Transdisciplinary Doctoral Programme in Sustainability Studies

Stellenbosch University

South Africa

http://www.tsama.org.za/

TsamaHUB advertised the Transdisciplinary Doctoral Programme in Sustainability in the press on the weekend of 29/30 August 2009.

Global Sustainability Challenge

This new Doctoral Programme is offered by Stellenbosch University, South Africa in partnership with its strategic partners the Council for Scientific and Industrial Research (CSIR), Human Sciences Research Council (HSRC) and Sustainability Institute (SI). This transdisciplinary PhD Programme has emerged in response to the global challenge of sustainability and the need for knowledge of complex inter-related social-ecological systems. In order to understand and be able to respond to such a challenge, we need new ways of knowing and producing knowledge that will make it possible to develop an integrated understanding of such systems. Complex global sustainability challenges relating, for example, to poverty, energy, water, waste, food security, biodiversity, urbanization, conflict, gender, values and identity cannot be understood and addressed using mono-disciplinary approaches. Sustainability is a transdisciplinary challenge. Engaging with this challenge, the Doctoral Programme provides participants with a unique experience of learning *beyond* disciplinary boundaries.

Core Modules

The PhD programme begins with course during January and February 2010, covering the following areas: sustainable development and sustainability; transdisciplinary theory;

complexity theory; transdisciplinary methodology; and research paradigms and strategies. These modules, presented by local and international experts in these fields, are not credit-bearing. The dissertation is the only credit-bearing component of the programme. For the duration of the Doctoral Programme students will be required to attend and actively participate in a regular postgraduate seminar series, to present and discuss their work-in-progress with fellow students and their supervisors as well as for furthering dialogue on relevant sustainability issues and problems.

Supervision

Doctoral students will have access to a Panel of Supervisors drawn from all the participating faculties / departments. This Panel is a supervisory and advisory forum, established to oversee the transdisciplinary co-supervision of all PhD students. Each student will be registered in a particular faculty and will be allocated to a main supervisor plus probably two (but not more than three) co-supervisors from other relevant faculties – depending on the cross-cutting nature of the research topic under discussion. Co-supervisors might also be sourced, for example, from the CSIR and HSRC or, where applicable, from our international partners. Together with the regular PhD seminars the co-supervision of individual students by multi-disciplinary teams of experts form the backbone of the Doctoral Programme.

Africa's Sustainability Challenges

Africa's sustainability challenges is a major focus of this Doctoral Programme. In the light of the extreme poverty prevailing in sub-Saharan Africa, the region is unlikely to reach the target set in the Millennium Development Goals (MDGs) of halving poverty by the end of 2015. The level of vulnerability of its inhabitants to food insecurity has increased, due to the degradation of the natural environment climate change poses a serious medium- and long-term threat to ecosystems in southern Africa. Increases in temperature will lead, not only to the greater frequency of extreme events, but also to the depletion of the region's biodiversity and the shrinkage of its already scarce water resources. South Africa experiences many of the problems that beset the sub-region and sub-Saharan Africa as a whole. Such problems are exacerbated by the very large number of people living with HIV and AIDS in the region.

Contested Issues and Processes

The complex social-ecological systems problems responsible for Africa's sustainability challenges behave in a non-linear and unpredictable manner, which can affect a diverse range of stakeholders and interest groups in different ways. Therefore, addressing sustainability problems is normally a highly contested process. In this context, the PhD Programme encourages pariticpatory multi-stakeholder research that is aimed at gaining an integrated understanding of both the material and non-material determinants underlying Africa's sustainability challenges.

Application

To find out more about this exciting new Doctoral Programme and how to apply for it, prospective students are encouraged to familiriase themselves with the relevant information pages on this website and email their (a) expression of interest, (b) research history and (c) bibliography of readings in sustainabiility, transdisciplinarity and complexity to the Programme Manager John van Breda

John.vanBreda@spl.sun.ac.za

Specific doctoral research projects :

Josephine Musango

Research Project

Josephine K Musango PhD study is on **technology assessment of renewable energy sustainability in South Africa**. Development of new and more sustainable energy technologies to address the issues of climate change, energy security and sustainability in general makes energy technology assessment an essential process. Energy technology assessment for sustainability however is inherently a complex and dynamic process that involve multiple stakeholders. In addition, energy technology assessment is "problem oriented" as it attempts to provide solutions outside science and provides advice mainly to policy/decision makers, academic community and general members of society. Energy technology assessment for sustainability thus requires a holistic and transdisciplinary approach. In the South Africa context, specifically, there is no formal and coherent approach to energy technology assessment from a sustainability perspective. Although the South African governance system is developing national measures of sustainability, serious application of sustainability based criteria is not common in technology assessment or other decision making on important energy technology developments.

Josephine's PhD focuses on developing an integrated framework for assessing sustainable renewable technology development in South Africa. Dynamic systems approach, specifically system dynamics modelling is the proposed methodology for the integrated framework. A case study to assess biodiesel technology development for sustainability in the Eastern Cape Province of South Africa is used to demonstrate such an integrated framework. This is combined with a consultative transdisciplinary approach where the key stakeholders are consulted to respond to certain aspects of the system dynamics model development.

Josephine's PhD work is funded by Council for Scientific and Industrial Research (www.csir.co.za) and is part of a bigger project on Bioenergy Systems Sustainability Analysis and Modelling (BIOSSAM – www.biossam.org).

Nadia Sitas

Research Project

My research is motivated by emerging discussions amongst conservation practitioners and peers about the current 'disconnect' between humans and the environment, and the urgent need to understand how people perceive and to what extent, value the environment. It has been further influenced by evident gaps in the academic literature with regards to stakeholder views of how both individuals and institutions understand and assign value to 'ecosystem services', and whether this concept has had the intended practical impact of promoting the interconnectedness of people and the environment in South Africa.

The ecosystem service concept has been proposed as a conservation approach to bridge the 'disconnect' between humans and the environment, by highlighting the interdependence of human well-being and intact socio-ecological systems. However, 10 years since the concept has become 'mainstream' in conservation planning and assessment, there is little evidence of a decrease in environmental degradation. Accordingly, one must ask whether and to what extent interventions based on the concept of 'ecosystem services' provide effective means for reconnecting people, decision-makers and institutions with their environment.

In light of this, my research seeks to investigate the validity of the following assumptions:

1. The 'ecosystem service' concept is not consistently defined by various stakeholders due to its locally situated and context-based epistemic nature (i.e. it means different things for different people).
2. The extent to which humans and the environment are predominantly viewed by people as 'apart' impacts on how humans relate to the environment (e.g. exploitative or considerate).
3. Understanding people's value orientations (attitudes and/or perceptions) towards what they define as 'ecosystem services' is necessary for the design of interventions and drafting of policies that would be effective in protecting the environment.

Charon Marais

Research Project

My study is concerned with **stakeholder responsibility in corporate governance for sustainability in Stellenbosch (Western Cape, South Africa).** Stellenbosch is a sought after international brand to the global players it hosts in the business, agriculture and academic fraternity. This mutual beneficial partnership testifies of a cultivated relationship over decades in some cases, and still pursued, enjoyed and favoured by existing and new entry high profile companies locally and internationally. Stellenbosch is also a town where the divide in the community between the very rich and the very poor is one of the highest in the world (as reflected by the Gini Co-efficient). Housing, food security, the demand and threats on available resources (land, water), health care, economy and employment, capacity building and infrastructure and services is a red flag concern, particularly for the poor. This resonates with the increasing worldwide alarm about the adverse impact of globalisation, the protection of the global markets in expense of sustainability and the unequal distribution of power that is reinforcing the growing gap between rich and poor globally. How do we respond to that?

My project will engage in an exploratory discourse with the corporate executive committees and top level decision makers, and policy makers and community leaders, to gain a deep understanding of the concepts sustainability and responsibility in economy, society and corporate governance in Stellenbosch. I propose to investigate moral interpretation (social) and strategic relevance (economy) of business responsibility and ethics. Ethical philosophy is explored from the theological tradition, and provides a familiar context to deliberate the vision of what a good society, action and people, is. It provides a means to reflect on the meaning of responsibility, its implications for vision, values and actions, to contribute to a better quality of life in its individual and public dimensions. The role executive management and decision makers play in their individual, institutional and strategic agency capacities, and their impact on the various role-players in the economic and public life, is an important interpretation. Sustainability is explored in light of challenges, opportunities and development for economic growth against the various global trends, national historical and local prevailing challenges in Stellenbosch.

The complex nature of the research project employs a mixed-method case study approach as the most suitable to understand the complex interconnections of the socio-economic system against a theological-ethical background. The use of theory and complimentary qualitative, participatory methodologies (PAR) will assist to transcend the disciplinary boundaries, so as to access knowledge that leads to a more holistic understanding of the problem. The meaning of responsibility and sustainability is a critical understanding, to find a thick description or definition (against the realm of economy and theology) as to how corporate governance might more strategically contribute. The concept of the "responsible society" is proposed as a framework to search for new solutions, and as criterion by which to judge all existing systems. My research aims towards a framework for assessing and applying strategy for sustainability in partnership with the various role-players in Stellenbosch. The national economic development initiatives can benefit from the outcome of this explorative discourse,

which can provide a learning experience benchmark to continue this discourse in a global setting, starting with South Africa and Africa.

Matt Zylstra

Research Project

This research explores meaningful nature experiences and profound wildlife encounters as catalysts for reconnecting humans with nature. Insights from such experiences are being used to refine current approaches to conservation action and experiential learning for sustainability. The research adopts a social learning approach and utilizes a range of interactive social media and marketing tools. 'eyes4earth.org' is the savvy branding being used to reach out and raise awareness in broader society about emerging research insights.

eyes4earth invites the public to share their compelling stories about meaningful nature and wildlife encounters. In doing so, the aim is to create awareness of the profound ways we benefit, interact and participate with nature. It is about (re)discovering how we can reconnect with the 'wholeness' of nature. It is learning how a felt understanding of Human-Nature interconnectedness may awaken and change consciousness. And it dares to ask how this knowledge may shape approaches to conservation and education.

On the ground (i.e. across the Baviaanskloof Mega-Reserve, South Africa), this action research is being used as a vehicle in providing opportunity for people (primarily less-privileged youth) the chance to get in touch with nature and wilderness. Insights from these excursions are helping to improve future conservation education programs in the area. The issue of non-native invasive species is central to this research. We look at how one's nature experience is affected by their pervading presence, how we can educate in a culturally sensitive manner and how we can manage using a 'wholeness' approach.

Ultimately, the *eyes4earth* initiative is using solution-oriented scientific research to enhance our collective understanding of what the profound experience of nature really means to us… on a practical level.

Sydney Mavengahama

Research Project

The goal of this study is to contribute to the alleviation of household food insecurity through the domestication, promotion and integration of indigenous vegetable species as part of the main diet so as to reduce hunger and micronutrient deficiencies. Indigenous vegetables are plant species that occur naturally in farming lands and also in the wild. They have traditionally been gathered and prepared as relish, but have not been fully domesticated.

Several studies conducted on indigenous vegetables have indicated that they generally have higher levels of various micronutrients than the conventionally cultivated species. Micronutrient malnutrition affects a considerable proportion of the world population, particularly in developing countries. In 2000, the World Health Report identified iron, vitamin A, zinc and iodine deficiencies as the most serious health constraints worldwide. Besides the nutritional benefits these plant species are adapted to the environments in which they grow, are hardy and tolerant of adverse climatic conditions (droughts or floods), grow well even in soils of low fertility. Their domestication will result in increased dietary diversity and better nutrition, as well as increased agro-biodiversity. Increased agro-biodiversity has been shown to support food security as well as buffering against unfavourable environmental conditions, pests and diseases. Although these vegetables are an important food source, they are not being widely cultivated. Their utilisation is based on harvesting without cultivation, that is, exploitation. This causes a decline in their natural populations as has already been reported for some. This decline is also due to weeding and chemical elimination as they are considered as weeds. This is especially true in Southern Africa where agricultural education in both commercial and communal areas was aimed at cash crop production and promoted monoculture, which emphasized the eradication of any other plant species in the field as they were regarded as weeds. This same attitude towards indigenous vegetables still prevails among farming communities, researchers and extension workers who still advise farmers to eradicate them from their fields. The utilisation is also unsustainable in that the benefiting people have no control over availability as they do not cultivate these vegetables, thus, availability is unpredictable and variable.

Robert Munthali

Research Project

My research proposal—titled **"A Comparative Analysis for Smallholder Farming: A Study on Rural Household Food Security and Agroecosystems"**— is aimed at investigating the effects of smallholder farming practices on; biodiversity, ecosystems functions and other natural resources, and subsequent impact on rural household food security. Among others the research outcome is to devise an Adaptive and Integrated Farming System aimed at building resilience in the Social Ecological Systems. The purpose of my research is to study and analyse the different farming systems such as traditional and near-organic farming and how these could be transformed and enhanced. It is envisaged that by adopting an Adaptive andIntegrated Farming System existing farming problems—facing smallholder farming in terms of food insecurity and environmental degradation—could be

significantly reduced. Although my study areas will be located in Zambia and South Africa, I hope that the outcomes will be applicable to other smallholder farmers in the region.

At present I hold a Masters in Sustainable Agriculture and Rural Development from the University of The Free State, a Postgraduate Diploma in Agricultural Development Economics from the University of London, and a Diploma as Technologist for Crop Production from Germany. In addition, I have also completed three modules at Sustainability Institute in Food Security and Globalised Agriculture, Biodiversity and Sustainable Agriculture and Managing Sustainable Agriculture Enterprises.

I have vast working experience in the agricultural sector working for various organisations in middle and senior management levels. I worked for Organic Producers and Processors Association of Zambia as Chief Technical Officer, Audit Control and Expertise as Credit Support Services Manager, Seed Company Zambia Limited as Regional Sales Manager, Tobacco Board of Zambia as Tobacco Inspector, Zambia Seed Company Limited as Technical Seed Manager. Apart from the private sector and NGO I have also worked in the public service as Horticulturist at National Assembly as welll as in the Department of Agriculture as a District Horticultural Officer and Crop Husbandry Officer.

Pieter van Heyningen

Research Project

Pieter's academic interest focuses on the forefront of developing and transforming economic systems toward sustainability. Innovation systems represent modern frameworks for institutional collaboration to advance and stimulate innovation to direct the economy. South Africa has been developing a national system of innovation (SANSI) for more than a decade already, with a general focus on economic growth. However, resource reserves in the country such as water, gas, coal and minerals are fast depleting and contribute to global warming. Planning for South Africa's future requires innovation for sustainability and not only for economic growth. It is expected that countries adopting and developing clean technologies and processes at an earlier stage will become more competitive internationally. South Africa has the ability and potential to 'leapfrog' developed nations through a strategic national or regional focus on implementing, developing and exporting sustainable innovations and technologies.

Pieter's specific PhD project focuses on **the dynamics of innovation systems at the regional level (Western Cape, South Africa)**. He asks pertinent questions about the functioning of these systems and their different network interactions existing on the micro level to the macro level. Often innovation on the micro level occurs informally and therefore creating the spaces for strategic interactions are very important. Pieter, is aiding network partners in the process of developing a "Sustainability Business Network Forum" in Technopark (designed as a Science Park), Stellenbosch. This is also designed as an intervention process to stimulate innovation for sustainability and to help build real (3-helix) networks with university, industry and government involvement. This project will be beneficial to replicate innovation networks

and to inform policy influencing innovation systems. It is also aimed at stimulating innovation for sustainability for the local economy of Stellenbosch and the eventually the Western Cape.

Peter Ocholla

Research Project

My proposed research project is underpinned within the coupled interactions between human and natural resource framework. Human intervention (i.e. construction of dams) in natural ecosystem is mainly to direct the natural flow of energy and matter (i.e., the system's productivity or potential productivity) into forms more readily exploitable by man. The increasing demand for access and use of ecological systems is further complicated particularly with the doubling global human population. In the last decade land under agricultural has increased more than six-fold. There is further evidence that the withdrawal of water from freshwater ecosystems have too increased eight-fold. There have been efforts towards modification of the Natural river systems to meet the increasing human needs, and since then dams have been constructed along the major world rivers to regulate flows; supply water to cities and farms, generation of electric power as well as to control floods.

The construction of dams along the Tana River in Kenya has led to the conversion of natural flow regime into water release schedules that are governed by human needs. This control is aimed at having the potential of managing the impact of floods (downstream) while ensuring the supply of natural flows of Tana River as well as enhancing power generation. There are, however, far reaching physical, ecological and social consequence of this; the most cited has been that river flows below dams have exhibited little resemblance to their natural dichotomy even when more dams are proposed as an end means on human control to further manage and develop the Tana River basin. Besides, the riparian communities and other stakeholders whom have in the past benefited and used the ecological services that come with the natural flows in the lower Tana have potentially suffered the destructive impact of inappropriate development policies in one element of the ecosystem upstream that are closely linked to source of livelihood within the floodplain "downstream". There is so far no evidence in terms of the involvement of the primary users of ecological services from the Tana River, and even efforts to integrate their perceptions and knowledge during the planning, implementation and monitoring of the intervention even when “experts” are aware of that there would be uncertainties as a result of alterations of the physical functioning of the lower Tana River. Furthermore, how far the communities (stakeholders) living downstream are Adapting/adapted, and or developed resilience, and hence sustainable besides consequences as a result of dam constructions as well as other drivers of change within the floodplain area downstream remains a puzzle. I therefore propose to Evaluate the impacts of impoundments on Social-Ecological Systems [SES] in lower Tana River in Kenya”. Using Transdisciplinary Case Study Research (TdCR) I propose to answer some of the following questions: (i) how does the lower Tana River functions in the physical sense following the construction of the dams; (ii) what drivers of change in river functioning have been, and are, at play, additional to the dams; (iii) how does the current functioning of the river differ from the situation that

prevailed prior to the construction of the dams; (iv) how had SES within the floodplain adapted to the physical functioning of the lower Tana River prior to the construction of the dams; (v) how has/is SES within the floodplain adapted/adapting to change in the physical functioning of the lower Tana River following the construction of the dams; (vi) what are the scenarios for adaptation of SES and what interventions can be taken to promote system change towards resilient system states that are desirable in terms of the sustainability objectives that the communities comprising the SES might have?