

**Environmental Education Association of
Southern Africa (EEASA)**



32nd Conference 2014

Book of Abstracts

Windhoek

Namibia

September 2014

EEASA PRESIDENT'S OPENING ADDRESS TO DELEGATES OF 32ND THE EEASA ANNUAL CONFERENCE

DR. JAMES MPEMPELANI KETLHOILWE

The annual highlight of the Environmental Education Association of Southern Africa (EEASA)'s activities has been its conference and workshops since 1982. The annual conferences and workshop promote the Associations mission by showcasing interdisciplinary and multidisciplinary nature of environmental education. Each year EEASA provides a forum for its members and others to support environmental and sustainability education processes, exchange ideas and opinions, share experiences and learning materials.



The success of these activities is facilitated by EEASA membership through the submission of EEASA's multidisciplinary and interdisciplinary abstracts. .

The 32nd EEASA Annual conference is based on the following theme and sub-themes;

Theme: Reflections on the current and emerging ESD issues and practices informing the post DESD framework

Sub-themes:

- Mainstreaming ICT's and media, including technologies, information knowledge and people into ESD/EE initiatives.
- Addressing specific challenges such as climate change, biodiversity loss, disaster risks through EE/ESD
- Promoting Community Based Natural Resources (CBNRM), water management, security and tourism for poverty alleviation through ESD/EE practices
- The role of ESD/EE in transition green economy (TVET, youth participation, leadership and governance)
- Promoting policies and capacity building of educators and trainers in ESD/EE
- The role of higher education and research in enhancing learning about and through ESD/EE
- The role of heritage institutions, indigenous knowledge and cultural practices in and through ESD/EE
- Promoting quality education, transformation learning and training environments, literacy and numeracy in ESD/EE
- The role of ESD/EE in accelerating the sustainable solutions at local levels

The abstracts submitted and included herewith reflect the above named themes and sub-themes. On behalf of the EEASA Council and the 32nd Local Organising Committee, I welcome you to the 32nd

EEASA Annual Conference. I trust you will have a fruitful and exciting stay in Windhoek. The EEASA 2014 Local Organising Committee is proud to host this annual conference despite the fact that they decided to step in and host it within a year. I trust you will bear with them in case they left out one or some of the traditional activities of EEASA annual conferences. I hope you travelled well and safely and you are now looking forward to an inspiring conference programme. I encourage you to study the abstracts and programme so that you derive the most benefit from an exciting annual conference.

Putting together an EEASA annual programme is always a challenging task. The LOC received over one hundred paper abstracts for presentations. The abstracts received, and as reflected in the programme, present an interesting mix of theoretical, empirical and practical contributions. I hope you will enjoy this array of contributions and take with you back to your places of work, the challenge of exploring further deeper meanings, engaging in dialogues, and questioning the way we think and do things to strengthen environmental and sustainability education for a just, equitable and sustainable society. Enjoy this wonderful and inspiring conference and a peaceful country together while exploring ***“Reflections on the current and emerging ESD issues and practices informing the post DESD framework”*** and trying to locate where we are, for the success of this EEASA 32nd Annual conference.

THE CONFERENCE THEME

The United Nations Decade of Education for Sustainable Development (UNDESD) comes out of the World Summit on Sustainable Development. The UNDESD runs from 2005-2014 and speaks about the bridges that must be built between academia and community, as well as the need to enact sustainability in education in a manner that affects society at large and the biosphere positively. This conference is a manifestation of building the bridges between academia and community.

The UNDESD comes to end in 2014. Therefore, the world educational community will meet in Japan in November 2014 to reflect on progress and map a way-forward for the UNDESD. The Environmental Education Association of Southern Africa (EEASA) community has opportunity together with the Regional Centre of Expertise (RCE) in Education for Sustainable Development (ESD) to reflect on progress and map a way-forward by reflecting on **‘current merging ESD issues and practices informing the post DESD framework’**. To this end, the EEASA 2014 Local Organizing Committee (LoC) has a mandate from EEASA Council to put-together all deliberations of the EEASA 2014 conference and prepare to share results of these deliberations with UNESCO and partners of the Global Action Programme (GAP).

FACING THE SUSTAINABILITY CHALLENGE DURING THE 2014 CONFERENCE

Therefore, this year EEASA Namibia is partnering with the University of Namibia’s (UNAM’S) Green Drive project and Ministry of Agriculture and Forestry- Okahandja nursery.

The UNAM'S green drive project aims to promote the global goals of reducing, reusing and recycling waste for a more sustainable planet. As a premier institution of higher education, UNAM has taken a commitment to lead to the drive this project and encourage the rest of academia to follow suit.

The Green Drive Project, sets the trajectory for more green events at satellite campuses, all aimed at encouraging recycling. Activities include: tree planting, launching of e-waste containers, campus cleanup campaigns. All activities occur throughout the year and culminate in a gala dinner where a 'Green Ambassador title' is awarded to the most resilient recycler.

Recycling bins will be available at a number of sites at the conference venues. Please make use of these bins for clean recyclable paper, tins and plastic which are sorted and baled by local waste reclaiming company.

Ministry of Agriculture and Forestry- Okahandja nursery has donated plants that should be planted as a measure of offsetting carbon emissions. Please join us at the tree planting session which is planned during the conference.

CONFERENCE EXCURSIONS

HABITAT RESEARCH AND DEVELOPMENT CENTRE (HRDC)

The Habitat Research and Development Centre which is situated along Claudius Kandovazu street in Katutura, Windhoek is a centre for housing research and development in Namibia. It was created to address the issue of housing by applying new methods and ideas of science and technology for the sustainable development of the Namibian housing sector. The centre promotes and facilitates ecological sanitation, water conservation, renewable energy and biodiversity.



It also promotes the production and usage of readily available recyclables, local building materials and appropriate technologies and indigenous designs for sustainable human settlements. HRDC has been supporting and capacitating communities, local and regional authorities in dealing with issues related to housing by contributing to policy formulation on housing, environment and resources management. For more information please visit <http://209.88.21.36/opencms/opencms/grnnet/MRLGH/HRDC/>.

WINDHOEK GOREANGAB OPERATING COMPANY (WINGOC)

The Windhoek Goreangab Operating Company operates the New Water Reclamation Plant and the wastewater and sludge treatment plant of the Gammams Waste Water Care Works. WINGOC is located in Matshitshi Street, Goreangab Ext.3 north-west of Windhoek. The plant that was first built in 1968 represents one of the first recycling facilities in the world to reclaim domestic wastewater for household use. Due to the fact that all naturally available water sources in and around Windhoek have been fully harnessed, the New Goreangab Reclamation Plant was completed in 2002 and comprises the latest available proven water treatment technology. This was done in order to ensure the total utilization of available effluent from domestic wastewater to ensure the security of water supply for the future.

For more information please visit <http://www.wingoc.com.na/>.

THE NATIONAL BOTANIC GARDEN (NATIONAL BOTANICAL RESEARCH INSTITUTE OF NAMIBIA [NBRI])

The National Botanic Garden of Namibia (NBGN) which was proclaimed in 1970, is a 12 hectare nature reserve in the heart of Windhoek, where you can see and learn about Namibia's fascinating plants. The garden is aimed at protecting and promoting the sustainable use of Namibian flora, with an emphasis on education and recreation. A large part of the garden is not landscaped in order to conserve water and to present plants in their natural environment, allowing visitors to learn about indigenous vegetation and water-wise gardening. For more information please visit <http://www.nbri.org.na>.



RENT-A-DRUM

Rent-A-Drum was established in 1989 as a holistic approach to waste management and recycling in Namibia. This company is responsible for the collection and sorting of recyclable materials, making it the leading waste management and recycling company in Namibia. Rent-A-Drum operates a fleet of more than 50 waste collecting and removal vehicles. Their recycling initiative has grown to the point where they have established a sorting Material Recovery Facility (MRF). For more information please visit <http://www.rent-a-drum.com.na>.



NAMIBIA ANIMAL REHABILITATION, RESEARCH AND EDUCATION CENTRE (NARREC)

NARREC is a non-profit organization that provides wildlife assistance and unique environmental education. The centre is nationally utilized for the treatment, care and rehabilitation of wildlife, specifically birds. NARREC operates as a special support service to the Ministry of Environment and Tourism, collaborates with the City of Windhoek, the Society for the Prevention of Cruelty towards Animals (SPCA) and the Ministry of Agriculture, Water and Forestry on issues relating to human and animal interactions. The primary focus of the centre is to provide professional care and rehabilitation facilities for injured, orphaned and misplaced wildlife in order to facilitate their release back into the wild. This is enhanced by an awareness and education component which includes housing non-releasable animals in facilities of an internationally high standard in a holistic environment that operates in line with sustainable-use principles and technologies. For more information please visit <http://www.narrec.net>.

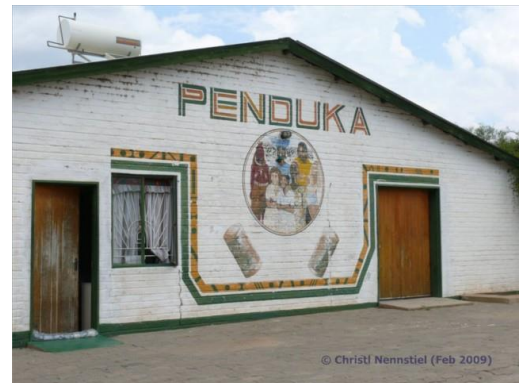
DAAN VILJOEN GAME PARK

The Daan Viljoen Game Park is a 40km² park that was proclaimed in 1968 to preserve the ecosystem of the Khomas Hochland. The park is located 24 kilometres west of Windhoek, Namibia. It is a conservation area for many game species with high numbers of hartmann's mountain zebras, giraffes, kudus, klipspringers, blue wildebeest, springbok, elands, gemsbok and leopard. There are also more than 200 bird species endemics and these include the Ruppell's parrot, white-tailed shrike and Monteiro's hornbill.



PENDUKA NAMIBIA

Penduka is a non-governmental development organisation that works with women in Namibia. It is based in Katutura, the former black township of Windhoek. In the local languages of Oshiwambo and Otjiherero the word Penduka means "Wake Up!" The programme is aimed at encouraging and supporting women throughout the country to take charge of their lives. Support is given to women in poverty situations, handicapped, ill or with low educational levels. The objective is to empower them through craftsmanship and tourism. For more information please visit <http://www.penduka.com/en/for-you/webshop>



CONFERENCE ABSTRACTS

KEY NOTE ADDRESSES

Title: Learning and agency in communities of practice: *Critical Review and Mapping Progress into the post-2015 Educational and ESD Agendas*

Professor Heila Lotz-Sisitka, Director Centre for Environment Learning and Research, Rhodes University, South Africa



The year 2015 marks the end of the United Nations Decade of Education for Sustainable Development, and the world will meet at the Aichi-Nagoya World Conference on Education for Sustainable Development in November 2014 to reflect on progress in the UN

decade of Education for Sustainable Development. It will also be discussing the role of ESD in the post-2015 education agenda, and the post 2015 Sustainable Development Goals. Key here is taking forward ESD praxis in the context of UNESCO's Global Action Plan for ESD which foregrounds ongoing work in policy making, professional development, transforming learning and teaching, and empowering youth and communities.

The southern African environmental education community has been actively engaged with the UNDESD, often providing 'world leading' examples of practice. What have been our strengths? And our challenges? And how do we mobilise our learning and agency in our communities of practice to continue to support southern African citizens to engage with the many challenges of environment, development and learning in the 21st century? This paper will synthesise the southern African engagement with the UNDESD, it will map out trends, challenges, and what we have learned, showing our capabilities and agency for learning and working together for social change.

Title: Emerging ESD issues and practices in the post DESD framework

Professor Paul Pace, Director: Centre for Environmental Education and Research, Univeristy of Malta,



Abstract

Sustainable development is and will continue to be a matter of substantial international interest and concern. The developments achieved over the past 20 years have been substantial, but in order to be better understood, some of the key issues need to be contextualised, because, after all, it is not just a matter of moving forward, but an issue of determining whether or not we are moving in the right direction.

This paper presents reflections about some of the key issues that will guide sustainable development and consequently ESD in the coming years. In particular, it analyses the deliberations of the UN Conference on Sustainable Development (Rio de Janeiro - June 2012) with a special emphasis on the document *The Future We Want*, which contains a set of suggestions and measures that both industrialised and developing

countries may consider, in order to translate the principles of sustainable development into reality. The presentation will also highlight the challenges these new perceptions of sustainable development have on the provision of ESD. These will be reviewed with particular relevance to the way forward following the conclusion of the UN Decade of Education for Sustainable Development.

PLENARY PAPERS

Title: Stories that gave a face to UNDESSED in Africa,

Prof. Akpezi Ogbuigwe. United Nations Environment Programme (UNEP),

Abstract

As we reflect on the current and emerging ESD issues and practices that will inform the post DESD framework it is necessary to look back to try and capture the substance of what has been done or achieved in the past 10 years. This will enable us define our path for the coming years with greater clarity. As an environmental and sustainability education practitioner who was involved in promoting the Decade values and principles in Africa and other continents, I will share stories from across Africa and in particular Southern Africa that would provide insights that we could contribute to the building blocks for the deepening and expansion of ESD in Southern Africa.

Title: Education for Sustainable Development: beyond the UN Decade.

Mrs. Alexander Leicht, Chief of Section, Education for Sustainable Development, UNESCO

Abstract

At the UN Conference on Sustainable Development in 2012 (Rio+20), the global community agreed to continue and scale up Education for Sustainable Development (ESD) beyond the end of the UN Decade of ESD (2005-2014). ESD aims at providing everyone with the knowledge, skills, values and attitudes that are needed to contribute to sustainable development. The plenary contribution will briefly present selected successes and challenges of the UN Decade of ESD and introduce the Global Action Programme (GAP) on ESD that was endorsed by UNESCO Member States as a follow-up to the Decade. The GAP has five priority action areas – policy, whole-institution approaches, educators, youth, local communities – and the presentation will suggest actions that can be undertaken by stakeholders in these areas. UNESCO hopes to substantially scale up ESD in the next five years together with its partners through the GAP.

Regional Centres of Expertise: Collaborating for Sustainability

Key-note Presentation: Abstract

By Dr. Jim Taylor supported by Dr. Abel Atiti, Tichaona Pesanayi and Prof Rob O'Donoghue

EEASA 2014 – Windhoek Namibia 9th September 2014

This is a key-note with a difference. It responds to just three questions:

1. What are RCE's and how do they work? (How have RCEs developed in the last 10 years)
2. Where are they and who is part of them – with special guest Dr. Abel Atiti (UNU Japan)
3. How are they doing? – With insights from Tichaona Pesanayi (SADC-REEP) & Prof Rob O'Donoghue (Rhodes ELRC)

For many years environmental degradation has been threatening quality of life in the southern African region. As a continent, however, Africa's biodiversity is one of the least degraded of any continent. Africa also has a social fabric of people seeking to work together and cooperate like no other, while links to the natural resource base are high. Millions of African people harvest local resources for their well-being and medicine (uMuthi) is purchased and used on a daily basis. Cooperation is a great strength in these African contexts and Education for Sustainable Development (ESD) provides helpful frameworks for learning and action for a more sustainable world.

The United Nations University initiated Regional Centres of Expertise (RCE) concept was therefore well suited to an African continent where people are keen to work together to achieve greater sustainability. Initiated in 2006 the RCE concept has grown and evolved steadily across southern Africa and many EEASA members are partners in such RCE processes. RCE's are approved by the Ubuntu Commission and follow a strong co-engaged and enabling orientation. This means that collaborating partners can contribute to, and benefit from, the projects that RCE's initiate.

“From its inception, the Regional Centres of Expertise on Education for Sustainable Development have been a living, global experiment to advance ESD at a regional level through innovative and appropriate learning strategies true to the local educational context, needs and aspirations through which individual RCEs were created.” (Petry, et.al., in press)

Examples of projects undertaken by RCE's in southern Africa include:

1. A cooperative action plan to address the cholera crisis in Harare
2. Developing an environmental education plan for the Nile Basin
3. The SADC-REEP (Tichaona Pesanayi, Dick Kachilonda and colleagues) have worked to encourage the development of RCE's across the SADC region. They are also working collaboratively on ESD course materials and training frameworks.
4. Working with RCE partners, in India to implement the 'Hand-print sustainability actions' concept

In particular the RCE's in the SADC region have actively engaged with issues that have touched people's lives and supported sustainability learning. These include food security and indigenous knowledge (e.g. Zomba RCE, Malawi), public health (e.g. Harare RCE – emergent cholera response), Mutare RCE (Sakubva River health: Zimbabwe), youth engagement in the green economy (Swaziland RCE), water, river health, citizen science and public advocacy (e.g. KZN RCE). RCE's have also been instrumental in facilitating public-engaged research and regional networking (e.g. Swaziland and Makana) among others. The RCE's have also contributed to value creation and the reflexive evaluation of RCE work to inform the forthcoming Global Action Plan. Fora for special cross-boundary networking has also been supported. This has connected the policy/decision makers with practitioners working at a local level.

A regional SADC-wide network has made it possible for the RCE's to work in a coordinated manner to plan for capacity development and to peer-review each other's work. Three colleagues will also now provide brief insights of RCE work in Africa. Abel Atiti from the Global RCE Service Centre in Japan will outline the current number and location of RCE's. This will be followed by brief insights from Tichaona Pesanayi (SADC-REEP) and Prof Rob O'Donoghue from Rhodes University who will outline how an enabling evaluation methodology, 'Appreciative Enquiry' was applied to gain deeper insights into the activities, risks and achievements of RCE's. Although monitoring and evaluation (M&E) has been a strong component of our work all too often an evaluative framework is applied that does not do justice to an enabling orientation or one where many people work together cooperatively.

Finally, the presentation will share some ideas for the road ahead. It will also invite participants at the EEASA conference and workshops to contribute, through the RCE movement, to strengthen the forthcoming Global Action Programme (GAP). This will help ensure that the forthcoming GAP really does offer the most relevant, effective and enabling orientation possible.

Dr Shepherd Urenje, The Swedish International Centre of Education for Sustainable Development (SWEDESD) Uppsala University – Sweden, shepherd.urenje@swedesd.uu.se



Title: **Enabling transformative learning in teacher education; the case of Fundisana Online**

Institution: Swedish International Centre of Education for Sustainable Development (SWEDESD)

Contact details: *Uppsala University, Campus Gotland, Visby SE-621 67 Visby, Sweden.*

Abstract

The last Intergovernmental Panel on Climate Change (IPCC) report of 2013 has laid down the most undisputable case to date that climate change is happening and that human actions are the main cause. A rapidly changing climate is only one of many signs of a global system under stress, the seriousness of which is further strained by environmental degradation, social instability and lack of equity. Currently, our education system including curriculum development, classroom practice and assessment, is deficient in tackling this enormous challenge.

SWEDESD, SADC REEP and Edumanity are working in partnership with teacher education institutions across the SADC region to develop and pilot a regional ESD course, Fundisana Online, for mainstreaming ESD in teacher education. This innovative, interactive and structured online platform & course complements the EE/ESD efforts already existing in the region. In a number of African languages, the term Fundisana means “learning from and with each other”. Fundisana Online will become a powerful tool to facilitate, accelerate and mainstream environment and sustainability in teacher education. In addition to mainstreaming ESD in teacher education, Fundisana Online is one way of including ICT in teacher education and will also enable a SADC wide reach at a very low cost per student.

During the plenary session I will discuss

- the collaborative process of development of cutting edge examples of integrating environment and sustainability in teacher education.
- the consultations with the leaders in teacher education and teacher educators from 43 institutions in all 14 SADC countries.
- the nurturing of dynamic teacher educators emerging from the SADC community of teacher educators
- the designing of a unique course by collaboratively pushing the limits of technology to enhance effective pedagogy in teacher education

Key words

Blended learning; Fundisana; transformative learning; sustainability competences; environment and sustainability education; sustainability literacy

PARALLEL SESSIONS

Facilitators/contributors: Tichaona Pesanayi (WESSA: SADC REEP); SADC Teacher Education Institutions (Claudia Buce, UEM, Mozambique; Chancellor College, Tiffany Banda, Chancellor College, Malawi, Prof Nkopodi Nkopodi, UNISA); Shepherd Urenje (SWEDESD); Wolfgang Brunner (SWEDESD); Anisa Khan (WESSA); Caleb Mandikonza (Rhodes University); Phindile Sithole (WESSA)

Abstract

Type: **Workshop** and Duration: **1½ hours**;

Sub-themes: Promoting policies and capacity building of educators and trainers in ESD/EE

Topic: Mobilising and utilising lessons learnt from feedback on supporting networks and resources for ESD in SADC Teacher Education Network: the ESSA experience

The SADC Teacher Education Network for re-orienting teacher education for sustainability was formed in 2009 as a response to the need for supporting teacher educators to enhance quality education through relevant teaching and learning in SADC. The SADC REEP, SWEDESD and a number of Teacher Education Institutions (Belvedere Technical Teachers' College, University of Zambia) formed a collaboration on ESD in 2011 with the aim of strengthening the network by focussing on integrating strong sustainability and agency (ESSA) in the classroom practice. The first participatory training of teacher educators in this collaboration started in 2013 with TEIs in 9 SADC Member States, and a further training took place in 2014 for TEIs in 5 more Member States. Each of these trainings was preceded by strategic meetings with heads of teacher Education Institutions (Faculty Deans and College Principals). This workshop will receive and discuss feedback from change projects from the TEIs in the form of reports, stories of significant change and testimonies; and will outline strategies for high-profiling and mainstreaming this work among policy and decision makers, and contribute lessons learnt in the end of DESD Conference.

Key words: agency, change projects, ESD, strong sustainability

Title: ESD and the destabilization of techno-centric neoclassical education tendencies in school and community learning contexts in central and Midwestern Uganda

Daniel J Babikwa, (PhD) dbabikwa@nemaug.org

Abstracts

This paper presents practical experiences and lessons in the implementation of ESD activities in schools and communities in Central and Midwestern Uganda. It highlights the different ways in which the implementation of ESD changes in schools and community education programmes has troubled and undermined traditional educational thinking and practices and empowered learners and educators to create positive changes in their lives. The experiences are based on efforts by a local NGO working with schools and communities to restore the ecological integrity of the Lake Victoria basin. The Lake Victoria Basin has been a victim of environmental degradation and ecological deterioration due to human activity in search of wealth and survival. Eight years ago, a multi-stakeholder education programme aimed at restoring the ecological

integrity of Lake Victoria Basin was launched. The experiences reported on in this paper are derived from this educational intervention.

The paper explores the ways in which the above education programme drawing on ESD principles, methods and values, grappled with a multiplicity of contextual challenges and dynamics to initiate and accelerate sustainable solutions to key sustainability problems and limitations in the Basin. It specifically delves into ESD activities and associated processes adopted by the programme to ensure change of mindsets and creation of concrete results in an educational/learning context inherently neoclassical and techno-centric in nature. The paper further demonstrates how the programme approach and methodology, educator capacity building, the 'eco-ideological' character of school greening initiatives, the curricula/programme design, personal factors and the inherent pursuit of self-reliance played a central role in achieving the transformative and emancipatory purpose of ESD both in schools and riparian communities. Key challenges, limitations and possible pathways are also explored and documented.

Title: An end-user perspective of improved energy access as means towards poverty alleviation

Johanna Neumbo , University of Namibia, jneumbo@unam.na

Abstracts

Initiatives aimed at rural electrification and energy provision are expected to reduce poverty as well as contribute to the community's general wellbeing. However, it is quite a challenging undertaking to determine the relationship between energy and development. Analyses aimed at determining this relationship lean heavily on quantitative data. Such analyses run the risk of providing a skewed picture of the energy-development-poverty nexus. By embedding quantitative data within qualitative data a more nuanced picture of how intervention programmes are transformed into outcomes can be generated in order to measure success of a project. The role of *place* is positioned at the centre in gauging experiences of the poor vis-à-vis the importance of locating resources and *capabilities* to address socio-economic issues within a geographical location. Interventions that fail to recognise the needs of certain groups and potentiality offered by place runs the risk of failing to reduce energy poverty and the attendant human wellbeing index improvement. Therefore, there is a possibility of an energy poverty penalty developing that impinge on sustainable development.

Title: Endocrine disrupting potential of the Gammams wastewater treatment and Goreangab water reclamation plants in Namibia

E.M. Julies; A.K. Faul; E.J. Pool, T. Iileka; University of Namibia, ejulies@unam.na

Abstract

In Namibia urbanization creates a greater demand for water in Windhoek, Walvisbay and Swakopmund. Endocrine Disrupting Chemicals (EDCs) are pollutants that are present in treated or untreated municipal waste waters and affect the endocrine system, biochemical messengers, and cellular receptors. In cases where wastewater is re-used or reclaimed it is essential to monitor concentrations of EDCs. This study investigated the concentrations of estrone, estradiol and testosterone in the Gammams (GSTP), and the Goreangab Water Reclamation Plant (GWRP). Seven bioassays were used to establish selected steroid hormone levels, immunotoxicity, cytotoxicity and neurotoxicity of water samples. Removal efficiency of

estrone and estradiol in the GSTP was 90% and up to 98%, respectively. Concentrations of estrone and estradiol in GWRP outlet were below detection limit. No testosterone was detected in GSTP and GWRP outlets. Both treatment plants achieved successful removal of neurotoxicity and cytotoxicity throughout the year. Any EDCs in the intake of GWRP is completely removed by tertiary treatment in the reclamation plant.

Title: Context and process based transformation of pre-service teachers during eLearning of Climate Change and Sustainability Education

Andrew Peterse, Schools Development Unit Department of Education, University of Cape Town
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Abstract

As part of a regional initiative to integrate Climate Change and Sustainability Education (CCSE) into mainstream education, we have introduced a CCSE course for pre-service teachers. Introducing CCSE and new teaching approaches and methods requires teachers to have an accurate understanding of climate change and of how it relates to broader issues of sustainable development. For education to promote change, it is vital that teachers' knowledge, attitudes, motivation and skills contribute to the effort. This requires them to understand what such change implies, to recognize the need for it, and to have the competence and confidence to introduce it into classroom teaching. There is a need for teachers to transform their practices from a traditional to a 'critical teaching approach' which is change and futures oriented. Students also need to be adaptive and innovative experts and hence a central feature of the intervention will be to include appropriate CCSE strategies, including the Open Teaching and Learning Framework (OTFL) and eLearning. This paper reports on the contextual and process changes in the evolution of Professional Learning Networks (PLN's) of pre-service teachers and Educators doing CCSE during eLearning. The study explores the application of emerging pedagogies in the context of CCSE. Activity Theory (AT) is used to research the development of pre-service teachers in partnership with expert educationalists. AT is used as a meta-theory for analyzing teaching and learning activities in eLearning and is thus useful to show how the PLN and the OTLF function as mediational tools that connect the communities of practitioners and experts. Using an Activity System as the unit of analysis, the evolving nature of the context and the process-based transformation (in-situ) of PLN of pre-service teachers is described and the interactions and the learning activities that take place highlighted.

Title: Position-Practice System and ESD Mainstreaming in African Universities

Vannesa Adesuwa Agbedahin, Email address: advanagbedahin@gmail.com

Abstract

To understand the continuous interplay between human agency and social structure, there is need for an investigation and analysis of the 'point of contact' between the two entities. This point of contact is a mediating system which is called the 'position-practice system' (ibid). This paper explores how the 'position-practice system' of university educators in Africa (human agency) can enable and constrain effective mainstreaming of Education for Sustainable Development (ESD) in African Universities (social structure). This paper emanating from an on-going PhD research empirically uses some African participants of the International Training Programme on ESD and EE/ESD MESA Chairs as case studies.

Title: Community-Based Natural Resource Management in Zambia: Promise, Rhetoric and Reality

Milupi, I. Dⁱ, Somers, M.Jⁱⁱ and Ferguson, Wⁱⁱⁱ. inongemba@yahoo.com

- i. *Faculty of Natural and Agricultural Sciences, Centre for Environmental Studies (CFES), The University of Pretoria, South Africa;*
- ii. *Somers, Michael John is a Professor at Faculty of Natural and Agricultural Sciences, Centre for Wildlife Management (CWM), The University of Pretoria, South Africa*
- iii. *Ferguson, Willem is a Professor in Faculty of Natural and Agricultural Sciences, Centre for Environmental Studies (CFES), The University of Pretoria, South Africa*

Abstracts

Recently, Community-Based Natural Resource Management (CBNRM) has been widely supported as an approach to promote biodiversity conservation and socioeconomic development. CBNRM's aim of promoting biodiversity conservation and socioeconomic development is compelling. There is little data regarding its implementation especially the reconciliation of environmental and social goals. This paper evaluates CBNRM as an alternative approach to natural resource management, using eight social and environmental indicators namely: Biodiversity protection; sustainability of natural resources; conflict resolution; equity; empowerment; participation; awareness and knowledge sharing and Gender balance. It also identifies some of the implementation problems in the approach and proposes ways to strengthen the approach and achieve natural resources sustainability in Zambia. The focus area is Zambia's Mumbwa and Lupande Game Management Areas (GMAs). This study used three methods to collect data namely: face to face interviews with the community members, resource managers (ZAWA staff) and traditional leaders located in the two study areas; literature review; and personal observations. Findings show that CBNRM in Zambia rarely resulted in biodiversity protection, sustainable utilization of natural resources, reduced conflict, equal distribution of natural resource benefits and power, active local community participation, community awareness and traditional and scientific knowledge use as well as gender balance. Findings further show that if CBNRM is properly implemented it can result in more biodiversity protection, sustainability of natural resources, reduced conflicts, equal distribution of natural resource benefits and power, active community participation, increased awareness and use of both traditional and scientific knowledge and gender balance consideration in the management of natural resources hence a viable approach to natural resource management.

Key words: Sustainability, biodiversity, community resource management, Zambia

Title: Evaluation of two teaching methods for Environmental Biology at Tertiary level

Mildred J. Johnson and Elsabé M. Julies, ejulies@unam.na, mjohnson@unam.na

Abstract

This study compared the performance of third year Environmental Biology students at the University of Namibia in a test set after two different teaching methods were applied. The group of students consisted of 8 males and 11 females between the ages of 19 and 25. All students had prior exposure to various topics in Environmental Biology and Conservation issues. The topic for the purpose of the study was on the Namib Desert and human impacts on this desert ecosystem. The two methods utilized to teach the students during a period of one hour were firstly a teacher-centered lecture given by the lecturer and secondly the playing of

an educational picture game developed by the Gobabeb Desert Research and Training Centre. Students were given a test consisting of 8 questions with similar, but not identical questions to assess the amount of learning that took place. For both the game and lecture no significant difference was found in the performance of males and females since both answered 50% of the questions correctly. Overall the entire class performed significantly better and answered more questions correctly after the game compared to the lecture method. This study revealed the efficiency and usefulness of picture games as a mode of instruction at tertiary level.

Title: The factors that constrain or enable black female botany and zoology honours students in transitioning to masters studies in Eastern Cape universities.

Aphiwe-Zona Dotwana, Environmental Education, Rhodes University, zonadotwana@yahoo.com

Abstract

The past of higher education in South Africa is one that boasts discrimination and racism. The South African government has since 1997 showed a marked interest in postgraduate studies because the country is not producing enough masters and doctoral students as is the case in the biodiversity sector. An important finding in the biodiversity sector was that the lack of postgraduates in the sector is mainly caused by the lack of students moving from honours to master's. Another difficulty identified in the sector is finding black entrants with advanced qualifications, specifically master's degrees. Therefore, the purpose of this study was to provide a description and explanation of the challenges that many graduates face, especially black females in moving to master's studies through the use of semi-structured interviews, document analysis and semi-structured questionnaires. The study will use the social realist theory as its ontological lens as it contributes a framework that allows for the explanation and causes of social change. Preliminary findings suggest that black females have constraints that hinder their transition to masters studies in biodiversity related fields e.g. lack of funding, family responsibilities, needing to prove themselves etc.

Title: Working for Ecosystems, a story of learning pathways emergence towards SMME development,

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Abstract

Global climate change alters climatic zones to the extent that species invasion and in particular, invasive alien plant growth, is regarded as one of the biggest threats to ecosystem functioning. Local workers in the eThekweni Municipality's 'Working for Ecosystems' biodiversity management programme are emerging Small Medium and Micro Enterprise contractors to the green economy in South Africa. The research centres on several dynamic interventions and relationships which are in place, interconnected and mutually dependent on one another in work place practice and examines environmental learning pathways through narrative enquiry.

Title: Exploring how Pre-Service Science Teachers Learn to Teach Environmental Education

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Abstract

The rationale for this work is based on four concerns: first, the imperative to explore EE within pre-service science teacher training is based on global concerns around environmental issues; second, my experience of learners being unconscious about environmental issues has given impetus for this study; third, the curriculum policy stipulation for environmental issues to be addressed in an effective manner; and fourth, the need to begin with education for pre-service teachers, as a way to contribute to human capital development in the sector of EE. A review of literature revealed the following: emphasis to increase knowledge of the environment and the environmental crises around the growing world population; educators need training on EE at all levels; education officials have, with some exceptions, very little EE knowledge and teachers admit that they leave out content of which they are not sure and Environmental Education is a relatively new knowledge and skill area for all of South Africa's teachers. Our Constitution also guarantees the right to an environment that is "not harmful to human health and well-being". Research into educational quality issues undertaken to inform the Environmental Sector Skills Plan for South Africa outlines critical issues associated with the poor quality of science and Environmental Education in the schooling and Higher Education system. Qualitative case study will be sought to explore 25 purposefully selected pre-service science teachers' experiences and views of learning to teach EE in the context of Natural Science Method 2 module at a tertiary institution in KwaZulu-Natal. This research will use an interpretive paradigm, with multiple data generating methods which comprise of video recorded observations, reflective journals, focus groups, and individual interviews. Drawing on the constructs of socio-cultural theory and the Zone of Proximal Development, pre-service teachers' learning experiences will be analysed.

Title: The Role Of Higher Education And Research In Enhancing Learning About And Through ESD/EE - Case Of Botswana

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Abstract

Sustainability education and **Education for Sustainability**, and **Education for Sustainable Development** (ESD) are used interchangeably when describing the practice of teaching sustainability. Environmental Education (EE) is the process of helping our community acquires understanding, skills and values that will enable them to participate as active and informed citizens in the development of an ecologically sustainable and socially-just society. The Botswana's National Environmental Education Strategy & Action Plan (NEESAP) set a guiding framework that is geared towards enhancing public awareness on environmental management for sustainable development. **Goal:** Environmental Education (EE) and Education for Sustainable Development (ESD) is integrated at all levels of the formal sector (relative to the national capacity). **Goal:** Strengthened intensity in EE & ESD and trained human resource pool on EE and ESD. Diversity and globalisation pose major challenges to sustainability as reflected in the three pillars of sustainable development; i) environmental, economic and social sustainability. Africa hosts a large number of ethnic groups with diverse languages, cultures and religion, with mineral based developing economies. Higher

education research has role to play in enhancing learning about environmental sustainable development-responding to the current severe situation of poverty, violence, inequity, and the climate change impacts.

Title: Experiences and possibilities on the incorporation of Education for Sustainable Development (ESD) during teaching and learning of science: Namibian students' perspectives reflected

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Abstract

Although Education for Sustainable Development (ESD) is emphasised in the curriculum, however, its integration and implementation is still not clear. Yet, central to ESD is situated learning and application of science to everyday life. Thus, this paper seeks to explore opportunities in using ESD as a vehicle to mediate learning and meaning making in science in a BEd(hons) Science Elective Course in Namibian context with a view to foster a holistic approach to teaching and interdisciplinary learning. Inspired by the Education for Strong Sustainability and Agency (ESSA) programme, the "Mission" tool for enabling thinking and agency on sustainability was introduced to students doing the BEd(hons) Science Elective course in the form of an interactive workshop in order to stimulate their thinking on sustainability issues. The activity was followed with some Biology lessons on respiration and photosynthesis. Furthermore, as an attempt to explore ESD from an indigenous knowledge perspective, a traditional non-alcoholic beverage called *Oshikundu* was made to illuminate scientific concepts on the fermentation process. Data were thus generated mainly through observations, day-to-day verbal reflections as well as written ones, mind-maps and questionnaires. It emerged from the teachers' reflections that they found the "Mission" approach relevant to learner-centred education (LCE) as espoused in the Namibian curriculum. Regarding the inclusion of indigenous knowledge during the activities, they found this to be particularly helpful in enhancing sense making of scientific concepts as well as making such concepts relevant to learners' everyday lives.

Key words: Mission, education for sustainability, situated learning, indigenous knowledge, scientific concepts

Title: The Cheetah Conservation Fund Okakarara-Waterberg Tourism Project & Waterberg Naturalist Training Camp.

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Abstract

The Cheetah Conservation Fund (CCF) is working together with key stakeholders in Okakarara to implement a multi-faceted environmental conservation and tourism project in the Okakarara area. This project, the Okakarara-Waterberg Tourism Project aims to bring environmental education, sustainable land management and ecotourism to the Okakarara region for the betterment of the people, land and animals. In order to facilitate the training of community members in ecotourism, CCF is administering Waterberg Naturalist Training Camps for teens and adults. The objective of the camps are to develop participants' understanding and attitudes about the environment as well as, spur thought and discussions on tourism, guiding,

environmental education, sustainability, and environmental threats. Join us as we discuss the training camps and how they advance the Okakarara-Waterberg Tourism Project.

Title: Fostering Multi-stakeholder ESD processes through Networked Governance Strategies

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Abstract

Multi-stakeholder dialogue and community engagement through ESD are central to accelerating the search for sustainable development solutions in a world characterised by uncertainty, complexity and risk. Since UNCED 1992, the importance of multi-stakeholder processes have been emphasized in achieving sustainability transitions at local, regional and global levels. The United Nations University (UNU) through its Regional Centres of Expertise (RCE) initiative fosters multi-stakeholder ESD processes to accelerate sustainable development solutions at local levels. The RCE initiative is based on the premise that diverse but interdependent network actors working together collaboratively are able to achieve ESD outcomes that would be impossible if each actor operated on their own. This paper explores how RCEs are integrating distributed reflexive capacities and pooling resources to search sustainable development solutions at local levels. The paper draws upon the *Ubuntu* philosophy to advance networked governance strategies as integrative, unrestrained and open-ended approaches of coordinating multi-stakeholder ESD processes. Case stories on how African RCEs are transforming livelihoods through community engagement are shared within a networked governance framework. Expanding and further strengthening African RCEs as local networks that enhance multi-stakeholder learning for sustainable development will hasten the search for sustainable development solutions in local communities and help shape the post DESD framework programme.

Title: Reflexive Deliberations on a Course Manual for Strengthening Capacities of African RCEs in ESD. Roundtable Discussions

Abel and Team

Abstract

Developing the capacity of educators, trainers and other change agents to become learning facilitators for ESD has been identified as a priority area for promoting the post DESD framework programme. The United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) in collaboration with African RCEs has developed a draft course manual whose implementation will contribute to this priority. Four focal areas have been identified as being central to strengthening capacities of African RCEs to respond to sustainable development challenges in their regions. These are:

1. Fostering transformative learning and social change
2. Enhancing collaboration, partnerships and networking
3. Enabling networked governance
4. Facilitating research and community engagement.

Four modules have been developed around the above-mentioned areas as modules for an RCE course manual for implementation in Africa. Successful implementation of the emerging course manual has the

potential to enhance capabilities of individual RCE actors, individual member organisations and an entire RCE network to deliver ESD within a post DESD framework programme.

The purpose of the proposed roundtable discussions is to engage participants in reflexive deliberations around each of the four focal areas (modules) with a view to refining and improving the RCE course manual. The following tentative questions will be used to elicit reflexive deliberations:

- How can the course modules be designed to promote reflexive and participatory processes of multi-stakeholder dialogue and cooperation within a specific context?
- What are your expectations of each of the modules and the entire course with regard to strengthening capacities of RCEs in ESD?
- What activities and case studies can be included to enrich the course content?

Title: Mainstreaming Gender Issues in the Context of the United Nations Decade of Education for Sustainable Development: Botswana's Junior Secondary Schools

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Abstract

This study investigated the effectiveness of teaching and learning methods in facilitating gender mainstreaming in the context of Education for Sustainable Development in the Junior Secondary Schools in Botswana. The research applied qualitative research methods and in particular, interviews, focus group discussions and class observations. A sample of 100 Students, 40 Teachers, 4 Members of the Senior Management Team and one Member of the Gender Committee in the Ministry of Education and Skills Development were used in this study. The findings revealed the inadequate nature of gender mainstreaming in the junior secondary schools. For example, the teaching and learning methods used are not gender responsive, unfair and have the effect of widening the inequality gap. The results of this study call for need to raise awareness and to workshop all stakeholders on gender mainstreaming.

Title: Investigation of the role of training in the first year of a 2.5 year incubation model to strengthen GIS interns towards full participation in workplace occupations: A case study of GroenSebenza internship programme.

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Abstract

South Africa as a developing country has an advantaged position to exploit green jobs via the emergence of green economy. There is also a potential to strengthen the potential of green jobs development programmes through different strategies. One such strategy involves empowering the Sector Education and Training Authorities to respond and deliver effectively and efficiently in areas and issues that need attention, such as improved internship systems. Although, internships exist as skill development initiatives that are recognised by the National Skills Development Strategy as an important intervention to enhance work integration, it is worrying that the skills produced in prior training are not adequate or sufficient to meet the labour market demands of the biodiversity sector. The concern of the study is that the objective of internships should not only to groom graduate interns to be employable in the sector but also to remain and succeed in it. This concern motivates the core focus of the study, which seeks to examine how training assists with integration into workplace communities of practice. The GroenSebenza (jobs fund) project is being developed as a

national pilot project and it uses a 2.5 year incubation model to facilitate access to employment in the Biodiversity sector. The model consists of five key elements supporting the development of incubants: Induction, Networking, Assessment and Appraisal, Mentoring, and Training. Preliminary results will be shared during the presentation.

Title: Promoting Sustainable Utilisation of Natural and Other Resources in Schools

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Abstract

The study addresses strategic efforts by different players in the formal and non-formal education sectors towards achieving sustainable development in rural Uganda, targeting schools and communities while putting emphasis on policies and initiatives, including the Millennium Development Goals (MDGs) educational objectives, the Uganda Education for Sustainable Development (ESD) Strategy 2010, and the School Environment Education Programme (SEEP) for Uganda. The study discusses how the implementation process will result into improved practices and better places to live in for the present and future generations.

The research highlights the 'Learner-centred' approach that enhances hands-on participation, discovery and conscious practical understanding; and how the learners in turn relate or teach what they have been practically taught at school to their parents and neighbouring homesteads. The approach brings about realisation among implementing personnel, particularly teachers, to realise the importance of practical teaching of ESD, re-orient them in ESD methodology and perspective as well as emphasise that ESD is now integrated in the school education curriculum; hence creation of a multiplier effect. Implementers will adopt a multi-media approach to enhance their educational programmes and activities. Through continuous monitoring and evaluation, success stories, innovations, challenges, and strategic frameworks will be documented and shared out.

Title: Landcare approach: addressing land degradation and promoting land literacy in Namibia

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Abstract

Environmental challenges such as land degradation, climate change and loss of biodiversity are steadily growing in Namibia. To address these challenges, there is a need to take care of the land. Caring for the land means utilizing the land and its resources in a sustainable manner, so that it can be available for tomorrow's generation. In this paper we look at the Landcare approach. Landcare is a holistic and inter-disciplinary approach that focuses on transforming attitudes and stimulating new ideas among land users to take on actions that address environmental problems. The Land care approach focuses on empowering local people to willingly take action on local problems, and integrate those actions in addressing broader issues. The term landcare in its own right has an extremely powerful symbolic content, as caring about something is the force that makes things actualize in reality. This paper examines the potential of Landcare approach in Namibia. It

concludes that to realise Landcare in Namibia, it needs to be supported by government agencies, private sectors, owned by local communities and relevant stakeholder at large.

Key words: Landcare, land degradation, land literacy

Title: The integration of environmental education in the secondary school curriculum of Botswana: A case study of a 10th grade (form 3) curriculum in Ngambao Community Junior Secondary School, the Okavango Delta

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Abstract

The integration of environmental education in Botswana continues to face implementation challenges in the curriculum. Botswana is one of the African countries with abundance of wildlife resources and heritage sites. It is among the top twenty countries globally with the highest proportion (18.1%) of land that is dedicated for biodiversity protection (Weaver, 2008). The purpose of this paper would be to present preliminary findings of a case study that will be conducted from June to August 2014 in the Okavango Delta of Botswana. A research gap for change exists on how to incorporate informal knowledge systems from local communities, where schools are situated, into the curriculum in the area of environmental education. In adopting the place based education approach and ideas of progressive thinkers such as John Dewey, the paper will discuss findings that emanate from the following questions: What role is played by informal knowledge systems from community elders in the school curriculum regarding the integration of environmental education? How is environmental education integrated into the curriculum by teachers in Ngambao community junior secondary school? How has the National Environmental Education Strategy and Action Plan of Botswana developed over time? The research methodology comprises of classroom observations; semi structured interviews; and government document analysis. The government of Botswana view environmental education as a process in which individuals and local communities develop critical thinking, nature awareness and acquire skills to solve environmental problems. The findings may be of value to curriculum designers, school principals, environmental practitioners and teachers in higher education and secondary schools through It may facilitate rethinking of what it means to learn and encourage authorities to employ alternative approaches that integrate environmental education in the curriculum with the motive of promoting quality education.

Keywords: Place Based Education, Environmental Education, Okavango Delta

Title: Local Knowledge and Resource Management to Mitigate Climate Change Impacts: Mapping and Assessing Water Management Challenges in North Pare Highlands, Tanzania

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Abstract

The purpose of this paper is to analyze water management in the North Pare highlands, Tanzania. The research site is Mangio village, in the Kilimanjaro region, where smallholder farmers manage water resources to fulfill domestic and other requirements of an intensively cultivated landscape, dominated by

banana and maize. In order to understand water management challenges, due to climate change impacts, this study utilized participatory research techniques of mapping natural springs and reservoirs using Global Positioning System (GPS), key informant interviews, drought history workshops, and household surveys to investigate presence of elements of adaptive co-management in water management. The paper argues that political alterations in the control and access of water in Mangio have caused a power shift away from traditional institutions. Consequently, local knowledge is barely applied to maintain water availability and common property management system. To achieve cogent adaptive co-management of water resources, in the presence of decreasing water levels, policy makers should encourage the blending of traditional practices with contemporary institutional arrangements. Moreover, the findings and subsequent recommendations of this study, from the North Pare highlands of Tanzania, indicates continuing challenges (socioeconomic, environmental vulnerability, and cultural vulnerability) that could inform the need to rethink and redesign future implementation programs under the education for sustainable development paradigm.

Keywords: water springs, water reservoirs, climate change, participatory mapping, adaptive co-management

Title: Promoting Quality Education through ESD: A case of Mutare Teachers' College

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Abstract

ESD is a cross cutting and highly contested issue/area. In Zimbabwe the Presidential Commission on Education and Training of 1999 noted that tertiary education did not address sustainable development issues. Currently effort is being made to address ESD issues. This study sought to establish how Mutare Teachers' College is working towards promoting quality education through Education for Sustainable Development. Both qualitative and quantitative methods were used to collect data. The research instruments were questionnaire, interview guide and focus group discussion (FGD) guide. A sample of 105 participants (10 student representative council members, 20 health education peer educators, 20 environmental education peer educators, 10 students with disabilities and 20 staff members), 5 representatives of 5 partners was used. Purposive and simple random samplings were used to select respondents. Data collected was presented in percentage frequency tables and was analysed using percentages, mean responses, standard deviation and analysis of variance (ANOVA). The study found out that quality education is being promoted at Mutare Teachers' College through education for sustainable development and agency a lot more needs to be done. The study recommends that there be more cooperation and collaboration among the various education sections within the college, more focus be put on agency, and that the college increases networking with other organisations.

Keywords: Quality Education. Education for sustainability. Agency

Title: The Role of Diploma in Primary Education (DPE) Setswana Syllabus in addressing Environmental Education in Botswana

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Abstract

The paper explored the extent at which the Diploma in Primary Education (DPE) Setswana Syllabus addresses Environmental Education (EE) in the teacher education curriculum in Primary Colleges of Education in Botswana. Questionnaires were used for data collection and were distributed to students of the three colleges of primary education. The sample of one hundred and forty eight (148) students was picked from the population of students in primary colleges of education.

The results have shown that the (DPE) Setswana Syllabus addresses EE at 91% under the banner of culture. This environmental care is of both Flora and Fauna. The sample stated that elders taught boys and girls environmental care, furthermore village regiments practiced and monitored the care of environment. Myths and folk tales dealt with accepted human behavior in the society, while taboos indicated what must and must not be done in the environment by humans like hunting pregnant and lactating species as well as not using certain trees for fuel while grass should not be harvested before it shades its seeds to the ground. Trees should not be uprooted or cut for commercial purposes. Human species are not supposed to make love while the woman is menstruating, even though science proves it otherwise. Though environmental care is addressed, it is under the banner of culture. There is need to link environment cultural care to (EE) using language. It can be argued if permanent city and town dwellers observe culture as compared to those in villages.

Title: The Role of Technical and Vocational Education in Successful Transitioning to a Green Economy Towards Decade of Education for Sustainable Development 2005-2014.

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Abstract

The global recession has brought new attention to chronic structural flaws in current economic models and assumptions. As economies struggle to recover, Botswana being one of the many is taking a closer look at the broader concept of a green economy. The green economy is defined as one in which value and growth are maximised across the whole economy, while natural assets are managed sustainably. In this context green economy will mean one that creates jobs for everyone and ensures that all have basic standard of living and is ecologically sustainable. Sustainable development is a constantly evolving concept thus being the will to improve everyone's quality of life, including that of the future generations, by reconciling economic growth, social development and environmental protection (United Nations 2005:1).

Vocational training and green job qualification are essentially for welfare, to reduce poverty, to promote new green jobs and to fight youth unemployment; therefore educators must teach students the importance of moving to a green economy. They must know why this is essential and believe in the effort. Boyd and Suzuki (2005), states that "Knowledge plus motivation equals action" this simply means understanding vocational education in the broadest of senses as well as acquiring the practical skills that will be needed for implementation.

The transition to a green economy requires a workforce with the right skills. This includes not only skills in the low carbon and environmental goods and services sector, but also those needed to help all businesses use natural resources efficiently and sustainably and to be resilient to climate change. Business and industry are thus the key sites for on-going vocational and professional training so that all sectors of the workforce can have the knowledge and skills to make decisions and perform their work in a sustainable manner. The significant role of Technical and Vocational Education under the ministry of education and Skills Development is the creation of competent and talented manpower that are able to position themselves in the social, economic and industrial development of Botswana. The objectives of this paper are as follows

- ✓ The role of Technical and Vocational Education in attainment of Green economy in Botswana
- ✓ Elaborate on the opportunities a Green Economy provides for poverty eradication in Botswana
- ✓ The strategies applied in TVET for Education for sustainable development

Title: Exploring the Role of Education for Sustainable Development (ESD) to Mitigate Environmental Challenges in Four Durban Schools.

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Abstract

This study intends to look at ESD strategies to mitigate current and future challenges affecting the world such as climate change, biodiversity loss as well as natural disasters. It will mainly focus at four basic education schools in Durban CBD. ESD is the guiding principle for the future development of the education system. Sustainable development is about meeting the needs of present without compromising the ability of future generations to meet their needs. ESD for is a vision of education that seeks to empower people to take responsibility for creating a sustainable future. Educators will play significant role raising awareness of sustainable development to their learners. Education and lifelong learning are necessary for the implementation of a comprehensive policy for sustainable development, particularly in Durban. Thus, education is only the means for developing a more effective education model. ESD can contribute to making education systems not only responsive to, and prepared for, current and emerging challenges, but also a truly proactive force in triggering market and political pressures to move the sustainable development agenda forward by empowering people to make informed decisions as citizens, workers and consumers. ESD needs to be adapted and formulated in the local context. ESD is a useful tool for changing behaviours and choices. Children are faced with degradation of natural resources and natural disasters. ESD will enhance children's knowledge, skills, attitudes and ability to adapt to a changing physical environment, while providing a mechanism to promote and support the use of facilities-based environmental solutions. Relevant theories as well as quantitative paradigm will be utilised.

Keywords: Education for sustainable development, sustainable development, climate change disaster risk, biodiversity loss

Title: Water and electricity crises in 2014: Implications for lifelong learning for poverty eradication in Botswana (EEASA 2014, Sub theme 3).

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Abstract

The year 2014 is perhaps one of the worst in the history of Botswana's water and electricity crises which adversely affected normal daily functioning at individual, the business communities, health facilities and the nation at large. The problem of inadequate access to these two resources (water and electricity) hit hard especially in the cities where there is usually structured patterns of life that revolve around their usage for high productivity. This paper is a reflection of trends in water supply shortage partly caused by the drying up of the Gaborone Dam (the main supplier of water for Greater Gaborone) and the failure of the Morupule B plant which was expected to produce electricity to benefit, amongst others, urban citizens.

The paper draws from in-depth conversations; media briefings, talk shows and newspaper clippings; and national calls for explanations, including parliamentary debates, accusations and counter accusations that literally dragged those in power to come forth and explain the trend and nature of the crises to the nation, with specific reference to two essential resources (water and electricity) using Gaborone as a contact point. Promises were made by the country president and legislator responsible during the month of March 2014 and it was not clear how much trust and outputs would be regained by those in power to deliver on the mandate of water and electricity providers.

A major conclusion drawn from the crises is that prudent water and electricity management is crucial for human survival, lifelong learning and eradication of different forms of poverty (human and non-human). Failure to provide these sparked a lot of belief that the Government of Botswana had dismally failed by not giving the nation any explanations on a prolonged crises until opposition party wings erupted and called for resignations of those vested with the responsibility to oversee water and electricity provision.

Conference Sub-Theme: Promoting quality education, transformative learning and training environments, literacy and numeracy through EE/ ESD.

Title: Environmental Educator Outreach- NaDEET

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Abstract

"Education is the most powerful weapon which you can use to change the world." NaDEET embodies these well-known words of the late Nelson Mandela. Through NaDEET's innovative and well-tested approach to EE/ ESD, thousands of Namibians- children and adults alike- have gained a "weapon" to improve the environment in which they live. A brief overview of NaDEET programmes including NaDEET Centre, Outreach- Community Development activities and NaDEET's well-known environmental literacy project will be given to reflect on those programmes over the past 10 years. NaDEET considers itself a learning organisation and can critically assess that despite initial enthusiasm and motivation by participants to take action fostered through truly transformative educational experiences, there is a waning in long-term action. How can this be addressed?

This paper explores the potential for reaching the sustainable development goals in Namibia (and SADC) if true collaboration and a joint approach to Education for Sustainable Development was taken that focused transformative, quality learning processes and environments.

Title: Promoting water management through Environmental Education (EE) and Education for Sustainable Development (ESD) in peri urban areas the case Study of Water Trusts in Lusaka

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Abstract

The Water Trust Model for the provision of Water Supply to peri urban areas which historically started as informal settlements started in the early 2000s. The Water sector reforms started in 1994 with policy document adoption by government; and by the year 2000 the reforms had advanced with the formation of Commercial Utilities (CUs) to provide water supply and sanitation on a sustainable commercial basis. However, informal areas or peri urban areas still lacked the infrastructure and access to clean water. The CUs did not have adequate resources to extend supply and provide house hold connections to these areas and the prognosis was that it was uneconomical to provide house hold connections as the communities could not afford to pay. The only available water supply schemes were a few scattered community based schemes provided by AID agencies or NGOs which were inadequate and the community resorted to unsafe shallow wells. The water sector reforms required that a sustainable solution to water supply to peri urban areas with some community run water schemes funded by international NGOs be found which met the sector policy principles. The organization of water supply needed rethinking and education on how to organize the community to manage the water supply infrastructure under the new sector policy regime.

Keywords: Reforms, Water Trust,

Title: Experiences of establishing an RCE network in a major mining region of Zambia: Copperbelt Regional Centre of Expertise

Prof. Overson Shumba & Steering Committee, RCE Copperbelt (Copperbelt University, Kitwe, Zambia) oshumba@yahoo.co.uk

Abstract

It has been observed that half of the world's top ten worst pollution problems are mining related¹. This paper shares experiences in the early phases of establishing an RCE in a region that is relatively urbanised, densely populated, and the core of the heavy metal mining industry. The major sustainability challenges of the region are connected to these characteristics of the region and its being the epicentre of the mining industry. The paper highlights the major sustainability challenges in the region and how an RCE network has been designed to tackle those challenges and to promote transformative learning. It will also highlight the proposed governance structure and how it is anticipated to create agency that will catalyse education for sustainable development. This presentation will also solicit inputs from the EEASA network to strengthen the RCE.

Title: ESD in climate change education and researching and learning for sustainability in the real world context

*Prof. Overson Shumba, Ms. Lavonia Kalutwa, Mr. Fewdays Mwila, & Ms. Beauty Choobe
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Abstract

The notion of 'learning as connection' is an important one and best supported when learning in real world contexts. Education for sustainable development is a potent framework for learning for a real world context while simultaneously tackling complex sustainability issues. It is thus important for education and training institutions to provide opportunities where students may experience real-world learning supported by modern information communication technologies accessed through the World Wide Web. This paper presents two case studies in which two undergraduate students were engaged in research projects involving (i) estimating the level of carbon emission from solid waste generated from two female hostels and exploring the attitudes, knowledge and agency for climate change mitigation and (ii) determining the fire incidence and impact of fires on soil nutrient cycles with implications for local agro-practices involving fire use. Carbon emissions from solid waste were estimated via the Clean Air Cool Planet carbon calculator software. Fire incidence was gauged via the FIRMS Web Fire Mapper and Rapid Response MODIS imagery data sets provided by NASA land atmosphere near real-time earth observation system (LANCE). Laboratory analyses included titrimetric and spectrometric techniques to explore impacts of fires on soil pH and nutrients. In addition to the scientific data sets yielded in the two case studies, this paper will show the ESD in climate change education and highlight learning for sustainability achieved. It illustrates how this real-world learning is achieved utilisation relatively free resources made possible by the WWW.

Title: The Quest for Attitude and Mind Change amongst Students and Staff towards Sustainability at HP Campus

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Abstract

It all started by our participation in Feb 2014 in a week long workshop on ESSA (Education Strong Sustainability and Agency) organized by the Swedish Organization (SWEDESD). When we came back we started to embark on the Change Project at our institution, HP Campus. Most importantly we brought the message to our classes. While the students and staff in general like the idea of sustainability and listen attentively and participate eagerly, however, this does not translate into mind, and attitude change. We like speeches, we can get emotional watching Mother Earth being slowly destroyed by us, but we continue with our destruction of the planet in small ways; namely littering. Research has indicated that for change to happen and become long term goals, change of mind set is required. This paper explores the processes that affect people's understanding on the issues of environment caring and preservation and how this understanding help change people from being consumers and exploiters to savers and protectors of environment. In the study the researchers will further explore the factors that prompt people to litter. To find out the participants' perception on the effects of littering and why do littering continues every day in the classrooms and in the immediate surroundings. The researchers would argue that protecting and

preserving of the environment is the responsibility of everybody if the planet earth would continue its capacity to cater for the next generations to come.

Title: How is the NACOMA Project addressing Coastal Environmental Issues through Education for Sustainable Development?

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Abstract

Flanked by the Benguela Current and Namib, the Namibian Coast stretches approximately 1570 km from the Kunene to the Orange. It is a place of exceptional beauty, blessed with spectacular features that if not well managed will lose their value. The coast is rich in biological diversity, with many endemic species; and areas of conservation importance, namely: its 6 protected areas which include, for example, global biodiversity hotspots like the Succulent Karoo and the Sandwich Harbour Ramsar site. Noteworthy, the Namibian coast has many stakeholders, and is being threatened by a number of activities taking place there, that have not always undergone Environmental Impact Assessments (EIAs), and or follow-up audits, which threaten sustainable development. Poorly managed and supervised mining, fishing, tourism, infrastructure development and waste disposal are a threat to the coastal environment. Climate change is a global threat. The latter poses both positive and negative impacts, including: employment creation, contribution to the Gross Domestic Product (GDP), environmental degradation, biodiversity loss, pollution, infrastructure damage and land degradation. Among the environmental issues at the coast are some conflicting issues, being: deep sea mining *versus* fishing; terrestrial mining *versus* tourism and sea level rise *versus* infrastructure development.

In view of the threats, the Namibian Coast Conservation and Management (NACOMA) Project continuously raises awareness on the value of the coast, and on the importance of protecting key areas and sustainably managing resources. NACOMA plays a significant role in building capacities for the coastal stakeholders, empowering them to improve their management efficiency. In addition, assisting the Ministry of Environment and Tourism (MET) with the implementation of the Environmental Management Act. This is being done in order to ensure that environmental impacts are avoided and or sustainably managed.

Title: Developing elementary understanding of environmental education concepts among selected in-service primary school teachers in South Africa

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Abstract

Past efforts to re orientate education towards sustainability have tended to engage with officials of the education department and teachers already interested in environmental education. The aim of this article is to report on research into the influence of a three-day short environmental learning programme on developing understanding of environmental education concepts among in-service school teachers in four provinces of the Republic of South Africa. The research data was collected by means of a structured questionnaire comprising a baseline survey and a survey after the short environmental learning programme intervention. Data collected was analysed using Cohen's effect size, which indicated that the programme

provided in-service primary schools teachers with new knowledge about the environmental concepts and practical application of environmental education principles. This research can be used to improve the praxis of short environmental learning programmes in environmental education for sustainable development. Post-training support and continuous evaluation are recommended

Title: The effectiveness of education for Sustainable Development on Transformational Leadership among selected Namibian school principals

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Abstract

There is a growing interest in Educational Leadership to adopt education for sustainable development as a tool to promote transformational leadership. The aim of this paper is explore the contribution of education for sustainable development on transformational leadership among school principals in the Kavango East Region. The paper maintains that implementation of education for sustainable development on transformational leadership requires a holistic understanding of living within the limits of natural resource systems, creating personal and communal shifts to ways of being and interacting that create balanced solutions to socio-economic and environmental challenges problems that schools face. The authors offer some tangible and pragmatic directions as to how education for sustainable development can facilitate transformational leadership among school principals in the Kavango region. The authors hope to enthuse and further the debate on education for sustainable development as a non-negotiable aspect on transformational leadership for Namibian schools.

Keywords: transformational leadership, Education for sustainable development, Environmental education; Natural science education,

Title: The Role of EE/ESD in Accelerating Sustainable Solutions at the Local Level

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Abstract

Students' health and wellness are essential for their attaining a good education. Botswana is committed to the provision of ten years of quality basic education for all by 2016 and subscribes to the United Nations Millennium Development Goals of 2001 according to the Botswana Millennium Development Goals Status Report (BMDGR, 2004). The provision of a good education revolves around the establishment of a conducive environment inclusive of sanitation. This paper therefore will address the hygiene and sanitation status in Okavango Junior Secondary School and the intervention by Southern African Regional Environmental Programme (SAREP) by improving the status of hygiene and sanitation and also equipping the students and staff with skills to ensure they maintain the facilities.

It is without a doubt that factors related to sanitation and hygiene affect children's right to education in many ways because in an atmosphere of poor health, children are unable to fulfil their educational potential. When the children's learning is affected negatively, poor academic results are inevitable. The role of schools

and educators is to ensure good academic results therefore if that doesn't happen, the education system has failed on its mandate. Sanitation facilities in schools are fundamental for promoting good hygiene behaviour. The improvement of these poor facilities will not only benefit students as current users of such facilities, but bring about new hygiene behaviour learned at school and translate into lifelong positive habits. It is this improvement of facilities and the incapacitating of students with lifelong skills that will see sustainable use of such facilities. This is because "Education apart from being a human right is a pre-requisite for achieving Sustainable Development and an essential tool for good governance" (World Summit on sustainable development, 2002)

Botswana's long term vision envisages "an educated and informed nation" Education encompasses knowledge about the environment we are living in. Therefore when SAREP improved the sanitation and hygiene and conducted a capacity building workshops for students and staff, they were subscribing to Botswana's vision 2016 goal.

Title: Botswana National Museum: reaching the society through strengthening environmental education on sustainable development

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Abstract

To date, museums are amongst the most stable and reliable institutions that communicate and contribute to knowledge in this rapidly changing world. The 21st century has seen museums increasing their awareness, discussions and concerns about environmental sustainability and human impact upon the environment. The Botswana Government recognizes the need to include environmental issues such as biodiversity conservation and environmental education in the planning and policy formulation processes in order to achieve sustainable development. In this regard, the Botswana National Museum & Monuments has shown considerable commitment to these globally critical issues. The museum is mandated to protect, preserve and promote Botswana's cultural and natural heritage for sustainable utilisation thereof by collecting, researching, conserving and exhibiting for public education and appreciation. It is against this background that the paper highlights how Botswana National Museum has been a heritage institution for strengthening environmental education and education for sustainable development (EE/ESD). Success stories of the museum on environmental education, natural heritage conservation and utilization/commercialization of natural resources for sustainable development will be put in the limelight.

Title: Teachers as Learners; Pedagogy of Indigenous Teaching And Learning. A Case Study of the Rural Community of Chongwe District of Zambia.

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Abstract

This article explores African Indigenous Teaching and learning methodologies of the rural community of Chongwe District of Zambia. It pays particular attention to society teachings on norms and survival skills, and examines them in the context of them contributing towards enlivening the teaching and learning process in the education system. Native education had critical elements which were critical to teaching and learning. The environment as one of the components of education at that time was perceived as very key to the survival of the community. Children especially boys were to master the environment they lived in, but this is

not to suggest that girls were not taught anything. To this effect, a teacher taught them about mountains, rains, seasons, rivers and some of the legends and beliefs associated with these topics so as to teach them how to protect the environment and equip the boys with survival skills. Children were further taught the names of plants which could cure different diseases and that they master them by heart and never destroy or cut them down. Tree conservation was also emphasized in traditional teaching. The logic behind this traditional pedagogy focused on the non destruction of the micro climate. The latter was paramount to the receiving of rains critical for agriculture, fishing, and pastoral grass and for domestic use.

Title: SADC Regional climate change policy discourse and interventions within the context of regional strategies and development plans

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Abstract

The SADC Region is highly vulnerable to climate change impacts. This stems from complex interaction of multiple stresses and low adaptive capacities. Besides poverty, climate change and variability are increasingly becoming a real issue that warrants greater attention globally but especially in the SADC Region. The consequences of extreme weather events such as droughts (Namibia in 2013), floods (Mozambique and Swaziland in 2014) and other natural disasters continue to plunge many more people in southern Africa into poverty. Consequently this leads to poor access to water, malnutrition, disruption of life (SADC, 2008) and even into conflicts over trans-boundary resources. Such disasters are relentlessly linked to climate change and variability. These coupled with rapid human population expansion that stands at an average annual growth rate of 3 per cent (SADC, 2010), a figure much higher than the average annual growth rate for Africa (2.4 per cent) has triggered a series of food shortages, in so doing exposing the region to serious food insecurity. For example, in 2002 when the region was faced with drought, approximately 14 million people were jeopardised by starvation in the region (SADC, 2008).

Due to the challenges faced by the people and environment in the region, Member States together with the SADC Secretariat have taken a number of steps to address them. A number of policy documents have been developed and approved by Ministers of Environment and Natural Resources. Others have even been endorsed by SADC Heads of States during summit. Implementation of such lies with various sectors within Member States. Forums such as EEASA conferences present opportunities for sharing information and dissemination of policies that guide our response to environmental challenges in the region.

Title: Exploring learning and emergent environmental citizenship in citizen science: A case study of a volunteer frog monitoring group.

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Abstract

Western Leopard Toad numbers have dwindled to the point where the species has become endangered. This is mainly because of the urbanisation of the areas which the toads inhabit. With increasing development it has meant that the toads survive in people's gardens and open green spaces in various suburbs of the City of Cape Town. Many toads are killed as they cross roads on their annual migration to their breeding ponds to spawn. Citizens observing this movement and roadkill, organised volunteer groups

to mitigate this threat and help the toads to survive in the local environment. My research interest lies in the analysis of the interplay of knowledge and learning in citizen science groups on the one hand and developing environmental citizenship on the other. I have chosen a case study approach to explore the practices of the Noordhoek Toad NUTS group in the Western Cape. I have used communities of practice theory to better understand the learning within group, individually and collectively, and practice architectures theory to explore how cultural-discursive, economic-material and social-political arrangements shape the emergent characteristics of environmental citizenship.

Title: The Factors That Constrain or Enable Black Female Botany and Zoology Honours Students in Transitioning to Masters Studies in Eastern Cape Universities.

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Abstract

The past of higher education in South Africa is one that boasts discrimination and racism. Post-apartheid, prominence has been given to affording previously disadvantaged groups, which include blacks and women access to higher education. Black in this context refers to African, Coloured and Indian populations. The South African government has since 1997 showed a marked interest in postgraduate studies because the country is not producing enough masters and doctoral students. This has also been the case in the biodiversity sector which botany and zoology form part of. An important finding through sector analysis in the biodiversity sector was that the lack of postgraduate graduates in the sector is mainly caused by the lack of students moving from honours to master's degrees. Another difficulty identified in the sector is finding black entrants with advanced qualifications, specifically master's degrees. Therefore, the main question that the study sought to answer was: What are the factors that constrain or enable black female botany and zoology honours students in embarking on master's studies in four Eastern Cape Universities?

This study will provide a description and explanation of the challenges that many graduates face in moving to master's studies so that more informed interventions can be created and implemented that will have a better chance at addressing this issue. The study will use the social realist theory as its ontological lens because social realism has the power to bridge the gap between practical social theory's explanatory power and the realist philosophy's ontological power. Social realism is useful because it contributes a framework that allows for the explanation of social change and the causes of that change, why are fewer honours students studying further to master's level? Preliminary findings suggest that black females feel they have a lot of constraints that hinder their transition to masters studies e.g. lack of funding, family responsibilities, cultural issues etc.

Title: Sustainable Tourism for Poverty Alleviation through Environmental Education

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Abstract

Sustainable tourism concerns all tourism development activities which optimise the environmental, economic and societal benefits without jeopardising the potential for similar benefits in the future.

Tourism has proven to be an important sector in the economy of Botswana, standing at 3,7% GDP contribution; if Botswana continue to heed the call of sustainable tourism development; this industry will significantly improve its benefit to the nation. Through the implementation of CBNRM programmes,

communities with natural and cultural heritage resources are enjoying socio economic benefits contributing to the improvement of livelihoods and poverty alleviation more extensively.

Botswana has the following legislation and programmes that enables communities to appreciate natural, cultural and heritage resources in order to conservation and advocate for sustainable usage of the same.

ENABLING ENVIRONMENT

- Tourism Policy
- Eco-Tourism Strategy and standards
- Tourism Stakeholders Consultation termed “Tourism Pitso”
- National Biodiversity Strategy and Action Plan
- Wildlife Conservation Policy
- CBNRM Policy

SUCCESSFUL COMMUNITY BASED NATURAL RESOURCES PROJECTS

- Sankuyo Tshwaragano Management Trust
- Kgetsi Ya Tsie Community Trust
- Kuru Community Trust Conclusion
- Arts and Craft Tourism

CONCLUSION

Tourism is a cross cutting sector which every Motswana can easily partake in and through education, a reasonable number of Batswana are now aware that tourism is an abundant resource for the betterment of their livelihood. Both Government, parastatals and private sector collaborate with CBOs to assist communities to appreciate and sustainably utilise tourism product, and today many successful CBNRM projects exist. Diversification on the other hand has positioned the industry as the 2nd income generator and there is no doubt therefore that as many Batswana embrace principles of sustainable tourism and running successful projects, poverty will become yesterday news.

Title: Addressing Drug and Alcohol Abuse Through Environmental Education

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Abstract

Attainment of Sustainable Development is impossible without a hardworking and sober population. One of the factors that hinder Sustainable Development in Zambia is abuse of Drugs and Alcohol. This often means that youths, who are the most productive section of the community, divert their priorities from production, entrepreneurship and sustainable activities to drug and alcohol abuse. This situation has worsened poverty levels in various households. According to Central Statistical Office (2010) 68 percent of Zambia’s population comprises youth below the age of 35. This is a critical observation when one considers the fact that youths are the section of the population hardest hit by the drug and alcohol abuse. DEC (2009).

In order to address this problem, a study was conducted on the Demand Reduction Approach and role of Environmental Education in combating drugs and alcohol abuse. This research was undertaken in three townships in Lusaka where the problem is rampant. These areas were Misisi, Kuku and Chibolya Townships.

This study examined the role Environmental Education can play in helping youth change their attitudes and perceptions towards drugs and alcohol. The study also looked at how young people can be transformed and helped to seek medical attention and counselling services through Environmental Education.

Title: Safety and Health as Critical Components of Transformative Learning and Quality Education

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Abstract

Zambia's education policy document, *Educating Our Future* (1996), notes that there is a two-way relationship existing between health and education. Teaching and learning are affected by the personal health of members of the school community, while school activities and what is learnt can be powerful influential factors in promoting the safety and well-being of pupils. The *Educating Our Future* document also endorses the role of the school as a health affirming and safety promoting institution for all pupils, and through them, for the community from which the pupils come and for the families which they eventually establish.

School Safety is an integral and indispensable component of the teaching and learning process. Indeed, no meaningful teaching and learning can take place in an environment that is unsafe and insecure to both learners and staff. It is impossible to have quality education or comprehensive transformative learning in the absence of a safe and healthy environment. Against the foregoing background, this study investigates the safety and health status of selected schools in Chisamba District of Central Province in Zambia.

Title: Zambian Indigenous Knowledge And Cultural Practices That Promote Environmental Sustainability

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Abstract

The Zambian culture is made up of an array of values, beliefs, norms and practices of 72 ethnic groups. This entails that Zambian indigenous knowledge and cultural practices is a blend of knowledge and practices of the 72 ethnic groups. On the other hand, Environmental sustainability can be defined as safeguarding of all **aspects** and **practices** that contribute to the quality of the environment on daily basis. Indigenous knowledge and cultural practices have a bearing on the way of life and ultimately the sustainability of the environment. It is therefore important to study the role of Zambian Indigenous knowledge and cultural practices in promoting Environmental Sustainability.

The aim of this study is to investigate Zambian indigenous knowledge and cultural practices that promote environmental sustainability. In order to achieve this, a survey of indigenous knowledge and practices will be conducted. The study will mainly rely on examination of secondary sources and the use of an interview guide.

Title: Promoting quality education, transformative learning and training environments.

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Abstract

Environmental Education (EE) as a subject or field of specialization is still in its infancy in the curriculum both at teacher training and school teaching levels in Zambia. The curriculum at both levels does not provide coverage on EE as the subject is treated as a cross-cutting issue. At primary and secondary school levels there are very few experts trained in EE as a discipline. Since EE is integrated in subject teaching, issues affecting the environment are taught at the discretion of a teacher. Teaching EE is still a challenge on the part of teachers in schools in Zambia. Pupils' understanding of EE in sampled schools was still at very low ebb. There were variations in responses between pupils coming from the low, middle and high social class areas on issues of the environment. As the Ministry of Education in Zambia is reviewing the school and teacher education curriculum, EE should be broadened in scope in order to contribute to the pupil's overall development as well as the promotion of education for sustainable development at national level. In order to foster transformative and strong sustainability, EE under the current integrated approach is rather conservative and weak in terms of sustainability. If the curriculum is overloaded, curriculum experts should identify and remove the dead wood from the curriculum and replace it with EE. To strengthen EE in the schools and teacher education curriculum, the Ministry of Education should consider retraining teachers in appropriate methodologies in EE for sustainable development as well as developing a citizenry that is conscious and motivated to develop and manage its own environment in a sustainable manner.

Title: Disaster Risk Reduction As A Critical Measure Of Transformation From Vulnerabilities Towards Resilience: The Case Of Kgatleng District - Botswana

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Abstract

This paper posits that disaster risk reduction is a very topical issue which requires emergency response, continuity response and a recovery response mechanism in the global agenda. In essence, the paper demonstrates that disastrous phenomena are endemic and intricate in nature hence the need to embrace very proactive ways of disaster risk preparedness. Contemporary research work shows that in risk management, the intention is not to eliminate hazard risks but rather to mitigate their impact on operations, human life and property within the possible acceptable limits/ levels since the probability of their occurrence is inescapable. The paper utilizes Kgatleng district in Botswana to showcase the extent at which issues of disaster risk are managed by the district. Findings of this study show that the district through the district commissioner has instituted a disaster management committee at district level for purposes of methodically cascading capacity building on risk and vulnerability assessment in communities coupled with the crafting of disaster contingency plans. While these attempts clearly indicate commitment pledged by the district leadership to set the tone at the top on issues of disaster risk, there is however evidence reflecting on the challenges which inherently prove to be a hurdle on the implementation of the intended plan.

This study recommends that the district should continually give issues of disaster the widest publicity by developing a more robust philosophy that embrace a disaster risk aware culture embedded at all

departmental levels. Furthermore, a more committing Disaster Contingency Recovery Planning (DCRP) needs to be implemented at district level for purposes of compliance though not rigidly prescriptive in approach to departments. By the same token, this study succinctly brings to the fore the notion that organisations including the business sector are more susceptible to hazard risks such as fires and floods and as such they need Business Continuity Planning (BCP) to guard against future incidents that would otherwise jeopardise or disrupt their operations. The intention is therefore to ensure that there is resilience which is achieved through the restoration of vulnerable functional areas to normalcy within the best possible timelines amidst such disruptions.

Title: Selected Examples of Provision of Education for Sustainability in Poverty Eradication in Zambia

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Abstract

Education can be described as the light of the world. It paves the way for human survival and development. Education enables people to solve many problems that beset mankind. For example it helps to eradicate such vices as illiteracy, poverty and disease to mention a few leading to the development of individuals and communities at large. Technology and other knowledge and skills are acquired through education and they lead to inventions that man has been associated with over time. Education has also distinguished man from other creatures on earth.

Governments all over the world have provided education at different levels such as early childhood, primary, secondary and tertiary. This however, has failed to meet the educational needs of all citizens in their countries especially people who fall out of the school system. Many organisations such as Non Governmental Organisations (NGO) and Development Agencies (DA) have come on board to provide education, especially, to adults and young people outside the school system. Through this many people have been empowered enabling individuals and communities to increase control over their lives. People have increased their assets and attributes and have built capacities to control their own destinies.

Many communities experience numerous problems due to lack of education. Poverty, which is lack of sufficient means to sustain oneself, has ravaged communities over time. However, through education, poverty can be alleviated and eradicated. This paper will examine the education for sustainability given to communities in Zambia and how it leads to poverty alleviation. It will focus on Education for Sustainable Development (ESD) provided by the government through the Ministry of Community Development Mother and Child Health (MCDMCH) and two NGOs namely Heifer International (HI) and World Vision Zambia (WVZ). The paper will show how education for sustainability can be used to transform communities and individuals from poverty to self-sustenance.

Key words Poverty, Community, Education for sustainable development, Poverty eradication, Illiteracy, Empowerment

Title: Orientation of BEd Science teachers and PGCE Natural Sciences Method Students to Education for Sustainable Development (ESD)

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Abstract

Despite the Decade of Education for Sustainable Development (DESD) coming to the end in 2015, efforts to mainstream ESD into Teacher Education are still unfolding. This paper explores how one of the tools developed to implement ESD can be introduced to teachers on a professional development course. Although Rhodes University conducts teacher development through post-graduate certificate courses, such as Post-Graduate Certificate for Education (PGCE), Bachelors of Education (BEd), Bachelor of Education (BEd(Honours)), Masters and Doctorate degrees in Education, however, ESD has not been intentionally integrated into most of these courses.

This gap triggered our interest to do an orientation by starting the conversation with teachers doing the BEd Science and PGCE Natural Science Method Courses on some aspects of ESD and its implications, teaching and learning and interdisciplinary learning. Following a brief experience with the Education for Strong Sustainability and Agency (ESSA) programme, the authors who are members of the university teaching team decided to introduce the thinking on sustainability onto these aforementioned courses. The “Mission” one tool for enabling thinking on sustainability was adapted into a shorter version and introduced to students through a mini-workshop. Students who are practicing teachers in the Eastern Cape Province, South Africa, were given an assignment to identify a topic in their curriculum, developed lesson plans and teach on sustainability to their learners. Data was generated mainly through reflections and observations in a workshop, document analysis on assignments and diary records. This paper presents the project from the process reporting back to institutional superiors, meetings to identify opportunities in the curriculum, adapting the Mission, the mini-workshop and findings from the students’ lesson plans and their reflections on the lessons they taught. Teachers found relevance of the Mission approach to their curriculum even though the language and examples in tasks during the workshop were not familiar to them. They thought their own learners would struggle too if the same task was taken to their classes as it is. We recommend that such tools as the Mission be adapted and piloted for both their internal and external validity before they are used with participants.

Title: Assessment of Sedimentation in Micro Dams and Effects Related to Sources, Sinks and Fate of Sediments in Southern and Lusaka Provinces of Zambia

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Abstract

Sedimentation in micro dams is a huge undesirable problem and has multiple impacts related to sources, sinks and fate of sediments in diverse scales, which requires substantive, systemic and comprehensive analysis so as to design sustainable reservoir management strategies. Management strategies that are parochially embrace technical and scientific approaches alone will prove futile, unless complemented by contextually relevant literacy, which would ensure management of micro dams *with*, and not *for* the communities.

Little is known on the comprehensive scale of sedimentation in micro dams in Zambia and, particularly Southern and Lusaka Provinces because, previous studies (Sichingabula, 1999, 1997, and 1996) and Walling et al. (2000, 2001) were directed at limited topics of investigation on sedimentation. Neglecting to understand sediment burden on dams and disregard for responsive social literacy would spell high operational costs and significant adverse impacts on society and the environment in general (UNESCO, 2011). The methodological framework of this research will be guided by Empirical Analytic, Analytical survey design and sedimentation theory. About 1000 micro dams are expected to be surveyed using modern tools such as coden hydrographic survey boat, HI9829 multi parameter meter, sediment, etc. Semi-structured questionnaire will be used to gather data from key informants. The main outcome of the project is sustainable management of community micro dams or reservoirs through increased community based literacy on design, construction and management. Triangulated analytical framework constituting mathematical models, statistical techniques and descriptive statistics will be employed.

Keywords: *sedimentation, micro dam, siltation, useful life, community based literacy, reservoir capacity*

Title: Explicit and Implicit mediation in capacity development for EE/ESD in Teacher Education in southern Africa

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Abstract

As the Decade of Education for Sustainable Development comes to a close and various attempts have been made to develop capacities of practitioners in EE and ESD, it is important to look into how these have been influenced by and have in turn influenced mediation of teacher education practices and sustainability practices in general. This paper looks at forms of mediation that took place on courses and in institutions from which course participants came. Mediation of meaning and mediation of action are key concepts derived from Vygotskian mediation that will be used to develop the concept of implicit and explicit forms of mediation. An interpretive study of some short courses implemented in SADC region was conducted through interviews, document analysis and observations. By establishing relationship between mediation and realistic evaluation the paper argues for the need to think of mediation during programme development in order to be able to review outputs and outcomes of the programme. Cases of courses conducted in the SADC region are used as examples to illustrate the mediation process. The paper recommends that it is critical for any capacity enhancement intervention to consider the forms of mediation as they create a platform for various methods and activities for enhancing capacity of practitioners in EE/ESD.

Title: Climate Change Mitigation and Green Solutions

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Abstract

The principal objective of this paper is to demonstrate the capability and importance of a Botanical Garden in Bokaa village. The University of Botswana-Wildlife and Environmental Conservation Society in partnership with the Bokaa community north of the capital city Gaborone have embarked on a Botanical Garden Project

as a mitigation measure in response to the effects of climate change. This community-based project will have the potential to attract social functions such as weddings and camping. It will also serve as an educational resource centre for schools and communities.

It will contain a permaculture garden which will be used to grow vegetables for sale. Small proceeds gained will be used for the maintenance of the project as well as other pressing needs of the community. The area is easily accessible as it is located along the tarred road, and the village has electricity and water connections which will support the operation of the facility. The formation of the botanical garden in the village will help the community to minimize the growth of poverty in the village for both workers and those that will be supported by the project. Poverty cases are a concern in Botswana but with this project, people's quality of living will be improved.

This paper narrates the developmental scope of the project, its intended focus towards mitigating climate change through its green solutions.

Title: Innovation of Education Programs, a Basis for Ownership of Concept Related to the EE/ESD by Learners in Path of Applied Biology, Geography Environmental Management, Tourism and Home Economy Management in Isp/Gombe.

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Heads of geography Environment Management, Tourism and Home Economy Management Departments, lecturers ISP/Gombe- training college/DRC, Kinshasa.

Abstract

Prospects for environmental education in the southern African countries must go through innovation of programs inherited from colonialism and any other programs in use today is out dated. Recognizing the need to strengthen the capacities of learners, teachers, trainers and leaders in the field of sustainable development in general in the new concept of EE and ESD, policymakers have decided for an innovative educational programs in the ISP/GOMBE – Training College/DRC. ISP/GOMBE as teaching pilot school has gone through adaptation of program contents in order to provide learners with strong knowledge in EE and ESD concepts.

Departments in ISP had for longtime operated under conventional and classical names with theoretical program contents far away from the sustainable development concept. They have undergone considerable changes. First, the Department of Applied Technical Biology has integrated and adapted appropriate courses related to sustainable development which is important to understand EE and ESD; in terms of Biology and Chemistry. Second, the Department of Geography and Environmental Management referred to as EE and ESD. This department has long operated under the name geography- history, geography Natural Sciences the current name of the subject that almost constitutes 30% of teaching program in environmental management, conservation resources and sustainable development. Finally, the training of tourism agents is based now on the management of tourism and hotel companies with a large portion of time devoted to eco-tourism that the Department of Tourism and Home Management provides.

Title: Learning Basics of EE/ESD and Behavior Change Targets Higher Education and University by the Introduction of Hygiene, Sanitation and Environmental Courses.

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Abstract

Based on the legal instrument of this innovation, these courses and the development of skills, knowledge and change endorsed by the University and Higher Education Ministry report with the EE/ESD. Ministerial Decision contained in the academic instruction No.14/MINESURS/CABMIN/2012 from 15/08/2012 on the systematization of cross courses is a response to the policy of building capacity of future teachers. This is done through the introduction of new cross-disciplinary courses Hygiene , Sanitation and Environment since 2012. The minimum content of these courses provide at each level the following subjects:

- First level, the basics of hygiene: ISP's learners must practice and pass on to secondary school students.-
- Second level, the program emphasizes the Environmental Sanitation particularly waste management . –
- Finally, the terminal level, essential concepts on environmental issues are the base of this course.

This curriculum innovation is the response to the building capacity policy of educators in EE / ESD.

Title: The Wood Industry In DRC : Role And Place Of The F.I.B. In Poverty Alleviation And Ensuring The Sustainable Use Through EE/ESD

*F.I.B./Industrial Wood Federation and Geography Environmental Management Department / ISP-GOMBE :
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Abstract

The Industrial Wood Federation (FIB) is a corporation of logging companies in DRC. A union interests of operators, part of the dynamics of a logging ensuring sustainability and traceability of revenues in the sector. At the same time FIB associate communities living in the vicinity of the concession in sustainable forest resources management. In compliance with the specifications, EE and ESD program is planned for them. FIB/Members companies in all forest titles subject to legal review by DRC in accordance With the application of the forest code. For the conversion of security concessions ,this positioning of the FIB as an interlocutor and indispensable partner of the Congolese state in terms of exploitation of forest resources makes it play an important role in the green economy in DRC. Taking into account the needs of communities, the first is legal compliance of existence of the member companies. Specifications of negotiation with communities living within the boundaries of exploitation concessions are a guarantee to improving the living standards of the traditional land owning communities. This knowledge pertains to EE/ESD. Techniques as well as the realisation of a management plan is a minimal impact operation which favors natural regeneration expensive investment in socio-economic studies.

Title: Ecological Foundation of the Zande Agriculture

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Abstract

In the sensitive African environment, people have to do with their country resources in a stable farming system. This is the case of Zande people who live in three countries: Central African Republic, South Sudan and Democratic Republic of Congo. In DRC, The Zande people are characterized by common culture, common law and language in a territory of 83.000 km². Zande community indigenous knowledge and cultural practices in agriculture show that this community has skills to control their environment. It's a good practice of EE and ESD. This communication is the result of our investigation in the field: we are one Zande people and we have practiced this agriculture for a long time. We completed our observation by reading some authors such as DE CHLIPPE (1986). The Zande agriculture is different from most part of southern Africa. When a land is worn out, it is deserted and a new land is chosen by farmer s and cleared for agriculture. The farmer recognizes land fertility by the character of vegetation on it. The Zande land offers diversity of soils and vegetations. The main food crops are cereal, leguminous plants, oleaginous, fruits and vegetables. Zande People could be said to be botanists and ecologists since they used 700 words to describe trees, bushes, creeper, grass, vegetation and topographical formation. These potential words explain degrees and various types of fertility for different plants.

Title: Departure from Indigenous Land use System and the consequential impacts: A case of Omusati Region in the Cuvelai Basin of north-central Namibia

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Abstract

Parts of North-Central Namibia consist of unique seasonal wetlands commonly known as the Cuvelai Basin. The Cuvelai Basin extends from southern Angola to the Etosha Pan in Namibia. In Namibia the basin lies between River Kunene in the west and River Kavango in the east. The basin is made of shallow pans known as oshanas which form a network of shallow ephemeral river system. The areas between the oshanas form a network of very low lying uplands consisting of a mixer of alluvial sediments (clay) and allollian sediments (sands) making fertile soil substrates for crop production. The lowest lying points of the oshanas and the uplands form shallow ponds known as ondombes. The basin is home to more than half of the country's population of around 2.4 million people, with the majority of people residing in rural areas. Early owambo settlers in the Cuvelai developed a land use system that was in harmony with the biophysical characteristics of the land. Knowledge on land suitability enabled them to determine which areas to allocate for homesteads, different crops, woodlands and grazing lands. This system minimized the impacts of drought and floods that the region frequently experiences. In the recent past, there has been increasing departure from this traditional way of managing land, may be due to among other factors pressure for land as the population continues to increase, ignorance of the value of this indigenous land use system and mushrooming of poorly planned urban centres. This paper describes this indigenous land use system of the Owambo people of north-central Namibia and discusses the possible reasons for the recent, increased

departure from the system. Consequential impacts of this departure on sustainability of land uses is also given attention as well as possible ways of preventing erosion of this indigenous knowledge.

Keywords: Cuvelai Basin, Owambo people, indigenous land use system, sustainable development.

Title: Truck drivers' Environmental and Energy attitudes at Chirundu Border Post: An exploratory analysis

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Abstract

Under the current situation of environmental degradation and resource shortages, some countries have developed policies and programmes designed to encourage truck drivers to reduce engine idling as a way to cut down on diesel emissions and fuel consumption. It has proven difficult, however, to target education and outreach to truck drivers, partially because little is known about them. Based on interview survey of 59 drivers, the link between drivers' environmental and energy attitudes and their adoption of idle-reduction measures were examined. Cluster analysis shows that truckers with some college education consistently expressed agreement with pro-environmental statements. However, pro-environmental values did not necessarily lead to pro-environmental behaviors. Regressions relating demographic, fleet, cost-consciousness, and environmental repeatedly found that drivers were concerned about fuel costs; this concern made idle-reduction technologies most attractive. Costs of technology and fuel are the driving considerations affecting the adoption of idle-reduction strategies. The study recommends some form of environmental education that may help truck drivers acquire knowledge that promotes behavioral change towards environmental citizenship.

Title: Atlas of Zambia's Changing Environment: Demonstrating Technology Use in Environmental Education

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Abstract

Sustainable development is a critical component of today's global agenda. The multidisciplinary nature of environmental issues coupled with the fragmentation of data and information across sectors and institutions makes it critical to harness it to support decision making. Technology can be used to collect and analyse environmental information to support Education for Sustainable Development (ESD). Environmental awareness among policy makers and the public has to be created and enhanced by utilizing updated techniques to improve the management of environment and natural resources.

Without doubt, the effects and magnitude of environmental change so far experienced indicate the need to put in place, adequate measures to safeguard citizens from hazards, secure livelihoods, alleviate poverty, protect public infrastructure and promote economic growth.

To address environmental challenges, Environmental Education (EE) is key to improving public participation in environmental management. To achieve this, provision of evidence based data or information for ensuring sustainable utilization of natural resources and efficient service provision.

In 2013, Zambia produced its first Atlas of its Changing Environment. The Atlas provides scientifically-based and credible evidence of the changes occurring across the country, as well as their causes, and communicates the urgency of addressing them to policy- and decision-makers and the public. Satellite imagery and other Information Technology tools have been used to provide evidence on both positive and negative environmental changes over the years. The presentation will therefore be used to share this initiative from Zambia as a demonstration of how technology can be used to strengthen ESD.

Title: Effective youth participation in Environmental Education Program

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Abstract

The paper will present approaches used by the presenter to effectively involve youth to participate in Environmental Education programs in the northern region of Namibia (Oshana and Ohangwena). The presentation will focus on the two (2) youth projects Okatyali Youth Agricultural Project located in Oshana and Ohangwena Environmental Youth Club. These projects were initiated by the presenter since 2009 and focus only on issues that address environmental problems facing the two areas where the projects are located. The environmental issues that the two projects are addressing are such as **littering (waste), Water scarcity and deforestation**. The projects involves 32 youth in total where by youth are trained to make use of available resources in their surroundings to ensure they produce/ come up with small garden by using recycled materials (old car tyre and plastics and papers) to grow vegetables in sustainable manner, water saving methods will be presented. This way youth are able to create employment opportunity for themselves.

The youth are not only learning but they as well go out in the communities to create awareness among schools on other issues such as deforestation, Flood and food insecurity that are highly contributing to the issue of Climate Change. The awareness is mostly done in the form of entertainment using Drama, Songs and Poems. Information leaflets and Outcomes of the two projects will be displayed during the conference. The awareness theme/slogan for the two projects is “Go green! As long as you are Young”

Title: From ESD to Citizen Science

LizKomen NARREC ([Namibia Animal Rehabilitation Research & Education Centre](http://www.orusovo.com/narrec/home.htm) - <http://www.orusovo.com/narrec/home.htm>) - lizkomen@fastmail.fm

A poster presentation - Abstract

Education for sustainable development has over time highlighted a number of key concepts including the need for biodiversity safety and the importance of Information Communication Technologies. Citizens provided with education for sustainable development can be keen observers of their social, political, natural and economic environments. In order to allow citizens to gainfully share their observations a platform is needed. These platforms need easy access from available technologies to record observations and contribute to scientific data.

The issue of population declines in all African vulture species is dire. These declines have serious natural, social and economic consequences because scavengers occupy the trophic level that curtail and or remove

diseases and pests linked to human and livestock health. Marking vultures for monitoring purposes has been ongoing for many years and current developments in the marking and monitoring systems strongly facilitate the re-sighting of individual birds.

In Namibia an online crowd-map for vulture re-sightings was developed in 2013 in order to allow environmentally educated citizenry to participate in data collection and data submission on vultures. To encourage re-sightings and populate the reporting various outreach initiatives have been pursued. These initiatives aim to engage networks of potentially environmentally sensitized communities, specifically tour operators, guides and tourists using wildlife national parks, conservancies and farms as well as land-owners and land-managers.

To date this open-source platform accessible by email twitter or direct on-map submission has collected over 320 re-sightings of vultures.

Title: Exploring the integration of Grade 9 learners' prior everyday knowledge and experiences with practical activities when teaching the topic on acids and bases in Physical Science: Towards education for sustainability

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Abstract

This study was conducted at the school where I taught which is a semi-rural secondary school (Grades 8-12) situated in Omuthiya Town in Oshikoto region, Namibia. The new curriculum that has been implemented in Namibia, has posed challenges in how best to put the curriculum into practice at this school. It was this challenge that triggered my interest in doing a research study with the aim of improving my practice. Essentially, the study sought to gain some insights into whether integrating learners' prior everyday knowledge and experiences of acids and bases in conjunction with practical activities using easily accessible materials enabled or constrained meaning-making of this topic.

This study was located within an interpretive paradigm. Within this paradigm, a qualitative case study approach was adopted. The research participants in this study were my Grade 9 learners. Data were gathered using document analysis, videotaped lessons and observations by a critical friend, stimulated recall discussions while watching the videotaped lessons as well as focus group interviews with the learners. An inductive analysis to discover patterns and themes was applied during the data analysis process. The themes were further turned into analytical statements which were analysed in relation to the research questions posed in this study, namely (1) What prior everyday knowledge and experiences related to acids and bases do Grade 9 learners bring to the science classroom? (2) Does elicitation and mobilization of learners' prior everyday knowledge and experiences regarding acids and bases enable or constrain learner engagement? (3) Does learner engagement enable or constrain meaningful learning? (4) Does integrating learners' prior knowledge and experience with practical activities enable or constrain meaning making, conceptual development and understanding of acids and bases?

The validation process was achieved by using a variety of data gathering techniques. I watched the videotaped lessons with a teacher who observed the lessons and transcripts of the interviews and a summary of discussions were given back to the respondents to verify their responses and check for any misinterpretations, a process known as member checking. I also translated what the learners said in Oshiwambo, their home language, into English.

The findings from the study revealed that the use of learners' prior everyday knowledge and experiences of acids and bases facilitated in part meaningful learning during teaching and learning. Furthermore, linking learning to learners' everyday experiences enabled them to learn scientific concepts in a relaxed and non-threatening environment. However, linking learners' prior everyday knowledge and experiences to conventional science (textbook science) proved to be a challenge. My recommendations are that teachers need support in their endeavors to incorporate learners' real life experiences into their teaching and learning repertoires.

Key words: learners' everyday life experiences, easily accessible materials (acids and bases), conceptual development, practical activities, interpretive paradigm.

Title: Success stories of NGO information dissemination on biodiversity conservation that lead to EE projects in Botswana

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Abstract

Non-governmental organizations (NGOs) have played a major role in pushing for biodiversity conservation in Botswana. The NGOs have very well expanded their scope to various sectors like education, health, environment, human rights etc. This way they have shaped a secure and sustainable environment for the deprived sections of the society. These NGOs have created an environment where people can live, grow, learn and also develop themselves. Sustainable Development aims at bridging the gap between ecological services and the quality of life and the NGOs have very successfully merged the two, as they are in harmony with the nature and in the cradle of the same nature they nurture mankind. NGOs in Botswana are looking after the environmental issues and promoting eco-friendly practices and with the same ideology they are marching towards the development of the viable society through education. This way these have built a symbiotic relationship between the environment and the society as both are mutually benefited.

BirdLife Botswana

BirdLife Botswana is a membership-based conservation NGO established in 1980, which aims to conserve birds and important bird habitats, by creating awareness, carrying out research and promoting beneficial relationships between birds and people.

The *Capacity Building of Schools in Environmental Education: Towards Sustainable Conservation Activities in Botswana* is a 2 year project that BirdLife Botswana is currently running, it aims to empower teachers and learners to initiate sustainable environmental education activities in their schools. The project objectives are:

- (a) Capacity building for teachers;
- (b) Building Continuity of environmental education and conservation activities in schools;
- (c) Facilitating opportunities for experiential learning for conservation awareness building, and
- (d) Advocating and disseminating the necessity and effectiveness of environmental education

To achieve the aforementioned goals, they are implementing a number of activities that include: (1) Conducting teacher training workshops; (2) Conducting in- house workshops at schools; (3) Producing and distributing environmental education materials (*e.g. colouring book of the 50 common birds of Botswana, A1- sized poster entitled "Living together with our forest"*); (4) Facilitating environmental education activities in schools; (5) Organising bird walks, and (6) Organising Best environmental education School Award

Title: YIELD OF SPINACH IN SACK GARDENING.

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Abstract

Botswana faces vegetable production challenges such as unproductive soils and, in some cases, inadequate water supply which includes unreliable rainfall and high water billing rates. Poverty stricken households are, therefore, restricted by the challenges in that, without government intervention, they are unable to independently grow their own vegetables in order to improve food security and nutrition in their households which would ultimately alleviate poverty. One of the Government of Botswana's interventions is the introduction of backyard gardening which makes use of the earth / ground in the backyard for growing vegetables but does not fully cater for the soil and water challenges faced by many Botswana.

A research project was, carried out in Francistown College of Education (Botswana), to determine whether growing spinach in containers in the form of sacks using a better soil from a more fertile place and using vertical space rather than ground space would provide sufficient yield for a family of four as a poverty alleviation measure.

A core of stones was made in the middle of each of twelve sacks. The spaces between the cores and the sacks were filled with a mixture of home-made compost and topsoil imported from a more fertile place. Holes were made on the sides of the sacks from the bottom of the sack up to the top. Spinach seedlings were transplanted into the soil through the holes. Treatment was applied across the sacks. The spinach was harvested over a total of 50 days and it was weighed each time whenever it was ready for harvesting. The total yield was calculated by adding the weight of the spinach collected from all the sacks put together and it was divided by a family-of-four-sized portions of 250grams to determine the number of meals the sacks would cater for. The results showed that, the yield was not adequate for daily provision for a family of four. It was expected that the yield would provide an adequate bundle per day. The reason for the inadequate or low spinach yield emanated from the fact that the spacing for holes was not efficiently done. Even though the yield was inadequate for the family, container gardening is still beneficial due to less water used for watering, sufficient use of space and healthy soils, which are a challenge in traditional gardening. This, however, was an important nutritional outcome because it was better than nothing especially since a family would have a vegetable at least once a week and would save the family some money or even generate an income, although small.

It is recommended that the spacing of the holes be more efficient in order to improve the yield.

Title: Occupational health and safety practices in selected schools of Lusaka District

Mubita Kaiko, Timothy, K Phiri, Mulenga Mathews, Mulenga Sydney and Sara Mwanza (The University of Zambia, School of Education, Geography & Environmental Education Unit) mubita016@gmail.com, timothykamuzu@yahoo.com,

Abstract

Occupational health and safety practices in learning institutions of any set up are an integral concern to the fulfilment of educational objectives. Work place health and safety affects everyone in the school communities, staff, learners, parents and visitors. It is, therefore, of great significance to ensure that appropriate Occupational health and safety measures are put in place in order to create an enabling environment for the proper functioning of learning institutions. It is, therefore, imperative that educational

stakeholders foster safe and secure school environments to facilitate increased learner enrolment, retention and completion and hence attainment and quality education.

This study will principally investigate Occupational health and safety practises in selected school environments of Lusaka district. This is with the thinking that no meaningful teaching and learning can take place in an environment that is unsafe and insecure. However, it has been observed that Occupational health and safety in schools in Zambia has not been accorded sufficient attention to acceptable standards. This is evident from media reports such as "Kalingalinga pupils continue to learn under poor sanitary conditions" (Post Newspaper, 17th April, 2014); and "Chingola pupil pulls out gun, threatens to shoot teacher" (Posted Online, 17th April, 2014) which are becoming common in various media in Zambia.

Title: Positioning African RCE's to play significant role in sustainable development achievement during post 2015 era. Lessons on the Achievements, Challenges and way forward from Greater Eastern Uganda RCE.

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Abstract

Regional Centers of Expertise (RCEs) initiative was developed to play a key role in the world by translating, articulating and delivering the global vision of Education for Sustainable Development (ESD) into the context of the local community in which they operate. Ten years of operationalization of RCEs; what has been achieved? What are the key constraints? What opportunities has African continent missed? What reforms are needed? How can the huge potential of the RCEs be exploited, developed and harnessed during post 2015 era in African context? These issues are discussed based on the vivid experiences from Greater Eastern Uganda RCE (GEURCE). The presentation gives key challenges faced in operationalizing RCEs based on the GEURCE experiences. And proposes strategies for improving the operation of RCEs in the context of Uganda. What different approaches could be used to bring in positive changes, leading to achieving the desirable goals and bring higher impact within the community. This is aimed at generating the scenario for strengthening RCEs roles and responsibility with African context in relation to the post 2015 era. This paper will contribute to the strengthening of the strategies, road map and position paper for African RCEs in preparation for the global RCE conference.

Title: Advancing the role of youth and actively involve them in Environmental Education training programme through the use of ICTs (mobile phones)

Gebhard Eshumba (Ministry of Youth, Sports and Culture- Usakos, Namibia) eshumbai@yahoo.ca

Abstract

The directorate of youth development, environmental education unit in the ministry of youth has embarked up on the project that aiming to empower the out of school youth with relevant skills and knowledge in environmental understanding. It aims at improving quality of life of the people of Namibia by promoting a clean and healthy environment, and mobilising members of the public to monitor, raise awareness and lobby for the improvement of the environment.

The environmental education (EE) training course was introduced to 20 out of school youth from Karibib and Usakos. The course generally addresses environmental issues at national and international level. An e-

learning platform (www.mnkusi.com/elearning) was developed by the facilitators where the EE course is accessed by the youth. The youth used mobile phones to access the course as they were provided by the facilitators and the whole training was done on-line. The EE course covers many different environmental topics which gave them opportunity to the youth to learn and understand the environment they live in. The training course runs for 8 weeks and it receive funds from UNESCO. The project supposed to be an on - going, due to financial constraints, it could not continue and hopefully it will start again once funds are secured. The EE youth officer is intending to share his experience with the conference participants and get some inputs how to develop the EE course further.

Title: Cross-boundary learning of water-harvesting in water-stressed dry-lands through capacity building, apprenticeship learning and citizen science tools

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Abstract

This paper explores the processes learning and actions around water harvesting practices in two communities in South Africa and Zimbabwe and reveals some learning opportunities, barriers and channels. Water stress is a characteristic of many Southern African states and local communities. This is due to inadequate rainfall and water-holding capacities worsened by climate change among other drivers. Various solutions have been tried that include damming of rivers, sinking of boreholes and conservation farming but they have been deemed either expensive or unsustainable or too labour-intensive among others. Water-harvesting has been applied by a few innovative individuals and promoted by CBOs and NGOs with varying degrees of success. For some it is the silver bullet that has been elusive, while for others it has made the difference for sustainable livelihoods and success. For the latter some gaps identified have been the lack of water-harvesting training in institutions that produce agricultural extension agents. While there are various types of water-harvesting, the choice of which to use depends on the climate, soil types, inputs available, and purpose among others. In this paper, resource-poor small-scale farmers were involved in this ESD study with the most common water-harvesting application being In-field channelling, sinking and use of rainwater.

Key words: cross-boundary learning, water harvesting, learning barriers and opportunities, water-use

Title: Climate change adaptation capacity development in SADC Trans-frontier Conservations Areas: processes and grassroots transformations

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Abstract

Climate change is worsening food insecurity, biodiversity loss, ecosystem services deterioration and ecological infrastructure stresses, water demand and health pressures in Africa. In some few cases, positive effects such as improved rainfall are or will be felt. The Southern African Development Community (SADC) and GIZ identified Climate Change Adaptation as a key capacity development need and developed a course in 2013 which has been facilitated through a change-oriented learning and action course by the SADC REEP in 2013-2014. The course was for Managers and Community Leaders in SADC Trans-frontier Conservation Areas (TFCAs). Key climate change issues such as rising temperatures, reduced rainfall and increased rainfall events over 30+ year periods and their impacts such as chronic drought, flooding, sea level rise, species

migration; and issues of sustainability of Wildlife Parks and TFCAs, and of the capacity development process itself were put to the test from a critically reflective perspective. Outputs included mangrove rehabilitation, water harvesting and afforestation actions among others. This workshop discusses some of the outcomes and impacts of change projects and seeks to mobilise stories and testimonies of significant change, and ideas for up-scaling the course on a wider scale and scope through ESD processes that can step-up Community Ecosystems-based Adaptation actions and benefits.

Key words: climate change adaptation, mitigation, course development, change projects, up-scaling, stepping-up

Title: Integrated Climate Change Impact Assessment For Maize Production: Case From The Zambezi Region Of Namibia

M Teweldemedhin, W Durand, O Crespo, Yg Beletse, C Nhemachena W. Michael and Montle P.B (Polytechnic of Namibia, School of Natural Resources and Spatial Sciences, Department of Agriculture and Natural Resources Sciences) tmogos@polytechnic.edu.na; bpmontle@gmail.com*

Abstract

In this paper, the Tradeoff Analysis for Multidimensional Impact Assessment (TOA-MD) model is presented as a method to evaluate the impact of climate change and the economic viability of adaptation strategies for small-scale stakeholders. The method was applied to the maize production systems of the Zambezi region of Namibia, with a combination of simulated baseline production and future simulated yield using the Decision Support Systems for Agro-technology Transfer (DSSAT) model, under five different climatic scenarios selected from 20 Global Circulation models (GCMs). Despite differences in the magnitude and extent of impact of the various GCMs, the projections show a negative economic impact, with losses reaching a high of 76 % and a low of around 46 % in the absence of any adaption strategies in the Zambezi region. The analysis of the tests done on the adaptation strategies and certain policy options suggest that the introduction of an irrigation system may be sufficient to offset the negative effects of climate change. Since various assumptions and uncertainties are associated with the use of the proposed approach, the results should be interpreted with caution. Despite these limitations, the methodology presented in this study shows the potential to yield new insights into the way in which realistic adaptation strategies could improve the livelihoods of smallholder farmers.

To safeguard the limited productive assets of rural Namibians, the study highlights the importance of policy targeting pro-poor disaster management and other adaptation mechanisms. In addition to protecting the productive resources of the rural population, such policy should target the diversification of the rural economic environment while strengthening rural-urban linkages.

Keywords: climate change, TOA-MD, maize, Namibia, Zambezi

Title: National coordination challenge for RCEs: Experiences from Kenya

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Abstract

Globally, the population of RCEs has been growing exponentially and now stands at 129 in April 2014. Most countries are proud to have more than one RCE acknowledged by UNU. Every day new applications are being processed and it is expected that the number of RCEs will continue to increase.

Kenya is proud to have a total of 9 RCEs of which 5 have been acknowledged by UNU. This is the highest number per country in Africa. The establishment of these RCEs can be partly attributed to the national coordination role played by the National Environment Management Authority (NEMA). This national coordination role is enshrined in the Act that establishes NEMA and consequently RCEs has been integrated in the corporate strategy and work plan of the institution.

National coordination entails many interventions which include RCE mapping, policy makers lobbying, support for stakeholder mobilization, project realignments, dialogue meetings and forums, mentoring and conflict resolution mechanisms. NEMA has invested heavily in RCE activities over the years. These activities are routine at NEMA and staff have been tasked and resourced to fulfill these roles. The 9 RCEs have established the Kenya National RCE Network with its own governance structure.

National RCE coordination also comes with a lot of challenges such as lack of adequate funding, commitment from partners and inadequate activities at the grass root level. NEMA has put in place mechanisms to address these challenges.

Development of appropriate supporting national policy has been a major preoccupation by NEMA in spearheading the work of RCEs. The National ESD Policy has been developed and ESD mainstreamed in diverse legislation passed by parliament. These policies will be instrumental in helping RCEs engage fully in ESD post 2014.

This paper presents Kenya's RCE journey and plans beyond the DESD.

Keywords: RCEs, national coordination, post 2014.

Title: An examination of teachers' strategies for mediating the construction of environmental content knowledge in the Grade 11 Life Sciences

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Abstract

In South Africa the new curriculum policy (CAPS) environment introduces a more strongly content referenced curriculum which has commitments to active and critical approaches to learning, and to environment and sustainability content. Successful implementation of CAPS requires that teachers attain the requisite knowledge and pedagogical content knowledge skills for integration of environment and sustainability concerns into the South African National Curriculum. Recent findings within the South African school context showed that actualized practices in the classrooms and the representations of environmental content knowledge by teachers is a cause for concern. The research will examine diverse ways teachers are mediating learning through exploring the classroom techniques used by teachers working with environmental content knowledge and the way that knowledge is constructed, so as to bridge the gap in the

understanding, investigating and application of environmental curriculum content. A number sensitizing constructs from the field of environmental education which offer different lenses for viewing mediation processes as a relational process of knowledge construction are used. These are knowledge co-construction (deliberation), relating environmental content knowledge to cultural historical context (situated learning), relating environmental content knowledge to everyday and intergenerational knowledge through hands-on experience (close proximity), and developing an iterative relationship between environmental content knowledge and sustainability practices (practical reasoning). The theory of practice architectures developed from practice theory by Schatzki (2012) and Kemmis & Heikkinen (2011) is used as the ontological lens to help in understanding the classroom approaches of educators in the teaching of environmental knowledge content. The practice theory will be used for exploring pedagogical sensitizing constructs in terms of sayings, doings and relating, architectures enabling or constraining the educators' sayings, doings and relating. The study findings will be central to South African teacher professional development programmes seeking to understand classroom practices in relation to curriculum's new environmental content

Title: Is it possible for human beings to live their lives without destroying nature?

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Abstract

This presenter believes that human beings can live fulfilling lives without destroying nature in the process. In fact, we can enhance nature, like it has been demonstrated with the Habitat Project. Secondly, one can also deal with one's waste in a sustainable manner by observing the 3 r's: Reduce, Re-use and Recycle. One can also abstain from burning one's waste, a practice which is polluting and harmful to the health of people, animals and plants. This paper will focus on building sustainably, environmentally, socially and economically. Secondly, it will look at ways to deal with waste in a sustainable manner. The paper and presentation will focus on an ongoing demonstration building & waste management project in Groot Aub in the Khomas Region of Namibia.

Title: Promoting Community Water and Rangeland Resources Management (CWRRM), and Community Development through Institutionalisation of Water Point Committees

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Abstract

Namibia is the driest country in Sub-Saharan Africa with limited water resources. Livestock production is the dominant agricultural land use. The accessibility of scarce ground water resources through the drilling of boreholes determines where and to what extent livestock production takes place. This study postulates that community water point committees (WPCs) are more advanced in regions with scarce water. Water scarcity influences the governance of WPCs. Four outcomes are evident: (1) A high sense of community vulnerability under conditions of poor community cooperation will lead to the demise of the community. Thus WPCs will be difficult to take off. (2) A community dominated by well-off individuals that do not see the need for cooperation among its members, will entrench individualistic approach which seeks maximisation of individual interests at the expense of the common good. Hence under this situation WPCs will not function well. (3) A high sense of community vulnerability under conditions of high community cooperation will lead

to the establishment of functioning WPCs. Here cooperation is motivated by “safety in numbers”. This situation cannot be sustainable because once vulnerability is reduced, cooperation declines. (4) A community dominated by well-off individuals that are cognisant of environmental sustainability will seek cooperation among its members to achieve the greater common good. The goal here is “Sustainability for the Common Good”. This is an ideal situation for which current WPCs can only dream about.

Policy makers should take advantage of this evolving institution to promote sustainable management of group resources.

Title: Contribution of ESD Into Improved Forest Governance to Ensure Citizens Benefits

Sophia Masuka, Gwamaka Mwakyanjala and Cassian Siang’a (Tanzania Natural Resource Forum, Tanzania (ORAL PRESENTATION))s.masuka@tnrf.org

Abstract

The Tanzania Natural Resource Forum (TNRF) seeks to improve governance and accountability in Tanzania’s natural resource sector to achieve more sustainable rural livelihoods and better conservation outcomes. Mama Misitu ‘Mother Forest’ is the communication campaign at TNRF that aims at improving governing of forests in Tanzania for the benefits of citizens. The campaign works with nine partner institutions (NGO’s) across four regions in Tanzania.

Campaign implements Education for Sustainable Development (ESD) through its communication strategy so as to bridge the gap between people’s local on forest resources management needs and practices; and national forest resource management priorities, policies, Laws and programmes.

The ESD programme is being implemented through trainings on social accountability monitoring, excursion to villages that have benefited from sustainable practices such as sustainable harvesting of timber, alternative livelihood projects from forest resources, production of video and audio spots, cartoon story books on legal issues and simplified book on forest act. Also different media platforms are being used to convey messages and show different sustainable practices to communities, youth, decision makers, conservationists and other friends of environment.

More than 25,000 communities, decision makers, youth, and timber traders have been directly involved in these activities; villages have started to generate income and support development activities in the village e.g. building of schools, hospitals; and communities are confident to voice out their concerns on issues that affect their livelihood or threatens the future of forest and other natural resources in their area.

Title: RCE Khomas-Erongo Region: Three years of sunshine.

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Abstract

The Regional Centre of Expertise (RCE) Khomas-Erongo region was recognized by the United Nations University on 20 November 2011. The initiative to form the RCE started in April 2010 when the first consultation meeting was attended by 6 members from different stakeholders. Four of these stakeholders

committed in writing to fulfill the role of Secretariat and lead the process of applying for RCE status. Currently the membership of the RCE has increased and RCE meetings during 2013 and 2014 have been attended by at least 30 individuals representing more than 20 different stakeholders. This diverse RCE membership contributed to a high diversity of RCE activities that address all key aspects of RCEs and Education for Sustainable Development (ESD). RCE Khomas-Erongo region had successful collaboration with both African and International RCEs, although such collaborations can be more. Flagship projects of the RCE that is a result of collaboration among stakeholders include: The introduction of ESD courses for out of school youth by the utilization of mobile telephones; the Green Environmental Project, Project Shine, Creative recycling competition, Coastal Biodiversity week, Eco-certification, Waste volume research and Outdoor learning; Water Research to improve water reclamation and recycling; a National Survey and gap analysis study addressing Climate Change Education for Sustainable Development. This study presents a critical evaluation of the successes and challenges of the RCE Khomas-Erongo for the past three years.

Title: Citizen Science: An Evaluative Case Study of Social Learning, Knowledge Production and Change.

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Abstract

The proposed paper will focus on a citizen science project in the Mpophomeni Township in the KwaZulu-Natal Midlands. Citizens volunteering for the Duzi Umngeni Conservation Trust (DUCT), a non-governmental organisation based in the city of Pietermaritzburg and the nearby town of Howick, noticed the pouring of untreated sewage into their streams and recognized the potential risk to Midmar Dam - a major source of freshwater for the KwaZulu-Natal province. In an attempt to address the causes of the problem DUCT launched a citizen science education project in November 2011, known as the Mpophomeni Sanitation Education Project (MSEP). The paper is based on a master's degree research project that aims to contribute to an understanding of the processes of learning associated with participation in a citizen science project as well as a deeper understanding of the question of epistemological access within the "changing knowledge environment" of citizen science (Lotz-Sisitka, 2007). The researcher's interest is to see how participatory learning, that takes place while citizens engage in activities around water and sanitation education, environmental monitoring and data provision, can enable citizens to "'learn our way out' of the mess that we ourselves are creating (Milbraith as cited in Bawden, 2007, p. 224). Through their involvement in the MSEP citizens of Mpophomeni are collaboratively producing contextualized knowledge around the problems of sewage spilling events and illegal dumping. For a better understanding of participatory learning the researcher drew on Etienne Wenger's (1998) social theory of learning in 'communities of practice'. The question of knowledge production in a citizen science context is explored by drawing on a range of key authors that include Gibbons (1998), Tabara & Chabay (2013), Young & Muller (2010) and Edwards (2010). Finally, Archer's (1995) theory of morphogenesis provides a useful lens with which to describe changes in water and sanitation practices resulting from the project.

Title: Fundisa for Change - A Professional Learning Community

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Abstract

South Africa has over the years been engaged in various approaches to teacher professional development with many initiatives focussing on environmental learning. Despite the many good practices, and good policy frameworks, very little has been achieved in ensuring that environmental issues are consistently and coherently integrated in teacher education due to inadequate capacity to make a wide systemic impact and achievements. A national partnership programme, Fundisa for Change, aims at addressing that and seeks to establish stronger institutionally located programmes within national policy and teacher professional development structures. This implies a need to understand the collective capacity building in Fundisa for Change as a professional learning community; where professionals in the environment: an education sector are working together to improve teachers' environmental knowledge, pedagogic and assessment practices through mutual support, mutual accountability and mutual challenges. Unless the partners in Fundisa for Change are fully engaged in the change process and are capacitated, transformative environmental learning through teacher education will simply not happen. This paper thus aims at using Fundisa for Change as a case study to argue that collective capacity building at all levels and across sectors can be an essential component of any successful improvement strategy, initiative, or intervention. The paper will also seek to explore what is meant by collective capacity-building, how it happens and what the challenges are. This has potential to advance national and global policies informing Fundisa for Change and ultimately improves CPD of teachers for transformative environmental learning

Title: Indigenous knowledge and Environmental Education: A case study of selected schools in Namibia

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Abstract

In some contemporary discourses, a new dimension of knowledge is increasingly being recognised. Sustainable development is no longer the exclusive domain of western science and technology. There is a growing interest in the role that indigenous people and their communities can play in sustainable development. The integration of indigenous knowledge (IK) into formal school curricula, especially environmental education (EE), is seen as a key approach to making education relevant to rural students. This will also promote the intellectual diversity required to manage the scope, complexity and uncertainty of local and global environmental issues.

This study is guided by constructivist approaches and postcolonial perspectives that recognize the differences between IK and western sciences but at the same time concerned with ways in which the two can work together. In particular, this study uses a qualitative case study of selected schools in the Northern part of Namibia to investigate how IK can be used to support EE in rural schools. The National (Namibian) Curriculum for Basic Education and the Life Science curriculum documents have been analysed, focusing specifically on how IK is coupled with EE at school level. The review of the curriculum documents revealed that IK is not only ignored and under utilised in schools, but also systematically undermined as a potential source of knowledge for development. The curriculum continues to reinforce western values at the expense of IK.

To gain more insight into existing EE practices in schools and the role that local knowledge can play in school syllabi, six teachers, two advisory teachers and two traditional leaders were carefully selected and interviewed. The basis for this was to possibly challenge and address the needs that learners and their environment have. The participants in this study embraced the inclusion of IK in EE. However, the processes of combining IK with science may be constrained by challenges related to: teachers' attitudes, the design of the curriculum, and the way learner-centered education is conceptualised and practiced in schools. The study suggests that, to incorporate IK into EE effectively may require a shift away from the current strong subject-based, content-focused and examination driven EE curriculum. A cross-cultural Science Technology and Society (STS) curricula that includes a broad range of disciplines and provides a context within which all knowledge systems can be equitably compared and contribute to our understanding of the environment is proposed as an alternative curricula framework.

Title: Exploring the Potential of Improved Cook Stove (ICS) Programs in Malawi as a Strategy to Climate Change - Sustainable Development Response: Challenges and Prospects

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Abstract

Improved Cook Stove programs have the potential to mitigate climate change and offer a range of other direct benefits to the users and the environment. Various Non-Governmental Organizations have mobilized and implemented stove programs in rural areas of Malawi with specific agendas and goals. Nevertheless, limited community acceptance has been acknowledged. On the other hand, Chapter 20 of the IPCC WGII AR5 (final draft) calls for a co-benefit approach for climate mitigation projects in order that actions should benefit both development and climate change responses concurrently (Abeyasinghe et al., 2014). Additionally, some literature points out that the co-benefit approach for climate mitigation and adaptation can help achieve community acceptance of the programs and hence increase program effectiveness (Wilbanks & Kates, 2010).

This paper explores the potential of Improved Cook Stove (ICS) programs in realizing co-benefits approach for climate mitigation within the context of Malawi. The paper highlights the climate change-health co-benefit and sketches the development benefit component of the programs. The paper explores possible challenges and prospects in this endeavor.

The paper suggests ways to increase the prospects for the co-benefits and deal with the challenges through, among others, the creation and/or strengthening of existing learning forums and participation of all stakeholders involved in Improved Cook Stove programs; including stove designers, disseminating (promoting) agents, women producing groups and women as stoves users.

Title: A measure of environmental orientation following the implementation of an environmental management system to mitigate climate change

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Abstract

The South Africa National Climate Change Response Green Paper states that climate change must be included in all relevant aspects of formal education curricula. The United Nations' Decade of Education for Sustainable Development (2005-2014) highlights how education plays a vital role in influencing positive changes in society and in the environment through the school as an organisation promoting education for sustainable development (ESD). The thinking behind this research is that everybody needs to assume responsibility for their actions and commit themselves to ensure a sustainable future. It means that a whole-school approach needs to be followed to make the world more sustainable. The purpose of this paper is to report on the attitudes of primary school teachers who were exposed to an environmental management systems (EMS) framework to promote ESD. The revised New Ecological Paradigm (NEP) scale, a widely used tool for measuring a population's environmental worldview was used. Eight additional statements (items) were added to measure the environmental concern of each participant. The NEP is used in environmental education where differences in behaviour or attitudes are believed to be explained by an underlying value, world view, or a paradigm. A pre- and post-test experimental-type research design was used. The participants (n=21) from seven schools attended a workshop that served as the intervention where the implementation of an EMS framework was shared for adaption. A pre-test survey of each participant's attitudes on the environment was conducted before the workshop commenced. The post-test survey was administered to the same participants after the follow-up workshop where feedback was obtained from each school about their experience around primary school resilience to climate change when implementing an EMS. The results of the study will show how knowledge of climate change and a whole-school approach to environmental management has influenced the worldview of participants involved in promoting ESD.

Keywords: *education for sustainable development (ESD); environmental management system (EMS), New Ecological Paradigm (NEP), primary education.*

Title: Investigating the Selection, Adaptation and Use of Textbooks for Environmental Learning in the Natural Sciences Curriculum. A Case of Five Grade 7 Classes in the Uitenhage District

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Abstract

Chisholm (2004) suggests that teachers need textbooks along with other learning support materials and they need to be trained to use them effectively. The purpose of the study was twofold, firstly to examine how textbooks are currently being selected and used in the planning of lessons and the mediation of environmental learning and secondly to inform professional development support in the use of textbooks. Three aspects of textbooks were reviewed, namely:

- Information
- Activities and
- Activity sheets (including supplementary materials developed by teachers).

The research explored whether educators worked with information from the textbooks, and if so, how they worked with information in terms of translating, summarizing and adapting it for learners. Also, the textbook was reviewed as a mediating tool for learning between the curriculum and the object (knowledge and skills of the learners).

The research interest was informed by the 2009 curriculum review which highlighted the importance of textbooks in strengthening content knowledge amongst learners. In response to this concern, the 2012, South African Curriculum and Assessment Policy Statement emphasized the use of textbooks to bridge the content gap amongst learners and educators (Curriculum News, May 2010: DoE). This presentation covers a study which investigates the selection, adaptation and use of textbooks for environmental learning in the Natural Science curriculum.

This case study examined teachers' choices of materials for teaching and learning in their classroom with specific focus on environmental education. The recommendations of the study could inform future curriculum implementation decisions in the schooling system and teacher professional development.

This study made use of Engestrom's Activity theory to illustrate different role players in curriculum implementation and in the process of teaching and learning. This theory was complemented with social learning theory for the purpose of understanding how learning takes place in the classroom.

The study was qualitative in nature with classroom observation, individual and focus group interviews and document analysis as part of data generation. The following pointers were some of the emerging findings from this case study:

- Teachers rely heavily on one source of learning support material (textbook) for teaching and learning.
- Teachers feel comfortable with their traditional teaching methodologies (chalk and talk method).
- Choice of textbooks is based on the assessment activities that the textbook can offer by most educators.
- Most learners do have textbooks in the subjects they learn but only interact with them in the presence of their teachers.
- Educators have content gaps in the field of environmental education.

Title: The role of bacteria in the breakdown of carcinogenic substances in wastewater for safe recycling purposes.

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Abstract

Water is one of the most essential natural resources for human daily life activities and yet so scarce. Treated wastewater and untreated sewage contain bacteria which can be advantageous to the recycling process. The composition of effluent, originate from various industries such as pharmaceutical industries, mining industries, agricultural sector, household waste, chemical industries, various manufacturing industries including the oil manufacturers. These introduce potential health threats compounds to wastewater. These compounds that remain for a long time without being broken down or change in their chemical composition and/or structure, on the environment are referred to as recalcitrant compounds. The capacity of Polycyclic Aromatic Hydrocarbons (PAHs) degradation by bacteria (biodegradation) depends on the diversity and characteristics of naturally occurring populations and their response to environmental conditions. Conventional physical and chemical methods used to decontaminate wastewater contaminated by

substances from pharmaceutical and textile industries are time and energy consuming. This therefore is not sustainable. This threatens the economic security of most developing countries. Biodegradation is the metabolic ability of microorganisms to transform or mineralize organic contaminants into less harmful, non-hazardous substances, which are then integrated into natural biochemical cycles. This process is not only cost effective but also environment friendly, which is what Environmental Education (EE) is striving for. Polycyclic aromatic hydrocarbons (PAHs) are highly toxic and can act as mutagens and carcinogens, in the bodies of humans. Wastewater that has gone through effective biodegradation can be fully recycled thus conserving raw water at the same time ensuring safe available water for all.

Title: The Role of Community Capacity Building - The Case of Zomba RCE Flagship Projects.

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Abstract

Zomba RCE was acknowledged in 2008 after submitting its application to the Ubuntu Committee of peers in 2007. The RCE comprises eight stakeholders who work around different flagship projects in a coordinated fashion. The vision of the RCE is to create a society that is socially responsible, economically viable and environmentally sound. The main objective of the RCE is to promote Education for Sustainable Development (ESD). In implementing the UNDESD 2005-2014, Zomba RCE has implemented a number of ESD projects. The RCE worked tirelessly in implementing ESD projects through various activities, meetings trainings and workshops.

Some of the ESD projects are considered key success stories considering the unique features associated with their implementation. In these projects a number of efforts to train communities have been employed and one of the key features of success is the aspect of some communities being able to replicate the training efforts by empowering their fellow communities. In this paper we look at some of these projects and share the success stories from their implementation. The outcome of such projects is that communities can now enjoy various benefits associated with their efforts in addition some of the sustainable challenges have been addressed as well as building resilience of communities to adverse environmental and climatic impacts. It is recommended that the RCE should strengthen coordination and networking among stakeholders to maximise resources and improve project implementation.

Keywords: Replication, Networking, Sustainability, Efficiency

Title: The Role of Regional Centres of Expertise in addressing local sustainable development challenges

A workshop by Abel Attiti (UNU-IAS) and Jim Taylor (WESSA) Jt@wessa.co.za, atiti@unu.edu

Abstract

As networks of formal, non-formal and informal education organizations, the United Nations University Regional Centres of Expertise (RCEs) are designed to facilitate multi-stakeholder learning for sustainable development. In their ten year of its existence, the RCE movement has played a key role in catalyzing various stakeholders across all scales (e.g., local, national, global) and sectors (e.g., business, government, civil society) of society to address sustainable development challenges. This workshop will introduce participants

to the UNU RCE initiative and contributions of African RCEs in addressing local sustainable development challenges. Processes involved in the formation and acknowledgement of a new RCE will be shared to encourage further expansion of the African RCE network. Participants will be deliberate challenges and possibilities of enabling multi-stakeholder learning and networking in ESD. Workshop participants are expected to gain a deeper understanding of the UNU RCE initiative.

Title: Using Environmental Management System to Integrating Climate Change Education in School Curriculum Through Whole School Approach: A Case Study of Okalumbu Combined School; Namibia

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Abstract

New approaches to contextualization of teaching and learning using environmental experiences offer inspiration options to improve educational relevance and desired academic achievements. Environmental management practices can be used as a media for whole school approach and enables learners and teachers to cope more effectively with general subject matter and contributes to skills formation process while fostering positive attitudes. Children are often eager to learn and practice new ideas, these ideas learned at school can lead to lifelong positive habits. The development of a critical climate change conscience is considered to the key factor to contribute to the achievement of the national and realization of the nation vision 2030.

Title: Stream Assessment Scoring System (miniSASS)

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Abstract

The new miniSASS website and database, is now live on a Google Earth! This may be the first time, in the World, that biomonitoring data can be placed 'live' on a Google earth platform for all to see! The website provides a dedicated home for the miniSASS community river health biomonitoring tool, to promote its use and serve the miniSASS user community by providing supporting materials, instruction, and news of the latest activities that have taken place.

The most important feature of the new website is the interactive map and database, which allows miniSASS users of all ages to explore their catchment, find their river and then upload their miniSASS results. In this way, a public-access, interactive map of river health across Southern Africa is developing, with results continuously contributed by users as citizen science. Users can explore all results, compare and contrast river health across catchments and in relation to land use activities, while connecting with others who are sampling rivers in their community.

The workshop will further share an initiative to build the capacity of youth in miniSASS in Tlokoeng Valley, north of Lesotho, through the use of the new website in collaboration with WESSA. The miniSASS is intended

to enhance the ongoing biodiversity conservation and ecotourism adventure supported by the RCE-Lesotho in the valley.

Title: Lusaka RCE led Round Table discussion during the 32nd EEASA Conference in Namibia

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Consumer Alliance of Zambia

From Millennium Development Goals to Sustainable Development Goals

Introduction

Zambia has a population of 13 million inhabitants and is one of the most highly urbanised countries in sub-Saharan Africa with 44% of the population concentrated in a few urban areas along the major transport corridors, while rural areas are sparsely populated. Unemployment and underemployment in urban areas are serious problems, while most rural Zambians are subsistence farmers. The population comprises approximately 72 ethnic groups, most of which are Bantu-speaking. About 68% of Zambians live below the recognised national poverty line, with rural poverty rates standing at about 78% and urban rates of 53%. Social indicators continue to decline, particularly in measurements of life expectancy at birth (about 40.9 years) and maternal mortality (830 per 100,000 pregnancies). The country's rate of economic growth cannot support rapid population growth or the strain which HIV/AIDS-related issues place on the economy.

Global Sustainable Development Goal

The Millennium Development Goals (MDGs) mark a historic and effective method of global mobilization to achieve a set of important social priorities worldwide. They express widespread public concern about poverty, hunger, disease, unmet schooling, gender inequality, and environmental degradation. By packaging these priorities into an easily understandable set of eight goals, and by establishing measurable and time bound objectives, the MDGs help to promote global awareness, political accountability, improved metrics, social feedback, and public pressures. As described by Bill Gates, the MDGs have become a type of global report card for the fight against poverty for the 15 years from 2000 to 2015. As with most report cards, they generate incentives to improve performance, even if not quite enough incentives for both rich and poor countries to produce a global class of straight-A students.

Developing countries have made substantial progress towards achievement of the MDGs, although the progress is highly variable across goals, countries, and regions.

Mainly because of startling economic growth in China, developing countries as a whole have cut the poverty rate by half between 1990 and 2010. Some countries will achieve all or most of the MDGs, whereas others will achieve very few. By 2015, most countries will have made meaningful progress towards most of the goals. Moreover, for more than a decade, the MDGs have remained a focus of global policy debates and national policy planning. They have become incorporated into the work of non-governmental organisations and civil society more generally, and are taught to students at all levels of education. The probable shortfall in achievement of the MDGs is indeed serious, regrettable, and deeply painful for people with low income. The MDG shortfall represents a set of operational failures that implicate many stakeholders, in both poor and rich countries. Promises of official development assistance by rich countries, for example, have not been kept.

Nonetheless, there is widespread feeling among policy makers and civil society that progress against poverty, hunger, and disease is notable; that the MDGs have played an important part in securing that progress; and that globally agreed goals to fight poverty should continue beyond 2015. In a world already undergoing dangerous climate change and other serious environmental ills, there is also widespread understanding that worldwide environmental objectives need a higher profile alongside the poverty-reduction objectives.

For these reasons, the world's governments seem poised to adopt a new round of global goals to follow the 15-year MDG period. UN Secretary-General Ban Ki-Moon's high-level global sustainability panel, appointed in the lead-up to the Rio+20 summit in June, 2012, has issued a report recommending that the world adopt a set of Sustainable Development Goals (SDGs).

Since the Rio+20 summit, high-level discussions have been held and continue to explore the next target, goals and indicators to be adopted. The SDGs are an important idea, and could help finally to move the world to a sustainable trajectory. The detailed content of the SDGs, if indeed they do emerge in upcoming diplomatic processes, is very much up for discussion and debate.

Why SDGs?

The idea of the SDGs has quickly gained ground because of the growing urgency of sustainable development for the entire world. Although specific definitions vary, sustainable development embraces the so-called triple bottom line approach to human wellbeing. Almost all the world's societies acknowledge that they aim for a combination of economic development, environmental sustainability, and social inclusion, but the specific objectives differ globally, between and within societies.

Certainly, as yet, no consensus regarding the tradeoffs and synergies across the economic, environmental, and social objectives has been agreed. Still, a shared focus on economic, environmental, and social goals is a hallmark of sustainable development and represents a broad consensus on which the world can build.

In view of dire and unprecedented challenges, the need for urgent, high profile and change producing global goals should be obvious.

The MDGs were targets mainly for the poor countries, to which countries were to add their solidarity and assistance through finances and technology. The Sustainable Development Goals will build upon successes and learn from the shortcomings of the preceding framework if it is to more realise the power of Goals, Targets and indicators (GTIs) even more effectively.

Conclusion

This discussion will explore how members of the EEASA Community can effectively participate and contribute to this change.

Certainly, the MDGs failed to address the root causes of poverty and of the lack of progress on realising human rights. There is an inherent danger in the 'MDG approach', in that it reduces 'development' to progress on some of the basic needs and development policy to development assistance to the most poor and problematic countries. So one could argue, as has Jan Vandemoortele, that the MDGs "represent a reductionist view of development" or an over simplification. 4 As Gandhi said: "The Earth has enough for everyone's need, but not for everyone's greed."

That will be one of the biggest challenges, how to develop Sustainable Development Goals (SDGs) that are addressing the root causes of poverty and environmental degradation, the interlink ages between both and try to achieve the needed paradigm shift crucial to build real sustainable societies worldwide. Further, the

main impact to the MDGs was on the aid system, while any post-2015 arrangement have to be designed to influence governments and behaviour.

The SDGs should go beyond where the MDG are criticised, making use of all the available knowledge to force the systemic change and fundamental transition agenda. The business as usual is not an option, and incremental changes are not enough, as the urgency to act is high. The international council of science in 2010 stated "Humanity has reached a point in history at which a prerequisite for development-the continued functioning of the Earth system as we know it- is at risk." The financial, social and environmental cost of not acting is potentially huge. Environmental damage and biodiversity loss is spectacular. A considerable increase in inequality has also been noted over the last 10-15 years, with the marginalised and disadvantaged falling still further behind and the gaps between the rich few and the poorer masses widening dramatically.

Title: Greening institutions: The case of the University of Zambia

Esther Hara, Matilda K. Nakazwe and Lillian Chipatu (University of Zambia) matildanakazwe@hotmail.com, simooya@gmail.com, lilly.chipatu@gmail.com

Abstract

Education is seen as a driving force in preparing humans beings to be environmentally literate. In order to achieve environmental sustainability, various tertiary institutions are embarking on the concept of greening. Greening campuses, of tertiary institutions can help train and demonstrate good environmental management practices.

One of the institutions that has embarked on greening the campuses is the University of Zambia which has a number of activities to that effect. The greening of the institution has not come without challenges. Although the University of Zambia has started to act upon their "sustainable development responsibilities", it is not known to what extent the greening initiatives have been implemented, hence the context for this present study.

A qualitative approach is going to be used in this study. To collect data, semi-structure interviews and focus group discussions will be used. The informants will be students, academic staff and non-academic staff. The collected data will be analysed using descriptive statistics.

Title: The Role of Environmental Education In Enhancing Popular Participation As A Tool For Effective Environmental Impact Assessment: A Case Of Lilongwe, Malawi

Emmanuel Charles Mkomwa (Msc In Environmental Science Student At University Of Malawi, Chancellor College - Malawi , Environmental Inspector - Environmental Affairs Department, Ministry of Environment and Climate Change Management – Malawi); nafemko@yahoo.co.uk

Abstract

It is a basic human right for every person to live in healthy environment; the environment that is free from pollution. The chapter 3 of Constitution of Malawi of 1994 calls upon all citizens of Malawi to manage environment responsibly. This is achieved through enforcement of Environmental Management Act (EMA) 1996 which put in place measures to prevent environmental degradation and to ensure sustainable

development in Malawi. The section 24 of EMA (1996) prescribes all activities that require Environmental Impact Assessment (EIA) before implementation to prevent environmental degradation. One of the prerequisites for EIA is popular participation. Hence this paper sought to assess the role of environmental education to enhance popular participation as a tool for effective EIA in Malawi in order to ensure sustainable development. Specifically; to identify the tools and methods used to enhance popular participation; to document the best practices that enhance popular participation and to identify major challenges that jeopardize popular participation in EIA in Malawi.

The paper deployed a systematic literature synthesis to document the role of environmental education to enhance popular participation as a tool for effective EIA in Malawi. The major challenges and opportunities of popular participation in EIA were identified in the synthesis. The study also used expert interviews with key specialist in the field of Economics, Sociology and Environment mainly the EIA practitioners and local communities to document the current status of popular participation as a tool for effective EIA in Malawi.

The study found that EIA is major mechanism to determine the significant impacts of the developmental project. It is effective decision making tool in the move towards sustainable development. However, there is limited participation by the local communities in the EIA studies due to various factors such as lack of effective communication for the need of EIA studies and results of EIA Studies to the local communities and illiteracy. It is therefore essential for Environmental Affairs Department to focus on EIA processes when conducting environmental and natural resources awareness programmes and education. In addition through critical case study of the approved EIA reports on various projects, policies and relevant programme documents the paper proposes the way forward for review of the methods used in public consultations in EIA Studies to suit the local communities.

Keywords: Environmental Education, Environmental Impact Assessment, Popular participation, Sustainable development.

Title: Managing risk through resilience for a village blacksmith in Chobe - An indictment to Education for Sustainable Development Schemes

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Abstract

Nearly at the end of the Decade of Education for Sustainable Development (ESD), one of the greatest risks that are likely to persist in poor communities is the disregard for environmental degradation in an attempt to sustain livelihoods of the said communities. Such communities can be viewed as socio-ecological systems that, when resilience lacks with them, can collapse into a chaotic undesirable state. The stability in these systems can be complex, costly and sometimes impossible to restore if not properly managed.

In this case study, drawing on resilience literature, we illustrate that communities can develop resilience by following the initiative of a vulnerable blacksmith in a poor Chobe community who has managed to develop skills and resources within these impending socio-ecological risks to sustain his livelihood, while attempting to reduce the impact of his activities on the environment. From the case study, we further argue that communities can sometimes take it upon themselves to improve their livelihoods under the most difficult conditions, and that not only is this a form of resilience, but should also be supported by incorporating such initiatives into development and education schemes.

Title: Assessment Of Sedimentation In Micro Dams And Effects Related To Sources, Sinks And Fate Of Sediments In Southern And Lusaka Provinces Of Zambia

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Abstract

Sedimentation in micro dams is a huge undesirable problem and has multiple impacts related to sources, sinks and fate of sediments in diverse scales, which requires substantive, systemic and comprehensive analysis so as to design sustainable reservoir management strategies. Management strategies that are parochially embrace technical and scientific approaches alone will prove futile, unless complemented by contextually relevant literacy, which would ensure management of micro dams *with*, and not *for* the communities.

Little is known on the comprehensive scale of sedimentation in micro dams in Zambia and, particularly Southern and Lusaka Provinces because, previous studies (Sichingabula, 1999, 1997, and 1996) and Walling et al. (2000, 2001) were directed at limited topics of investigation on sedimentation. Neglecting to understand sediment burden on dams and disregard for responsive social literacy would spell a high operational costs and significant adverse impacts on society and the environment in general (UNESCO, 2011). The methodological framework of this research will be guided by Empirical Analytic, Analytical survey design and sedimentation theory. About 1000 micro dams are expected to be surveyed using modern tools such as coden hydrographic survey boat, HI9829 multi parameter meter, sediment, etc. Semi-structured questionnaire will be used to gather data from key informants. The main outcome of the project is sustainable management of community micro dams or reservoirs through increased community based literacy on design, construction and management. Triangulated analytical framework constituting mathematical models, statistical techniques and descriptive statistics will be employed.

Keywords: *sedimentation, micro dam, siltation, useful life, community based literacy, reservoir capacity*

Title: Education, Learning and Leadership Nexus in Mainstreaming ESD in Zambia

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Abstract

The world adopted Sustainable Development Agenda in 1992 in Rio de Janeiro – promising to chart a development chart path that is equitable, environmentally just and economically rewarding. As we approach the end of the United Nations Decade of Education for Sustainable Development (2005-2014), this approach to education is yet to be fully implemented in Zambia. In the SADC area only Zimbabwe, Lesotho, Namibia and Tanzania have formulated National ESD Strategies and Action Plans out of 15 countries.

Zambia's social and economic development agenda is set out through Vision 2030. Vision 2030 articulates possible long-term alternative development policy scenarios at different points and it is operationalised through five-year development plans, starting with the Sixth National Development Plan (2011-2015) and annual budgets. Vision 2030 recognises development of policies consistent with sustainable environment and natural resource management principles; access to good quality basic human necessities such as shelter, titled land, health and education facilities and clothing for all; safe and secure social environment, among others, as part of the many fundamental aspirations of Zambians.

ESD/EE offers a chance to collaborate and integrate science and technology. It covers not only environment and natural resources management but a tool we can use for poverty alleviation, gender, peace and dispute settlement, inter-cultural understanding, democracy .ESD/EE can be used to mobilize and provide a learning space. Sustainable development requires unprecedented learning and leadership to change the current way we operate in Zambia. To this end, the organizational learning and leadership theme of this paper explores how change can happen and how to create desired change towards implementation of ESD /EE strategies in Zambia

Keywords: Education ,Learning, Sustainability and Leadership.

Title: The Role of Heritage Institutions, Indigenous Knowledge and Cultural Practices in, About and Through EE/ESD Indigenous Knowledge: What It can Contribute to Sustainable Development

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Abstract

Indigenous Knowledge should be defined as the knowledge; skills and best practices of the indigenous people built over time and are transferred from one generation to the other. It is all about indigenous peoples' lives. It is about what they know, the approaches and skills they use in their lives and the best practices they apply to sustain their lives. This is justified by Nakashima, Prott and Bridgewater (2000) who say, "Sophisticated knowledge of the world is not confined to science, human societies all across the globe have developed the rich sets of experiences and explanations relating to the environment they live in". Therefore, indigenous Knowledge is the key to sustainable development. This paper discusses the indigenous knowledge as a valuable resource that could improve the efficiency, effectiveness and sustainability of development process. It highlights significant contributions indigenous knowledge can make to the attributes of development such as physical development, social development, economical development, political development and cultural development. It shows how indigenous knowledge becomes the basis for community participation in decision making for sustainable development. This entails that all development initiatives should look at its sustainability and should strive to have the broadest possible knowledge base in order to achieve best possible results. Therefore, this paper discusses the valuable contributions of the use of indigenous knowledge in sustainable development with minimum damage to the environment.

Title: Reflection on the current and emerging Education for Sustainable (ESD) issues and practices informing the post Decade of Education for Sustainable Development (DESD) framework Programme.

Albertinah Phiri (Molepolole College Of Education), albphiri@gmail.com

Abstract

Molepolole College is an educational institution training teachers for a diploma in secondary education qualification. It is located in Kweneng District in Botswana, unfortunately this institution still uses a lot of plain papers for printing their daily duties and student's work that at times it has to run short of plain paper or the printing machine would be out of a toner which makes the daily running of the college to be difficult. With Molepolole College using up to 45000 reams (a ream has 500 sheets)(Statistics from supplies department) per semester on plain paper this makes ICT essential is the way to go. Today, the world is revolutionalized by the use of ICT and is recognised as a crucial element in the infrastructures to constitute a

modern nation in many developing countries. The researcher wanted the public to be aware that the use of ICT is environmental and a sustainable initiative. It can have both financial and environmental benefit. A ream costs P32.00 that means 45000 reams equals P1440000 per semester and more than 6 toners for printers, while each toner is P1700 a total of P10200. If we look at paper that is used in Molepolole College of Education it is bulky to store, in boxes or cabinets and it is also expensive as already stated above. CD-ROM database, electronic data storage can be taken into account to store material in offices to save costs. E-mails can be used to share documents and ideas. E-mails that can be printed are the ones you need to have a hard copy of. This advice goes for Internet documents as well. Instead of printing a web page, bookmark it or save the page on your hard drive and pull it up when needed. This study aims at raising an awareness to the college community that the use of the ICT system is cost effective solution of reduction of paper use and would also reduce the cutting of trees which are used to make paper therefore our plants and services provides a significant opportunity to reduce carbon waste and to improve energy efficiency and the commendation is a great boost for our future activities. ICT adds value in development of any sector by reshaping, reorganising and restructuring working methods.

Title: Teacher Education for Environmental Sustainability In Botswana; Challenges And Opportunities

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Abstract

Though Education for Sustainable Development (ESD) is a universal imperative, for a country like Botswana being semi-arid and consequently having a very fragile ecosystem, it is of paramount importance that it be treated as a matter of absolute urgency. This is underscored by the fact that Batswana generally live a consummative lifestyle and the country's economy also heavily depends on this delicate environment. The Report on the National Commission on Education (1993) recognizes the importance of the role played by education in understanding, preventing and solving environmental problems. In the same vein, teachers have been noted as one of the significant determining factors in ensuring quality education since they are potential bearers of critical knowledge as well as experts in pedagogy who can help people construct alternative futures (Lotz- Sisitka, 2012; Harris as cited in Hukle and Sterling, 1996).

In Botswana, there are policies that stipulate that ESD should be infused as part of teacher training; nonetheless, there is no measure or structures put in place to ensure that this happens. From experience, infusion does not guarantee that environmental issues will be incorporated into the teacher training programme and therefore, environmental education is still marginal to mainstream teacher education in Botswana colleges of education. Consequently, the teachers produced thereof seem to continue to lack the necessary knowledge, skills values and attitudes which will enable them to affect and transform pupils with regard to the environment.

It is against this background that this paper examines better ways of incorporating ESD into teacher education should be considered.

Title: Conditions and Consequences of Using Social Media in Learning Sustainable Development

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Abstract

Little is known about the conditions and consequences of using social media in learning sustainable development. This research attempts to describe such conditions and consequences when teachers experiment using it in teaching. Thirty students /teachers aged from 24 to 45 years old participated in the course in which they were required to attend sustainable development social media sites. The research findings arrived at using the grounded theory show that the conditions which affect the teachers/students' work in social media were 1) casual conditions: the course's requirement 2) intervening conditions: the participants image on social media, the participants work characteristic and the participants competence in computers and the internet 3) contextual conditions: the site's subject and the environment's characteristics or conditions. These conditions influence students learning actions and interactions on social media, especially their level of participation. The actions or interactions of participants, together with the various conditions influenced the consequences of students educational work in the social networking sites. These consequences varied, starting from discovering how to utilize the social media for teaching and being aware of the advantages / disadvantages of doing so, to proceeding with social media usage in the contexts other than those being suggested in the course.

Keywords: Teachers, Students, Student's adoption, social networks, sustainable development

Title: Learning in the desert – Inquiry-based environmental education in Namibia

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Abstract

The Gobabeb Research and Training Centre in Namibia has operated as a scientific and educational facility for 52 years. From the onset, education for sustainable development (ESD) has been a core component of its activities, with more than 100 Masters and Ph.D. candidates executing the bulk of their thesis research at the centre in the Namib Desert. Gobabeb's newest programme, the Youth Environmental Summit (YES), is a biannual, inquiry-based science education programme for senior secondary learners. Initiated in 2012, the YES brings together 30 Grade 11 learners (and their teachers) for one week with the primary goal of inspiring them to become interested in scientific and environmental careers and studies, while teaching basic principles of the scientific process. This is done by combining three key elements: (1) a theme-based focus that changes for each YES to address current environmental issues of national relevance e.g. climate change, desertification, or uranium mining (2) an emphasis on simple, inquiry-based research questions and (3) close mentorship from current university students and recent graduates. Four YESs have been hosted to date and a range of skills in Namibian learners has been developed, while creating awareness of relevant issues. Some 150 selected learners from schools in five regions of Namibia have participated in this activity-based training programme during the past three years, demonstrating an increased knowledge of and interest in science and environmental fields. Participants have gone on to present at 10 national and international events including the 11th Conference of Parties of the UNCCD and international science fairs.

Title: Chinhoyi Urban Residents' Attitude towards Solid Waste Management initiatives a deterrent to behaviour change in solid waste disposal

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Abstract

The research aimed to determine Chinhoyi Urban residents' attitudes towards initiatives to improve solid waste management and how this impacts on behaviour change. A total of 200 respondents were purposively sampled from working groups in six high density areas. The residents were selected basing on their participation in the initiatives set towards improved solid waste management. Six voluntary working groups each with at least forty people were set up in six high density residential areas. Questionnaires, observations and interviews were used to collected data from the 200 respondents. Preliminary findings show that attitude is the main factor influencing behaviour change in solid waste disposal in Chinhoyi Urban high density suburbs. The researcher recommends a strong community involvement drive for behaviour change towards solid waste management in urban areas involving all stakeholders and across age groups.

Title: Higher Education Policy Implications for Sustainability in Kenya:: Current Hurdles and Opportunities for the Future

DR OTIENO MARY A.

Abstract

The role of education for sustainable development (ESD) is to help people develop the attitudes, skills, and knowledge to make informed decisions for the benefit of themselves and others, now and for the future, and to act upon those decisions. While many nations around the world have embraced the need for education to achieve sustainability, only limited progress has been made on any level. This lack of progress stems from many sources with the main one being a lack of policy framework to support the mainstreaming of ESD in higher education curriculum (university). This paper focuses on examining current higher education policies in place, and how they are an impediment for sustainability including possible future hurdles this poses for ESD. The vision for the education sector for 2030 is "to have globally competitive quality education, training and research for sustainable development". To achieve this vision, four strategic areas, namely, access, quality, equity, science, technology and innovation have been identified for support based on their impacts on the economic, social and political pillars (Kenya vision 2030, final report, 2007). However, the challenge is the sustainability strategy which failed to be identified. By addressing education policies as critical impediments in the planning stage, Kenya specifically can prevent or reduce delays or derailment of ESD efforts and, ultimately, the attainment of sustainability. This will be a national study, where basic and higher education stakeholders as government, private sector, civil society, learning institutions and the international community among others, will participate in providing their opinion. Document analysis, interview and questionnaires will be used to assess current situation, examine and analyze existing education policy documents to reveal whether they accommodate ESD content. The paper notes that at the moment, unfortunately, education policy in Kenya is not clearly defined and does not optimally support this **holistic** learning. Kenya like any other developing country faces a fundamental decision in addressing an ESD strategy. She must decide on a method of implementation whether to create another "add on" subject, (e.g., Sustainable Development, Environmental Education, or Population Education) or to reorient entire education programs and practices to address sustainable development. This is best done through clear policy

frameworks In this regard sustainable development education is an ideal vehicle for interdisciplinary learning and can be used to bring relevance, depth, challenge and breadth to learning. Embedding sustainability themes within the curriculum, and in the life of the school, develops our children and young people as global citizens and equips them with skills, values and attributes for learning, life and work This study will be significant in guiding the government towards developing policy responses for ESD. The paper concludes that learning for sustainable development constitutes a trigger for innovations in education and should therefore be supported.

Title: Participatory natural resource management; sustainable livelihood options for sustainable development in the Greater Mara-Serengeti ecosystem

David W. Ong'are

Abstract

The Mara- Serengeti is an important biodiversity ecosystem and contributes significantly to the economies of Kenya and Tanzania. The protected park areas interface with the non- protected areas and activities in one area have a direct impact in another. This ecosystem is currently under severe pressure from various fronts including rapid population growth, urbanisation, overstocking, and in predictable weather patterns.

A multi- disciplinary research team from different institutions and countries studied the baseline socio-economic and environmental conditions. It also identified possible alternative livelihood options in light of the fact that the predominant preoccupation of pastoralism is becoming less viable by the day. Stakeholder meetings were then held to rate the acceptability, or otherwise, of the proposed alternatives.

It is clear that the community values and cultural practices are important in determining choices of new interventions. Some of the current practices that are deemed scientifically unfeasible have innate, intangible values that need consideration. Community elders remain key in uptake of new practices as they are the custodians of the cultural norms and values

Title: For Schools and Water Conservation Practices in the era of ESD

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Abstract

Water supports and sustains ecosystem processes. It sustains life and abiotic supports sanitation, health, machinery etc. It predicts change in ecosystems and determines ecological protection. Its utilization and sustainability is for all. **The effective and sustainable utilization and management of water resources is an essential pre-requisite for sustaining all forms of life. (Hirji 2002)** Its availability and scarcity influences interrelation between man and his environment. Schools as custodians for human ecosystems hardly operate without water. Water scarcity poses threat to organizational operations. In Botswana, water is a scarce resource. Climate change, desertification, inconsistent weather patterns and unsustainable water usage results in Botswana getting dry. Expensive as it may be, our government has taken strides to supply communities with water. Some areas though, are less fortunate as supply to such face challenges like low pressure and borehole breakdowns. In some cases though, water shortages are a result of ineffective management and conservation strategies. The world' water shortages are mostly a result of ineffective management. **(FAO 2013)** Some schools in Northwest District seldom enjoy good water supply. Though the

local area boast of the world heritage site- the **Okavango delta**, borehole breakdowns, low pressure and ineffective conservation strategies by schools has to some extent led to such shortages. Andrew Wellio School experienced a serious shortage of water for a considerable period of time due to less pressure from the main line. School toilets, kitchen and taps went dry for a long time. Students turned to the nearby bush to answer **nature's call**. Poor hygiene and lack of good sanitation left children vulnerable to health hazards. This predicament forced us to try all possible avenues to solve the problem. To this regard, we proposed a water conservation project endorsed by **Regional Education Office** and partnered with **water Africa** through adopt a school initiative. This paper therefore covers the initiative the school undertook to solve this challenge.

Title: The Effectiveness of National Biodiversity Strategies and Action Plans and Stakeholder Involvement: a Case of Swaziland

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Abstract

This paper seeks to look into the effectiveness of National Biodiversity Strategies and Action Plans as principal instruments for implementing the Convention on Biological Diversity at the national level in helping countries achieve biodiversity conservation. The Convention requires countries to prepare a national biodiversity strategy and to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact either positive or negative on biodiversity. The paper will also explore the strengths and weaknesses, stakeholder involvement and the role of stakeholders in helping countries achieve their conservation targets. Specific roles of structures among stakeholders can play a very crucial role in ensuring that Swaziland can better protect its biodiversity and at the grassroots level since real users of biodiversity are those at the lowest base. These include but are not limited to traditional leaders, the youth, government sectors and biodiversity experts. The intervention strategies that can be engaged to raise awareness and better capacitate relevant structures that can play a crucial role in biodiversity conservation in Swaziland especially traditional authorities in the form of chiefs whom The Swazi Administration Order appoints as responsible for biodiversity protection at the community level will also be considered under this project.

Title: Pre and Post Biodiversity Knowledge and Understanding of Rural Learners at Two Selected Schools in the Central Namibia

By: Corris Kaapehi¹ and Apollonia Dirks²

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Abstract

Understanding the complexity of environmental issues is a path to sustainable development which every country is striving towards. In order to achieve sustainable development, it is necessary to change people's ecological, economic and social perceptions.

For this reason, EduVentures have proposed a mobile EE project, referred to as the EduMobile to contribute closing the gap by broadening its services to target Namibian rural schools, considering the lack of experience based education due to lack of facilities and isolation of these areas.

We evaluated the pre and post biodiversity knowledge and understanding of learners at two schools in the central Namibia, K. J. Kapeua Combined School and Okakarara Secondary School in order to determine the effectiveness of the EduMobile project.

Although there were no significant differences before and after ($n = 2$, $P > 0.24$) the EduMobile and also between schools ($n = 2$, $P > 0.24$), there is evidence that with more schools there will be significant difference before and after the EduMobile.

In conclusion, Mobile environmental education based on a specially equipped vehicle gives the chance of shifting the classroom into the open space, especially in Namibia's rural areas and thus should be recommended.

Title: Ombombo Mobile Classroom: Experience from the field

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Abstract

More than 50 % of the Namibian population live directly from natural resources, especially in rural areas where subsistence agriculture is still practiced. Key to understanding the environment in rural areas is important, since the people are the immediate users and managers of ecosystems. Learners in rural areas live close to the environment and they have the potential to play the primary role in conserving and protecting the environment. Therefore it is essential that environmental education be more emphasized in rural schools.

Thus, EduVentures have proposed a mobile EE project, referred to as the Ombombo Mobile Classroom to broaden our services to target Namibian rural schools and communities, due to the lack of experience based education due to lack of facilities and isolation of these areas. The aim of this project is to supplement the Namibian Education system with a hands-on experiential learning on theoretical topics covered in the Namibian school curriculum.

More than 5 projects have been conducted and 8 different schools have participated in the program. Therefore, EduVentures would like to present at 2014 EEASA conference to share the first-hand experience gained from the Namibian Mobile Environmental Education Programme (MEEP) in rural schools.

Title: Biodiversity and Product Value Chain: The Imperative of Under-utilised and Exposure of Multiple Uses of Species

ALI BUKAR AHMAD; RCE KANO, NIGERIA

Abstract

A neglected species are that animals and crop plant domestic, wild or semi wild that have potentials and are not being exploited at least nationally. These classes of resources are mostly locally located and globally rare; their occurrence is sometimes limited to their economic potentials. While underutilized species are those that are being used for ages but their full or numerous potential are not put to use, only some. Example, not

all cultures know that there is a Corn derivative part in plastic, batteries, cosmetics, deodorant cough drops, diapers, carpets, textile products, vitamin C, and yogurt etc. Their occurrence regionally and globally and their adaptability to numerous ecosystems may be economically viable but their potentials and uses vary from environment to environment and culture to culture without common front globally. In some cases the numerous potentials may be put to use but locally, regionally, or in an isolated manner, by a multinational or conglomerate.

Over production of staple food by the industrialized countries, over consumption by the super developed countries and the rich individual in every society, the emergence of BRICS, countries which increased over exploitations of biodiversity upsurge interest in underutilized and neglected species. Attention and research are intensified in that direction largely because of conservation of diversity, sustainable appreciation of economic development, human well-being and livelihood.

This survey concluded that sustainable utilization of both over utilized species can be achieved through increase research and development, local community engagement, integration of traditional knowledge and scientific research, cooperation and coordination among local, national, regional and international institutions with the same agenda and expertise

Title: Language and Sustainability Education in the Nigerian Context

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Abstract

This paper seeks to interrogate how the language of instruction as used in the context of English as a Second Language [ESL], provides for the current global ideological networks on sustainability development. The English Language, which is indeed now a property of the whole world by its status as international language, so widely used, should be able to cater for the needs of the sustainability projects. To source data for this paper, a survey was conducted on Nigeria's National Policy on Education (NPE) in order to establish the status of the courses offered on agriculture in schools at various educational levels. This was then correlated with the language policy, to ascertain the extent of reciprocal complementation between the courses on agriculture and the language of instruction in the schools. A pilot study was then conducted in two first-tier level schools (nursery & primary), and two second-tier level schools (secondary) and a university, all located in the northern part of Nigeria. Records were consulted while interviews and questionnaires were administered on respondents. Findings reveal that there is an inadequate conceptual knowledge of botanical terms and also of benefits of plants as sources of dietary supplements as well as of their being medicinal and economic herbs. There is an indication of the possibility of a significant positive attitudinal change through language manipulation which will enhance the quality of education for sustainability development. A purposeful use of language can expose the youth to a variety of environmental and entrepreneurial settings within their locality, therefore, it is recommended that the Education for Sustainable Development [ESD] projects should include on their agenda, a re-engineering of language use so that it captures sustainability matters.

Title: University Faculty of Education Members' Perceptions About/on the Integration of education for Sustainable Development in the Curriculum

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Abstract

This study sets out to explore the perceptions of the Faculty of Education, Hifikepunye Pohamba Campus regarding Education for Sustainable Development (ESD) and how this has impacted on their practices. This is a qualitative study, in the interpretive paradigm, seeking to examine the teaching strategies that faculty members use in implementing and integrating ESD activities into their teaching. The pertinent issues that this research will need to explore include: the extent to which faculty perceive changing students attitudes and values toward the natural environment as an important aspect of their teaching; the extent to which faculty members provide teaching that promote the kind of deep learning that helps students understand the world around them and the ways in which faculty members implement and facilitate students' self-directed learning. This study will also allow the Faculty of Education to rethink about its position on environmental education and ESD, to build capacity to engage critically with sustainable development discourses.

Title: A Research into Endangered Animals of Zimbabwe and how the Children at our School Can Play a Role in Protecting Them

Presenters: Brendon Chinembiri, Ashley Njerewete and Tinashe Mateketa; Eiffel Flats Primary School, Kadoma, Zimbabwe,

Abstract

Animal conservation is something we think is important for the animal activists and the national parks department. As the future decision makers of our country, we decided to take a closer look at animal extinction and assess how exactly it affects and how this would have an impact on our future.

The research that we did was inspired by some research material that was done last year by our predecessors in the EE club at school. They researched on different themes on greening the economy. Their research papers were based on ways that the economy was affected by issues regarding environmental conservation. They discussed the importance of tourism in Zimbabwe and the huge economic impact that extinction of our animals would likely be in that department.

This year our focus was not really on the economic impact but on how the average person in the street is affected by this and how they can do something to prevent it.

We went on the internet to find out more about animals that have been made extinct by our actions and visited some animal conservation parks to find out more from the people that kept the animals. Our research also involved speaking to fellow pupils and members of our community to find out how they felt the animals survival affected them.

We compiled our findings to come up with some interesting recommendations. During our research we also managed to come across new and better ways for us to contribute to a less dangerous future for our animals.

We discovered some interesting things about the conservation of animals and managed to see how they could affect us directly and indirectly.

Title: A study into the carbon footprint of pupils and staff of Eiffel Flats Primary school, Kadoma, Zimbabwe

Presenters: Tinomuda Chitoro, Tadiwanashe Chitoro, Ryan Jani, Tanatswa Mukuyu; Eiffel Flats primary School. Kadoma. Zimbabwe

Abstract

The term carbon footprint has become a buzzword for environmentalists. Many of us use the term in our discussions yet we do not really understand what it means. We sought to understand the term carbon footprint and also to see how the average footprint could be reduced by the pupils in our school. We gathered our data through case studies on the internet, questionnaires and experiments. We used the pupils and teaching staff at our school to assist us with data. We also saw it as an opportunity to assist and educate pupils in the school about their carbon footprint. We launched an awareness campaign and then we asked more questions to the pupils at our school about their footprint. We came up with some interesting results and these helped us come up with practical solutions on reducing a person's carbon footprint

Title: Making artifacts using waste paper

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Abstract

The day to day running of the college involves the use of paper. There are no control measures in place to monitor the disposal of used paper. The risk that could be incurred is that the used paper can eventually pollute the environment. Our organization strives to maintain a clean and healthy environment. If waste paper is not controlled it may interfere with college efforts to achieve a green environment.

Provision should be made to understand why we need to change the way we dispose material which is not biodegradable. Moreover, choosing wisely ways of dealing with waste will reduce the amount of unnecessary negative impacts to the environment. However, it is essential that we quickly find the balance between the benefits of products and services and their cost if improperly disposed of. On that note, before we are successful in our attempts to reduce, reuse, recycle, we must first refuse, replace, and relearn. I want the EESA participants to help our institution with relevant information, benchmark copy, learn and appreciate the efforts that are taking place.

Title: CONSERVATION OF INDIGENOUS FRUIT TREES OF SOUTHERN AFRICA THROUGH CLONAL PROPAGATION: A CASE OF JACKET PLUM (*PAPPEA CAPENSIS*)

JOEL O. SEGOBAETSO, E.S. du TOIT, P.J. ROBBERTSE, HOW-CHIUN WU; Department of Plant Production and Soil Science, University of Pretoria, 0002, South Africa; E-MAIL: jsegoba@yahoo.com*

Abstract

Tree products in Africa have made a significant economic contribution as a source of human nutrition, timber, fuel, medicine and livestock feed. Multiplication and domestication of some elite indigenous fruit trees through clonal propagation can increase food production, help impoverished communities, provide income, conserve biodiversity and rehabilitate degraded lands. Jacket plum (*Pappea capensis*) is a tree widely found in Southern Africa. It produces edible fruits that can be processed into jelly, beverages and

vinegar, while leaves are a source of forage for livestock. Seed oil is used for medicinal purposes and as bio-fuel. Vegetative propagation is the preferred method for domesticating indigenous fruit trees like *P. capensis*.

The experiment for grafting *P. capensis* tree entails commonly used techniques: Mature terminal shoots (20mm long and 10mm in diameter) with 2-3 buds were used as scions and grafted onto two-year old potted seedlings. Whip and whip-tongue methods were used with and without the application of Agar (8 g L). Trials were conducted inside the greenhouse and outside during the months of April, October and December. Approach grafting was conducted using splice and tongue. *In vitro* micro-grafting was conducted using slit technique with and without the application of agar. Callus formation, graft-take percentage and scion growth rate were recorded.

The findings showed that graft-take of approach tongue was highly significant ($P \leq 0.05$) and there was no significant difference between whip and whip-tongue method. Summer grafting exhibited higher graft-take of 60% compared to spring grafting with 30%. The slit technique with agar was highly significant ($P \leq 0.01$) during *in vitro* micro-grafting.

Title: Analysis of Climate change adaptation measures on livelihoods of vulnerable communities in Lower Shire Valley, Malawi: implications for Adult Literacy Education

Author: Stella Mzumara (Mphil/PhD in Environmental Education; University of Botswana, P.O. Box 00705, Gaborone, Botswana. email: stellamzumara@yahoo.co.uk)

Abstract

In the 21st century, the threat of increased warming and unpredictable precipitation patterns due to global climate change presents the most serious environmental threat to the livelihoods of farming communities in sub-Saharan Africa and achievement of Sustainable Development goals. Whilst most farming communities have devised coping strategies for adapting to varying climatic conditions, based on their indigenous knowledge, their adaptive capacity will be overwhelmed by the projected scale and magnitude of global climate change. Unfortunately, the most vulnerable resource-poor communities in Africa are the least informed and unaware of anthropogenic climate change (its causes, consequences, and possible solutions). Initially international and national policies prioritized mitigation efforts. But due to residual effects of greenhouse gas (GHGs), there is a growing need in developing countries to enhance adaptation measures taking into consideration gender dimensions and enhancing bottom-up approaches to ensure sustainability of interventions.

The paper presents a research proposal primarily to explore smallholder farmers perceptions, awareness, and knowledge of climate change as prerequisites to adaptation; and to further analyse adaptation measures in the natural resource management sector using the multinomial logit model with the goal of promoting environmental sustainability and achieving developmental objectives. A mixed method approach will be used. Socio-economic and demographic data will be collected using a structured questionnaire and analysed by quantitative methods. Qualitative data collection methods such as content analysis, Focus Group Discussions, interviews with key informants will be used to obtain information about the people's perceptions on climate change and adaptation strategies employed. The Climate Risk Screening Tool – Adaptation and Livelihood (CRiSTAL) will be used to collect data on climate impacts, livelihoods, and adaptation activities of local communities in Chikhwawa District, Malawi. The study will be underpinned on Behavioural change models, the Sustainable Livelihoods Approach and Social Learning theories. The study

will therefore identify knowledge gaps about climate change adaptation and mitigation strategies that could enhance the environmental component in the Adult Literacy programmes in Malawi.

Title: Promoting Quality Education, Transformation Learning and Training Environments, Literacy and Numeracy in ESD/EE

Okorie Uka Okoro; RCE Lagos; Nigeria

Abstract

The lead concept in this theme is quality education which is applied to transformation learning, focusing on literacy and numeracy skills. The application environment is the ESD/EE in any society. We may contrast poor quality education from quality education to let the desired one stand out clearer. Education prepares youths for adult working phase of life having built each recipient up with those basic desired skills on which adult life could stand meaningfully on. Of course communication and numeracy are key to any skills of life. The twin components are often involved nearly in every operation in life.

From cradle, the first significant measurement of achievement is the West African Senior Secondary School Examination done after the first twelve years of formal schooling in Nigeria. Poor quality education at this stage fails to let the youth acquire credits in pre-determined disciplines for the tertiary education. Other attributes to poor quality education include: high dropout rate; high failure rate; poor requisite skills for working and adult life and the like. Ezesobor's study estimates a failure rate of 60% in the said examination for over 50 years now. The failure rate includes an alarming number that scored from zero to ten percent, totals of all papers put together. A significant number of these figures boost the rising youth crime rate swirling around sexual crimes, human trafficking, thuggery and the most recent rash and nerve – raking terrorism. These negative activities infringe on the constitutional right of the individual and nation whose life and property are not secured.

Of course quality education is the bedrock of all the development of manpower and rich economy the nation requires. It is common knowledge that learning environments that have integrated innovation and technology into learning task delivery have achieved greater and quality output from formal education. The aggregate effect grows each year from each cohort engaged. Sooner, a transformational effect a nation's lifestyle is visible. Technology has been applied to make learning sustainable in every learning situation.

Title: Teaching sustainable development in geography

David Manyatsi

Abstract

The study seeks to investigate the teaching of sustainable development in geography lessons in Swaziland senior secondary schools. Sustainable development is not specifically mentioned in the Geography syllabus, but the expectations are that such issues should be addressed since Geography is amenable to sustainable development. This is in line with the UN Decade of Education for Sustainable Development which comes to a close at the end of this year. The Swaziland Government is also aware of the necessity to address sustainable development issues in all the subjects taught at school.

The researcher is carrying out a study to determine the extent to which teachers teach sustainable development issues in their Geography lessons, how the issues are addressed and why they are addressed the way they are addressed. A video-taped observation of three geography lessons from three schools was

made and the recordings reviewed. On analysis of the lessons it was revealed that the teachers mentioned sustainable development issues sporadically rather than consciously. This could be interpreted to be a fertile ground for the mainstreaming of sustainable development issues without necessarily having a stand-alone curriculum on sustainable development. It was also revealed that teachers teach for examinations rather than for knowledge and life-long learning.

On the basis of the findings some recommendations are made, among which are the need for the Geography syllabus to specifically request teachers to infuse sustainable development in their lessons, teachers should avoid teaching for examinations, teacher training institutions should prepare teachers to mainstream sustainable development in their lessons as well as subject inspectors work shopping teachers to be in a position to infuse sustainable development in their lessons.

Title: The Namibia e-waste landscape: A snapshot

Hylton J Villet, Ph.D. ; Tom Hongwere; Paul Rowney

Abstract

Waste from Electronic and Electrical Equipment (WEEE), generally referred to as e-waste, could become the fastest growing component of solid waste, in Namibia in the future. E-waste refers to any unwanted, unneeded, or obsolete electrical or electronic device/equipment (UNEP 2010).

With the continued potential increase in e-waste, there is an absence of associated regulatory framework/s on how Namibia plans to deal with the ever increasing, envisaged e-waste.

A recent survey conducted with 200 household consumers in Windhoek highlights the fact that individual consumers of EEE have differing ways of what constitute e-waste and ways of storing, dismantling and disposing of e-waste. Interestingly, those surveyed have limited understanding of the hazardous nature of WEEE and the harmful impacts on nature and human health is the store, dismantling and disposing of e-waste inappropriately.

The preliminary results highlight the importance of aggressive sensitization of consumers on e-waste. Questions that can be posed relates to marketing and promotion through general promotional material but more importantly, the presence/absence of components of e-waste in the general school curriculum. While this survey was conducted in Windhoek, it also poses questions on how e-waste is handled in areas that fall outside the ambit of Local Authority jurisdiction and even if variance exists in how different local authorities handle e-waste.

Title: Perception of *Keeping the University of Zambia Clean Initiative* among Students at the University of Zambia

Manoah Muchanga; manaoahmuchangaa@yahoo.co.uk

Abstract

Although the 'Keep University of Zambia Clean' Initiative was launched about two years ago, most of the students do not know a lot about it and, some are completely unaware of it. Such ESD oriented initiatives are apt to fail without interactive dialogic engagement with stakeholders such as students, lecturers, support staff, campus traders and surrounding communities. By the time this research was proposed, students' awareness of the 'Keep University of Zambia Clean' Initiative was uncertain. It was also not clear why most if

not all students were not participating in keeping the campus clean. Interpretivism, social constructivist theory and case study design were used. A total number of 80 students were sampled ranging from first to fourth year level of study at the University of Zambia. Non-probability sampling design and, particularly purposive sampling was used to select the sample. During data collection, the study employed semi-structured interview guide. From the data collected, it was found out that 61 per cent of sampled students were unaware of the 'Keep University of Zambia' Initiative. It was further noted that the University Management had not sensitized the whole University populace about the purpose of the campaign. The majority of students (70%) viewed the campaign as simply a programme for the school of education and Environmental Education students. It was therefore, recommended for the management to initiate awareness and sensitization campaign about the Initiative.

Title: Addressing Environmental Challenges with Disaster Preparedness and Environmental Education Practices – The Case of Zimbabwe's Tokwe Mukosi Disaster

Luke Chinanzvavana (chinanzva@cooltoad.com); Morgan Zintec College, Box 1700, Harare. Zimbabwe

Abstract

Disasters events have become issues of concern to governments, communities, local authorities and individuals. Efforts to improve the quality of life of many marginalised and vulnerable communities have been derailed. Spending on disaster response has been increasing. Disaster experts are calling for large expenditure on disaster preparedness and implementation of environmental education in an attempt to reduce the impact of the catastrophes experienced.

Did (2011) observe that disasters are the greatest challenge to development? When they strike, they claim lives, destroy livelihoods, property and infrastructure causing disruption on a national scale and sometimes affecting the international arena.

Disaster preparedness and environmental education are critical elements for sustainable development in many marginalised and vulnerable communities. Disaster events have been soaring recently because of climate change and human development. The impacts of disaster devastation can be lessened if government and its development partners embrace disaster preparedness and environmental education.

The Hyogo Framework for Action (HFA) 2005-2015 urges governments and development agencies to champion disaster preparedness and environmental education to prevent damaging outcomes in future. Disaster risk management embraced if sustainable development is to be realised. Furthermore, UNESCO has singled out disaster preparedness as a core issue to be addressed under the Decade for Education for Sustainable Development (DESD) to reduce loss of life and destruction to the environment.

This research focuses on the Tokwe Mukosi disaster that devastated parts of Masvingo province of Zimbabwe in February 2014.

The area, disaster event, situation, disaster preparedness activities and the contribution of environmental education to disaster risk management will be critically examined using the Tokwe Mukosi disaster as a case study. The flood victims were taken to Chingwizi Transit Camp where many organisations mobilised an assortment of goods and services.

The study is an outcome of analysis of documents, reports, maps and pictures of the disaster. Daily news bulletins were analysed too. Brief interviews were undertaken with Civil Protection Unit (government arm) which is tasked with disaster risk management countrywide.

Title: The case of Nyanga, Guruve and Zvimba districts of Zimbabwe

Diego Matsvange, Munyaradzi Kaundikiza and Ruvimbo Teclar Sagonda

Abstract

Environmental education is vital to ensuring sustainable community based natural resources management. Rural communities have an education system that appear very simple but may not be as simple as generally purported. This paper presents a study carried out to assess the impact of environmental education on the Big Lottery Fund project being implemented by Progressio UK and Environment Africa in Guruve, Zvimba and Nyanga districts of Zimbabwe. The main purpose of the project is to reduce poverty and food insecurity by strengthening the livelihoods of 30,000 disadvantaged people in Zimbabwe through the use and management of natural resources. The study was carried out in October 2013 and was measured against similar studies conducted during the same period in 2011 and 2012. The RICA approach being complemented by Environmental Education Strategies Framework was conducted in 3 wards in each of the 3 districts, in three successive years since project inception. Analysis of change was based on two major outcomes namely the Income and Food Security and Forest Benefits which also constitute the tools used during the research. A total of 214 interviews from systematically selected respondents. A semi structured questionnaire was used to guide 9 focus group discussions comprising with 115 participants in total. The survey revealed that communities derive economic benefits from forests. There has been high rate of deforestation (firewood for domestic and tobacco curing), veldt fires and stream bank cultivation. Secondly, nutrition gardens were identified as alternative livelihoods option that increases income and food security. Thirdly, the FFS approach and EAGs ensured increased participation of communities in management, conservation and utilisation of natural resources.

Title: Analysis of Climate change adaptation measures on livelihoods of vulnerable communities in Lower Shire Valley, Malawi: implications for Adult Literacy Education

Stella Mzumara (Mphil/PhD in Environmental Education; University of Botswana, P.O. Box 00705, Gaborone, Botswana. email: stellamzumara@yahoo.co.uk)

Abstract

In the 21st century, the threat of increased warming and unpredictable precipitation patterns due to global climate change presents the most serious environmental threat to the livelihoods of farming communities in sub-Saharan Africa and achievement of Sustainable Development goals. Whilst most farming communities have devised coping strategies for adapting to varying climatic conditions, based on their indigenous knowledge, their adaptive capacity will be overwhelmed by the projected scale and magnitude of global climate change. Unfortunately, the most vulnerable resource-poor communities in Africa are the least informed and unaware of anthropogenic climate change (its causes, consequences, and possible solutions). Initially international and national policies prioritized mitigation efforts. But due to residual effects of greenhouse gas (GHGs), there is a growing need in developing countries to enhance adaptation measures taking into consideration gender dimensions and enhancing bottom-up approaches to ensure sustainability of interventions.

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Title: Implication to Transformation Social Learning in and Around Collaborative Governance Practices - Case of REDD Project at Pugu and Kazimzumbwi Forest Reserves in Tanzania.

Victoria Ferdinand vickywcst@gmail.com

Abstract

The Forestry community at Pugu and Kazimzumbwi Forest Reserves (PKFRs) in southeast Tanzania has had history of changes in Participatory approaches of forest management practices over the past fifteen years. Social Learning is apparently pre-supposed to play around within changes in forest practice, manifesting on change in perspectives and transformation of practices. Participatory Forest Management (PFM) was introduced at PKFRs community in 1980s and recently a pilot project for Reduction of Emissions from Deforestation and forest Degradation (REDD) was introduced from 2011. REDD at PKFRs community had articulated Adaptive collaborative approaches to improve local forest practices by engaging multi-stakeholder collaboration in learning by doing.

The influence of REDD project mechanisms on learning at PKFRs community was investigated using qualitative case study methodology to identify the learning, enabling and constraining mechanisms and comment on potential opportunities and gaps. Systemic exploration, intervention and explanation of local people's experiences through direct interactions, archival records and observations of events was conducted from 2012 to 2014. Conceptual mapping of Transformative Social learning was modeled to produce five cluster indicators of learning; *local engagement, change in understanding, tension, motivation/empowerment and subtle shifts in practice*. The research was under-laboured by realist ontology while employing Realist Social Theory and Social Practice Theory for systemic approaching of emergent properties of learning from various discourses of the forest practice in the world of the real.

This paper presents some early findings to be deepened and extended within a PhD study. REDD mechanism influenced social learning at PKFRs when people formed, understood and used interactive relations to shared local interests, learnt about carbon market potentials and anticipated better future. People had also engaged in critical reflections on past experience, validate the past against REDD, comment on institutional structure, information flow and collaborative forums. Tensions and contradictions on REDD was influenced

by both necessity and contingent from REDD mechanisms. Most learning journeys did not elaborate to transformations partly due to unfocused facilitation and enabling mechanisms.

Keywords: forest management practice, REDD mechanisms, practices, learning

Title: Introducing renewable energy in the secondary school curriculum: Experiences from a South African programme

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Stellenbosch University

Abstract

Climate change and renewable energy have recently become part of the school curriculum in South Africa, which implies that most educators at the secondary school level have to teach topics with which they are not (necessarily) familiar. The Centre for Renewable and Sustainable Energy Studies at Stellenbosch University has established a school programme - as part of the mandate from the national government - to provide materials to aid the educators in the teaching of renewable energy topics. A research-based set of Learner Teacher Support Material (LTSM) was developed for high school educators. The educational material includes a DVD, PowerPoints, posters and a teacher's manual. The material is available in both English and Afrikaans. This paper provides an overview of the programme with specific focus on the feedback received from the questionnaires and reflects on the success and challenges on the programme. It is concluded that after the workshops teachers are not only better equipped with an understanding of renewable energy but they are also supported with a resource which facilitates an easier presenting of the topic.

LAND RECLAMATION

mosa lebogang modise , mosamodise@yahoo.com, mosalmodise@gmail.com, St Gabriel's primary school, Botswana

The project is carried out at St Gabriel's primary school. The land is muddy, sloppy and on above land where there are more stones. The problem results during rainy seasons whereby the water from uphill flows to the school and as a result taking/ washing away top soil and leaving gullies and washing away top soil. This problem hinders the school to achieve the green environment.

PROJECT IMPLEMENTATION

As a way of dealing with the matter, the school through the environmental education committee decided to undertake the project to try and make the situation calm. Firstly there was the use of stones to top water from running and washing away top soil in the gullies formed. We also used bricks as bridges for the area where human movement was high. Secondly we started now to make rockeries in areas where water was flowing mostly and in those rockeries we planted trees because firstly there was no where we could plant trees because of the problem.

We also made an attempt of channeling water to the garden where we would use it to water ornamental plants planted at the garden where the same water passes when flowing out. The problem persisted and we ended up sourcing funds from the area local council where we secured funds and help through the local programme for empowering people which is called Ipelegeng. The school was accessed and there were pavements done in the school and path for human movement. There area was now free to be planted and be green and the problem of soil erosion was solved.

With this presentation, I want members of EEASA and participants to help with ideas and also to come up with possible measures that can be taken to deal with the situation. It can also benefit other participant who has the same problem at their work stations to deal with the situation.

Title: Developing Critical and Creative Thinking through Visible Thinking Model Using ePortfolio and Social Networking for Fostering ESD

*By Teofilus Shiimi (Lecturer) and Maurice Nkusi (Head: Instructional Technology), Polytechnic of Namibia;
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Abstract

One of the main goals of education, at any level, is to help students develop their general thinking skills, including in particular their critical thinking skills. The reflective cycle approach in education is a vehicle utilised to build the critical and reflective thinking skills where it also capacitates students to develop inquiry-based skills and capabilities to apprehend the cognitive processes that they are going through during their lifelong learning journey. The fact is that in many instances, students are being exposed mainly on low order of thinking due to the teaching and assessment methodologies applied in the classroom or beyond. In this study, we will emphasise on the benefits of “visible thinking” model combined to the use of technologies, such as ePortfolio and social networking to support students developing their understanding, analytical skills and conceptualisation of solutions to global issues, such as climate change, global warming, unemployment and in general issues related to social, environment and economic dynamics (ESD) at local, regional and international levels. We will stress on the cognitive aspects of learning linked on the assessment of different knowledge dimensions and how the resulting factors is supporting the development of positive behavior, attitude and responsibilities (affective domain of learning) while developing critical and creative thinking.

Keywords: visible thinking, social networking, ePortfolio, reflective cycle, ESD

Title: Use of eLearning and mLearning in an offline environment to enhance the accessibility of quality EE-ESD learning materials and their integration across the school curricula.

By Maurice Nkusi (Head: Instructional Technology), Polytechnic of Namibia – mnkusi@polytechnic.edu.na

Abstract

The National Institute for Educational Development (NIED) developed quality environmental education materials through the SEEN and EnviroTeach projects; both donor funded projects. These resource materials were printed and made available to some schools in Namibia. The printing and distribution processes were hampered by the high costs they generated and as a result a considerable number of schools did not get these resources as expected; the return on investment (ROI) was not achieved. Even some schools that received these books do not have them anymore due to many factors. To address this situation, I developed a change project during my participation in the International Training Programme (ITP) course funded by SIDA and implemented by the SADC REEP and WESSA where available EE-ESD resources, including opportunities to integrate them across the school curricula in Namibia were made freely accessible through a web portal. Even though this model was good, it did not accommodate the circumstances of the majority of schools in the rural areas, even the urban areas where Internet is still unavailable or unreliable; this means these

resources are still not accessible in many schools. In this paper, I present a model to address the above mentioned pitfalls where quality learning materials are accessed and managed by sustainable cutting-edge technologies. I also discuss the usage of this model to implement the ICT integration across the school curricula, such as in Mathematics, English, Science subjects and especially how such model can enhance literacy among young children and young adults. This model is also designed to be implemented in areas where there is no electricity.

Keywords: ICT integration, EE-ESD materials, web-portal, eLearning, mLearning, hotspot, quality education

Title: Creating and identifying incentive for landowners in the Northern Central Namibia: Economic opportunities for soil carbon through PES.

Simon T. ANGOMBE (University of Namibia), Martha Talamondjila NAANDA (University of Basel)

Abstract

Studies in Africa suggest that improving Soil Organic Carbon (SOC) on cropland soils increases yields, but also offers the opportunity of earning carbon credits. Further potential for earning carbon credits and generating Payments for Environmental Services (PES) lies in an integrated approach to landscape carbon management, including shrub land and pasture used for grazing and timber supply. These studies indicate that funds raised from PES could be used to foster the development of small-scale farming in northern Namibia. However, the limited information on soil quality and the rationale for particular soil management and land use practices applied by small-scale farmers in Namibia prohibits a conclusive assessment of the potential of Payment for PES as a source of income or funding opportunity for development initiatives in Northern Central Regions of Namibia. Therefore, the aim of this study is the identification of potential intervention mechanisms to improve the livelihood of small scale-farmers and reducing land degradation with the support of PES in the communal regions of northern Namibia. Four settlements were selected for the field work based on their distance to the urbanized road corridor between Oshakati. The results confirm the potential to increase productivity on land used by small-scale farmers as well as the opportunity to develop landscape carbon stocks. However, limits to earning PES might be the lack of a market, and thus incentive for the farmers, to shift from subsistence to commercial farming.

Title: Role of Education Standards Officers in ESD/EE – Practical Experience of Eastern Province of Zambia

Presenter: Florence Mwindula Chikalekale – ZANEEP member; Position: Principal Education Standards Officer – Ministry of Education, Science, Vocational Training and Early Education, Eastern Province

Abstract

Quality education is usually associated with provision of material items such as text books, reading materials, desks as well as human resource like teachers. However, the Education Department in Eastern Province, in Zambia, is implementing activities aimed at providing an enabling environment in schools so as to reduce absenteeism as well as prolonging the time children stay in schools. With support from the USAID project Schools Promoting Learning Achievement through Sanitation and Hygiene (SPLASH), the province is providing Water and Sanitation (WASH) facilities and Hygiene Education in some districts in the Province. These activities will only be sustainable with the support of local initiatives.

This paper discusses how the Education Department in Eastern Province is trying create sustainable means of implementing and rolling out these good practices started by Cooperating Partners to all districts and schools. The Standards Department has developed an integrated monitoring instrument which is now used to collect information as well as used to advise schools on how to transform their learning environments in a sustainable way.

Transformation of learning environment involves taking care of both inside and surrounding areas as well as ensuring provision of better WASH and Menstrual Hygiene Management (MHM) facilities. Lack of appropriate facilities has for a long time contributed greatly to learners' absenteeism especially for bigger girls. This initiative aims at creating sustainability of good practices, thereby contributing to increased literacy levels especially among the girls which have been quite low.

Title: The promise of Green Economy for Educationally Marginalised Youth in South Africa

Gumede, Sibusisiwe Mumsie, PhD Candidate – Environmental Learning Research Centre; Department of Education - Rhodes University, RSA

Abstract

This conceptual paper seeks to explore a landscape of the role of education in skills development within the South African green economy to open access to employment. The layered exploration lenses include youth with weak education; education frameworks for lower skills levels; a deeper understanding of the green economy, globally and locally; a predominantly secondary economy that involves a greater degree of self-employment; and access. These are pulled together through a framework that mirrors the Green Economy as the labour demand side and skills development as the labour supply side.

The ontological grounding of the mirror framework is supported by a Pierre Bourdieuan stance on the symbolic, cultural, and social capital that determines the ability of the youth to access the green economy field. It also borrows on the Antonio Gramsci's purport of hegemony as the paper seeks to see firstly how the conventional view on skills development for known economic needs hampers these educationally marginalised youths' potential and secondly what binds them in their current state outside the green economy.

Intertwined in this exploration are the implications on education in the South African context: this includes the educational policies, curricula, and institutions that implement the policy.