



**INNOVATIONS AND
BEST PRACTICES ON
EDUCATION
FOR SUSTAINABLE
DEVELOPMENT
AND SUSTAINABILITY
IN UNIVERSITIES**

SUCCESS STORIES FROM AROUND THE WORLD

Enhancing sustainable development through greening of university curricula, infrastructure, facilities, operations, teaching, research, community engagement, university management, student participation and engagement

GUPES

Global Universities Partnership on Environment for Sustainability



Introduction

**Education for Sustainable
Development and
Sustainability innovations
in universities; simple
beginnings but remarkable
successes**

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Simple beginnings indeed lead to remarkable successes. This can be confirmed by the various Education for Sustainable Development and Sustainability innovations in universities across the world as gathered by UNEP's Environmental Education and Training Unit in the month of August 2011. Sustainable development is a long-term goal, which individuals and institutions alike need to pursue through appropriate means and mandates bestowed to them. In this regard, universities have a role to contribute towards sustainable development through their core mandates of teaching, research, community engagement as well as through other innovative strategies.

Given that the Global Universities Partnership for Environment and Sustainability (GUPES) aims at promoting the integration of environment and sustainability concerns into teaching, research, community engagement and management of universities, as well as enhance student participation in sustainability activities for sustainable development; UNEP's Environmental Education and Training Unit sent a request to participating universities to the high level planning meeting held at the Universidad Andrés Bello, Santiago, Chile on 5-6 September 2011 to share some innovations and good practices already in place at their universities.

The innovations shared and included in this publication show the great transformative potential that exists in universities. This, if initiated through simple beginning steps, can lead to widespread sustainability transformations not only in universities, but across societies. Moreover, there exists a lot of promise for even greater impact if these innovations are replicated in many more universities across the world.

The sustainability best practices and innovations as shared in this publication show innovative experiences that can serve as examples that can inform, inspire and motivate other higher education institutions and actors, thus helping them to start similar experiences in the fields described. They also demonstrate that integration of environment and sustainability concerns into university processes is actually a possible and worthwhile venture with inherent remarkable successes.

The best practices and innovations in universities cut across: Teaching (including curriculum, pedagogy and / or use of ICT); Greening of University infrastructure/facilities/operations; Community engagement; University management; as well as student participation and/or engagement with sustainability. Additionally, the best practices and innovations reflect the following:

- The intention of the UN Decade on Education for Sustainable Development, which requires re-orientation towards sustainable development
- Relevance to the social, economic and environmental contexts in the respective regions of the world and the way in which universities are responding to changing social needs
- Principles and values of sustainable development
- Sustainability and viability in the long term
- Processes of mainstreaming environment and sustainability into the 'normal' programmes and activities of the universities
- Evidence of links to, and partnerships with community institutions and/or industry and business
- Origins from the identification of a problem or opportunity in the framework of priority local and/or global environmental and sustainability as well as educational challenges
- The aim of providing an innovative and socially relevant response or solutions to situations or problems that arise in the higher education institution's internal or external context, as well as innovative approaches in their design, implementation and orientations.
- Evidence of active participation of the higher education institutions' communities including students, researchers, teachers as well as managers in some of the university bodies
- Contributions and partnerships which ensure that particular projects are coordinated with the society in the relevant field.

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Section One: Curriculum innovation and best practices for sustainable development

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SUCCESS STORY 1 - MAINSTREAMING CLIMATE CHANGE ISSUES AND ADAPTATION STRATEGIES INTO THE CURRICULA OF THE UNIVERSITY OF BUEA IN CAMEROON - AFRICA

Introduction

As a response to climate change, the University of Buea in Cameroon has embarked on developing and applying adaptation strategies to impacts of climate change through teaching.

Main Focus of the Innovation

In this innovation, members of an Interdisciplinary Climate Change Laboratory that was established in the university in November 2010, are incorporating Education for Sustainable Development (ESD) innovative processes into their teaching and conception of research themes for students at the undergraduate and post-graduate levels. This is based on an understanding of the past trends and future projections of climate change, as well as an appreciation of its impacts on water resources, natural hazards and food security. The results of research work are presented in seminars as well as to the local communities. Additionally, the content of a compulsory University course, CVE 100: Civics and Ethics, was modified in October 2011 to incorporate this ESD innovation process.



Background and overview of the innovation

This innovation at the university of Buea is informed and inspired by the fact that climate change has become a serious threat to human survival on this planet, and that it is actually an important issue of debate due to its impacts on economic developmental and socio-cultural issues. Even though controversies about its natural and/or anthropogenic causes, magnitude, and future projections abound, the truth is that during the past two to three decades, the rate of global warming and its impacts on climate change across the entire globe is unprecedented in recent and even geologic history as seen from the rates of extreme warming, sea level rises due to melting polar glaciers, droughts and associated famine, heat waves, depletion of water resources, sporadic precipitation events with accompanying floods and landslides, hurricanes, amongst others.

The frequency, intensity, duration and magnitude of climatic disasters had actually been predicted by scientists based on observed past increases in levels of carbon dioxide and other greenhouse gases in the atmosphere (IPCC, 2007). These events have been responsible for enormous socio-economic costs around the world. Regrettably, various protocols aimed at mitigating or reducing the concentrations of greenhouse gases to acceptable levels have hardly been respected by the countries producing the highest amounts of these gases. Furthermore, improved systems for monitoring and reporting extreme events linked to climate change are available in the developed world, while the developing countries such



as Cameroon are affected without prior sensitization and warning of the community due to lack of relevant expertise, innovative tools and methods, incentives, and more importantly government policies that favour holistic approaches for monitoring this phenomenon.

According to Allen, (2008), global temperatures from 2000 to 2008 are almost 0.2°C warmer than the average for the decade 1990 to 1999 with the year 2007 having been noted as the second warmest year in history. Past changes of this magnitude took thousands of years and species could adapt slowly and it is evident that if the present trends continue undisturbed, the effects will be disastrous even within the next 20 to 30 years thus the need to act now.

Adaptation approaches which understandably will be region specific are accordingly crucial at this point in time. For example, in Europe and the USA, increase in temperatures means more suitable conditions for the production of cereals such as maize while in Africa and Asia, production of crops such as rice and maize as well as cattle production amongst others will decrease with further increase in temperatures (Benhin, 2008). In the later instance, more resilient crops and animals are gradually taking over the vulnerable species. This therefore necessitates constant sensitization of the community and in particular, the future generation on adaptation and conception of resilience approaches towards the phenomenon.

The present ongoing innovative ESD process being handled within the framework of the Interdisciplinary Climate Change Laboratory of the University of Buea has accordingly been designed to:

Elaborate adequate scientific studies of the trends and impacts of the phenomenon from which adaptation strategies can be conceived and even incorporated with identified ongoing indigenous adaptation approaches.

Specifically;

Elaborate a strategy to mainstream adaptation strategies to climate change into the curricula of the University of Buea by incorporating topics on the

subject into a University compulsory course (Civics and Ethics).

Ultimately extend this mainstreaming process into curricula of other tertiary institutions in the country through the authorities of the Ministry of Higher Education.

Conceive and carry out research with postgraduate students on the trends and impacts of the phenomenon and utilise the results to further enhance the mainstreaming process and sensitise the community on adaptation strategies.



The Cultural Village at the University of Buea

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- Allen, Myles 2008. Climate Process: An insider's view of climate science politics and solutions. Retrieved from <http://climateprogress.org/2008/12/16>
- Benhin J. 2008. Climate change and agriculture in Africa. Impact assessment and adaptation strategies. Earthscan/CEEPA/World bank 2008. 224p.

Strengths of the ESD innovation

The initiative is highly appreciated by partners and students due to its innovativeness, impact on the beneficiaries, social and environmental relevance, long term sustainability, relevance for future planning and decision making, and mainstreaming strategy into teaching and further research.

Challenges

Some of the challenges faced in this innovation include the following:

- Refusal by farmers during field research to provide information on farming practices and crop yields over the years.
- Insufficient data for computation of degree and trends of climate change.
- Insufficient funds to cover cost of field work by researchers and the students concerned

Expected outcomes and social/environmental impact after say 3-5 years

Through this innovation, it is expected that graduates with high level of understanding of aspects of ESD in relationship to climate change will be produced. Additionally, the innovation will yield useful information on adaptation strategies to climate change impacts for local cocoa farmers and for the Delmonte-Cameroon Development Corporation (a banana plantation).

ADDITIONAL INFORMATION

Target beneficiaries:

Students, the local communities (especially farmers) and agricultural plantations.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

This ESD innovation is directly based on studies of the impacts of climate change which is a UNEP priority thematic area.

Partner organizations

National government: The university is occasionally invited by the Cameroon Academy of Sciences and the Africa inter-parliamentary Network on Climate Change to make presentations on aspects of this innovation.

Local government: The University of Buea works closely with the Local Council on matters related to impacts of climate change such as natural hazards and disasters – mainly landslides.

Media: University of Buea occasionally holds radio talks on impacts of climate change.

NGO's: The University of Buea collaborates with NGOs such as the Bio-resources Development and Conservation Programme (BDCCP-C) based in Yaoundé, Cameroon.

Education/research institutions: The University of Buea works on climate change issues in collaboration with the Hydrogeology Unit of the Institute of Geological and Mining Research, Younde Cameroon.

Business and Industry: The University of Buea is currently supervising two Master of Science (MSc.) theses on the Impacts of climate change on banana and cocoa production.

Others: The University of Buea plans to disseminate the results of research to the University community and to local communities through workshops, and media among others.

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Section One: Curriculum innovation and best practices for sustainable development



SUCCESS STORY 2 - A SYSTEMATIC APPROACH TO INSTALL ENVIRONMENTAL EDUCATION FOR SUSTAINABILITY (EES) AT UNIVERSITIES THAT ARE NOT YET SUSTAINABLE; THE CASE OF THE SCHOOL OF CHEMISTRY AND BIOLOGY AT THE UNIVERSIDAD DE SANTIAGO DE CHILE , CHILE – LATIN AMERICA.

Introduction

This innovation is inspired and motivated by the need to have sustainable development (SD) and environmental education for sustainability (EES) on campus at the Universidad de Santiago de Chile.

Main Focus of the Innovation

Systematic approach uses state of the art knowledge about campus sustainability models and indicators, along with educational models, to carry out EES in science education at the university level. An original workshop trains faculty on how the methodology should be applied in the local context, specifically to infuse sustainability into existing science courses, and to create original courses centered on sustainability thematic areas. The courses are defined according to competencies, and require the use of constructivist approaches.

Background and overview of the innovation

It is generally felt that, with the exception of several Mexican and some Argentine and Brazilian universities, sustainable development on campus is practically non-existent in most Chilean as well as other Latin American universities. These institutions share common needs and problems, including lack of environmental education across the curriculum, precarious campus environmental management systems, and general absence of sound sustainability principles and practice. The same is true for research on methods, environmental systems and sustainability science.

In this scenario, the School of Chemistry and Biology at the Universidad de Santiago de Chile realized that priority should be given to developing EES first, since education is the central activity in any campus. However, there was no systematic methodology readily available to accomplish that under the indicated constraints. To solve the problem the the School of Chemistry and Biology has used specific consideration and comparison of current literature that discusses models for campus sustainability (MCS), and especially models for EES. In this regard it selected three MCS which provided a framework that led it to the systematic approach to install only EES in a campus where sustainable development is absent. The three MCS –Velazquez’s Sustainable University, AASHE, and ACUPCC – were selected based on: 1) their structural framework and mode of application – which closely resembles the organizational structure of a typical Latin American university in regards to education, research, administration and community relations; 2) they have actually been used in universities; 3) they provide indicators to evaluate their effectiveness; and 4) they facilitate university-society relationships.

The systematic approach to install just EES comprises seven steps: local problem statement; updated literature review on MCS and systems; MCS selection and adoption; choice of EES indicators from selected MCSs; local EES design; selection of local EES indicators; and local campus implementation.

The approach operates as a quality cycle and can be updated and improved depending on local needs and campus characteristics.

In the case of first time application at the School of Chemistry and Biology at the Universidad de Santiago de Chile, step 5: local EES design was further elaborated as follows:

Taking inspiration and theoretical guidance from the successful Ponderosa- Piedmont model (USA), an original EES methodology allowed an implementation of the approach in the School of Chemistry and Biology to infuse sustainability in the curricula and science courses of the school’s undergraduate careers. At

the center of this EES methodology was a workshop to train faculty on how to adapt the approach to the local context, specifically to infuse sustainability themes, values and ethics into existing science courses using ad hoc procedures for didactic design, and to create original courses centered on sustainability thematic areas, such as climate change. The courses are defined according to competencies, and require the use of constructivist approaches, such as problem-based learning, inquiry, group projects and literature reviews.

Special consideration was given to the fact that the so called “education for sustainable development, ESD” is actually just a higher stage of development within the very powerful and inclusive realm of environmental education (EE). In other words there is no dichotomy and conceptually ESD cannot “replace” or “eliminate” EE. This strong view is shared by many authors and is based on the unique cultural values and historical discourse developed in the Latin American region in regards to the practice of environmental education. That is why the School of Chemistry and Biology at the Universidad de Santiago de Chile, refers to its approach as Environmental education for sustainability.

Strength of the ESD innovation

The EES approach provides solid ground to start environmental education for sustainability in campuses that are a long way from being sustainable. The program is supported by state of the art theory and models. As opposed to reported success stories (e.g. Ponderosa), this program at the School of Chemistry and Biology at the Universidad de Santiago de Chile allows direct access to key activities, such as know-how and resources to conduct, and benefit from, the workshop for faculty on EES. Besides, the workshop can be made available to train high school teachers. The innovation can also be transferred to other Chilean institutions.

Challenges

Some of the challenges faced in this innovation include the following:

- Insufficient SD knowledge by campus decision makers.
- Faculty are not sufficiently proficient on environmental protection and sustainability.
- Many faculty members do not fully understand nor appreciate interdisciplinary academic work.
- Scarce rewards for interdisciplinary research on sustainability science.

Expected outcomes and social/ environmental impact after say 3-5 years

It is expected that through this innovation, many faculty and high school teachers will be trained to conduct EES at their institutions of work. Many university students will also be equipped with the knowledge, principles and values of sustainability. Additionally, an array of courses and curricula, especially in the sciences, will emerge with sustainability infused.

ADDITIONAL INFORMATION

Target beneficiaries:

In the initial phase, the innovation is allowing faculty in the School of Chemistry and Biology to reformulate existing science courses, so that students obtain knowledge, attitudes and values for a sustainable professional life. It is however anticipated that the innovation will later be made available campus wide and to other universities.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

Systematic approach allows installing effective EES practice in a campus that is not yet sustainable. Methodology for EES facilitates infusion of sustainability thematic areas (e.g. climate change, green chemistry) into preexisting science courses, and also how to create

courses centered on sustainability, environmental protection and climate change

Partner organizations

National government- Ministry of Environment, Chile

Education/research institutions - Since 2009 Universidad de Santiago is a member of the Consortium of Chilean Universities for Sustainable Campuses.

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Section One: Curriculum innovation and best practices for sustainable development



SUCCESS STORY 3 - RE-ORIENTING TEACHING STRATEGIES OF THE PRE-SERVICE SCIENCE TEACHERS TOWARDS ACHIEVING EDUCATION FOR SUSTAINABLE DEVELOPMENT AT THE MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY IN UGANDA- AFRICA

Introduction

This innovation aims to address poverty, food insecurity, health and sanitation, as well as environmental degradation issues through teaching.

Main Focus of the Innovation

The project aims at retooling the teaching methods such that the teacher trainees are equipped with practical methods with emphasis on making subject content locally relevant to address local needs and perceptions; taking into account context, local priorities and global developments; to inculcate values of respect for environment, economy, and society, equity and social justice; to cause behavioural change, encourage critical thinking and innovation.

Background and overview of the innovation

The Change Project ‘Re-orienting teaching strategies for Mbarara University of Science and Technology pre-service science teachers towards Education for Sustainable Development’ was conceived after realizing that despite the many years of formal education, Africa continues to experience many sustainable development challenges including poverty, environmental degradation, high incidence of preventable diseases, many conflicts, inequalities, among many others.

It is based on the premise that the overall aim of ESD is to empower citizens to act for positive environment and social change, implying a participatory and action-oriented approach.

It entails re-thinking and retooling of teaching approaches to equip student teachers with

approaches and mind sets for actualizing ESD; mainstreaming environmental education in the curriculum; integrating socio-economic perspectives in teaching; more community engagement by staff especially through action research, and developing self-concept as a change agent to bring about ESD.

The innovation is based in the Faculty of Science and involves lecturers and pre-service teachers of Bachelor of Science with Education. The retooled teaching methods should encourage more interaction among teachers, learners, and communities toward sustainable development.

The anticipated outputs include more community sensitization about sustainable development issues, social justice, and harmonious co-existence, among many others.



Strengths of the project

This innovation involves staff and students with a high multiplier effect as its practice cascades down to the ultimate beneficiaries who are the communities. Its efficiency lies in the fact that it is blended with the existing programmes at no extra cost, and involves both students and staff in sustainability issues with anticipated social and environmental impact and eventual positively changed behaviour and livelihoods of affected communities. When fully mainstreamed in

the curricula it will be self-sustaining in the long term. Plans are underway, in the current curriculum review process to mainstream environmental education and climate change as mandatory courses for teacher trainees at the Mbarara University of Science and Technology. The innovation follows a participatory approach and student teachers are empowered to contribute ideas with the vision that they will also involve their learners as they also teach in secondary schools.

Challenges

Some of the challenges faced in this innovation include the following:

- Semesterisation of university programmes giving little time for lecturers to engage student teachers in more exemplars due to limited semester time of fifteen teaching weeks and fixed content to cover.
- Tendency of some lecturers to default and teach in the ways they were taught (using lecture methods mainly).
- Negative perceptions of students who see these approaches as time wasting having been used to the spoon feeding methods.
- Occasional inability of lecturers to reach the communities in their teaching programmes except when doing action research.

Expected outcomes and social/ environmental impact after say 3-5 years

It is expected that this innovation will result in empowered citizens who will act for positive and social change, and respectful of the environment and social values, conscious of the complex and dynamic environmental, social and economic problems as well as the desired behavioural change to prepare today's world for tomorrow's generations.

ADDITIONAL INFORMATION

Target beneficiaries:

The target beneficiaries include secondary school students and ultimately communities

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

Since the innovation deals with retooling the teaching methods and content delivery in the context of ESD pillars and principles all the listed thematic areas are involved in one way or the other. All these are related to sustainability of human livelihoods, biodiversity and peaceful co-existence.

Partner organizations

National government: Curriculum review efforts to include environment and sustainability issues in curricula.

Education/research institutions- Academic staff being engaged in research with community development overtones.

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Section Two: Innovation in greening university infrastructure, operations and grounds



SUCCESS STORY 4 - CREATION OF A 4500-HECTARE GREEN UNIVERSITY CAMPUS THROUGH A PARTICIPATORY RE-FORESTATION PROGRAMME; THE STORY OF THE MIDDLE EAST TECHNICAL UNIVERSITY (METU), TURKEY - EUROPE

Introduction

Greening of university grounds is considered essential for many reasons. In this regard, the Middle East Technical University (METU) has undertaken a huge campus reforestation programme. This was in response to the disappearance of wilderness, degradation of biodiversity and extinction of species due to urbanization and other human processes.

Main Focus of the Innovation:

As scientifically proven, green areas have many environmental services ranging from air purification, wind and noise filtering to microclimate stabilization. The Re-forestation Program of METU, which has led to the successful planting of some ¾ of the campus area, has been going on for some 50 years now. Every year, over 20000 trees are planted jointly by students, staff and alumni.

The forest area created not only contributes to the quality of campus life for the users (students, faculty, staff), but also to the urban quality of life for the entire Ankara citizens. Additionally, and more importantly, it provides a broad range of other environmental services.

The reforestation programme is in line with the aims and principles of ESD in that:

It reflects principles and values of sustainable development

It is sustainable and viable in the long term

It has arisen from noting the problem of biodiversity degradation in the framework of priority local and/or global environmental and sustainability as well as educational challenges

It includes the active participation of the higher education institution's community (students, researchers, teachers, managers).



Middle East Technical University (METU) plays a key role in the greening of Ankara through its comprehensive re-forestation program. Preliminary planning for the METU Re-forestation and Landscaping Program began in 1958 in response to two major incentives: First, being that the capital city Ankara, which is surrounded by hills, suffers from heavy air pollution. Second was that, the Turkish law provides for such an innovation in the sense that: support for a green zone next to Ankara exists in the provision by Turkish law. This law states that forest land cannot be expropriated, thereby encouraging the creation of newly planted woods to limit urban sprawl.

The initiative was further inspired by the fact that 4500 hectares were available on campus for this purpose. The area was formerly a degraded, barren pasture of wheat fields once covered with primal forests. By 1960, the university's department of landscaping had tested tree species that would be appropriate, and in 1961, the re-forestation program commenced. The area with non-irrigational plants covers 3000 hectares. Plants that require irrigation cover 800 hectares, and are located within the built environment of the Campus where they form a beautiful landscape along the pedestrian network. The remaining 500 hectares consist of lakes and ponds. The flora at METU consists of more than 250 species, some of them native, others from other parts of Turkey.

The METU green area helps purifying Ankara's air, filters wind and noise, stabilizes the microclimate; i.e. makes the city much more sustainable and livable. In 1995, the Re-forestation Program received the Aga Khan Award for Architecture (URL: <http://www.akdn.org/architecture/project.asp?id=1364>). The habitats created by the planted area, step and lake-shore areas provide living conditions for many species of mammals, birds, fish and butterflies. A recent research found out two endemic butterfly species in the METU Campus; namely *Polyommatus cornelia* and *Polyommatus menalcas* (URL: http://dkm.org.tr/eng/strategy_eng.html).

The built environment in METU has been created to the north-west of the Campus in line with sustainable design principles (human scale, walkability, gathering spaces, mixed-use, harmony with nature). Along the pedestrian corridor, social and educational life is played out (activities of student communities, performances by the Fine-Arts & Music Department, pedestrian traffic between different educational buildings, etc.). Local trees and construction materials were chosen to create the built environment. Besides, the first solar house was built in the METU Campus. Recently, the built area has been expanded out of the main pedestrian axis due to emerging needs for research and education space. Additionally, energy-efficiency principles have been adopted in the construction of new buildings. Two examples of these include:

- Centre for Built Environment and Design (under the Faculty of Architecture): The building was constructed within 6 months through funds provided by donors. In 2008, it was awarded as an environmentally-friendly and energy-efficient building by the nationally known Building Information Center.
- Yalçın Ayaslı Research Center (annex to the Department of Electrical and Electronic Engineering): This building is currently under construction with funding from private donorship. It is planned to be opened in late fall 2011. Part of the research to be carried within the center will focus on solar energy. For this purpose the roof is designed to include

photovoltaic panels that will provide energy for the operation of the basic equipments within the building. Panels themselves, which will be of different type and capacity will be used also by students for research purposes to compare efficiency and use.

Additionally, the METU Campus comprises an archaeological site. The findings from the site are preserved and exhibited within the University museum. This is the first university museum in Turkey.

The universal principle of sustainable development integrates nature preservation and restoration; social equity and well-being; economic prosperity and development; and necessitates the attainment of these integrated goals through the participation of relevant stakeholders. The Re-forestation Program of METU, pioneering to other national universities, has provided an invaluable green area for not only the university users, but also for the entire Ankara city. Every year an afforestation festival is held in the Campus through the participation of students, staff and alumni.

METU Campus also integrates natural and archaeological heritage, a sustainable built environment, a vivid social life, an advanced learning and research environment for its students, staff and researchers.



Rehabilitation of Lake Eymir

Strengths of the ESD innovation

The RE-forestation Program of METU is the first large-scale program of its kind, which was realized through the active involvement of students and staff. The 4500-hectare Campus contributes purifying Ankara's air and stabilizing the climatic conditions. In other words, its effectiveness goes beyond the Campus boundaries, and serves the entire Ankara region. The program is sustainable in both short and longer terms; since the forest area created has been improved every year through an Afforestation Festival, where the university community actively participates. The University has an Afforestation and Landscape Department which provides maintenance and implementation strategy for plants. Decision-making on the sustainable development of the Campus (in a way to preserve natural/cultural heritage, maintain its original design principles, govern the Lake area) belongs to the Presidency and its related offices. There is a Commission for University's Spatial Strategy and Development that pays due attention to the preservation of greenery, while responding to the spatial development needs of the Campus.

Challenges

The Re-forestation Program has been a cost-efficient one, and did not require significant funding. However, some of the challenges mainly related to financial limitations. For example, energy-efficiency in buildings does require funding, which, so far, were provided only in two new buildings. The energy performances of older buildings also needed to be improved.

The other challenge is the pressure for urban development towards METU's land. The forest area is under political pressures for opening new transportation routes by the Municipality.

Expected outcomes and social/ environmental impact after say 3-5 years

Since the Re-forestation Program had been started for some 50 years ago, its positive environmental outcomes are already visible. Presently, the University has intensified attempts to increase awareness for

sustainability among students, research and education communities. A student competition named "Towards a Sustainable Campus" was held recently, and received great attention by multidisciplinary students.

A new sustainability related interdisciplinary graduate program, named Earth System Science, was launched in 2010. The Program mainly targets employees of public institutions so as to integrate sustainable development into governmental decision-making and implementation. Besides, a new research park is on the agenda of the University, where research units will be located and find the opportunity for mutual learning. The expected outcomes of these activities are awareness raising, mainstreaming sustainable development into education, research and implementation.

ADDITIONAL INFORMATION

Target beneficiaries:

Beneficiaries include campus users (students, teachers, staff, researchers) and residents of the city of Ankara.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

Researches highlight the significance of green areas in combating the climate change, and advice preserving and expanding those areas within the urban setting. There are specific researches on heat islands in Ankara which prove that METU Campus is one of the coolest areas in the Ankara region, and therefore a strong component of the city in combating climate change. It helps to temper the dry summers and severe winters.

As far as ecosystem management and environmental governance are concerned, the Campus area (forest and step) accommodates many mammal, bird and butterfly species; and they are taken care of by the University Administration. Moreover, the Campus comprises a lake (named Eymir) that is home to certain fish species. The Eymir Lake together with its

basin is under protection by law. Use of the Lake area is constrained to daily recreational activities, and the sustainable use and protection of the Lake is managed and monitored by the University.

Additionally, the built environment in the Campus was designed around a pedestrian axis, and constructed with local materials. The design and construction was carefully considered so as to avoid any conflict with the forest area and the Eymir Lake (like expansion towards the forest or lake). Further, no harmful substances and hazardous waste are produced in the Campus; rather, wastewater treatment and re-use is provided in some buildings. Resource efficiency is provided for through many recycling boxes spread all around the Campus.

Partner organizations

National government: Ministry of Forestry (having provided trees during the 1960s); General Directorate of Afforestation and Erosion Control (annually providing 20000-25000 tree seedlings)

Business and Industry: Provides grants for new energy-efficient buildings that comply with the natural environment

For more details, please contact 1). Lale Ozgenel and 2). Bahar Gedikli

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Section Two: Innovation in greening university infrastructure, operations and grounds



SUCCESS STORY 5 - ACHIEVING COST REDUCTION AND ENVIRONMENTAL EXCELLENCE AT THE UNIVERSITY OF NAIROBI; THE OUTCOMES OF AN ENVIRONMENTAL AUDIT AT THE UNIVERSITY OF NAIROBI, KENYA – AFRICA

Introduction

To ensure cost reduction and promote environmental excellence at the University of Nairobi, an environmental audit was conducted. The audit targeted: Waste generation, management and disposal; Energy management; Water management and economy of use; Noise reduction, evaluation and control; Air emission and indoor air quality; Emergency prevention and preparedness; Staff/student awareness and training in environmental matters; as well as setting up environmental management system, suitability and performance and a University Environmental Policy.}



Main Focus of the Innovation

Given that the University of Nairobi recognizes that the nature and scale of its activities can impact on the environment, both locally and globally, it has a responsibility to manage its activities in a way that reduces the negative environmental impacts and enhances positive impacts. To this end, two general principles act as overarching guidelines which apply to, and embody, the University of Nairobi's environmental goals and objectives, and provide direction in achieving these goals (as contained in the

Environmental Policy). These principles include: Legal obligations to relevant national and international legislation and voluntary agreements and; Sustainable development. These two principles informed the focus of this innovation. Thus: the University of Nairobi is committed to sustainable development and the preservation and enhancement of the natural ecosystems on campuses and their environs, and integrating human activities with these ecosystems.

In this endeavor, the University will support the country's Vision 2030 development strategy and in particular the development of the Nairobi Metropolitan Region and by ensuring that all planned activities support the development of sustainable communities and regions. Further, the University of Nairobi recognizes the important contributions made by the Government through the National Environment Management Authority (NEMA) and the City Council of Nairobi (CCN), the Nairobi Central Business District Association (NCBDA), the United Nations Environment Programme (UNEP), UN-Habitat, the United Nations Development Programme (UNDP), several donors, the Kenya Association of Manufacturers (KAM), several Non-Governmental and Community-based Organizations to better environmental quality in Nairobi and its environs and cooperates with these stakeholders to ensure the impacts of University operations on the environment are minimized.

Inspired by the above, the key aspects of this innovation include: Strategic planning and implementation; Education and Awareness; Safety and Health; Monitoring and Reporting; Communication; Purchasing Policy and; Environmental Management System.

In regard to the Environmental Management System, the University is committed to developing and sustaining an Environmental Management System (EMS) based on the International Standard ISO 14001. The EMS, together with the ISO 9001- 2000 Standard, have been adopted as the mechanism for achieving the University's Environmental Policy, including

compliance with legislative requirements and the measurement of continual improvement targets and outcomes.

Background and overview of the innovation

An initial environmental audit of the University of Nairobi's environmental system was carried out in 2008. The objectives of this initial environmental audit were to assess the environmental performance of the University of Nairobi through a review of its core activities, occupational health and safety issues, any significant effects on the surrounding environment, compliance with statutory and internal policies and standards and to develop an environmental management plan for the University, identify improvement opportunities and develop an environmental policy for the University of Nairobi. The audit was done in line with the requirements of the Environmental Management and Coordination Act, 1999 and the Environmental Impact Assessment and Audit Regulations, 2003 which require industry to undertake annual environmental audits and submit reports to the National Environment Management Authority (NEMA).

The audit exercise covered the campuses of the University located in and around Nairobi City. The audited sites also included the Student Welfare Authority (SWA), University Health Services (UHS), Central Administration under which fall the University of Nairobi Enterprises and Services (UNES) the Chiromo Funeral Home, several cafeteria, the University Bookshop, and Jomo Kenyatta Memorial Library.

The environmental audit covered the following important areas of the University's operations:

- Material management, savings and alternatives
- Energy management and savings
- Water management and economy of use
- Waste generation, management and disposal

- Noise evaluation, reduction and control (internal and external)
- Air emissions and indoor air quality
- Environmental emergency prevention and preparedness
- Transportation and traveling practices
- Staff awareness, participation and training in environmental issues
- Environmental information publicity
- Public enquiry and response to complaints
- Regulatory and legislative compliance.

The audit exercise involved a first meeting with the University Management Board chaired by the Deputy Vice-Chancellor (Administration & Finance) on behalf of the Vice-Chancellor. This was followed by a two-day training of senior managers in the core operational units to facilitate a shared vision of the audit exercise as well as to build capacity for follow-up audit activities. The topics covered in the first day of the training included: Legal and institutional framework for environmental impact assessment and audit; Corporate environmental, health and safety policy formulation – "Leadership at the institutional level"; Environmental audit methodology and Cleaner Production Principles and Techniques. The second day of the training involved a walk-through of the audited facilities with the facility teams and, assignment of tasks, setting of targets and timelines for the environmental audit.

Other aspects involved included review of relevant secondary data, assessment of the work procedures, determination of water (effluent, river, borehole and tap), air, and soil quality at selected sites, assessment of noise, interviews with management, workers, and members of the public in the neighbourhood, review of relevant secondary data, assessment of compliance with internal and statutory requirements, development of improvement measures and conducting a closing meeting to discuss preliminary findings.

The following were the major conclusions from the audit exercise:

- Conscious of its role locally and globally, the University of Nairobi is quite proactive in certain areas of environmental management. The University has set up a Health and Safety Committee up to the College level. The University obtained the ISO 9001:2004 Quality Certification. Moreover, a number of operational units are involved in innovative environmental programmes and Corporate Social Responsibility activities.
- Although a Health and Safety Policy has been under development for some time now, the University or any of its major functional units, does not have an Environmental Policy to guide its operations in line with the tenets of sustainable development.
- The measurement culture at the University is weak as far as resource use and waste generation are concerned. However, there is a policy of printing/copying on both sides of the paper to minimize costs and reduce waste.
- Although there is a procurement policy which is informed by the Government Act, environmental considerations do not seem to be important in the procurement of goods and services for the different University units.
- Nearly all laboratories in the University do not keep Material Safety Data Sheets.
- The University does not have an asbestos management plan despite having buildings with asbestos roofing.
- No recycling takes place at the University.
- There has not been air quality monitoring at any site in the University.
- Also, there has not been noise monitoring at any relevant facilities in the University.
- There are no emergency response procedures and/or contingency plans.
- There is need for staff awareness and training in environmental matters.

- University's response to public enquiries and complaints is not clear.

Following these recommendations, an environmental policy was developed in 2009. And in 2010, a maintenance policy for all assets owned by the University was developed in which environmental considerations were mainstreamed.

Strengths of the ESD innovation

Following the initiative, top management in the University are now aware, supportive and committed to improving the environmental performance of the University. No other University in Kenya has performed an environmental audit of its products and services. All units of the University have since embraced environmentally sustainable practices and to some degree, the students as well. The University has also become proactive on issues likely to impact on the surrounding communities. However, the University is yet to make a specific budgetary allocation for environmental management and the appointment of a Standing Environmental Policy Steering Committee as stated in the Environmental Policy.

Additionally, the University of Nairobi has endeavoured to support the country's Vision 2030 development strategy and in particular the development of the Nairobi Metropolitan Region and by ensuring that all planned activities support the development of sustainable communities and regions. The University recognizes the important contributions made by the Government through the National Environment Management Authority (NEMA) and the City Council of Nairobi (CCN), the Nairobi Central Business District Association (NCBDA), the United Nations Environment Programme (UNEP), UN-Habitat, the United Nations Development Programme (UNDP), several donors, the Kenya Association of Manufacturers (KAM), several Non-Governmental and Community-based Organizations to better environmental quality in Nairobi and its environs and will cooperate with these stakeholders to ensure the impacts of University operations on the environment are minimized.

Challenges

Some of the challenges include:

- Organizational barriers – allocation of human and financial resources
- Systemic barriers – e.g. poor record keeping and reporting
- Lack of coordination
- Technical barriers – technology and expertise.
- However, some of the systemic barriers are being addressed by the Quality Management System already in place at the University of Nairobi.

Partner organizations

National government: National Environmental Management Authority – NEMA – Kenya.

Others: University neighbours including local communities.

For more details, please contact Prof. David Mungai – University of Nairobi.

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Expected outcomes and social/ environmental impact after say 3-5 years

It is expected that the University of Nairobi will establish leadership in environmental management. This will lead to a win-win situation where cost reduction and environmental excellence are achieved. The University will also reduce its ecological footprint and live in harmony with its neighbours.

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ADDITIONAL INFORMATION

Target beneficiaries:

The University and local communities as well as the global community.

Linkage between the ESD innovation and any of the UNEP priority thematic areas

The environmental audit and environmental policy address all of UNEP's thematic areas.



Section Two: Innovation in greening university infrastructure, operations and grounds



SUCCESS STORY 6 - UNIVERSITY OF NEW SOUTH WALES MANAGED AQUIFER RECHARGE - AUSTRALIA

Introduction

The University of New South Wales has undertaken to address storm water management, water conservation and water reuse through a unique innovation.

Main Focus of the Innovation

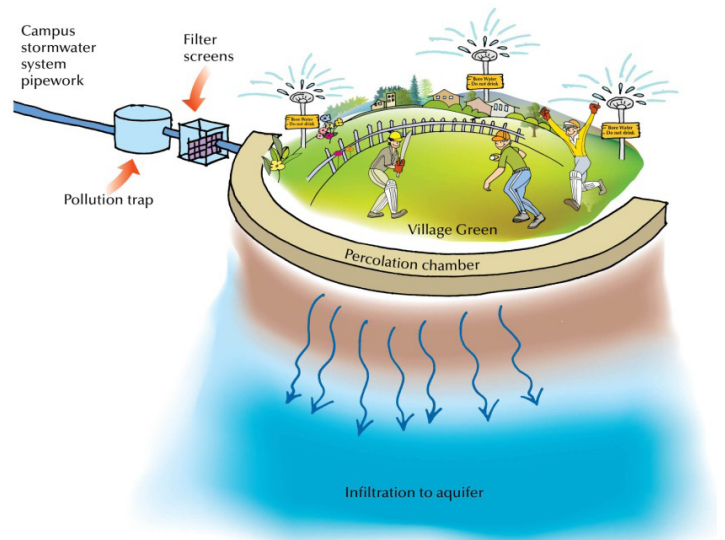
In this innovation, the University of New South Wales extracts borewater from a large aquifer lying beneath its main campus for a variety of non-potable uses, which enables a reduction of 40% in the use of potable water which would otherwise be required. To manage this resource sustainably, runoff from rainfall is collected and returned to the aquifer via a percolation chamber installed at the low point of the campus. It has been established that more water is returned to the aquifer than is extracted.

Background and overview of the innovation

Untreated and / or treated borewater is used across the University of New South Wales Kensington campus for many non-potable uses including:

- grounds irrigation;
- toilet flushing;
- vehicle washing;
- laboratory non-potable supplies;
- raw water to reverse osmosis treatment plants;
- cooling tower make-up;
- swimming pool make-up; and
- construction work.

This substantially reduces the University's reliance on Sydney Water potable supply and reduces overall water costs. However, borewater is a finite resource and must be managed to ensure all demands are satisfied into the future.



In 2004 the local government authority, Randwick City Council, approved construction of the University's new Law building on the basis that borewater would replace Council's usual requirement for installation of rainwater storage tanks with each new development. This decision was subsequently given broader statutory force through the Kensington Campus 2020 Master Plan, approved by RCC in 2006 as the Development Control Plan for the Kensington campus. Randwick Council's approval for this variation from standard requirements was predicated on the installation in 2006 of a managed aquifer recharge system (percolation chamber) located under the "Village Green" sports field at the western end of the Kensington campus. The Village Green is the campus low point – prior to installation of the percolation chamber it functioned as a stormwater detention basin.

The MAR system collects stormwater runoff from 68% of the campus area, and was designed to replenish the aquifer with approximately 180 ML for an average rainfall year. A gross pollutant trap, wire screens and geotextile wrapping the percolation chamber drainage modules prevents pollutants entering the aquifer. Conservatively assuming a 20% rainfall infiltration rate and 90% irrigation efficiency, it is estimated that an additional 30 ML/yr is infiltrated to the aquifer via the campus's pervious surfaces such as lawns and garden beds, for a total of 210 ML returned to the aquifer in an average rainfall year. Average annual borewater consumption since 2000 has been 157 ML, with the highest consumption (in 2000) being 204 ML; consumption in 2008 was 148 ML – i.e. more water is returned than extracted.

In 2007 the State Department of Environment and Climate Change awarded a water saving grant to the University for Construction of a treatment plant to raise the PH of the extracted borewater. This has enabled borewater substitution to be extended to a range of additional uses, such as cooling towers and laboratory applications, where untreated (i.e. slightly acidic) borewater was unacceptable.

Managed aquifer recharge at UNSW is a straightforward means of indirectly harvesting rainwater through active diversion of overland flow to replenish the groundwater, rather than sending it to the Pacific Ocean. Whereas UNSW Kensington campus is actually 72% impervious, the upshot of the MAR system is “as if” the campus was 68% pervious. In effect, the aquifer acts as the University's rainwater tank.

Where the amount of water returned to the aquifer equals or exceeds the amount extracted for human use, MAR enables the long-term sustainable yield extraction of borewater, as opposed to short-sighted “mining” of this valuable resource. MAR thus represents a significant element in the mix of methods – of which conservation is primary – necessary for genuinely sustainable water management in this driest of continents. At the same time, other water efficiency

measures (e.g. efficient fittings and fixtures, culture / behaviour change programs) remain necessary to ensure wise water use into the future.

Strengths of the project

University of New South Wales (UNSW) was recognised as a finalist in the prestigious national Banksia Environmental Awards in 2009 for this initiative. As the largest managed aquifer recharge system in New South Wales, the UNSW MAR system has been used as an example for the development of other projects in the State and nationally. It has also provided valuable teaching and research opportunities for UNSW students and academic staff. The key feature is that more water is returned to the aquifer than is extracted for non-potable uses on the campus.

Challenges of the project/ESD innovation

The main challenge relates to demonstrating a convincing business case to senior management that lifecycle benefits outweigh establishment costs.

Expected outcomes and social/ environmental impact after say 3-5 years

As long as more water is returned to the aquifer than is extracted from it, the system will remain sustainable. However, other water efficiency measures must be continued and enhanced so as not to squander the borewater resource.

ADDITIONAL INFORMATION

Target beneficiaries:

The campus community and the wider Sydney community in general benefits from this initiative, in terms of reduced potable water use and maintenance of the integrity of the aquifer. In addition the Managed Aquifer Recharge system has supported teaching and

enabled a number of student projects, particularly in Engineering.

Linkage between the innovation/project and any of the UNEP priority thematic areas

The main focus of this project is resource efficiency.

Partner organizations

Local government: Randwick City Council

Business and Industry: Atlantis (provider of percolation chamber drainage modules)

Others: Funding from the New South Wales State government to support construction of a borewater treatment plant on campus.

Some Major publications/production titles associated with the innovation:

Timms W, Acworth I, Badenhop A (2007). Managed aquifer recharge in the Botany sand aquifer - part of the treatment train for water reuse? In: Khan S, Stuetz R, Anderson J (Eds) Water Reuse and Recycling 2007. Proceedings of the 3rd AWA Water Reuse and Recycling Conference (REUSE07), Sydney, Australia, 16-18 July 2007.

For more details, please contact: Name: Prof. Deo Prasad; Email: d.prasad@unsw.edu.au





Section Two: Innovation in greening university infrastructure, operations and grounds



SUCCESS STORY 7 - TYREE ENERGY TECHNOLOGIES BUILDING – 6 STAR GREEN STAR EDUCATION DESIGN AT THE UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA

Introduction

This innovation was aimed at addressing indoor environmental quality, energy consumption, water conservation and Carbon emissions.

Main Focus of the Innovation

The Tyree Energy Technologies Building (TETB) has been planned, designed and constructed in alignment with the Green Star Education Design rating tool. The design is consistent with a 6 Star rating which will benchmark this building as a “World Leader” in holistic Environmentally Sustainable Design (ESD). The Green Star Education tool assesses a wide range of ESD attributes including Management processes during design and construction; Energy consumption; Water consumption; Indoor Environment Quality; Emissions; Ecological effects and; Transport.

Background and overview of the innovation

The Tyree Energy Technologies Building (TETB) has been designed and is currently seeking certification under the Green Building Council of Australia’s (GBCA) Green Star Education Design Tool at a level of 6 Stars. This level is defined by the GBCA as “World Leading”. A number of initiatives incorporated in the design and construction are instrumental in achieving this rating. These include:

- Environmental Management – The head Contractor, Brookfield Multiplex, is ISO 14001 certified ensuring that sound environmental practices are involved in all decision making processes associated with the design and construction of the building
- Waste Management – The construction waste management plan and agreements with waste contractors ensure that waste streams are sorted and recycled where appropriate. Reports

during construction have indicated that over 80% of the construction waste has been able to be recycled or re-used.

- Indoor Environment Quality– Increased ventilation rates are provided to spaces when they are air conditioned to increase occupant comfort. Large areas are also able to be naturally ventilated if desired by the occupants. Displacement ventilation will also assist with air quality in high occupant density areas such as lecture theatres and lab write-up spaces.
- Indoor Environment Quality – Furniture and finishes have been carefully selected to reduce off-gassing of Volatile Organic Compounds and Formaldehyde, therefore improving air quality.
- Tri-generation – The building is provided with a tri-generation plant that services not only the TETB but also has the capability and capacity to export both electricity and chilled water to surrounding buildings. This ensures that the tri-generation system operates for longer hours and maximises the benefit of the reduced carbon emissions provided by this method of power and chilled water production.
- Shared Energy Systems – TETB is “plugged in” to the existing Central Energy Plant (CEP) which services this area of the campus. This allows TETB to share in the energy benefits of the economies of scale provided by the larger plant installed in this CEP.
- Energy Efficiency – Air conditioning is one of the major energy uses in buildings and the minimisation of its use provides significant emissions savings. Air conditioning load is reduced in TETB by linking the air conditioning controls to motion sensors in all spaces to shut down the air conditioning in any space that is not in use. The load is further reduced through the use of carbon dioxide sensors, which modulate the amount of outside air provided to a space depending on the level of occupancy. An underground labyrinth and borewater is also used to pre-cool/warm incoming outside air.

- Internal Circulation – Several staircases are provided within the building to encourage their use instead of the lifts. This encourages healthy habits in the staff and students as well as reducing energy consumption by the lifts.
- Energy Production – Not only does the building provide electricity from the tri-generation system but it is also furnished with 1,000sqm of photo-voltaic panels which will produce up to 150KW of electrical energy.
- Water re-use – TETB feeds into and expands the campus' already wide spread rainwater collection system (see Initiative 1). An existing bore feeds into a storage tank which also collects rainwater from the roof. This systems feeds into the campus borewater system which is then treated and returned to buildings as non-potable water. This is used in TETB for toilet flushing, laboratory water and makeup to the evaporative cooling systems. Fire system testing water and run-off from hardstand area is also returned to the aquifer through the percolation chamber.
- Water efficiency – Water efficient fixtures are used throughout the building, including waterless urinals. The cooling of the tri-generation system is provided by a hybrid Muller 3C cooling tower which only uses water for evaporation when ambient conditions are extreme and loads are high. This is fed by non-potable, treated borewater and rainwater.
- Embodied energy – A total carbon analysis has been performed on the building and compared to the business as usual case. The total carbon content has been reduced through the use of the following initiatives:

- »Replacement of Portland cement with fly-ash

- »Use of steel with high recycled content

- »Re-use of timber and/or sourcing from environmentally certified sources

- »Replacement of PVC piping with more environmentally responsible alternatives, e.g. HDPE.

- Stormwater reduction – As mentioned, rainwater is collected to be fed into to campus non-potable water system and hardstand area is discharged to the percolation chamber which replenishes the local aquifer. These systems are designed to cater for up to 1-in-100 year storm events without discharging to the municipal system. This reduces downstream environmental impacts of stormwater, including flooding and erosion.



Strengths of the ESD innovation

The strength of this project mainly lies in the holistic approach of the ESD features, their cost effectiveness and practicality. Not only does the project address environmental issues locally, such as immediate energy use, but also has the ability to mitigate the environmental impact of the University as a whole. This is achieved through its rainwater harvesting, tri-generation system, use of the central energy plant and stormwater minimisation.

Strengths of the ESD innovation

The strength of this project mainly lies in the holistic approach of the ESD features, their cost effectiveness and practicality. Not only does the project address environmental issues locally, such as immediate energy use, but also has the ability to mitigate the environmental impact of the University as a whole. This is achieved through its rainwater harvesting, tri-generation system, use of the central energy plant and stormwater minimisation.

Partner organizations

National government: Department of Education, Employment and Workplace Relations - Educational Investment Fund.

Business and Industry: Brookfield Multiplex (Builder); AECOM (ESD Consultant)

For more details, please contact: Name: Prof. Deo Prasad. Email: d.prasad@unsw.edu.au

Expected outcomes and social/ environmental impact after say 3-5 years

The TETB will continue to provide state-of-the-art accommodation for energy-related teaching and research in a building which itself “walks the talk” in terms of being an exemplar for energy and materials efficiency and reduced carbon footprint.

ADDITIONAL INFORMATION

Target beneficiaries

Many of the features benefit the community as a whole by reducing carbon emissions and demand on resources, both renewable and non-renewable. Benefits to staff and students are provided through the pursuit of Indoor Environment Quality initiatives and the provision of additional amenities such as bicycle parking and associated shower and changing facilities not normally provided in facilities such as this.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

In some respect all the UNEP priority thematic areas are addressed to some extent in this Building and in the Green Star Rating tool.



Section Three: Some cross-cutting innovations for sustainable development

GUPES

Global Universities Partnership on
Environment for Sustainability



SUCCESS STORY 8 - THE CENTER FOR ENVIRONMENTAL AND SUSTAINABILITY EDUCATION AT FLORIDA GULF COAST UNIVERSITY

Introduction

The Center for Environment and Sustainability Education promotes teaching, research, community engagement and development, university management and student participation/engagement.

Main Focus of the Innovation

The center exists to help Florida Gulf Coast University (FGCU) meet its mission of environmental sustainability both in curriculum and campus operations. It accomplishes this by engaging university faculty, staff, and students through environmental and sustainability education. The center is driven by the belief that academic centers with expertise in sustainability and environment education are important institutional innovations in higher education. The mission and goals of the center are stated below:

Mission:

The Center for Environmental and Sustainability Education works toward realizing the dream of a sustainable and peaceful future through scholarship, education, and action. The Center advances understanding and achievement of the goals of environmental and sustainability education through innovative educational research methods, emergent eco-pedagogies, and educational philosophy and practice based on the ethics of care and sustainability. The Center seeks to elevate the environmental mission of Florida Gulf Coast University and serves the university community, the local community of the Western Everglades and Barrier Islands, and the wider community of scholars.

Goals:

- I. To advance innovative educational research methodologies and pedagogies in environmental and sustainability education. This work includes assessment of sustainability, philosophical research, and curriculum and program development, and takes place in a variety of educational settings and geographical locations, ranging from local to global.
- II. To educate for an ecologically-literate citizenry and to advance civic engagement in the critical environmental issues of the Western Everglades and Barrier Islands. Key areas of emphasis include applied ethics, activism, and the literary arts.
- III. To provide opportunities for faculty, administrators, staff, and students from across the campus to engage in scholarly activity, teaching, and service related to environmental education.
- IV. To provide professional development for educators in environmental education and education for sustainability. The priority audiences include University administrators, faculty and staff, and in-service and pre-service teachers.

Background and overview of the innovation

The advent of Florida Gulf Coast University was fairly well publicized in higher education. There was much interest in the founding of a public university with a mission to promote environmental sustainability and to emphasize the environment where it was to be developed. The founding faculty and the founding Dean's Council recognized the possibilities and challenges of incorporating sustainability into the university curriculum and institutional practice. However, as Florida Gulf Coast University grew, the dialogue and commitment to environmental sustainability drifted. Several faculty members saw the importance of creating an academic center where scholarship, teaching, curriculum development, thinking, and discussion about these issues could be

nurtured and housed. The Center for Environmental and Sustainability Education was created to carry on the institution's commitment to environmental sustainability, to create a place where those conversations could take place, and to pursue research at the university level and beyond. The Center was envisioned to support scholarship, support teaching, and help fulfill the University's public environmental and sustainability education mission.

Strengths of the ESD innovation

The Center for Environmental and Sustainability Education is deeply committed to the environmental sustainability clause in the FGCU Mission. This statement, "Florida Gulf Coast University...practices and promotes environmental sustainability," is passionately promoted in all of the center's activities.

The first goal of the Center is to help the University achieve its environmental mission. The ambition is to provide the inspiration and expertise to define and achieve environmental sustainability at the University. The Center has specifically enhanced this dimension of the mission in four areas:

A. Mission-related Research

As an academic Center, the primary work is scholarship. Virtually all of the center's scholarly activity is directly related to the environmental sustainability dimension of the University's mission. A list of books, chapters, journal articles, professional conference presentations, and invited talks that were completed in 2009-2010 is available.

Environmental sustainability is the unifying focus of both the Center's philosophical research and its institutional research at FGCU; for example, the Center presented the University's work toward environmental sustainability in curriculum and campus operations to an international audience of scholars through the publication of a special section of the *Journal of Education for Sustainable Development*. This effort offered an opportunity for several faculty and staff

affiliated with the Center to publish mission-related research. A second special section for the *International Journal of Sustainability in Higher Education* focused on sustainability efforts and developments in higher education within and across selected Asia-Pacific countries. The project sought to develop a uniquely Asian-Pacific voice rarely heard in the predominant academic discourse in the field of higher education for sustainability.

The Center often represents Florida Gulf Coast University in professional gatherings related to environmental sustainability. For example, the Center participated in a conference celebrating the tenth anniversary of the Earth Charter at the International Peace Palace in the city of The Hague, The Netherlands. The event featured several new books focusing on the Earth Charter, and the Center Director shared our recent publication, *Young People, Education, and Sustainable Development: Exploring Principles, Perspectives, and Praxis* (2009) at an authors' reception. Dutch officials from the national program, "Learning for Sustainable Development," helped fund the publication and attended its European debut.

As a way of showing stakeholders the path of the center's research and other activities, a comprehensive five year report was published - "Works Toward Realizing the Dream". This was a major undertaking that includes information on all Center presentations and publications. In addition, the center supports professional development and scholarly activity by faculty with modest research grants.

B. Humane and sustainable food system initiatives

The Center's initiative to advance a sustainable and humane food system at FGCU is seen as an important opportunity to make significant progress in a particular area of institutional practice. It also serves as a lens through which larger sustainability issues can be envisioned. Activities include the development of educational materials related to the Earth Charter

and food practices, ongoing work in institutionalizing sustainability in Eagle Dining, and workshops and educational events in food and sustainability on campus.

C. Earth Charter Affiliate Agreement

University President Wilson G. Bradshaw signed an Affiliate Agreement with Earth Charter International on February 20, 2009. The center believes that the Earth Charter Affiliate Agreement elevates the sustainability mission of FGCU and the role of the Earth Charter in the world of the University, and also expands FGCU's access to intellectual resources via connections with other universities worldwide and their respective work with the Earth Charter. Since the signing, the Center has helped FGCU further several initiatives intended to both honor the Affiliate Agreement as well as uplift the University's environmental mission.

The Center is home to the Earth Charter Scholarship Project, directed by Dr. Richard M. Clugston. The Earth Charter Scholarship Project seeks to enhance the Earth Charter's contribution to accelerating the transition to sustainable ways of living. Its goals are to develop additional high quality, readily accessible Earth Charter-based educational resources that can accelerate needed changes in lifestyles, in organizational and professional practices, and in social policies to create a just, sustainable, and peaceful future.

The Center also coordinated several meetings with faculty and staff associates to advance the Earth Charter at FGCU. On January 15, 2010, the Center convened a small meeting of Center advisors and friends to help plan for Earth Charter +10 at FGCU. The meeting sought to coordinate a series of inter-related events planned for fall 2010, include an FGCU Earth Day, a visit by Chief Jake Swamp, the official opening of Academic Building 7, as well as Earth Charter +10 events. In addition, the center arranged a mindful Earth Charter brunch based on Earth Charter principles followed by a workshop on February 5, 2010. Faculty shared their ideas and experiences teaching with the Charter. Finally, the Center held a workshop for

summer and fall grants on April 30, 2010, to identify particular environmental and sustainability education projects that the Center would support through mini-grants of up to \$1,000.

E. International Outreach

As the University matures and expands its interests internationally, the Center contributes in several ways in collaboration with FGCU's International Services office. The center continues active work with The University of the South Pacific (USP), Fiji as per the Memorandum of Agreement.

The center collaborates with the Education for Sustainable Development Research Center at Rikkyo University in Tokyo, Japan, on scholarly projects such as the special section for the International Journal of Sustainability in Higher Education, and has advised them on the development of their center for environmental and sustainability education.

The Center also works with African universities through the Mainstreaming Environment and Sustainability in African Universities (MESA) project of the United Nations Environment Programme (UNEP), including helping to co-organize international meetings. The center has also continued to work with the Environmental Education Unit at Rhodes University in Grahamstown, South Africa. In 2010, the center also began to work with Wangari Maathai Institute for Peace and Environmental Studies at the University of Nairobi, Kenya.

The latest collaborating international partner is the recently established Centre for Global Sustainability Studies (CGSS) at University Sains Malaysia (The Science University of Malaysia).

F. Annual signature public events

Rachel Carson Distinguished Lecture Series

In order to advance the goal of ethics, activism, and the literary arts, the center has created the Rachel Carson



Distinguished Lecture, a signature event of the Center, that works to bring public intellectuals to southwest Florida to discuss issues such as sustainability, ethics, democracy, and literature.

Terry Tempest Williams Student Dialogue Series

The Terry Tempest Williams Student Dialogue series focuses on sustainability and education for a sustainable future, including students' role as stewards of natural, cultural, social and political environments. Intended to spark youth activism and inspire the intellectual climate among the FGCU and southwest Florida communities, the initiative fosters an open space for dialogue and student ownership of that dialogue.

Challenges of the ESD innovations

Florida Gulf Coast University, located in southwest Florida in the United States, opened its doors in 1997 with approximately 1,500 students as the tenth institution in the State University System. It was born in controversy. Indeed, the site of the campus was a topic of disagreement between proponents of economic growth and development and proponents of sustainability and environmental sensitivity.

Building the university in the middle of ecologically fragile, undeveloped land led to the explosion of housing developments nearby, the creation of shopping malls and business parks and the widening of roads and canals. Also, some of the university's own past building practices were questionable in terms of sustainability. Thus, FGCU finds itself squarely situated in the growing tourism/consumer nexus of Southwest Florida. While it claims to practice and promote environmental sustainability in its mission, the university must face the irony that the surrounding culture is firmly committed to an unsustainable trajectory of economic growth and increased material consumption.

In addition to this larger challenge, the Center itself often struggles in its efforts to steer the university toward the path of sustainability. One particular example might illustrate this point, particularly as it relates to sustainable campus operations. Currently the Center is working with corporate food service provider Aramark, who entered campus a few years ago and contracts with the university to operate dining facilities. The center has an ongoing initiative to create a humane and sustainable food system inspired by Earth Charter principles. Aramark has been receptive to the center's efforts to dialogue with them and has made a number of small efforts to realize the university's mission of environmental sustainability. However, Aramark has also brought with it several corporate franchise vendors such as Taco Bell, Subway, and Starbucks. While Aramark has been willing, to an extent, to modify its own corporate food sourcing and operational practices to make them more sustainable, the franchise vendors are more or less outside these efforts. The strict corporate guidelines that govern how they can source, package, and prepare food make the center's sustainability efforts next to impossible when it comes to "greening" FGCU's corporate fast-food vendors.

In a larger sense, the center faces the challenge of creating a sustainable university in an unsustainable culture with an unsustainable economic infrastructure. At a campus level, it struggles with the contradictions inherent in its commitment to both sustainability and growth.

Expected outcomes and social/environmental impact after say 3-5 years

Expanded participation in Center activities by faculty and staff associates across university colleges and departments

Expanded base of student involvement in the Center

Continue to help faculty "mainstream" environmental sustainability across university curriculum

Continue to develop the Center's body of scholarship on environmental and sustainability education

Continue to host the Rachel Carson Distinguished Lecture, Terry Tempest Williams Student Dialogue, and other events in order to educate the Southwest Florida public concerning sustainability issues

The center also plans to build a new home for itself in a LEED Platinum green building. The building will be assessed through the lens of the Earth Charter – and in doing so create the first building of this type.

ADDITIONAL INFORMATION

Target beneficiaries:

The center serves the Western Everglades and the Barrier Islands. While seeking to serve the five-county area of Southwest Florida, the center's primary work has been in Lee County with some participation from Collier County. The center has been particularly active on Sanibel and Captiva Islands with modest initiatives reaching out to the Fort Myers and Naples communities.

The two signature events, the Rachel Carson Distinguished Lecture and Terry Tempest Williams Student Dialogue, are both free and open to the public. Likewise, the center freely distributes its environmental and sustainability education research via the internet and among interested local organizations.

The Center also has a modest program of wide-ranging international activities in educational research. These range from sustainability in African universities, to the course in environmental education required in all universities in India, from exchange with The University of the South Pacific – the national University of twelve island nations, to university research centers in Japan, South Africa, Malaysia, and Kenya.

The Center has formed partnerships with other organizations, including joint ventures with institutions of higher education and educational organizations such as United Nations Educational, Scientific, and Cultural Organization (UNESCO), United Nations Environment Programme (UNEP), The Humane Society of the United States, Green Cross International, Wege Foundation, and, most recently, the Wangari Maathai Institute for Peace and Environmental Studies at the University of Nairobi, and the Centre for Global Sustainability Studies at Universiti Sains Malaysia. The Center has also collaborated with local environmental organizations, including partnership work in the Western Everglades and on the Barrier Islands, with Sanibel-Captiva Conservation Foundation, Naples Botanical Garden, Captiva Memorial Library, Saint Michael and All Angels Church, and Sanibel Sea School.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

Given the educational focus of the center's work, it is believed integrates most of UNEP's priority thematic areas, and more strongly with UNEP's "Education and Training" work.

Partner organizations

NGO's: Earth Charter Initiative

Education/research institutions: Pacific Centre for Environment and Sustainable Development (University of the South Pacific), Centre for Global Sustainability Studies (Universiti Sains Malaysia), The Wangari Maathai Institute for Peace and Environmental Studies (University of Nairobi), Environmental Education and Training Unit (Rhodes University)

Others: UNESCO UNEP

Some major publications/production titles associated with the innovation

1. Young People, Education, and Sustainable

Development: Exploring Principles, Perspectives and Praxis. Edited by Peter Blaze Corcoran and Philip Molo Osano with editorial assistance from Joseph Weakland and Brandon P. Hollingshead. Wageningen Academic Publishers, 2009. Preface by Wangari Maathai, Foreword by Gus Speth, and Afterword by Ruud Lubbers.

2. A Voice for Earth: American Writers Respond to the Earth Charter. Edited by Peter Blaze Corcoran and A. James Wohlpart with editorial assistance from Brandon P. Hollingshead. University of Georgia Press, 2008. Forewords by Homero Aridjis and Terry Tempest Williams.

3. The Earth Charter in Action: Toward a Sustainable World. Edited by Peter Blaze Corcoran with editorial assistance from Brandon P. Hollingshead. Royal Tropic Institute (kit) Publishers, Amsterdam, 2005. Published in Dutch, Spanish, and English.

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4. Higher Education and the Challenge of Sustainability: Problematics, Promise, and Practice. Edited by Peter Blaze Corcoran and Arjen Wals. Kluwer Academic Publishers, Dordrecht, The Netherlands, 2004.

For more details, please contact: Name: Prof. Peter Blaze Corcoran. Email: pcorcora@fgcu.edu



Section Three: Some cross-cutting innovations for sustainable development



SUCCESS STORY 9 - REORIENTATION OF UNIVERSITY OF ZAMBIA (UNZA) TEACHER EDUCATION TOWARDS SUSTAINABILITY – ZAMBIA AFRICA

Introduction

This innovation by the University of Zambia is in response to the lack of qualified Zambian Personnel in Environmental Education (EE)/ Education for Sustainable Development (ESD) despite existence of policy frameworks on environmental education.

Main Focus of the Innovation

The innovation focuses on: Training students in EE/ESD; Devising new curricular at university level in EE/ESD; Conducting research related to quality and relevance of education; Facilitating networking and linkages around teacher education and ; publishing materials and journal articles on EE/ESD.



Background and overview of the innovation

The University of Zambia (UNZA) is striving to become a fulcrum of activities for re-orienting teacher education to address sustainability in the SADC Region. In this regard, a host of different EE/ESD academic and professional programmes around teacher education are currently being implemented. These include undergraduate and post-graduate

training, research around issues of quality and relevance of ESD, managing a Mainstreaming Environment and Sustainability in African Universities (MESA) Chair in Teacher education, mounting a SADC Regional Training Programme (RTP) in Teacher Education, running a Zambian Teacher Education Network for Sustainability, membership to an African and International Teacher Education Network as well as publishing materials and journal articles related to re-orienting teacher education towards sustainability. Success of the reorientation process is partly evidenced by various awards in form of 'certificates of recognition' as well as receipt of an academic MESA Chair in Teacher Education. Opportunities exist in terms of durable support from SADC-REEP, UNEP and UNZA management as well as perennial student demand for ESD training. Challenges remain at the Zambian Ministry of Education where high ranking decision makers have not yet fully bought into the EE/ESD movement and, therefore, stall progress in several areas like staff training, curriculum redesign, assessment, teacher continuous professional development, award system, among others.

Strengths of the ESD innovation

As a country, Zambia in the 1990s lacked a University-level academic programme in Education for Sustainable Development (ESD) and Environmental Education (EE) to address numerous challenges affecting its people, society and environment. A breakthrough came in 1994 when the Ministry of Environment and Natural Resources developed the National Environmental Action Plan (NEAP) which stipulated to "incorporate environmental education into existing school curricular and technical and university teacher training programmes," (p.66). In line with this stipulation as well as other policy expectations within Zambia and internationally, including the United Nations Decade of Education for Sustainable Development, the University of Zambia (UNZA) initiated a teacher education degree programme in environmental education covering undergraduate and postgraduate students.

Consequently, Reorientation of Zambia's teacher education towards sustainability became UNZA's ESD innovation. The innovation has since become a hive of activity sprawling into the following innovative areas:

- The BEd (Environmental Education) degree programme annually enrolling over 150 students undergoing full time studies, parallel studies or minoring in environmental education. Student demand for this programme is simply too overwhelming to satisfy. Candidates in this programme undertake a whole semester school/community attachment with any institution of their choice in the first semester of their 4th and final year of study. This student attachment component is a central means of outreaching to various organisations for purposes of educating them about ESD. This year, the best student on such attachment was offered a full sponsorship and attachment by one of Zambia's leading copper mining conglomerate. Moreover undergraduate students on this programme have formed a vibrant University of Zambia Environmental Education Students Association (UNZAEESA). The University of Swaziland and University of Botswana have made visitations to UNZA for purposes of learning how the BEd (Environmental Education) is structured and managed.
- The Med (Environmental Education) programme which has successfully generated over 25 graduates since its inception in 2006 and seven staff development fellows since 2008 to join the lecturing staff at UNZA, in addition to producing graduates who have penetrated the Zambian job market. ESD is taken as a compulsory course in both BEd and MED (Environmental Education) programmes.
- Networking and linking with MESA, AFRITEIS, UNESCO Chair for Reorienting Teacher Education to Address Sustainability, SADC_REEP and other local, national and international networks.
- Facilitating the establishment of the Zambian Teacher Education Network for Sustainability

Education (ZATENSE) and its registration with the Registrar of Societies on 23rd February, 2011.

- Receipt of the award on 27th November, 2008 of the "Certificate of Recognition" from UNEP (Nairobi) for the innovation in mainstreaming Environment and Sustainability in the University of Zambia as well as in 2006 from the UNESCO Chair on Reorienting Teacher Education to Address Sustainability.
- Receipt of the award of MESA Chair for Reorienting Teacher Education towards EE/ESD from the SADC-REEP and UNEP on 24-25th March, 2010 in Swaziland. As one of its planned activities, this MESA Chair intends to host a high profile workshop for SADC Permanent Secretaries of Ministries of Education and Environment. This is in recognition of the critical point that "sufficient change towards sustainability in designed learning, including aims, curricula, methods, assessment, reward structures, etc. is directly dependent on sufficient institutional learning –which can, in turn, facilitate re-design", (Sterling, 2010, p.32).
- Facilitating the approval by UNZA senate on 3rd August, 2011 of the SADC Regional Training Programme in Teacher Environmental and Sustainability Education which will service the SADC region by awarding Teacher Education Certificate of Competence in Environmental and Sustainability Education (TECESE) to successful candidates starting in late 2011 onwards.

All of the above sub-programmes around reorienting teacher education towards sustainability are durable new activities not seen before in Zambia.

Challenges

Challenges arising from the reorientation of teacher education at UNZA include the following:

- An unresponsive cadre of high ranking key decision makers at the Zambian Ministry of Education to direct policy and regulatory changes needed. This is especially true of the

Permanent Secretary (Ministry of Education) and his or her Directors.

- Student demands for ESD too overwhelming to satisfy.
- Understaffing for people with ESD qualifications at UNZA.
- Problem of securing attachments for EE students.

Partner organizations

National government: Ministry of Education; Ministry of Tourism, Environment, and Natural resources.

Local government: City Council for student attachments.

NGO's: Various NGOs which accept University of Zambia students for attachments.

Education/research institutions: Teacher Training Colleges; District Education Boards.

Business and Industry: Mining companies (copper and coal) for student attachments.

Others: Faith-based organizations (e.g. Roman Catholic Church) for student attachments;

SADC-Regional Environmental Education Programme.

Some Major Publications / Production Titles associated with the innovation

Namafe, C.M. (2006). Environmental Education in Zambia: A Critical Approach to Change and Transformation, New Horizon Printers, Lusaka.

Lupele, J. and Namafe, C.M. (2010). Responding to Risks and Vulnerability Issues Through Interdisciplinary Curricular Teaching: A Case Example from the University of Zambia, Southern African Journal of Environmental Education, Vol 27, p 126-133.

*For more details, please contact: Name: Dr. Charles Namafe.
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Expected outcomes and social/environmental impact after say 3-5 years

- A significant number of Zambian Teachers would be trained in ESD after 3-5 years for them to pass on the message to future citizens.
- UNZA would be a fulcrum of activities for re-orienting teacher education towards sustainability in the SADC region.

ADDITIONAL INFORMATION

Target beneficiaries:

Both pre-service and in-service student teachers; Adults in community; various institutions like government, non-governmental as well as industries and civil society groups.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

All UNEP priority thematic areas are covered in undergraduate and postgraduate courses and teaching; -some post graduate student dissertations have focused on such themes as climate change and disasters.



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SUCCESS STORY 10 - INNOVATIVE MASTER DEGREE PROGRAMME IN SUSTAINABLE URBAN DEVELOPMENT AT THE UNIVERSITY OF NAIROBI, IN KENYA - AFRICA

Introduction

This innovation aims to address issues of sustainable urban planning; Ecosystem degradation in urban areas, human health, urban poverty and food security through teaching, community engagement/development and, student participation/engagement.

Main Focus of the Innovation

The main focus of this Project is to promote education for sustainable urban development through training at the post-graduate level of professionals who may serve as planners, organizers, instructors, field development agents and practitioners for sustainable development. The Project emphasizes strengthening of problem-solving capacities for practical application in the industrial and community settings.

Background and overview of the innovation

ESDA – SUD is a project involving the United Nations University in Japan, the University of Nairobi, and Kenyatta University in Kenya, with support from UNEP and UN-HABITAT and other stakeholders. Under this initiative, an innovative Master's degree curriculum on Sustainable Urban Development (ESDA-SUD) has been developed in the context of ESD. The new curriculum seeks to put more emphasis on practical field-based and participatory learning in contrast to the present situation where, for various reasons, teaching and examinations take the centre stage.

The objectives of the course are:

- To equip the students with skills and competencies for innovation development in pursuit of sustainable urban development.
- To equip students with skills of doing technology-oriented research with direct bearing to enhanced social-economic development.

- To inculcate into the students innovative entrepreneurial culture and practices for wealth creation and poverty alleviation.
- To develop professionals capable of advising governments on policies that support sustainability thinking for societal development.
- The key features of the new programme include:
 - Re-tooling of teaching methodologies from theoretical to practical learning.
 - A curriculum that is responsive to urban communities' needs through community-based processes.
 - Recognition of potential of communities to contribute to sustainable urban development.
 - Participatory methods and bottom-up development approaches.
 - Action research strongly based on creativity and innovation as well as harnessing indigenous knowledge and innovations.
 - Appropriate technology and community product design, development, production and marketing and distribution.

This Master's Degree Program will consist of Coursework, Examination and Project and shall be covered in two years (or 4 semesters). Students will take 11 core units in the first and second semesters, and 4 elective units for their specialization in the third semester. The areas of specialization include: Water and Sanitation Management, Urban Food Security and Renewable Energy

During course work, learning will include the following methodologies:

- Community-based conceptualisation and development of innovation projects.
- Mandatory field work within target communities.
- Exchange visits - Outside the University.

- Community-based demonstration of Innovations.

The last semester will be devoted to an innovation-based research project.

Inter-university collaboration involving African, Japanese and Nordic countries is a key feature of the proposed degree programme. There will be an advisory board comprising policy makers, industry leaders and recognized personalities around the world to advise the programme and assist in fund raising for scholarships as well as improving teaching and research infrastructure in the participating universities.

Strengths of the ESD innovation

The programme has so far received strong support from the relevant UN organizations, University Management, the National Council for Science & Technology and the urban communities that it has worked with. The actual strengths of the programme will be determined after implementation.

Challenges of the ESD innovations

The key challenge has been lack of a shared understanding of ESD principles among the faculty, as well as challenges related to funding of the initiative.

Expected outcomes and social/environmental impact after say 3-5 years

- Human capital with competencies to address sustainable urban development created.
- Better managed urban ecosystems with less contributions to global warming.
- Improved livelihoods particularly of the urban poor.
- More responsive urban planning by the local authorities.

ADDITIONAL INFORMATION

Target beneficiaries:

The programme initially targets the poorer segments of urban and peri-urban communities, urban authorities and development agents especially, as well as the faculty and students who will participate in the programme.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

There are a number of courses that directly address UNEP's priority thematic areas. These courses include: Ecosystem-based development; Climate change and sustainable urban development; Urban governance and ethics; Principles of Cleaner Production and Green Economy.

Partner organizations

National government: Ministry of Higher Education, Science & Technology; Ministry of Planning and Vision 2020; Ministry of Local Government.

Local government: Cities and Municipalities in Kenya.

Education/research institutions: There will be partnerships with Kenyatta University (Kenya) and Universities in Japan and Europe.

Business and Industry: The innovation plans to involve the business community and industry under the auspices of the National Council for Research and Technology (Kenya).

Others: UNEP, UN-HABITAT, UNESCO

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SUCCESS STORY 11 - INTEGRATING SUSTAINABILITY INTO THE OPERATIONS, MAINTENANCE, TEACHING, LEARNING AND RESEARCH AT THE UNIVERSITY OF WOLLONGONG, AUSTRALIA

Introduction

This innovation targets teaching, greening of university infrastructure/facilities/operations, community engagement, university management and student participation/engagement. It aims to address integration across all spheres of the University.

Main Focus of the Innovation

The project aims to integrate all aspects of sustainability into the way the University operates from its teaching, learning and research to its infrastructure, management, community engagement and student and staff participation.

Background and overview of the innovation

The University established the Environment and Sustainability Initiatives Unit (ESI) in 2009. The Unit has 7 staff whose goal is to integrate sustainability into everything the University does. The unit operates across facilities management, teaching, learning and research as well as community outreach. The Unit reports directly to the Vice Principle Administration.



An Environmental Management Plan and Environment Policy, prepared in consultation with staff and students sets the strategic direction and includes:

Energy: Reduced consumption by 22% through lighting and occupancy sensor retrofit, behaviour change program; Energy use 6.8 GJ per EFTSU/year; Purchase 15% Green Power; Carbon Management Plan; Monitor energy use across campus with 190 electrical smart meters, 34 gas meters; Energy Savings Action Plan; Increase proportion of Alternative/Renewable to 45% by 2013; Design Standards to 5 star buildings and refurbishments; Energy Policy.

Water: Reduced water total consumption by 35%; In 2003, 23 kL/EFTSU/year was used, in 2010, 10.4 kL/EFTSU/year was used. Other aspects include: Water Savings Action Plan; 2 ML of Water storage: Grey Water System to be installed; Monitor water use with 30 water meters Self Sufficient Water Plan.

Management Systems: EMS developing Green Procurement and Purchasing underway.

Materials Management: Increased recycling by 20% aim to 66%; composting trial underway.

Research Teaching and Learning: Provide lectures for sustainable courses; Seek grant funding for environmental projects (\$450,000 to date); Provide learning opportunities for students in work experience and projects; Produce graduates across all disciplines with an understanding of sustainability; Prepare summary of all coursework including sustainability.

Campus Environment: Biodiversity Management Plan – rehabilitated 4000 m² of riparian corridor since 2009 ; 50% plants propagated locally; Increase awareness through tours and education of campus plants and animals; Training for landscape staff on biodiversity, stormwater management etc.

Transport: Modal shift – increased bus travel by 10% since 2007; 3 Go Free – carpooling, provide software for people to connect via internet; some

tutorials scheduled according to postcode to enable carpooling; 500 car spaces provided for carpoolers – in 2005, 3 carpoolers but in 2011, 500 per day; increase in 2 or more travelling in car by 7% since 2007, increased train use by 2%.

Community Engagement: Building capacity and resilience among UOW community; Partnerships with NGOs; Established a network of Environment Champions across campus (130); Signed Talloires Declaration.

Strengths of the ESD innovation

The key strength of the innovation is in three areas:

- The integration of the program across all areas of the university – operational, teaching and learning, research and community engagement/partnerships.
- Metering system – 190 smart electrical meters providing data at 15 min intervals, 34 gas meters 1 hour interval and 30 water meters at 1 hour interval. Providing real time information for staff and students on energy and water consumption and allows the project implementers to track reductions in consumption through various initiatives.
- Transport work: 3 Go Free car pooling, Parking signage to indicate where available spaces are – iPhone application identifying available car spaces; Provide free shuttle service to meet train; free shuttle service in surrounding suburbs increased bus use by 10%, train use by 2% and shift in car use to 2 or more people by 7%.

Challenges of the ESD innovation:

It is anticipated that the ongoing behavioural change to reduce consumption will continue to be a challenge.

Expected outcomes and social/ Environmental impact after say 3-5 years

The following is expected in 3-5 years:

- Reduce energy consumption by 30%;
- Increase renewables/alternative energy to 45%;
- Reduce water consumption by 50%;
- Increase recycling to 66%;
- Compost organic waste;
- Increase awareness of sustainability in the community;
- Produce graduates with good understanding of their role in sustainability.

ADDITIONAL INFORMATION

Target beneficiaries: Staff and students, community partners and the general community.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

Partner organizations

National government: Education Investment Fund; Office of Water; Department of Environment & Heritage.

Local government: Wollongong City Council; Kiama Council; Southern Councils Group

NGO's: Green Jobs Illawarra; Futureworld EcoTechnology Centre; Permaculture Partners.

Some Major Publications/ Production Titles associated with the innovation: EMP, Environment Policy; Energy Savings Action Plan, Water Savings Action Plan, Self Sufficiency Water Plan, Alternative/ Renewable Energy Plan.

For more details, please contact: Name: Prof. Muttucumaru Sivakumar. Email: siva@uow.edu.au



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SUCCESS STORY 12 - "MAKING PUBLIC HIGHER EDUCATION SUSTAINABLE: UMASS BOSTON APPLIES BEST PRACTICES BY ENGAGING CAMPUSES AND COMMUNITIES IN ADDRESSING ENVIRONMENTAL, SOCIAL AND ECONOMIC CONCERNS." -UNIVERSITY OF MASSACHUSETTS (UMASS) , BOSTON, USA.

Introduction

This innovation encompasses teaching, greening of university infrastructure/facilities/operations, community engagement/development, university management, as well as student participation/engagement.

Main Focus of the Innovation

The move towards sustainability at UMass Boston's is accomplished through a host of innovative strategies in keeping with the university's vision and urban mission in www.umb.edu. A sampling of which include:

- Green building design,
- Sustainability as a core leading principle in Master Planning Purchase of energy efficient products,
- Installation/procurement of renewable energy,
- Recycling and composting,
- Eco-friendly bookstore products,
- Sustainable dining and foodware options,
- Hybrid buses/vehicles in shuttle fleet, bicycles, alternative transit rewards,
- Increased tracking, participating in Greenhouse Gas inventories, Climate Action Plan,
- Toxics use reduction and electronic waste recycling,
- Increased green space,

- Expansion in academic offering in sustainability areas, and
- Increased students programs, events and opportunities in sustainability areas



Background and overview of the innovation

UMass Boston, the harbour campus is Boston's only public university. It is a signatory to the international Talloires declaration and also is a signatory to the ACUPCC President's Climate Commitment. In 2004, UMass Boston was awarded the "Sustainable University of the Year" award by the MA State Sustainability Program (LBE). It was one of a few campuses nationwide to have a sustainability program starting in the late 1990s. In 2011, UMass Boston was recognized with a Leadership Award for its Excellence in Commuting Options.

UMass Boston is engaged in building new science and academic buildings where sustainability is now one of guiding principles of the university's Master Planning process and all future building will be designed to meet LEED Silver standards at a minimum. Campus environmental and sustainability personnel include the office of sustainability, the environmental health and safety office, energy manager, LEED-certified project specialists and a number of senior management and operational departments that help with reducing its environmental footprint.

UMass Boston's move towards sustainability is accomplished through a host of strategies that have been ongoing for more than a decade in keeping with the university's vision and mission. These include: energy efficiency programs, energy-efficient equipment, fuel switching (vehicle and marine), purchase of energy efficient products, increased energy conservation by employees, installation/procurement of renewable energy, use of bio-based and other alternative fuels, water conservation, recycling, composting, clean air incentives, eco-friendly bookstore products, sustainable dining and foodware options, hybrid buses/vehicles in shuttle fleet, alternative modes of transportation such as carpooling, biking, vanpooling, eco-friendly printing, recycled paper, scan to email, desktop power management, green building, energy-management systems, use of energy-efficient equipment, energy-star products, increased tracking, toxics use reduction, emphasis on organic, locally grown foods and increased green space.

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UMB offers doctoral, masters and certificate programs in the environment and sustainability fields through many interdisciplinary academic programs and research opportunities offered by the Environmental, Earth and Ocean Sciences Department, College of Management, Green Chemistry track, Environmental Biology track and more.

Campus events such as Earth Day, America Recycles Day, Focus the Nation have wide participation. Student clubs such as the Sustainability Club have successfully included a renewable energy fee to help support renewable energy on campus. Other activities include funding reusable cups, working on internships and other 'green' events in collaboration with the campus sustainability program, engaging local school children in green education and green jobs pipelines through pre-collegiate programs.

In 2010 and 2011, UMass Boston was chosen by Princeton Review as one of 311 Greenest Colleges in the United States.

Strengths of the ESD innovation

The strengths of the initiative are reflected in all of the ongoing innovations as described above.

Challenges of the ESD innovations

The main challenges relate to financial, aging building infrastructure challenges, as well as state funding support.

Expected outcomes and social/ environmental impact after say 3-5 years

Improved environmental and sustainability education and reduced ecological footprint.

ADDITIONAL INFORMATION

Target beneficiaries:

There are multiple beneficiaries to this initiative. These include; university community (students, faculty and staff), local, city, State, national and international community.

Linkage between the ESD innovation and any of the UNEP priority thematic areas

The efforts at UMass Boston link to at least five of the six UNEP priority thematic areas as implied in the description above.

For more details, please contact: Name UMB Sustainability Program, UMass Boston – Prof. Maria Ivanova/Anamarija Frankic. Email: UMBe.Green@umb.edu; Anamarija.Frankic@umb.edu



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SUCCESS STORY 13 - THE SUSTAINABLE BUSINESS PRACTICES SOCIETY – THE MAKING OF A GREEN IMPACT, LONDON SOUTH BANK UNIVERSITY – LONDON, UNITED KINGDOM, EUROPE

Introduction

This innovation comprises of teaching, research, as well as community engagement / development

In regard to teaching, it targets awareness raising of Education for Sustainability within the context of Business and Management Education.

The research component provides an identifiable community for focus on research in Education for Sustainability (Efs) and dissemination of practice.

The community engagement /development component is the focal point for activities and events, community outreach and conferencing in collaboration with RCE London.



LSBU ESD African learning community tutors and students

Main Focus of the Innovation

This is a student and staff society whose primary aim is to have members support and uphold the principles and practices of the UN Decade of Educational for Sustainable Development and the UN Global Compact Principles for Responsible Management Education.

The society proactively monitors and evaluates the inclusion of sustainable business practices and global citizenship in the offerings of the Faculty of Business.

Background and overview of the innovation

Based on the principle that together we can – and do – make a difference, this Society has great support from students and staff, principally within the Faculty of Business at London South Bank University. With linkages between the University Sustainable Development Group, People & Planet Society and Faculty committees, the society provides a focal point for Green Impact, the UN Decade of Education for Sustainable Development, the UN Global Compact Principals of Responsible Management Education, inclusion of sustainable development and global citizenship in curriculum, assessment and research, supporting discussion forums and facilitating research-orientated colloquia in these areas. LSBU has also recently joined the UN Global Compact's Principles of Responsible Management Education. LSBU is a founding member of the COPERNICUS Alliance, the European Network on Higher Education for Sustainable Development.

The Green biT Green Impact team within the Business Studies Department was awarded Gold Standard in May 2010 at LSBU.

The society hosted an innovative assessment conference on Sustainable Business Practices as part of the Knowledge, Globalisation & Development module in March 2010.

Since the formation of the Sustainable Business Practices Society in February 2010, both the elected President and Vice-President have attended all Sustainable Development Group meetings and are involved in a committee to develop a curriculum plan for sustainability. A number of executive committee members of the society have also been in attendance at Sustainable Development Group meetings – this is a fine example of student engagement.

Within the context of Green Impact, the Sustainable Business Practices Society won the Environmental Hero award at LSBU and is being considered at national level within this context. The Society was also given a Special Recognition Award by the LSBU Students' Union in May 2010. There are 12 members of this society who are Environmental Auditors. Membership is already over 60 and every member of the Green biT Green Impact Team is a member of the Sustainable Business Practices Society.

under the umbrella of the Regional Centre of Expertise on Education for Sustainable Development (acknowledged by the United Nations University) at London South Bank University.

Strengths of the ESD innovation

Describe the strength of the initiative in terms of innovativeness, effectiveness, efficiency, social and environmental impact, degree of community/student/staff involvement, impact on beneficiaries, social and environmental relevance, longer term sustainability, the way of implementation, mainstreaming strategy; decision making, and networking & linkages among stakeholders.

The society has been very successful in bringing sustainability into the curriculum as a result of student engagement. Students from the society have continued to focus on sustainability in their continuing education and in their professional lives. Student involvement from the society in LSBU's Sustainable Development Group and HE Curriculum Development Group has become a strong voice and there are strong linkages with other groups such as People & Planet and South Bank Entrepreneurs and RCE – London.

Implementation and monitoring of behavioural change has been seen through the Green Impact scheme which has had active student and staff involvement through the society.

Challenges

Given the strong and enthusiastic participation of students and staff, where there has been resistance to including sustainability this has been worked through by organic, inclusive and participative change, particularly from students, thereby 'mainstreaming' sustainability rather than it becoming 'marginalised'.



Gender workshop at the UK commonwealth scholarship commission (Ros Wade 5th from left)

This society has an exciting future and the energy and dedication of its members will sustain it in its drive to include innovative critical approaches to sustainable development within the Faculty of Business at LSBU and disseminate this practice within LSBU, community stakeholders and academic institutions

Expected outcomes and social/ environmental impact after say 3-5 years

Looking further ahead, the Sustainable Business Practices Society will grow as a focal point for sustainability with active engagement of students and staff. One emergent focus is that of the GREntrepreneur – Globally Responsible Environmental entrepreneur – in conjunction with South Bank Entrepreneurs. The society is also playing a leading role in embedding sustainability within all the business degrees, particularly in imaginative and inclusive forms of curriculum delivery and assessment which continues to receive very positive feedback from students and staff involved.

ADDITIONAL INFORMATION

Some Major Publications/Production Titles associated with the innovation

Transformative Learning in Practice: Sustainable Business Practices – Conferences as Assessment – David Clemson & Ceyhun Elci, Faculty of Business, London South Bank University at International Entrepreneurship Educators Conference, Cardiff, September 2010

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Section Three: Some cross-cutting innovations for sustainable development

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GUPES
Global Universities Partnership on
Environment for Sustainability



SUCCESS STORY 14 - EDUCATION FOR SUSTAINABILITY POST GRADUATE PROGRAMME BY DISTANCE AND FLEXIBLE LEARNING, LONDON SOUTH BANK UNIVERSITY – LONDON, UNITED KINGDOM, EUROPE

Introduction

This innovation addresses issues in teaching, research, community engagement / development, student participation/ engagement. In regard to teaching: the course is about the learning needed to reorient society towards sustainable development. It is designed to enable participants to address their own particular sustainability issues in their own context and workplace, thereby linking theory to practice.

In terms of research: the active research programme has addressed issues around : the qualities of leadership needed for sustainability; the interface between local and indigenous knowledge; developing an interdisciplinary framework and a language for Education for Sustainable Development (ESD): consideration of ecosystem services and ESD has been built into materials as part of a commitment to the Millennium Development Goals but this is also an ongoing research theme. This is also reflected in the work done by team members on the UNESCO discussion document on Education for All (EFA) and ESD as part of the Decade of Education for Sustainable Development.

In regard to Community Engagement / Development: Community engagement takes place through the EFS community of practice at local and global levels. Many students choose to engage with their communities of practice in their dissertation work using an Action Research approach. In London it takes place through the partnership with the London Regional Centre for Expertise in ESD- with local schools, business and communities.

In terms of Student Participation/ Engagement: the programme has been a catalyst in setting up the LSBU Sustainable Development Group which has instituted policy on Sustainable Development (SD) within the university and brought together all the various service sectors, academic staff and student body to build a sustainable university. This is manifesting itself in all LSBU new buildings, in energy policy, procurement policy, in waste and water management among others.

Student participation in developing the EFS field takes place mostly through the Masters dissertation. The range of dissertation topics from different global regions helps to inform programme developments. Student work is also used in updating materials subject to their agreement.

Main Focus of the Innovation

The innovation arose from a concern that the educational commitments of Agenda 21 were not being addressed seriously by either governments or universities. This resulted in a group of UK based (but internationally active) environmental and development NGOs developing the concept of an innovative course which would seek to empower agents for change.

The course was designed to be taken by fulltime, flexible or distance learning and to link theory to practice. All coursework is designed around effecting change for sustainability within the context, culture, country and organisation of the participant. As EFS is still a new and emerging area, expertise was sought from both the academic and NGO sector and this partnerships have continued upto today and is one of the strengths of the programme. The programme is designed to encourage interdisciplinary and cross sectoral engagement, to draw on scientific and indigenous knowledge and to empower participants to become effective agents for social change towards ESD.

Most recently the EFS programme has been working to develop a learning community of practice in eastern and southern Africa and to support the MESA programme. This consists of over 80 members across the region and has recently been widened to include West Africa. This professional network is actively championing the cause of ESD across Africa and is a resource for future work in this area.

A key consequence of the involvement of major global NGOs meant that the programme had access to global perspectives. In this way universities can utilise experience and perspectives from global civil society actors. A tutor team was also chosen from people active in the field rather than existing academics. This has made the programme more relevant but also more unusual within the academic setting.



Background and overview of the innovation

It is widely believed that Education for Sustainability requires innovative and responsive approaches. The EFS Programme at London South Bank has 15 years of experience in delivering high quality, flexible distance learning at Masters level to a wide variety of students overseas and in the UK. The programme has been rated highly by the UK Quality Assurance Agency as a

flagship for flexible learning, linking theory and practice in innovative ways. A key aim of the programme is to generate skilled and well-informed 'agents for change' in education. Content importantly includes perspectives and analysis from different global regions and emphasises the need to combine local and expert knowledges for effective education.

Innovations include:

1. Partnerships with international, national and local environmental and development NGOs – to develop course materials, placements and to provide expert practitioners to tutor students
2. All coursework develops skills for students to become effective agents for change in their own context/ workplace.
3. The course collects a body of evidence of the impact of this change through coursework and dissertations.
4. Links between research dissertations and key UNESCO and UNEP themes.
5. Adaptive, appropriate pedagogy – combining the best of flexible, distance learning: high quality materials, E learning, and face to face
6. Walking the talk: The students and staff of the EFS programme are engaged as agents for change within London South Bank University and have been instrumental in setting up the following:
 - LSBU Sustainable Development Group which has developed policy on sustainable energy use, procurement, waste and water management and the curriculum (www.lsbu.ac.uk/sustainability)
 - The London Regional Centre for Expertise in ESD- addressing the key challenges and sustainability issues for London communities
 - The UK network of Teacher Educators for ESD/GC

The Education For Sustainability Programme

London South Bank University's Education For Sustainability (EFS) Programme offers post-graduate courses from CPD to masters level, aimed at providing personal and professional development for anyone involved in communicating sustainability in whatever context.

The context from which the EFS Programme emerged

This innovative programme was originally set up in 1994 by a group of development and environmental organisations, with financial contributions from WWF-UK, Oxfam and the EU. It was a response to the commitment from the 1992 UN Earth Summit to 'integrate environmental and development concerns' in the emerging concept of sustainability. A unique collaboration developed between this group of organisations and London South Bank University, resulting in the first ever masters programme on Education for Sustainability. The first cohort of students started the course in 1994 and the first masters degrees were awarded in 1997. This first group has now grown into a strong international learning community, covering all global regions except Alaska.

Courses offered by the EFS programme

A range of post graduate units form the core of the programme. Participants can take them by distance learning or through dayschools at the university. These include an introductory unit on Education for Sustainability and seven others on themes such as Processes and Management of Change, Science and Culture, Environmental and Development Perspectives, Values and Participation, Researching EFS. The course content was developed by the EFS team in collaboration with stakeholders. The team includes a group of tutors with internationally recognised expertise, as both practitioners and researchers in a range of EFS fields.

The range of courses available:

- Short courses and Continuing professional development (one/ two units)
- Post graduate certificate (4 units)
- Post graduate diploma (8 units)
- MSc Education for Sustainability (8 units plus the dissertation)

Teaching and learning is supported by an expert team of tutors, an acclaimed set of distance learning materials and E learning. (QAA 2001) A tailor made web site also enables students to feel part of an active learning community and to participate in dynamic web based interaction, for example through on line debates on topics such as education and climate change.

The EFS programme is part of the Education Department which is strongly committed to the values of diversity, equality and sustainability. The Education Research Centre (CCCI) has a long track record and a remit of research in these areas (www.lsbu.ac.uk/ccci).

Strengths of the ESD innovation

The EFS programme has developed from a very small course of 20 students in 1994 to an international programme with around 150 students per year. It has been recognised by Chevening and by the UK Commonwealth Scholarship Commission which has so far awarded over 70 scholarships for African students. Students contribute to the development of the programme through their feedback and through some of their coursework which, where appropriate is used as readings within the course materials.

The majority of students are on leadership positions within their organisations and through the course are able to make an impact on mainstreaming strategy, developing policy and practice. Many have gone on to influential positions in their organisations, for example, in Oxfam Education UK, Ecoschools Tanzania, British Council Malawi, Education Ministry Fiji, Wildlife Clubs

of Kenya, NEMA, International Education RSPB, Civil Service College UK.

Through the students and alumni around the world, the programme makes an international impact in developing and consolidating a global community of Educators for Sustainability. The programme content is continually reviewed in conjunction with NGO partners, students, alumni, practitioners and academics to reflect developments in this fast-changing field. The programme team also have considerable experience in making issues and debates accessible and relevant to practitioners in a wide variety of work contexts across the globe. In addition the team is skilled in supporting and developing students who are not familiar with the academic requirements at Masters level, particularly reflective and analytic aspects.

Challenges of the ESD innovations

The main challenge relates to the lack of/limited understanding of ESD among senior management.

Expected outcomes and social/ environmental impact after say 3-5 years

A research project is currently in place to assess the detailed impact of the programme over the last 5 years. This will identify key examples of impact at both the local and global levels.

Some of the general findings on impacts so far include the following:

- An active global community of practice in ESD: a group of empowered practitioners who are effective agents for change within their own organisations, countries and contexts.
- Within London South Bank University (LSBU): Alumni, students and staff have been instrumental in developing the London Regional Centre of Expertise in ESD. They have also helped to set up the
- LSBU Sustainable Development Group.

- Increase of interdisciplinary courses and projects at university level.
- Embedding of ESD across Higher Education (HE) courses – including a strong appreciation of the value of biodiversity, forests and water management.
- Skills for mediation of and adaptation to the effects of climate change
- Behaviour change for ESD
- Understanding of the importance of linking scientific, cultural and indigenous knowledge
- Policy change for ESD at personal, institutional, local, regional, and national levels
- Informed leaders committed to ESD.

All the above lead to: sustainable approaches to livelihoods, energy use, travel, consumption and production, as well as biodiversity.

ADDITIONAL INFORMATION

Target beneficiaries

The programme targets all sectors i.e Civil society, Business, and Government. It is aimed at anyone who is involved in the practice of education (in the broadest sense) communications and learning for sustainability. The current student body includes participants from: media, health, conservation, civil service, local government, business, Higher Education (HE), schools, and NGOs.

All coursework is directed at change towards ESD within students' own context and organisation, but also develops the capacity to present a reasoned argument for learning for sustainability and to assess different strategies.

Linkage between the ESD innovation and any of the UNEP priority thematic areas:

The innovation closely links with aspects of climate change and ecosystems management among others. A body of research and evidence on mainstreaming Education for Sustainability (EFS) has been collected from the work of participants in most global regions. This includes work on the interface between indigenous and scientific knowledge, gender and sustainable development; HIV AIDS education and sustainability; interdisciplinary learning to address climate change challenges; the psychology of EFS; the influences of faith and culture on EFS; building sustainable livelihoods; governance, participation and EFS, ecosystems services. This represents a resource that could be mobilised for the international ESD community.

Partner organizations

NGO's: Environmental and development NGOs, such as World Wide Fund for Nature, Oxfam

UNESCO UK ESD Group

Education/research institutions: London Regional Centre of Expertise in ESD and

Education Research Centre LSBU

Business and Industry: Professional practice for ESD (network and training organisation for the business sector)

Others: UNESCO International Teacher Education network ; London Regional Centre for Expertise in ESD

Some Major Publications/Production Titles associated with the innovation

A) 'Journeys around Education for Sustainability' (Parker, J and Wade, R eds) 2008 LSBU, WWF, Oxfam

B) Course materials for the programme:

1. An Introduction to Education for Sustainability (Parker,J_)
2. Processes and Management of Change: with a focus on the formal sector (Grunsell,A and Wade,R)
3. Values and Participation with a focus on adult, youth and community education (Parker, J and Rea, V)
4. Local and Global with a focus on NGO education (Clarke Patel and Parker,J)
5. Theories and perspectives on Environment and Development (Wade, R and Maiteny, P)
6. Science and Culture (Parker, J and Maiteny, P)
7. Education for Sustainability: Education in Change (Sterling, S with Wade, R)
8. Researching Education for Sustainability (Plant, M)

C) 'EFA ESD dialogue: Educating for a Fairer World Wade', R and Parker, J Unesco 2008 Paris

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