-governmental organizations (NGOs) and industry: this is an encouragement for coordination of efforts since the university cannot create social change on its own (at various levels).
- Inter university cooperation: this will facilitate sharing of information and cooperation in pursuit of practical solutions to the sustainability problem

Becoming a signatory to a declaration is only the beginning of the process toward achieving sustainability within universities. Much remains to be done for SD to become genuinely and fully implemented and for higher education to become a true leader in SD.

Specific Cases Illustrations to HEIs Response to SD Agenda:

During the last two decades HEIs worldwide have implemented various SD initiatives. There are many examples of where HEIs have incorporated SD policies and practices. For example: at Tokyo's Todai university the overall research aims are to adopt a transdisciplinary approach to developing global sustainability strategies (Ferrer-Balas *et al.*, 2008); at Universitat Politčcnica de Catalunya, SD is cemented as the basis for internal processes and for institutional policy through the institutional framework (Ibid.); lecturers from different disciplines at Tecnológico de Monterry have collaborated to design SD courses for educators (Lozano-García, 2008). Steps such as these can inspire students, such as at the University of British Columbia where 37% of students at felt inspired by the institution's commitment to sustainability (Pagani, 2008).

Table1. Case Illustrations

Actions	Examples	University and country
Using resources efficiently	reduce energy and raw material use; drive waste out of the system	Universitat Politecnica de Catalunya (UPC), Spain; Institute of Technology Sonora (ITSON), Mexico

Developing the new economy	*exploit teaching, research, business development opportunities in low-carbon, high human creativity economy*	Turku University of Applied Sciences, Finland Oberlin College, USA
Conserving and enhancing the environment	*subscribe to low-impact travel schemes; - increase biological mass and diversity (on campus and locally)*	Portland State University (PSU), USA; University of Copenhagen (UC), Denmark; University of the Sunshine Coast, Australia
Attracting and retaining high caliber staff and students	create community of purpose for staff, students, other stakeholders; be values led *organization; ensure healthy working culture and physical environment; be active on diversity*	Chalmers University of Technology, Sweden
Providing quality student experience	*be a values led organization; ensure healthy working culture and physical environment; enhance employability of graduates; ensure sustainable literacy for all*	University of Plymouth, UK; Chalmers University of Technology, Sweden
Promoting lifelong learning	*mix on/off campus learning experiences for both students and community; clear learner paths in and out of higher education – from school, further education, work, non-working*	Hosei University, Japan
Fostering governance and management	ensure clarity and coherence in strategic planning and well trained managers; *modernize charters, decision-making systems to ensure transparency and democracy*	Portland State University, USA
Fostering excellence in research and teaching	*integrate student learning with campus improvement and community experience; sustainability research/consultancy; encourage innovation for sustainable design solutions*	University of British Columbia, Canada
Promoting community relations and outreach	*share sports, library, other facilities; build portfolio of joint ventures for student, staff and local residents; sustainable transport partnerships*	Tipperary Institute, Ireland
Competing internationally/regionally	*structure and make relationships to facilitate ideas-innovation-implementation process; export models and programmes*	University of Graz, Austria
Modernizing risk management	*report on environment and social impacts as well as financial; use procurement strategies to support local markets and ethical trade*	Portland State University, USA

Responding to other policy agendas	*ensure equal opportunities/access and human rights; understand employer demands in context of future needs; renew purpose of HEI; provide leadership for society in complex, rapidly changing times; higher education to set as well as respond to agendas*	Institute of Technology Sonora (ITSON), Mexico

The case studies show that HEIs are concerned with more than simply limiting carbon footprints, and that institutions are engaging in creative and resourceful ways to change learning and limit environmental impact. These case studies illustrate the seemingly limitless possibilities available for HEIs to engage in sustainable development. From transport policies to procurement policies to resource conservation efforts and waste management, the surveyed universities are creatively responding to the economic, social and environmental challenges posed by sustainable development theory.

Education and Learning approaches for Sustainability

The higher education declarations on sustainability explicitly acknowledge and confirm the importance of learning, communication and capacity building for SD. However; it is not simply a matter of integrating new content into our education programmes or building sustainability literacy across all subject areas but it requires the unpacking of social, economic, cultural as well as environmental assumptions which serves the status quo and which are reproduced by our education systems (UNESCO 2002). As Galang (2010) remind us centuries of teaching resource extraction need to be questioned and learning efforts redesigned so that professionals understand the responsibility and implications of sustainability for their area of influence. The focus has been on developing new specialist courses on sustainable development (e.g. University of Phillippines; TERI India; Dalhousie University) which are improving the sustainability literacy and capabilities of those interested in pursuing careers in this area. Curriculum and pedagogy which are at the core of higher education experiences need to be transformed if universities and colleges are to make a meaningful contribution to sustainable development (UNECE 2011). Arguably the Australian Research Institute in Education for Sustainability and through its business education (ARIES) work has challenged dominant assumptions within existing programmes; developed inter and intra-university partnerships to support systemic change; built staffs' confidence and expertise in sustainability; addressed the professional capacities as well as responsibilities of the students; as well as embraced the dual challenge of pedagogical and curriculum development for sustainability.

Table 2 .Shifts in Learning and Teaching Approaches for SD

Shift from	Moving towards
Transmissive learning	Learning through discovery
Bolt-on additions to existing curricula	Innovation within existing curricula
Passing on knowledge and raising awareness of issues (Teacher-centered approach)	Questioning and getting to the root of issues (Learner-centered approach)
Teaching about attitudes and values	Encouraging clarification of existing values
Seeing people as the problem	Seeing people as change agents
Sending messages about sustainable development	Creating opportunities for reflection, negotiation and participation
Raising awareness and trying to change behavior	Challenging the mental models which influence decisions and actions
More focus on the individual and personal change	More focus on professional and social change
Accumulating knowledge and content	Self-regulative learning and real issue orientation
Negative 'problem-solving' approaches	Constructive creation of alternative futures
Isolated changes/actions	Learning to change Teacher-centered approach
Individual learning	Collaborative learning
Low-level cognitive learning	Higher-level cognitive learning
Theory dominated learning	Praxis-oriented learning (theory & experience)
Institutional, staff-based teaching/learning	Learning with and from outsiders

Source*:* Sterling (2004)

It should underline that sustainable education targets "all" students. Therefore, and adopting a holistic perspective, sustainable education is not solely about separate courses or programs but also, and more fundamentally about, integrating SD and its implications for education in existing and traditional ones(Holmberg and Samuelsson, 2006).

Research for Sustainability in Higher Education

It is generally acknowledged that research, as a generator of new knowledge, including the one conducted at universities, is pivotal for SD. The "Declaration on Science and the Use of Scientific Knowledge", adopted at the World Conference on Science, held in Budapest in 1999 and co-organized by UNESCO and the International Council for Science (ICSU), firmly states:

> *The sciences should be at the service of humanity as a whole, and should contribute to providing everyone with a deeper understanding of nature and society, a better quality of life and a sustainable and healthy environment for present and future generations* (UNESCO-ICSU, 1999).

While further exploration and development are necessary, several generic characteristics of such a holistic approach for research in higher education for SD are introduced such as: action orientation, continuity, environmental, safety and security management, independence, knowledge transfer, local–global level of scale, local knowledge, multidimensionality, multi-/ inter-disciplinarity, participation , precautionary principle and uncertainty, public interest, short, medium and long term perspective (inter-generationality), societal peer review, sustainability impact, sustainability relevance, transparency (Waas, Verbruggen, and Wright, 2010). Anticipating the research requirements of SD, a "vibrant movement" of various disciplines is emerging (Clark and Dickson,2003) applying a wide variety of scientific approaches, often through sustainable science characteristics: multi-, inter- and intra-disciplinarity, co-production of knowledge & participation (trans-disciplinarity), normative, systemic integration, exploratory character, recognizing its own limitations and assumptions, learning-oriented perspective, production of socially robust and socially relevant knowledge, attention to system innovation and transition (Hugé, 2012).

Table 3. Research for sustainability

Shifts from	To be more inclusive of
Research which is discipline focused	Research which is inter and multidisciplinary
Research that has academic impacts	Research which has social impact
Research that informs	Research that transforms
Research on technological and behavior change	Research that focuses on social and structural change
Researcher as expert	Researcher as partner
Research on people	Research with people

Source: Marie Curie IIF 2011

It is widely acknowledged that sustainability requires forms of research activity which challenges boundaries at several interfaces, not least between academic disciplines and research paradigms, across professional roles and in relation to professional values.

Sustainable Campus Operations

The majority of the universities engaged with sustainability are preoccupied with the greening of the campus. The evidence for this can be found within research papers published in journals of higher education but also across institutional web pages which document extensive sustainability efforts to minimize waste and energy consumption; develop low carbon buildings; protect biodiversity and natural space; source sustainable goods and services; and model sustainability to influence behaviors of staff, students and local communities. Examples of good practice in campus management for sustainability have been documented across the world. The ISCN Sustainable Campus Excellence Awards capture and celebrates the diversity of responses to challenges in this field. Interesting examples often not celebrated through high profile awards include: the University of Hong Kong's systematic efforts to reduce environmental impact and conserve natural environments; the University Autónoma of Madrid eco-campus which creates innovative and effective opportunities for engaging staff and students in sustainability activities; Mabada Univerity in Lebanon which recycles its water and generates its own electricity (Salame 2010). Equally, the Universidad Autónoma del Estado de Morelos (UAEM) in Mexico provides an exemplary case

study of how to progress campus change for sustainability through internal and external partnerships. Sustainable campus operations up until now mostly dealt with the environmental management of higher education institutions (Waas, Verbruggen, and Wright, 2010) in order to reduce the environmental impact of their various activities. However (re)orienting campus operations towards SD is much broader than recycling programs and energy efficiency and includes socio-economic objectives and stakeholder participation as well (Lozano, 2006 ; Cole, and Wright, 2005). For example, the Campus Sustainability Assessment Framework (CSAF) (Cole, and Wright, 2005), adopts such a broad perspective and distinguishes two broad categories. The first is Environment, which is subdivided into the following dimensions: 1) air, 2) water, 3) land, 4) materials and 5) energy. The second category is People who are subdivided into the following: 1) knowledge, 2) community, 3) governance, 4) economy and wealth, and 5) health and well-being. Each of these is further subdivided in a number of elements (Cole, 2003).

Leadership and Strategy for Sustainability

Implementing SD in institutions of higher education implies moving from a current situation towards a desired situation (a period of transition). Research shows that such a process of change requires at least six key elements for success: Advocacy is the impetus to begin the change movement, Policy addressing the proposed change(s) is required, Resources for the change movement are imperative, and Leadership is the key for a successful change movement. The strategic implications of sustainability are innovation not integration of this agenda into mainstream institutional structures and practices (Sterling 2004; Tilbury et al 2005). In other words, translating signatures on international declarations into institutional responses requires adjustments to academic priorities, organizational structures, financial and audit systems (Ryan et al 2010). A review of journal articles accompanied by a web search reveals that there are several leadership for sustainability initiatives across the globe which essentially target senior managers from the corporate sector (see for example the *Cambridge Programme for Sustainability Leadership*). Universities do operate as business at one level but at another level academic change for sustainability requires a different model of leadership and thus existing programmes are of limited value senior management teams working with higher education concerns.

Partnerships and Outreach: Sustainability beyond the University walls

The issues and solutions for progressing sustainability lay with universities and the sector itself. However, it must reach beyond the university walls to address sustainability within the communities of practice which they serve (Ryan et al 2010; Lotz-Siskita 2011). The last ten years, have therefore seen a stepping up of activity relating to partnerships and outreach for sustainability. The University of Western Sydney is an example where the sustainability efforts have been constructed through an approach situated within their locality and with a focus on supporting the communities closely linked to the University. The partnership is particularly active in issues of watershed management. The journey of transforming the institution towards sustainability has been shared particularly with community and government stakeholders. The King Abdullah University of Science and Technology runs a community-wide recycling and compost scheme where problems and solutions to the waste issue are co-constructed with local stakeholders (Salame 2011). In the Philippines teacher education partnerships have redefined town and gown relationships (Galang 2010). Whilst at the University of Gloucestershire in the UK an edible garden had brought together local residents, students, staffs as well as local government support and enforcement agencies in

learning skills in perm culture design, food awareness and community building. Worthy of attention, are the United Nations University (UNU) accredited Regional Centers of Expertise (RCE) which focus on partnership learning and action for sustainability. In the US, Partnership for Education for Sustainable Development established in 2003 had brought together schools, science and research, faith organizations, NGOs, government agencies and youth advocacy groups to support implementation of sustainability initiatives. Lotz-SisKita (2011) reports a parallel trend in Africa where, universities are seeing sustainability as an opportunity to redefine university-community relationships. She presents evidence that institutions are making tangible contributions to local communities through addressing issues of peace, security, conflict resolution and HIV/AIDS. She cites Uganda Martyrs University and its improving livelihoods initiative which has resulted in improved income; food security, water conservation and sustainable livelihoods as well as better relationships between the university and the communities it neighbors with.

Modeling Practice across Campuses

The majority of the universities engaged with sustainability are preoccupied with the greening of the campus. The evidence for this can be found within research papers published in journals of higher education but also across institutional web pages which document extensive sustainability efforts to minimize waste and energy consumption; develop low carbon buildings; protect biodiversity and natural space; source sustainable goods and services; and model sustainability to influence behaviors' of staff, students and local communities.

Summary, conclusion and future directions

The term "sustainable development" is the catchphrase in current discourse on holistic development. According to Lélé (1999), "Sustainable development (SD) has become pervasive. SD has become the watchword for international aid agencies, the jargon of development partners, the theme of conferences and learned papers, and the slogan of developmental and environmental activists". This pervasiveness is an acknowledgement of the reality of the many crises the world faces; a prominent one being the ecological crisis. Today, there is increasing acknowledgement that the quality of the environment, especially the ecological aspect, has drastically reduced, so much so that the situation needs immediate attention. It is also admitted that the crises the world faces and the ecological crisis in particular, are convoluted. If we follow all the conferences from 1972 to 2002, we can observe that there was the shift in the political debate from a primary emphasis on environmental issues at the 1972 Stockholm Conference, through a shared focus on environmental, social and economic development at the Rio de Janeiro Earth Summit in 1992 where leadership formally adopted SD as a leading development model, to arguably a primary emphasis on poverty alleviation at the Millennium Summit in 2000 and at the Johannesburg World Summit in 2002. SD is a visionary development paradigm; and over the past 20 years governments, businesses, and civil society have accepted SD as a guiding principle, made progress on SD metrics, and improved business and NGO participation in the SD process. It is generally accepted that SD calls for a convergence between the three pillars of economic development, social equity, and environmental protection. Across the word, Universities and HEIs are giving SD a place in curricula, education and research program; are making a leading principle in their own logistics and managerial processes; playing as local knowledge centers. Also, an increasing number of HEIs are responding to this concern with action encouraged by a common perception that the potential impact of HEIs on sustainability efforts is significant but in Ethiopia,

legally and practically, are not well harmonized unless some universities offer courses for specific undergraduate and postgraduate program in the areas of agriculture, environment and natural resources. To this effect, despite HEIs are responding to sustainability agenda specially in the area of agriculture, environment and resource management by addressing sustainable development principles, institutional wide policy responses and practices are inadequate across disciples.

Way Forward

Sustainability is a paradigm for thinking about a future in which environmental, social and economic considerations are balanced in the pursuit of development and an improved quality of life. Embraced by many stakeholders worldwide (e.g. governments, businesses, non-governmental organizations, higher education, and citizens), SD is deemed highly imperative for the current and future well-being of humanity and the planetary state. In this regard, creating sustainable HEIs is vital by incorporating sustainability concepts, skills and values into core policies and stimulating students to reflect on environmental problems and forming local and global partnerships; acting to protect and enhance the wellbeing of people and ecosystems and helping society make the transition to a more sustainable state through minimizing its own negative impacts and promoting positive behaviors' through its diverse activities (Radford, 2012).

In Ethiopia, we are facing critical environmental, social and economic challenges visa a vis rapid population growth, which require new ways of thinking and acting. We need to prepare our students by educating them in the basics of SD and preparing them to take their places as environmentally, socially and economically literate citizens, consumers, workers and leaders of today and tomorrow. Therefore ; as major contributors to the values, health and well being of society, higher education has a fundamental responsibility to teach, train and do research for sustainability as the success of higher education in the twenty-first century will be judged by the ability to put forward a bold agenda that makes sustainability and the environment a cornerstone of academic practice. Therefore; the following lessons are drawn from global HEIs experiences to be reconsidered by Ethiopian HEIs.

Visioning SD

A visioning exercise and the resulting vision statement are constructive tools for HEIs to use as part of a transformative strategy and as future reference for consultation on progress. It serves as an ideal concept from which the institution can move forward. To effectively shift away from current practice and implement the statements, institutions should consider when drafting the visioning statement: where are we now? Where do we want to be? How do we get there? How do we make it happen?

Reorienting existing Curricula

Perhaps the greatest challenge of all is to reorient the higher education curriculum so that it aligns with SD. This requires not just the inclusion of relevant subject matter and the pursuit of inter- and trans-disciplinary approaches but also the development of education for SD competencies of university and college educators as well as learners. Including issues that enable graduate competencies such as systemic thinking; critical reflective thinking; futures engagement and values

clarification; the ability to deal with complex and contradictory situations; the capacity to work in partnership in order to facilitate transformative actions towards sustainability are vital.

Sustainability learning via Progressive Pedagogies (PP)

At the core of sustainability learning are knowledge, skills and values that lead to discourse on how to foster the mutual well-being of people and nature, and such learning requires an understanding and appreciation of sustainability concepts, processes and values. Sustainability learning involves knowing concrete concepts which are specific to contemporary sustainability concerns within a given body of knowledge. Such concepts necessarily vary according to issue, discipline, and context. For example: concepts may relate to the history of sustainability and the differences between various sustainability frameworks and world-views, they may relate to the science of climate change or the science of oceans or forests or food webs, or they may relate to social or economic resource inventories and/or resource allocation techniques. This cognitive learning should challenge students to move from remembering and understanding sustainability content, towards evaluating and applying concepts. Understanding sustainability processes, or procedural knowledge related to sustainability, can similarly be context specific, such as learning to apply skills and tools. For example learning how to: conduct a spatial analysis to benchmark changes in biota across time, asset-based community development for cities, value-chain mapping within business, or life-cycle assessments applied to infrastructure. Sustainability processes can also include skills such as learning how to be an effective change agent, a competency that cuts across issues and disciplines. This cognitive learning will start with an ability to describe the fundamental mechanics or steps in the process or procedure and, as the student gains expertise, will enable the application of the knowledge within a variety of unique contexts and challenging situations. Lastly, sustainability learning also necessitates the examination of personal values related to people and place. This requires an exploration of personal attitudes and beliefs relating to equity, justice, technology, and nature, applied within a variety of social contexts, including self, community, others, and ethnicity. Students grounded in sustainability knowledge thus need to participate in course-based activities that explicitly attend to affective learning and the personal development of sustainability-oriented values, attitudes, and beliefs. In this regard, transforming traditional pedagogies to progressive pedagogies is vita. Progressive pedagogies (pp) denotes the integration of a collection of teaching approaches under the ESD framework to extend practice beyond individual theories, methods or tools such as critical reflection & practice and problem solving, action/experience-oriented, student-centered learning, knowledge production through iterative interaction, life-long learning, cyclical process of collective (cooperative) inquiry. Outstanding sustainability teaching and learning start with the goal of producing graduates who have the knowledge, skills and motivation to contribute to crucial elements of society. Graduates must be prepared to understand uncertainty, and be skilled in working responsively, flexibly and adaptively to achieve significant shifts towards a sustainable world.

Integrating SD in to research and development at university level

The most important aims of research on sustainable development are to produce information on the environment, society and cultures so that the precursors of as well as possible hindrances to sustainable development can be identified and analyzed; to produce information and to develop action plans and technology that advance sustainable development, including education and training content and method; to create know-how whereby people can assimilate and apply

research results that have been produced elsewhere; to help as a nation those in a weaker position and to make an effort in solving global problems. Moreover; as a new research area, the extent to which learning communities grasp sustainable development concepts still needs to be explored across languages and cultures including students in formal and non-formal learning contexts, educators, community groups, policy makers, the private sector, youth and the media.

Developing partnership and quality standards for SD

Working in partnership with a wide range of other educational partners and maintaining an international perspective is a good starting point. This approach of learning in, by and between institutions, organizations and communities recognizes the interdependence of HEIs and other institutions and processes, and how actions, choices and decisions taken in one establishment can impact on the sustainability of quality standards.

Integrating SD into quality assurance

Innovative learning and teaching methods, the promotion of project initiatives of students as well as external learning processes (like environmental and social responsibility, cooperation in local and regional Agenda 21 processes, etc.) shall be accredited. Therefore standards (in terms of ecological and social qualifications) of education for sustainable development as part of an integrated and sustainable system of quality and accreditation for higher education institutions and for degrees (Bachelor and Master) should be included into the system of evaluation and accreditation of study courses and institutions.

Integrating SD in to the qualifications framework and learning outcomes

A person with a university degree will have the basic know-how and skills needed in the professional world and to work as an expert. Interacting in socially heterogeneous groups, acting autonomously and using tools interactively are indispensable prerequisites for an individually successful life and for the sustainable socio-economic and democratic development of society. And that is where education for SD comes in: to learn to know, to do, to understand, to be, also to be aware of our individual responsibilities to contribute, to make responsible choices, to respect diversity. These reference points support in particular the articulation of outcomes-focused approaches to national higher education frameworks of qualifications.

Conclusion

Generated by the Industrial Revolution and further advances in science and technology, the attitude of modern society towards sustainability was characterized by a combination of indifference and ignorance, predicated on the idea that humans can conquer the environment to get what they want without taking cognizance of the consequences of such actions. We simply ignored the trail of our ecological footprint and embarked on 'development', spurred largely by the desire for economic profit. Although the environmental movement began centuries ago, it was much later, in the 1970s that it started to gain traction and climaxed with the World Commission on Environment and Development report "Our Common Future" in 1987, and the growing recognition that it can no longer be business as usual, and that the environment is not our foe. Hence, the slogan, "environmentally friendly", "green", "organic", "renewable", "recycled" and more became catchphrases (Lumley and Patric, 2004). Yet, from Stockholm in 1972 - UN Conference on the

Human Environment, Rio de Janeiro in 1992 - UN Conference on Environment and Development, Johannesburg 2002 - the World Summit on Sustainable Development and, more recently the Climate Conferences in Copenhagen in 2009 and Cancun in 2010, the world's journey towards sustainability has been one of great challenge and promise. Even much worse is for developing countries especially Africa due to rapid population growth, corrupt and inefficient government systems, low technology innovation and utilization, recurrent draught, environmental degradation, poor investment and saving tradition. So, Africans, the o'clock is clicking either to survive safely or in deepen crisis, so, wake up, wake up politicians, scientists, activists, individuals etc and come together, table the agenda, consult each other, set options and solutions

In Genesis1:28-31 it is written

> *God blessed them saying, 'be fruitful, multiply, fill the earth and subdue it. Be masters of the fish of the sea, the birds of heaven and all the living creatures that move on earth" and God also said "Look, to you I give all the seed-bearing plants everywhere on the surface of the earth, and all the trees with seed-bearing fruits..."*

The implication here is that God wanted humanity to have a balanced interrelationship with the environment. To subdue means that the creator put man and woman in charge of the earth to manage and not to destroy. Human beings depend on the earth (environment) for food and other livelihoods, which means that the emphasis is on the interdependence of all things, i.e. people, animals, vegetation, atmosphere and social pressures. In the ecosystem, anything that one element does or anything that happens to one element of the system has consequences for all other elements. Environmental justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things. The Garden of Eden which epitomizes god's intention of peace and tranquility for humanity is brought out in Genesis 2:8. *In Genesis 2:15, man was given the responsibility to take care of the Garden of Eden and to keep it.* This resonates further with another principle of environmental justice which stipulates that a public policy should be based on mutual respect and justice for all people, free from any form of discrimination or bias.

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