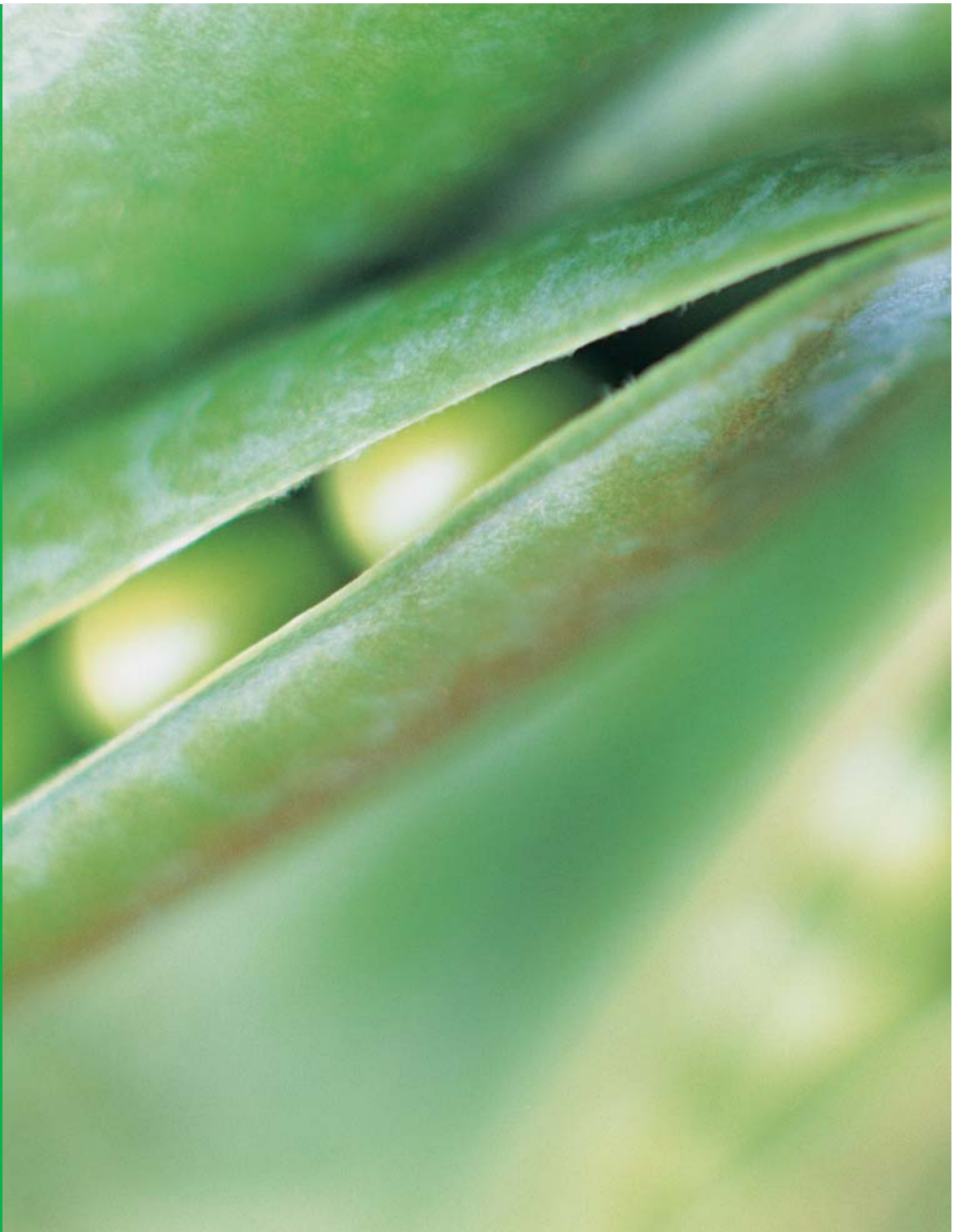


# THE ESTABLISHMENT OF A CENTRE OF EXCELLENCE IN NATURAL RESOURCE MANAGEMENT AT THE UNIVERSITY OF ZAMBIA

BY STEIN W. BIE

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**The Establishment of a Centre of Excellence  
in Natural Resource Management at  
the University of Zambia**

By  
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## **ACRONYMS**

CAADP	Comprehensive Africa Agriculture Development Program
CE	Centre of Excellence
CGIAR	Consultative Group on International Agricultural Research
COMESA	Common Market for Eastern and Southern Africa
EPMR	External Programme and Management Review
FARA	Forum for Agricultural Research in Africa
ICSU	International Council of Scientific Unions
NEPAD	New Partnership for Africa's Development
NRM	Natural Resource Management
SADC	Southern African Development Community
UNZA	University of Zambia

## **EXECUTIVE SUMMARY**

Having one of the strongest schools in soil science and other studies in natural resources management, the School of Agricultural Science at the University of Zambia has a good starting point for being the focal point of a new centre of excellence in natural resources management. The request from NEPAD to create such a centre of excellence can be met by assembling high quality academic staff from UNZA, the region and internationally, combined with a group of PhD students, in a new centre housed by UNZA. Whilst internationally centres of excellence often focus on academic research at the highest level (and judged by international publication criteria) it is suggested that an important task of this centre would be to have the ability to provide the African Union generally and NEPAD specifically with sound scientific guidance on development and research projects.

The total annual costs of establishing and operating such a centre is estimated to be in the order of USD 2,775,000.

## **1. BACKGROUND: AFRICAN CHALLENGES IN FOOD PRODUCTION AND THE MANAGEMENT OF MANAGEMENT OF NATURAL RESOURCES**

The high level of food insecurity and prevalence of child malnutrition and undernutrition on the African continent give rise to serious concerns. The combination of significant sections of the community with insufficient purchasing power to acquire enough healthy food for daily sustenance, and periodic physical shortages of available food caused by insufficient local and regional harvests, creates a bleak food security picture for around 250 million people on the African continent. Many of these factors have their roots in more general political issues: underdevelopment and lack of alternative incomes for rural and urban people, insufficient infrastructure, poor governance and civil strife. A rapidly expanding population has created increased demands for food, but the response of the African farmer, although greatly increasing total production, has been insufficient to stave off increased food insecurity. Yields have remained at the lowest level among world farmers, and much of the increased production has come from bringing new and often more marginal lands into cultivation. Although there have been major improvements in farming methodologies elsewhere, e.g. the so-called Green Revolution in Asia, similar advances have been few and localized in Africa.

The African Union has identified the failure of African agriculture to provide adequately for Africa's people as a major impediment to economic growth and improved human welfare. Whilst previously the development philosophies of many African nations, and of the international development assistance community, centred on creating increased purchasing power through non-agricultural investments, there is today a more general realization among African leaders that agriculture is an

important engine for economic growth and poverty alleviation, not the least for rural people that have the lowest purchasing power and the highest level of food insecurity on the continent.

Food is produced on the land, from soil resources, water resources and biological resources. The management of these natural resources is a key element in any quest for increased food production. The African continent is not generally well endowed in all these resources. In particular, its soils are often strongly weathered and therefore low in plant nutrients, its water resources – both in the form of precipitation, rivers and lakes and underground resources – are spatially unevenly distributed and subject to weather vagrancies, whilst the continent does possess rich biological resources, both indigenous genetic resources and access to the global crop and livestock pool. Good management of land and water resources is a prerequisite for increased production. A recent broad International Assessment of Agricultural Science and Technology for Development (IAASTD, April 2008) has stressed the need for solid underpinning of agricultural development through scientific support, particularly to science aspects that relate to smallholders. Most African food production is by smallholders.

Africa does not have a strong tradition in education and research in natural resources management. The expansion of its educational system in the post-colonial period in general, and in the last two to three decades in particular, have seen investments in other fields than natural resources management in general and its relation to agricultural improvement in particular.

NEPAD, the mechanism constituted by the African Union in support of the agriculture sector, has identified natural resources management (NRM) as a field in need of major improvement if the ambitious aims of 6% annual growth in the agricultural sector can be reached. Unlike many other African countries, Zambia has maintained a strong knowledge base in NRM, and the University of Zambia has a School of Agriculture with significant expertise in soil and water management. In support of its planned activities for improving agricultural production (CAADP), NEPAD has approached UNZA to be a knowledge centre for NEPAD in its CAADP Pillar 1 programme. UNZA has a strong comparative advantage in natural resources education and research, combined with interests from other UNZA schools in natural science and social science aspects of this. UNZA has signalled to NEPAD (October 2007) that with a further strengthening of UNZA capabilities, UNZA, through its School of Agriculture, could create an internationally recognized Centre of Excellence in Natural Resources Management that could also serve as technical support to CAADP Pillar 1 and to NEPAD as a whole. NEPAD has asked UNZA to put forward a concrete proposal.

Parallel to this, there are activities within SADC and COMESA that relate to similar issues, and which may be considered as interested parties for the existence of a CE.

This report outlines the organizational and thematic frameworks for the proposed Centre of Excellence, and how it could serve NEPAD and the African and global science community. It sets the NEPAD request in a greater scientific context to ensure a true centre of excellence at UNZA, able to respond to changing African and international requirements over the next decade, and to act as a catalyst, through

networks, for a general strengthening of African expertise in NRM. It attempts to define a centre of excellence at UNZA in the framework of internationally accepted norms for such centres. Building on existing UNZA expertise it proposes new and inter- and multidisciplinary approaches to NRM, also through the presence of top scientists from the outside, and with capabilities to explore new challenges in NRM (e.g. in climate change, environmental policies) for at least a 10-year period. Institutional innovation and administrative nimbleness are prerequisites for efficient operation of a centre of excellence.

## **2. WHAT IS A CENTRE OF EXCELLENCE?<sup>2</sup>**

The term “Centre of Excellence” has doubtlessly different connotations for different people and in different countries. A centre of excellence (CE) as commonly defined internationally is a time-bound research centre affiliated with a research institution that is responsible for its activities (the “host institution”). The host institution is the formal applicant for funds and responsible for the practical, professional and financial aspects of establishing, operating and subsequently closing the centre. The host institution may collaborate – in the form of a consortium or in a looser context - with other institutions nationally or internationally for the establishment, operation and financing of the centre, but retains the overall responsibility, also for its scientific achievements.

The aim of a CE is to create a setting where research and research training can a) be executed at a high international level, and b) on topics not normally covered by a single unit within the host institution, or nationally or regionally. An important feature of a CE in Africa could be to undertake studies and evaluations that are currently contracted to quality institutions outside the continent.

The CE shall be created around research workers of proven international standing, but in the current African setting with emphasis on the potential for future innovative scientific achievements and insight into local and regional challenges. These talents may weigh more heavily than past formal scientific production<sup>3</sup>. Scientists may have full-time or part-time employment at the CE.

As an integral part of its activities the CE will have a responsibility for training graduate students up to PhD level, selecting students who can be expected to contribute significantly to the high professional standards of the CE. If the CE itself is not accredited for awarding PhDs, it must arrange with an accredited institution (normally the host institution) for awarding the degrees.

The CE being created also to assist NEPAD must be able to attract and keep staff and students from throughout the region and beyond. The host institution must have made arrangements with national authorities to ensure possibilities for employment of staff

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<sup>2</sup> This paragraph draws in part on a paper (in Norwegian) of 31.5.2005 on centres of excellence issued by the Norwegian Research Council (*Senter for fremragende forskning. Krav og retningslinjer*)

<sup>3</sup> E.g. as measured by number of papers published in internationally refereed journals, or citation indices.



from countries within the sub-region/region (and also more widely internationally) and for PhD students also from other countries. The CE should enjoy much freedom to select its own staff and students. As staff coming from outside the institution may be on time-limited contracts, they should – as far as possible – be granted return rights to their original institution for the period of employment at the CE.

The CE will consist of several research groups that are physically co-located in the same building. As an exception, the CE may also include groups that are not co-located but linked by advanced and functional data communication and possibilities for exchange of personnel. These “remote staff/students” shall in all important respects be treated as co-located staff.

The CE shall be headed by a centre director, alone, or supported by a leader group. The director shall be drawn from the group of research staff selected for the CE. He/she shall enjoy much independence in deciding on scientific issues and in the further recruitment of scientific personnel.

The CE shall be served by a board approved by the host institution. The board shall be international in nature, with a high level of integrity. The rules of the CE board shall specify its roles and responsibility, including those of the chair of the CE board.

The CE shall prepare a medium-term programme outlining proposed activities for the CE for the coming 3 to 5-year period. The programme may be rolled-over annually. At least 10% of the research programme shall be “blue sky research” without specific research deliverables.

The financing of the CE shall be through a model that ensures financial independence of the CE during the financing period. The financing can be in cash and/or in kind.

The CE shall report annually on scientific, financial and administrative matters to the host institution, which will make this report, together with any comments the host institution may have, available to the donors. This report shall be available to the donors in a form that as far as possible fulfils the individual requirements of the donors. Donors are discouraged from requesting individual reports except when required by law.

A mid-term evaluation shall take place about 3 years into a 5 year period. The evaluation, which shall be carried out by a highly competent international team, shall cover scientific, financial and administrative achievements during the initial period and prospects for the 5-year period. It will form an important basis for decisions of whether to close down the centre after the 5-year period or to extend it for a further 5 years. Staff implications, and the facilities for PhD students to complete their theses and courses, must be regulated.

### **3. A CENTRE OF EXCELLENCE AT UNZA – THE NEPAD SETTING**

The University of Zambia (UNZA) has been approached by NEPAD (New Partnership for Africa’s Development) to constitute a centre of excellence in the field

of natural resources management at UNZA. This follows a model by which the University of KwaZulu Natal has been invited by NEPAD to establish a CE for Food Security and FARA (Forum for Agricultural Research in Africa) for Agricultural Research. The NEPAD approach to UNZA is founded on Pillar 1 of CAADP (Comprehensive Africa Agriculture Development Program) and is described in a (draft) NEPAD paper of June 2008.<sup>4</sup> The main context of Pillar 1, extracted from this document is attached in Appendix 2. The document itself (about 66 pages) is a detailed analysis of the land and water resources of the African continent, and the potentials for sustainable use of these resources.

UNZA, through its School of Agricultural Science, responded to the NEPAD approach by a proposal dated October 2007 (Appendix 3 contains the Executive Summary of the proposal). This proposal outlined the establishment of a Centre of Excellence in the School of Agricultural Science, based primarily on the professional resources of the UNZA Schools of Agricultural Science, Natural Sciences, and Humanities and Social Sciences. It saw the CE as a congregation of a selection of outstanding UNZA professionals from the three schools, to create a broader and better approach to the teaching of NRM at Bachelor, Master and PhD levels, to conduct more advanced NRM research, and to be available for NRM consultancy services for NEPAD and others, primarily in the sub-region of Eastern and Southern Africa, but also beyond. The proposed CE would draw heavily on the existing staff resources but not substitute for existing schools and departments.

This UNZA concept of a CE is significantly different from the concept of a CE as outlined in Section 2 of this paper. The tasks to be undertaken by the October 2007 CE concept are wider, involving teaching at all levels (thus also much elementary science) of a much larger number of students, somewhat more narrow in the definition of the research portfolio (with a strong emphasis on the technical aspects of land and water management, thus not vastly different from current activities in the School of Agricultural Science in general and its Department of Soil Science in particular), and with a significant emphasis on income-generation through consultancies. It is assumed that existing UNZA staff will primarily be involved. Thus on most important issues, the October 2007 CE concept differs from the more classical interpretation of a CE as outlined in Section 2. However, the NEPAD invitation for a fuller proposal, and the willingness of Norad/Norwegian Embassy, Lusaka, to finance the full proposal, does not preclude an October 2007 interpretation of what a CE should be. But the October 2007 concept is sufficiently close to a general upgrading of the current tasks of the Department of Soil Science at UNZA that it may be difficult to attract donor interest for this approach to the construction of a CE, beyond general support for the university, its schools and departments.

This current proposal therefore builds on the October 2007 UNZA CE proposal to NEPAD in some respects but expands the setting into that of a more classic CE as outlined in Section 2 (above).

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<sup>4</sup> This is a draft for internal NEPAD use only and may be subject to change. It has nevertheless been useful to have an insight into current NEPAD thinking on Sustainable Land and Water Management. More details may emerge from a technical workshop to be held in November 2008 for which UNZA plays a lead role.

The sustainable development of land and water resources in Africa in general, and in Eastern and Southern Africa in particular, is a vast subject, interwoven between many sciences and subject to social, political and economic frameworks beyond the natural sciences. Indeed, it may be argued (as does the NEPAD paper) that it has been the failure of more narrow approaches to specific natural science topics (e.g. soils, hydrology, agronomy) that has led these sciences to have less than optimal impact on practical implementations for sustainable development. This is further exemplified in the difficulties experienced in up-scaling successful pilot projects to community level and beyond.

But Africa has also seen periods of emphasis on advancement and growth through integrated rural development approaches, farming systems approaches, the demonstration approaches of Sasakawa 2000 and FAO programmes, and – more recently – the establishment of a series of Millennium Development Villages. TerrAfrica and AGRA are recent concerted effort to place agriculture as an engine of growth in poverty alleviation in Africa in general and as a contribution to achieving the Millennium Development Goals by Year 2015 (or – realistically – later).

By and large the research communities in Africa, and including the universities (also UNZA), have been focusing on specific sciences, be they natural sciences, social sciences, humaniora, etc., as their prime function and educating new generations of students to equip the countries with cadres of well-trained professionals. In this the universities have followed classical educational and research structures, and they have been most successful in increasing the number of university graduates (certainly at Bachelor level, increasingly at Master level, and with a growing number of successful PhDs) in many African countries. In that sense they have certainly done their job as requested. But it remains a fact that African food security has remained low, as sustainable use of land and water resources has yet to be implemented on a larger scale in African food and fibre production. Unsustainable use flourishes. There has been no single research institution in Africa of sufficient size and standing that has created the critical cross-cutting scientific approaches to sustainable land and water management issues, and carried out the required multi-disciplinary and inter-disciplinary research that can underpin large-scale sustainable development of the primary rural industries.<sup>5</sup>

There have been a limited number of academic institutions outside Africa that have considerable experience in more integrated approaches both in teaching and research, in Europe, North America, India, Australia, Central America and elsewhere, including in the global CGIAR system (Consultative Group on International Agricultural Research). In spite of significant cooperation with African universities and research institutions, they have not so far generated an African apex research institution dealing with sustainable land and water management in support of the African primary rural industries and rural development. There is therefore a strong argument that such an African centre of excellence should exist, with African ownership and African leadership, and thus contribute to the global world of knowledge.

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<sup>5</sup> Primary rural industries, as used here, include agriculture (crops and livestock), forestry and small-scale fishing, and their support facilities. It also includes wildlife and habitat management in the context of eco-tourism and agro-tourism.

UNZA has been asked specifically by NEPAD, and through NEPAD the African Union, to consider this challenge of establishing such a centre of excellence on its campus. UNZA in turn has asked its School of Agricultural Science to develop this programme document as a tool to attract critique from peers Africa-wide on the concept, and ultimately to attract the interest of world-class scientists from Africa and beyond and financial donors to contribute in kind and in cash to the realization of a Centre of Excellence in Natural Resource Management at UNZA in Lusaka, Zambia.

This document suggests UNZA's initial response to this challenge. NEPAD's interest is to have available the highest level expertise in support of implementing CAADP Pillar 1. UNZA's interest is to do so through having a versatile centre to provide knowledge on a broad range of topics associated with natural resources management to meet both predicted and unpredictable simple and complex queries.

#### **4. A CENTRE OF EXCELLENCE AT UNZA – THE INTELLECTUAL FRAMEWORK**

UNZA is a university of good regional standing, covering the classic spread of subjects of a well-established reputable university. Appendix 4 is a brief outline of UNZA and Appendix 5 presents its School of Agricultural Science and Department of Soil Science. From the early 1970s agricultural science in general and soil science in particular have been marginalized in universities worldwide, leading to a significant decline of academic capability to handle rural development issues. UNZA is a clear exception to this trend, having consistently recognized that food production, rural development, poverty alleviation and sustainable use of natural resources constitute most important elements of the development nexus of lesser developed countries. Its determined stand against reduction or elimination of these subjects in its university has recently been vindicated by a growing national and international realization that agriculture and sustainable land use are important engines for economic growth. The NEPAD CAADP document outlines a mood of change in the African Union, the new strategies of The World Bank and important international donors point in the same direction. UNZA is therefore remarkably well placed to make a contribution in this field, both as it has maintained a good scientific standard in its work over the years, and that the provision of such academic resources regionally and internationally is now much more limited than a generation ago.

As noted in Section 1 the classic idea of a CE is that it should

- be unique, covering ground that is not covered by others, not more of the same
- have a specific location to co-locate the varied groups of scientists
- produce world-class science, not only good but exceptionally good
- be recognized by peers as a true centre of excellence
- attract staff and graduate students from among the best available
- have the financial and administrative freedom to excel
- have a time-limited mandate, to ensure clear achievement focus

- be obliged to conduct at least 10% “blue sky research” that may or may not yield genuine new and unpredicted knowledge, also beyond the CE’s mandate

To translate this into the setting of an UNZA, a CE in NRM will give an intellectual framework for the centre.

- **Unique:** NRM contains elements from many sciences in the wider sense, and including strong social science elements (sociology, anthropology, economics, geography, law, possibly medicine, philosophy and theology) to supplement the more classic natural sciences (agriculture, veterinary medicine, geology, physics, climatology, biology, information technology, engineering). Although the UNZA School of Agriculture may be the “Godmother/father”, the CE in NRM must contain or have open access to a wide pool of high-class science. It is not a new department in the School of Agriculture, but an independent institution, with its own leadership, its own board, and in a harmonious relationship with its host institution (UNZA). Scientifically the CE-NRM is a rainbow institution, unlike any other university department, school or existing institute.
- **Location:** the CE has a concentrated physical home, whether on existing premises (e.g. in the School of Agricultural Science) or in a new construction on UNZA’s spacious campus in Lusaka. Good scientists expect a highly conducive physical environment for their work, both seclusion for their own thinking, common areas for fermentation of ideas from colleagues and visitors, and gathering places for brown-bag lunches, workshops and conferences (although larger gatherings may be elsewhere). PhD students shall feel that they are given the best facilities available for graduate studies, with workspace and open access to CE scientists. The physical facilities have the best telecommunication facilities available, to expand the physical location at UNZA to scientists and their institutions elsewhere with elements of a virtual CE, and to create functional networks of collaborating scientists and institutions globally. Good housing facilities must exist, not all world-class scientists are willing to “rough it”. UNZA centrally must give assurances that it will honour such ideals for its NRM CE – UNZA’s recent track record is not without blemishes, with both staff and student unrest.
- **World-class science,** not only good science, must be the ambition of the CE. Staff at the CE must show ability to innovate scientifically, be open for impulses from other sciences. It is not enough to have an impressive list of past publications in internationally refereed journals. Indeed, other recent achievements (patents, awards, hits on web sites, spin-off enterprises, community leadership and contributions) may count as more than classic publication lists and citation indices. It is nevertheless assumed that staff are of high academic standing, and that students accepted for graduate studies appear to have the talents that will ultimately bring them into that category. Staff and students must have an excellent capability for communicating their work to the outside world, particularly to Africa, choosing communication tools that can lead to adoption of research findings. Publishing in internationally refereed journals remains important.
- **Recognition by peers** is the scientific acid test for excellence. Academic tradition puts emphasis on peer review of scientific findings, is the academic quality control mechanism for research work. One piece of poor work or, even

worse, a fake, can ruin the reputation of an institute, and turn a centre of excellence into a mockery. Internal quality control mechanisms are musts to precede external presentations. Whilst publications in recognized journals is the classic way to achieve peer recognition and must be maintained, new internet-based communication tools offer new opportunities. Particular to a CE in NRM at UNZA serving Africa's needs, is the creative thinking of established and new ways to communicate with decision-makers and implementers of land and water management policies in African settings. To the African Union and to NEPAD, the CE in NRM at UNZA must not appear a collection of impractical eggheads lost in their own world of multiple sciences but as genuine innovators and supporters for new and bold development steps. Whilst scientists are not development workers, it serves scientists well to include development workers among the peers.

- **Staff and students of the highest calibre.** A CE should not only have good but outstanding colleagues. The host institution, UNZA, in its staff contributions, must be willing to tempt some of its best people to spend periods at the CE. Carrots may be required. UNZA must not be tempted to shift problem staff into the CE, or suggest staff to CE positions as rewards for other services rendered. Only science counts. The UNZA complement of staff will be significant but not necessarily dominant. It is the challenge of UNZA as the host institution to advertise and select high-calibre candidates from other research establishments Africa-wide, with a further sprinkling of other international staff. Suggestions of candidates with support from donor agencies and sabbatical arrangements must receive the same scrutiny for quality and fit into the CE as would potential employees. There should be no back door, only a science front door. This understood, support from donor agencies for outstanding candidates and *ditto* sabbatical arrangements are most welcome. Candidates for PhD studies should come from near and far, and comply with the notions of having excellent talents for work in line with the CE's mandate. A strong complement of African graduate students is a prerequisite, with a further sprinkling of international candidates. UNZA must not monopolize graduate facilities at the CE. The host institution (UNZA) must negotiate suitable arrangements with the government on immigration, residence and work permits for CE staff and students. In the international world it is particularly important to obtain suitable spouse residence and work permits, as it is unlikely that world-class scientists will be interested in coming without having guarantees of adequate spouse arrangements. In the selection of staff and students equal opportunity principles must apply, also to obtain a good gender balance. If donors offer special incentives to special groups, the "front door principle" of best science applies.
- **Financial and administrative freedom to excel.** The experience of other CEs is that generous and flexible financing and administrative practices greatly facilitate operations. The collection of high-performing African and international scientists in a CE at UNZA will very likely require remuneration and conditions different from the national norm. UNZA must be prepared to make exceptions, and to explore novel arrangements to ensure this. This may include negotiations with NEPAD and/or the African Union, and with friendly international donors, and may have to include elements of retirement benefits and health insurance beyond national Zambian norms or UNZA practices. The host institution (UNZA) remains responsible for financial and administrative matters. It will do well to

have available in its central administration staff who are well briefed on the characteristics of the CE and understanding of its special nature. The CE must have an administration of exceptional standard, eliminating the need for the scientists to spend significant time on administrative matters, and ensuring a smooth and delay-free operation. It is equally important that the CE is subject to the strictest accounting and auditing routines to ensure legal conformity with national and international practices.

- **“Blue sky research”** is a euphemism (often used in the European research context) for the financing of research that may seem promising but has no obvious application in the foreseeable future. The idea of “blue sky research” is to allow for the follow-up of wild ideas, spin-offs from other research work, and trials on something that were not originally part of the agreed research portfolio. Occasionally useful things emerge from “blue sky research” and then the benefits are commonly great. Often “blue sky research” leads to nothing. World class scientists perform best if they are allowed some leeway on the follow-up of ideas or intuition. The rules for conducting such research are essentially the same as for programmed research, so are the evaluation principles. But the insistence on a deliverable project is absent. A CE is a good place to have programmed the notion of “blue sky research”. It is common to allow for 10-20% of time and funds for this concept. It is the task of the leadership of the CE and the host institution (UNZA) to guard zealously the 10% so that it is not wasted on “miscellaneous activities” or seen as petty cash.
- **Ability to undertake commissioned work**  
The NEPAD interest is clearly fuelled by expectations that the UNZA CE will be capable to offer serious support to NEPAD for tasks defined by NEPAD inside current (CAADP) and future programmes, and for other tasks required by the African Union. It is therefore vitally important that the CE also cultivates enthusiasm, nimbleness and discipline in responding to NEPAD and other requests for reviews, evaluations, planning documents and background documents for political decisions. As some of the work may be donor financed it follows that CE capabilities must reflect on high international standards for such work. The CE may do well to have in-house report preparation services to ensure high-quality and timely outputs. Commissioned work can represent interesting lead-ins to research topics for faculty and student projects. They must therefore be viewed not as a burden or necessary evil to ensure funding but as opportunities to get involved with serious natural resources challenges.

## **5. A CENTRE OF EXCELLENCE IN NATURAL RESOURCE MANAGEMENT AT UNZA – THE PROPOSAL**

- **The goal** of establishing a CE in NRM at UNZA is to support through sharply focused inter-disciplinary and multi-disciplinary research Africa’s development of its primary rural industries and related fields, to achieve sustainable use of its natural resources for the benefit of all, to contribute to poverty alleviation of its rural and urban people, and to contribute to global scientific knowledge. Specifically the CE has a

support role for NEPAD's CAADP Pillar 1 as requested by the African Union. No similar institution or centre of excellence has been identified in Eastern or Southern Africa. The CE is not intended to compete with existing schools, departments and institutions with more limited remits in natural resources management, including those at UNZA, but to augment their work by benefiting and contributing to their operation.

An additional note is that the UNZA School of Agricultural Science has been requested to take over the defunct SADC Land and Water Management and Applied Research Programme<sup>6</sup>, which again will require a strengthening of the School and the Soil Science Department. It is likely to benefit significantly from the establishment of a CE in this field at UNZA.

- **The scientific focus** will be on the integration of existing global knowledge on natural science and social science in support of NRM in Africa, and the generation of new knowledge through intensive medium and long-term research programmes and projects, and “blue sky research” conducted by the CE, and in collaboration with networks of scientists and institutions in Africa and beyond. The CE will not in the least, but neither exclusively, focus on issues that have been identified by NEPAD as key causes of land degradation, and that are likely to relate directly to NRM during the decade 2010-2020.

**Some of the Key Causes of Land Degradation in Sub-Saharan Africa<sup>7</sup>**

The most important *natural factors* relate to the risk of:

- water erosion – steep slopes, high intensity rainstorms, erodible soils;
- wind erosion – strong winds, semi-arid/arid climatic zones with sparse vegetative cover;
- soil fertility decline – strong leaching of soil nutrients, rapid decay and mineralisation of soil organic matter, weathered acidic soils low in organic matter and soil nutrients;
- degradation in soil physical properties – weak structured soils low in organic matter;
- salinization – semi-arid/arid climates with high evaporation rates and low leaching intensity;
- vegetation degradation – low and erratic rainfall limits vegetative recovery following disturbance; and
- climate variability - decline in water quality and quantity –alternating abundance and scarcity according to the season (wet or dry), or natural climatic cycle (El Niño/La Niña).

The *direct (human) causes, or pressures* on the land include:

- inappropriate management (shorter fallows, exposed soil, etc.) of the land for the cultivation of annual rainfed, irrigated and/or perennial crops
- poor management of natural forest and tree plantation/woodlot areas;
- removal and degradation of natural vegetation through deforestation and/or overexploitation of local species;
- overgrazing of natural and planted pastures
- poor management and over use of surface and groundwater resources; and
- poorly planned and managed urban and industrial development (resulting in the physical loss of good farm land, pastures and forest areas as well as on- and off-site pollution).
- Forest Fires
- Population growth

The key *root causes or driving forces* of particular importance in SSA are:

- poverty/economic disadvantage (poor people cannot afford to forgo short term production/resource exploitation to take care of immediate income needs for the sake of long term

<sup>6</sup> A brief introduction to the L&WMAPR programme is given in Appendix 6. It has been extracted from a consultancy report by C. Patrick, Botswana College of Agriculture, May 2008

<sup>7</sup> Extracted from “The SLWM Pillar Framework, NEPAD Secretariat, June 2008”



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|---|
| <p>sustainability);</p> <ul style="list-style-type: none"><li>• lack of awareness of the consequences of land degradation which happens progressively but for which the symptoms are not immediately evident</li><li>• population pressure leads to small land holding size, in high potential areas, with traditional fallowing practices abandoned as individual plots are of necessity cultivated on a continuous basis;</li><li>• high input costs, low produce prices, and other market failures are disincentives to investing in improved land management practices;</li><li>• under nourishment and ill health are interlinked, rural households with food shortages are more susceptible to the ravages of malaria, HIV-AIDS and tuberculosis, which in turn reduces their ability to produce their own food, or earn their livelihoods in off-farm employment;</li><li>• rural households with insecure user rights, for their farm plots, pasture and forest resources, are less willing to invest in ensuring future productivity, being unsure as to whether they will be the ones to benefit</li><li>• inappropriate development policies driven by short term output targets that ignore long term sustainability; and</li><li>• weak/non-existent advisory support services limiting land users' access to improved farm inputs and information on alternative land use enterprises and improved land management practices.</li></ul> |
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This is a very broad list of elements that relate to natural resources management. In designing research programmes for a centre of excellence, it is important to concentrate on a limited number of sharply focused issues, which - if resolved - have broader applicability. Only a more limited research portfolio can have a sufficient staff complement to ensure critical mass for each issue. Below is a preliminary list of topics for the portfolio of a CE at UNZA:

**1. Land and water management.** Continued degradation of much of Africa's productive lands through over exploitation, non-sustainable farming practices and depletion of soil nutrients must be researched in the context of the existing natural science knowledge base, the impact of existing and alternative land and water ownership and tenurial rights and their gender implications, the availability and affordability of agro-chemicals (especially fertilizers, herbicides and insecticides), also in the framework of variable input/output relations for farm produce. Important elements are: the communication of knowledge on sustainable land and water management issues through non-traditional channels in the absence of proven extension systems, and research on the efficacy of alternative outreach methods, including the use of new communication technologies.

**2. Environmental policy strategies.** The collection of experiences from a variety of African and international policy interventions to distil guidelines for sustainable natural resources management in Africa, under varying natural and socio-economic conditions. Research on the impact of changing trade regimes, including alternative WTO scenarios, and the role of agricultural interventions also arising from the private sector (vertical integration by national and international food companies, the new roles of cooperatives and civil society organizations and farmers' organizations). The implications of changing food prices and farm input costs. The natural resource impacts of expanding national and international markets for organic food, fair trade foods and certified sustainable wood products and sustainable fisheries. The challenges of genetically modified crops for the environment, farmers, consumers, national policies, food exports and food imports (incl. food aid). Given existing gender roles in natural resources management in many African communities, implications for women and men with changing environmental policies.

**3. Climate change.** The implications for rural and urban populations in how they manage natural resources, particularly land, water and biological resources, under conditions of less predictable weather patterns and possibly significant climatic change. The likely nature of climate change will be established. The research will focus both on physical and socio-economic adaptation to climate change including changes in farming systems and the need for new varieties and breeds of crops and livestock, land and water conservation in the context of adaptation, and preservation of indigenous biodiversity. The research will consider socio-economic issues such as rural-urban migration, increased rural reliance on remittances from migrants, community implications of distorted age pyramids and gender balance, resulting from adaptation to climate change. The thrust of this programme will also be to identify ways in which the wise use of natural resources may mitigate climate change by contributing to carbon sequestration and other benefits that may be eligible for support from the international community, and how such benefits should be distributed, including associated gender issues.

**4. Environment and human health.** Many human diseases, many of them serious – even fatal, are closely linked to the state of the natural or human-made environment. Examples are malaria, schistosomiasis, leishmaniasis, and waterborne gastric diseases, all of which claim millions of lives annually in Africa and beyond. Other diseases may have links to the natural or human-made environments: the state of the human immune system may be influenced by micro- and trace elements in soil, in mycotoxins (especially aflatoxin) on crops (especially groundnuts, maize), the protein content of the diet and indirectly diseases caused by HIV-infection, tuberculosis and many other diseases directly linked to the state of the immune system (i.e. most). Whilst epidemiologists create some bridge function between the environmental sciences and human medicine, there is a pressing need to see human (and animal) diseases in the context of existing and changing natural environments. Research on the management of land and water resources through a lens of human and animal diseases may offer new suggestions for interventions that reduce the risks of disease. Vector habitat studies are central, also in the context of changes induced by irrigation, deforestation and afforestation, industrial soil and water pollution, and changes in farming systems and farming practices. The use of agro-chemicals may distort ecological balances, pollute soil and water and be directly toxic to humans. Climate change may cause habitat change and thus influence the communicability of disease. The economics of human disability on land management and the human health cost of changes in land management constitute important research fields.

**5. Eco- and agro-tourism as rural poverty alleviation tools and for wildlife and natural habitat management.** Increased national and international interest in exotic natural resources (wildlife, habitats, landscapes, rural life) has created a market for rural people to offer products and experiences to visitors from near and far. Research will focus on tools to identify saleable commodities (products, produce, experiences, adventures) that can benefit local communities and contribute to national income. Visitors from different backgrounds have different expectations and require different deliverables.

The distribution of earned income in local communities and nationally. The plough-back mechanisms of income earned into natural resources management to enhance sustainability and maintain or create tourist markets. The impact of tourism on biodiversity and farming systems.

- **Management structure**

The host institution for the CE in NRM is UNZA. UNZA may delegate the responsibility for hosting to its School of Agricultural Science, whose formal head is the Dean. The financial and administrative responsibilities for the CE and its staff and students are with UNZA. UNZA is also responsible academically and for the formal reporting and evaluation procedures, also to external donors. The Zambian ministries of Education, and Agriculture and Cooperatives, shall agree to the establishment of the CE.

The CE is constituted as a unit within UNZA with its separate board, with responsibilities limited by its charter. The prime task of the board is to ensure the scientific integrity and independence of the CE. The board also proposes to UNZA the appointment of the director of the CE. The board is approved by UNZA and may include members from the UNZA Council. The board is small and international, its members acting in their personal capacities, not as representatives of institutions. The proposed composition of the board may be: 2 members nominated by UNZA, 2 members nominated by NEPAD, 1 member nominated by the African Academy of Sciences and 1 member nominated by the International Council of Scientific Unions (ICSU). The Director serves on the board in an *ex officio* capacity. The board shall be so constituted that natural and social sciences are equally represented, and shall have a good gender balance. The selection should ensure a good international spread of members. The board will select its own chair. The board will meet 1-2 times a year. The board will undertake an annual self-evaluation of its performance.

The board will approve programme documents prepared by the director. The board will approve annual reports prior to transmission to UNZA.

The board shall propose to UNZA the name of the director following an international selection procedure, and in consultation with UNZA. The director shall preferentially come from the natural sciences and have a deep knowledge of natural resources management challenges in major parts of Africa.

The director shall select staff for the CE. All scientific staff positions shall be subject to international announcements. Appointments shall formally be made by UNZA, at the advice of the director. The director is responsible for the daily leadership of the CE, and for producing annual programmes and reports of its work. It is particularly important to shield the director from routine university work and meetings, and to allow him/her to focus on achieving the highest scientific standards for the work of the CE. The staff shall include a communication/outreach specialist.

The director may appoint a leadership group from his/her staff to support him/her in daily tasks, and to deputise when required. NEPAD shall be invited to locate a desk officer at the centre. The board may decide to invite a national or regional Scientific Advisory Committee to meet regularly in support of the director.

- **Accounting and auditing procedures**

The CE can receive contributions in cash and/or in kind from respectable sources in Zambia and internationally. As host institution UNZA will provide accounting facilities for the CE. The CE accounts will be audited in a timely fashion by the appointed UNZA auditors.<sup>8</sup>

- **National and international linkages**

The CE will be a self-contained centre with an ability to undertake the essential elements of the agreed research programme, and constitute a strong institution for undertaking commissioned work, for NEPAD and others. It will draw on other Schools at UNZA in support of its work, and work for synergy between the CE and the UNZA Schools. The CE may enter into contracts with the Schools as appropriate and regulated by UNZA rules.

The CE may seek collaboration with other educational and research institutions in Zambia as appropriate in the conduct of its research and commissioned work, and enter into contracts with these as appropriate. Zambian institutions may be expected to bring own contributions to the work, in kind or cash.

The CE shall enter into collaboration with educational or research institutions in Africa and beyond. Close collaborators may subsequently be incorporated in the CE as “virtual staff members”, operating (in part) at a distance. The director will decide on institutional arrangements for “virtual staff members” in consultation with UNZA.

The CE will seek to build networks of interested institutions and individuals for each of its research programmes, and for larger commissioned projects. The quality requirements and the quality control mechanisms for network participants shall reflect on the overall level of excellence expected of the CE. Members of the networks are expected to bring contributions in kind or cash to collaborative efforts.

- **Monitoring and evaluation**

Daily monitoring of activities is the responsibility of the director. There shall be a project management system in place to enable updated reviews of status of work at monthly intervals. The project management system shall be so designed as to constitute a monitoring of key variables on a monthly and an annual basis.

The board receives annual reports on activities in a form that enables the board to evaluate monthly and annual monitoring reports, and use the monitoring reports to authorize the annual reports.

After about 3 years after upstart of the CE the institution and all its work, scientifically, financially and administratively, shall be subject to an international External Programme and Management Review (EPMR), conducted by an internationally constituted panel of 3-4 members with a relevant skill mix and gender balance. The panel composition shall be proposed by the board following consultations with UNZA. The EPMR Panel shall advise the host institution (UNZA) on its findings, also including an assessment of board performance, and recommend

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<sup>8</sup> The question will arise whether some donors will insist on international auditing to US or European standards of CE accounts. UNZA must clarify whether this is indeed possible.

whether the CE shall be invited to continue beyond its first 5 year period. The host institution will make on its own conclusions, and be responsible for any decision taken on the recommendations from the EPMR Panel.

Should the CE be discontinued after the first 5 years a separate EPMR panel<sup>5</sup>, similarly constituted, should be invited to make a brief, final assessment of the achievements of the CE following its closure.

If continued, separate EPMR panels<sup>9</sup> shall be similarly constituted at periodic intervals to review the work of the CE.

- **Sustainability issues**

It makes little sense to establish a CE unless there is financial security for initially 5 years. This means that contributors to the CE as a group must a) provide enough funds for its upstart and b) guarantee to meet running costs for the first 5 years and, in the event of it closing down after Year 5, the closing down costs associated. The demands on each contributor may vary as long as the contributors as a group adhere to this principle. The funds contributed may be held by UNZA or another body as agreed by the donors, and be protected against currency fluctuations.

It is of crucial importance that funding is available up front, before the inauguration of the CE. It is highly detrimental for an institution that necessary commitments and investments cannot be done at the onset of activities, whatever the reasons for delay. The CE should only be started when the money is actually on the table. To aid the establishment an inception period, of 6 months, may precede the opening of the CE, and allow for the initial establishment of the board and the recruitment of the director.

At the time of closure of the CE its assets shall be disposed of to the benefit of UNZA.

- **Funding requirements**
- **Funding requirements<sup>10</sup>**

For its first 5-year period the CE may have 20 scientific staff members, 10 PhD students, and 2 administrative staff. It will be reviewed thereafter.

Based on the above assumptions the **annual** financial requirements may be considered to be:

**Personnel costs**

International scale scientists: 5 x USD 125,000 =	USD 625,000
Regional scale scientists: 7x USD 50,000=	350,000
National scale scientists: 8x USD 30,000=	240,000
National scale administrative staff: 3x USD 20,000=	60,000
Support Ph.D. students 10x USD 15,000=	150,000

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<sup>9</sup> It is open to discussion whether the same panel may do all evaluations. Replacements may be necessary.

<sup>10</sup> Includes salaries and allowances (allowances to be avoided, best to stick to a straight salary), pension contributions, health insurance, employment taxes if applicable)

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Board and EPMR costs 100,000

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USD 1, 525, 000

**Office costs**

Buildings, e.g. rent USD 10,000

Furniture USD 10,000

Maintenance, buildings, vehicles? USD 50,000

Travels, per diems, network costs USD 200,000

Telecommunication, computing USD 50,000

Accounting, auditing USD 30,000

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USD 350,000

**Miscellaneous costs**

Research equipment USD 100,000

Consultancies external co-workers, networks USD 300,000

Workshops, seminars USD 100,000

Communication and publications USD 100,000

Other miscellaneous USD 50,000

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USD 650,000

**USD 2,525,000**

**Initial investment costs**

Building, equipment, vehicles (will depend on ownership, model). Could be USD 250,000)

**An annual grand total of USD 2,775,000 may be required**

## **6. CONCLUSIONS**

Having one of the strongest schools in soil science and other studies in natural resources management, the School of Agricultural Science in the University of Zambia has a good starting point for being the focal point of a new centre of excellence in natural resources management. The request from NEPAD to create such a centre of excellence can be met by assembling high quality academic staff from UNZA, the region and internationally, combined with a group of PhD students, in a new centre housed by UNZA. Whilst internationally centres of excellence often focus on academic research at the highest level (and judged by international publication criteria) it is suggested that an important task of this centre would be to have the ability to provide the African Union generally and NEPAD specifically with sound scientific guidance on development and research projects.

The establishment of a UNZA centre of excellence may be somewhat different from traditional international centres of excellence, but to be worthy of international donor attention, its quest to attain high quality at all levels must be stressed. In principle UNZA can achieve this. It is most important that the centre does not aspire to be a consultancy bureau generating income for the university and for individual staff. If that is an aim, then much simpler commercial organizational constructs would be appropriate.

The total annual costs of establishing and operating such a centre is estimated to be of the order of USD 2, 775, 000.

## **APPENDICES**

### **APPENDIX 1. TERMS OF REFERENCE**

#### ***TERMS OF REFERENCE:***

#### **Assistance in the establishment of a Centre of Excellence in Natural Resource Management at the University of Zambia**

#### **Abstract**

**In response to a request from the University of Zambia (UNZA) to the Norwegian Embassy in Lusaka, Noragric has accepted to provide technical assistance to help establish a Centre of Excellence in Natural Resource Management (NRM) at UNZA. The main activities under this task will take place in September 2008 and will be funded under the Norad-Noragric frame agreement with a budget frame at NOK 155,000.**

#### **Background**

The University of Zambia (UNZA) has been nominated as a lead institution by the New Partnership for African Development (NEPAD), and the Common Market for Eastern and Southern Africa (COMESA) to provide direct expert support for the development, implementation and monitoring of the Comprehensive Africa Agriculture Development Programme (CAADP) framework on Sustainable Land and Water Management (SLWM)/Natural Resources Management (NRM). In order to implement these activities and as a CAADP Pillar I lead institution, UNZA seeks to establish a Centre of Excellence in NRM within the School of Agricultural Sciences, to be administered by the Department of Soil Science (DSS). The Centre will support the organization and nurturing of institutional networks under CAADP with SLWM/NRM expertise to ensure the richness and cross-pollination in knowledge and experiences within the intersectoral/inter-disciplinary and comprehensive character of the CAADP agenda.

Recently, UNZA and the Southern African Development Community (SADC) Secretariat through the SADC Food, Agriculture and Natural Resources Directorate (FANR) have proposed a Memorandum of Understanding (MoU) for partnership and collaboration in hosting and implementation of the SADC Land & Water Management Applied Research Programme at UNZA on behalf of the SADC member states. This initiative is expected to complement the implementation of the objectives under the Centre of Excellence in Natural Resources Management (CENRM).

The Norwegian Embassy is already one of the development partners who are actively involved in CAADP activities in Zambia; therefore, UNZA has requested the Norwegian Embassy for technical assistance in the establishment of the Centre. In response to the request, the Department of International Environment and Development Studies (Noragric) at the Norwegian University of Life Sciences has been asked to provide such assistance under its frame agreement with Norad.



## **Objective**

The objective of this task is to assist UNZA in the establishment of a Centre of Excellence in Natural Resource Management.

## **Time schedule**

The formulation of a draft document in close cooperation with UNZA staff will be done in week 37 and 38 (8-20 September) while the final output will be submitted by the end of September 2008.

## **Staff**

Noragric will make Dr. Stein Bie available for the assignment.

## **Output**

The output of the exercise will be a draft organisational plan for the Centre to be submitted to the Dean of the School of Agricultural Sciences at UNZA, with a copy to Norad.

## **Content and format of the organisational plan**

The draft organisational plan should address, but not necessarily be limited to the following items:

- Goals, scope, indicators and activities
- Scientific focus
- Management structure
- Accounting and auditing procedures
- National and international institutional linkages
- Monitoring and evaluation
- Sustainability issues
- Funding requirements

Being a programme under the African Union, NEPAD enjoys considerable political support. NEPAD does not, however, possess financial means available for supporting the proposed Centre. It is therefore important that the organisational plan is given a format that makes it suitable as a basis for seeking donor assistance.

While the Centre will be established at the School of Agricultural Sciences at UNZA, it is expected to have an interdisciplinary focus and a geographical scope that reflects the fact that it is established as a component of a programme under the African Union Commission (AUC). This should be reflected throughout the organisational plan.

**Tentative budget**

Professional fee, Stein Bie, in Zambia: 2 weeks * 42 h/week * NOK 934/h =	NOK 78,456
Professional fee, Stein Bie, in Norway: 1 week * 37.5 h/week * NOK 934/h =	NOK 35,025
Subsistence and accommodation allowance in Zambia: 15 days * NOK 1700 =	NOK 25,500
Flight ticket Oslo – Lusaka – Oslo	NOK 13,000
Miscellaneous expenses (local travel, visa fee etc)	NOK 3,019
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Total	NOK 155,000

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## **APPENDIX 2. SUMMARY NEPAD CAADP PILLAR 1**

### **PILLAR 1 IN THE CAADP AGENDA**

The New Partnership for Africa's Development (NEPAD) is both a vision and strategic framework conceived by African leaders to address the socioeconomic and political challenges plaguing the African continent (poverty, underdevelopment and marginalisation). As a program of the African Union (adopted July 2001) NEPAD seeks to achieve its vision of food security, poverty eradication, sustainable growth and development and active participation in the world economy and politics by focusing on five key economic sectors (agriculture, human development, infrastructure, agro-industry diversification and development, and environment). Due to its contribution to the economy the agriculture sector is critical to the success of efforts to reduce food insecurity and poverty<sup>11</sup>. Accordingly, African leaders identified the agricultural sector as one of the key priority areas for intervention in achieving the NEPAD vision. But, the overall performance of the agricultural sector in Africa remains weak and fragile. In response, African leaders developed the Comprehensive Africa Agriculture Development Program (CAADP) as the NEPAD framework for the revitalization of the agricultural sector in Africa.

CAADP is at the heart of efforts by African governments under the AU/NEPAD initiative to accelerate growth and eliminate poverty and hunger among African countries. The main objective of the CAADP is to help African countries reach a higher path of economic growth through agricultural-led development - eliminating hunger, reducing poverty and food insecurity, enabling the expansion of exports and supporting environmental resilience.

CAADP is now acknowledged not only as an African conceived and driven agricultural agenda, but also, it has emerged as a key entry point for both national and international development partner support to the agricultural sector in Africa.

As a program of the African Union, it emanates from and is fully owned and led by African governments. Although continental in scope, it is an integral part of national efforts to promote agricultural sector growth and economic development. It is not a set of supranational programs to be implemented by individual countries. It is rather a common framework, reflected in a set of key principles and targets that have been defined and set by the Heads of State and Government, in order to: (i) guide country strategies and investment programs; ii) allow regional peer learning and review; iii) facilitate greater alignment and harmonization of development efforts.

These key principles and targets include:

- agriculture-led growth as a main strategy in attaining targets on food security and poverty alleviation (MDGs)
- exploitation of regional complementarities and cooperation to stimulate growth;

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<sup>11</sup> On average agriculture accounts for 30-60% GDP, 60-90% employment and 25-90% export earnings. Second, the majority (70%) of poor people in Africa live in rural areas and rely on agriculture for their employment and income. Third, Africa's poor spend more than 50% of their income on food.

- application of principles of policy efficiency, dialogue, review, and accountability;
- usage of partnerships and alliances, including farmers, agri-business and civil society;
- shared responsibilities and collective commitment among the various African institutions, from the AU institutions (AUC, NEPAD Secretariat and REC) to national governments, the civil society and private sector institutions.
- Assignment to individual countries the role and responsibility of program implementation, the coordination to designed Economic Regional Communities (RECs) and facilitation to the NEPAD Secretariat.

CAADP marks two key intermediate targets, namely:

- pursuit of a 6% average annual agricultural sector growth rate at the national level;
- allocation of 10% of national budgets to the agricultural sector;

With the four pillars as its foundation, the CAADP efforts drill down to the national level through the “roundtable” process which focuses on:

- Aligning state policies with regional priorities and the four pillars;
- Exploiting synergies and inclusive discussions on socio-economic bottlenecks and deciding appropriate action on those matters;
- Identifying gaps in the donor funding needed to achieve agreed priorities;
- Initiating work to monitor and evaluate CAADP’s progress at the national, regional and continental levels

Land and water are the primary natural resources necessary for agriculture, food production and rural development in most countries. If used in proper association with suitable technologies and related factors such as labour, investment, land and water have the capacity to enable global agricultural production to continue outpacing growing demand despite declining availability of per capita land and water resources. For this trend to take root in Africa and to continue elsewhere, increased output must come mainly from intensified production, as new land for expansion is very limited.

In spite of the inherent fragility of Africa's soils, the continent's climatic variability, and the uneven distribution and availability of both surface and subsurface water resources, there is substantial untapped potential for the development of the continent's water and land resources for increasing agricultural production. FAO estimates that the current area under managed water and land development totals some 12.6 million ha<sup>1218</sup>, equivalent to only some 8 percent of the total arable land. Substantial public and private investments in developing and improving the management of these land and water resources will be essential to enable African countries reach the levels of agricultural production required to meet the targets for poverty alleviation, food production and economic recovery by 2015. Building up soil fertility and the moisture holding capacity of agricultural soils, and rapidly increasing the area equipped with irrigation, will not only provide farmers with opportunities to

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<sup>12</sup>FAO. 2000. Agriculture Towards 2015/30. Technical Interim Report. Rome: [http://www.fao.org/docrep/005/y6831e/y6831e-03.htm#P455\\_107316](http://www.fao.org/docrep/005/y6831e/y6831e-03.htm#P455_107316)

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raise output on a sustainable basis but will also contribute to the reliability of food supplies.

### **APPENDIX 3. SUMMARY OF UNZA'S PROPOSAL TO NEPAD OCT. 2007**

The University of Zambia seeks to establish a “Center of Excellence in Natural Resources Management (NRM)” to be housed in the School of Agricultural Sciences at the Great East Road Campus of the University of Zambia (UNZA). This document provides the rationale for establishment and recognition of the Center of Excellence in Natural Resources Management at UNZA.

The vision of the School of Agricultural Sciences is to become “the premiere engaged natural resources management institution of the 21st century.” Therefore, a Center of Excellence will be an important resource unit for achieving and delivering on this vision.

The analysis of the existent capacity for NRM in the region has revealed gaps in methods and technologies for the rational use of natural resources; access to environmental legislation for proper use of natural resources and managerial expertise at national and international levels and the impact of climate change on the use of natural resources. Therefore, the document outlines the Center's functions in the context of institutional priorities and substantial experience with training, research and public service engagement in terms of intra- and inter-institutional connections. The Center will take the lead in the areas of sustainable land and water management, climate change issues, land tenure issues, biodiversity for food and agriculture, and research and development issues.

The Center's vision is to be a leading force in the provision of knowledge necessary to better manage natural resources in Zambia, the region and Africa as a whole. The focus in realizing this vision is targeted, cost-effective and innovative, with a view to enhancing the environmental, economic, social and cultural well-being of the African continent and adaptation strategies for coping with impacts of climate change. The Center will have a strong focus on education and training, monitoring and evaluation, and will promote itself to international clientele in natural resources management (NRM) such as professionals (civil servants, development organizations) and students, to further their education in Zambia and the SADC region. It will also develop training courses of international relevance on global issues for delivery in Zambia, the region and overseas. Through partnerships with other regional and continental institutions, the Center will promote the development of new courses and will market and offer a suite of existing programmes in natural resources management ranging in degree (BSc, MSc and PhD) and professional courses. We believe that this Center of Excellence will be a showcase of Zambia's world-class education, and training and research facilities in natural resources management. Further, we believe that natural resources management affects billions of people, and is a critical issue for many countries around the world. We expect to establish partnership with education, government and industry organizations and work together to give the best possible learning opportunities to people around the world.

Some of the areas of expertise that the Center will endeavor to develop will include: sustainable natural resource use, surface water and groundwater water management; integrated natural resource management; ecosystem management, natural resources policy development and analysis; natural resource technology; asset management; health risk assessment, and natural resource economics.

## **APPENDIX 4. A BRIEF OUTLINE OF UNZA**

### **1.1.1 BRIEF PROFILE: UNIVERSITY OF ZAMBIA**

- 1.1.2 The University of Zambia (UNZA) was established in 1966 by an Act of Parliament from the former Rhodes-Livingstone Research Institute. UNZA is the largest and leading university among existing three public universities in Zambia. It is composed of two campuses, the main Great East Road Campus and Ridgeway Campus located in the capital city (Lusaka) of Zambia. UNZA has nine Schools/Faculties namely Education (1966), Natural Sciences (1966), Humanities and Social Sciences (1966), Law (1967), Engineering (1969), Agricultural Sciences (1971), Mines (1973), Medicine and Veterinary Medicine (1983), and three Directorates/Institutes of Economic and Social Research (INESOR), Directorate of Distance Education (DDE) and Directorate of Research and Post-Graduate Studies. The University of Zambia currently has more than four hundred (400) highly skilled and qualified academic members of staff trained from renowned institutions from different parts of the world. There are over three thousand (3,000) well trained support staff to manage and train more than twelve thousand (12,000) undergraduate and post-graduate students.
- 1.1.3 The School of Agricultural Sciences was established in 1971 with an initial student enrolment of five (5) and now stands at five hundred (500) with an average intake of 100 students per annum at second year level from the School of Natural Sciences. Over its period of existence, the School has produced more than one thousand two hundred (1,200) undergraduate and about a hundred and twenty MSc graduates. Most of these graduates are now key managers of development in public and private sector institutions dealing with different aspects of natural resources management at national, regional, international institutes, and the Diaspora.
- 1.1.4 The School of Agricultural Sciences which is proposed to host the Centre of Excellence in Natural Resources Management is made up of five departments, namely 1) Animal Science, 2) Crop Science, 3) Agricultural Economics and Extension Education, 4) Soil Science, and 5) Food Science and Technology, a 10ha Field Station on campus for research, a 700 ha research and production farm located 30 km from the University. The School has nine well equipped laboratories for training and specialized and routine analysis. The School also underwrites and supervises diploma training in natural resources management at the Natural Resources Development College (NRDC); a government funded training institution under the Ministry of Agriculture and Cooperatives (MACO). The establishment of this Center of excellence will see University of Zambia become a hub that will provide trained critical thinking analysis of NRM issues and provide trained cadres.
- 1.1.5 The strengths of the School of Agricultural Sciences are in its research and graduate education, outreach, and undergraduate teaching. The School is continually looking for new opportunities and adjusting current programmes to enhance its ability to meet the changing needs of society. The School is actively involved in graduate degree (MSc and PhD) training programmes in Agronomy, Animal Science, Soil Science and Agriculture Economics. It has two undergraduate degree programmes namely Bachelor of Agricultural

Sciences and Bachelor of Food Science and Technology. Students following Bachelor of Agricultural Sciences programme can specialize in Animal Science, Crop Science, Soil Science and Agricultural Economics and Extension Education. The School has been managing a regional Master of Science programme in Agronomy since 1989 and has a Regional Plant Breeding and Seed System Masters programme. The School has run many Regional Land and Water Management training courses and has hosted regional training in Research Methodology, Research Proposal Writing, Agriculture Science, Technology Information Systems (ASTI).

- 1.1.6 Although all Schools in the University provide training in their areas of specialization, staff in all Schools teaches in other Schools. As a result, the School of Agricultural Sciences has a larger pool of skilled human resource in academic and research staff resident within the University that are available multidisciplinary research and training. Other than UNZA staff, the School collaborates with staff in Research Institutes, Non Governmental Organization within Zambia such as Zambia Agricultural Research Institute (ZARI), Golden Valley Agricultural Research Trust (GART), National Institute of Science and Industrial Research (NISIR), Livestock Research Institute (LDT) Veterinary Research Centre, Maize Research Centre (MRI), Tropical Disease Research Centre and others. We also have close collaboration with various agricultural training colleges and institutes and NGOs such as Zambia National Farmers Union (ZNFU). The University belongs to various Regional and International Networks such as Association of African Universities (AAU), RUFORUM, ANAFE, etc who we exchange information and collaborate in training and research. We have actively involved successfully in the South-North and North-South collaboration with universities, colleges and research institutes.
- 1.1.7 The School of Agricultural Sciences has a strong integration of research and extension efforts to enhance its visibility and effectiveness in the nation and SADC region. Staff in the School is involved in spearheading and coordinating a number of national and regional programmes and networks such as ANAFE, RUFORUM, Land and Water Curriculum Development, Integrated Water Resource Management. These programmes involve regional post-graduate training in Agronomy and regional short-course training in land and water management.
- 1.1.8 As a national public university, UNZA has always had a unique mission to support the learning, well-being, and quality of life of the citizenry of Zambia. UNZA strives to be “one of the best national and regional universities by integrating teaching, research, and service to better serve the citizenry and communities of Zambia.” A systematic, to comprehensive approach to natural resources management can contribute in innovative and powerful ways toward realizing this vision.

## **FINANCING:**

The University of Zambia is financed through government grants and has the autonomy to utilize its resources according to approved budget. The accounting system is decentralized to School/Faculty but pass through accounting procedures of the University of Zambia which include internal audit. The authorizing officers for University expenditures are Deans/ Directors ( $\leq 2,000.00$  US\$); Vice Chancellor ( $\leq 10,000.00$  US\$) and the Government of the Republic of Zambia Tender Board



(>10,000.00 US\$). The accounts are audited according to audit procedures and regulations as a public institution. Each School/Directorate is allowed to open a bank account with signatories within the Unit but controlled by the University of Zambia Audit System. The University of Zambia has also independent auditors for its accounts and the Government of the Republic of Zambia as the main financier of the institution.

**Auditors:**

GRAND THORNTON, P. O. Box 30885, LUSAKA, ZAMBIA. Tel: +260 211 228 167/9; Fax: 260 211 225 186; Telex: ZA40027; E-mail: [gthorntn@zamnet.zm](mailto:gthorntn@zamnet.zm)

**PHYSICAL ADDRESS:**

The main University Campus is situated on the south side of the Great East Road about nine (9) kilometers from the town centre in Lusaka, Zambia. With an area of about 290 hectares, the campus is on a fairly level site and much of the properties has been brought into use for academic and residential purposes, or has been attractively laid out as parkland, lawns and gardens.

**Official contact:**

**The Vice Chancellor**

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**School of Agricultural Sciences:**

**Dean**

**P. O. Box 32379, Lusaka, ZAMBIA, Tel/fax: +260 211 250 587,**

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## **APPENDIX 5. A BRIEF OUTLINE OF THE UNZA DEPT. OF SOIL SCIENCE**

### *Background*

The Department of Soil Science (DSS) is one of the five Departments (Animal Science, Crop Science, Agricultural Economics and Extension Education, Food Science and Technology and Soil Science) established in the School of Agricultural Sciences (1971) at the University of Zambia. It has a staff establishment of twenty, composed of academic, technical and support staff. The Department offers training, research and public service in Land and Water Management with the mission of enhancing the quality of human life and health, and to sustain environmental resources through a better understanding of soil, water, atmosphere and related disciplines. The Department conducts fundamental and applied research on Land and Water Management through basic and applied sciences, and educates graduate and undergraduate students. The main goal is to promote principles to implement integrative and effective systems for soil and water resources management, and enhance science education and public appreciation of soil science.

### *Vision and Goals for the Department of Soil Science*

We have strength in research, outreach, and teaching undergraduate and graduate program in Land Management in the nation and the sub-region.

The Department maintains a high quality of programme delivery by:

- Establishing a creative and interactive environment that fosters productive Department's staff and students;
- Creating and fostering quality training programs by recruiting outstanding individuals, who are highly motivated and competitive;
- Developing high impact extension and research programs that address the changing needs of the citizens of the nation, and the world;
- Maintaining a balance between applied and fundamental research programs;
- Striving for an extramural funding base of competitiveness that is complemented by other appropriate funding sources;
- Supporting high publication productivity in respected peer-reviewed journals and;
- Maintaining analytical laboratories with high quality standards, to support outreach programs and needs of clientele.

The scholarly focus of the Department is driven by the pursuit of fundamental knowledge and a mission to deliver new technologies and solutions to soil science-related problems. The Department provides the intellectual basis for knowledge application to improve the quality of life. The Department adapt to new opportunities and challenges as they arise and whose influence extends beyond the University of Zambia, through our teaching, outreach, and the strengths of our graduate students. Through our extension programs, the Department fosters the adoption of sustainable land and water management practices and promotes safety and stewardship of the natural resources.

To be the reference institution for provision of knowledge and information about practices that sustain Zambia's land and water resources and guide their wise use to secure an adequate and healthy food supply and a quality environment, the mission of the Department are:

- To enhance the sustainability of soils and water, the environment, and Zambian society by integrating diverse scientific disciplines and principles in soil science for the wise stewardship of the natural resources.
- To advance the discovery, practice, and profession of soil science through excellence in the acquisition and application of knowledge to address challenges facing society, in the training and professional development of soil scientists, and in the education of, and communication to a diverse citizenry

#### *Center of Excellence in Natural Resources Management*

The School of Agricultural Sciences through the Department of Soil Science has been recognized as lead institution in the implementation of Comprehensive Africa Agriculture Development Programme (CAADP) Pillar I on extending area under Sustainable Land and Water Management (SLWM). The Department has well equipped laboratories for training and specialized and routine analysis. The strengths of the Department are in its research and graduate education, outreach, and undergraduate teaching. The Department is continually looking for new opportunities and adjusting current programmes to enhance its ability to meet the changing needs of society. The Department is actively involved in graduate degree (MSc and PhD) training programmes in Agronomy and Soil Science. The Department runs regional training courses in Land and Water Management. The Department has a larger pool of skilled human resource in academic and research staff resident within the University that is available multidisciplinary research and training. Other than UNZA staff, the Department collaborates with staff in Research Institutes, Non Governmental Organization within Zambia such as Zambia Agricultural Research Institute (ZARI), Golden Valley Agricultural Research Trust (GART), National Institute of Science and Industrial Research (NISIR), Livestock Research Institute (LDT) Veterinary Research Centre, Maize Research Centre (MRI), Tropical Disease Research Centre and others. We also have close collaboration with various agricultural training colleges and institutes and NGOs such as Zambia National Farmers Union (ZNFU). The University belongs to various Regional and International Networks such as Association of African Universities (AAU), RUFORUM, ANAFE, etc who we exchange information and collaborate in training and research. We have actively involved successfully in the South-North and North-South collaboration with universities, colleges and research institutes.

The Department has a strong integration of research and extension efforts to enhance its visibility and effectiveness in the nation and SADC region. Staff in the Department is involved in spearheading and coordinating a number of national and regional programmes and networks such as ANAFE, RUFORUM, Land and Water Curriculum Development, Integrated Water Resource Management. These programmes involve regional post-graduate training and regional short-course training in land and water management.

As a national public university, UNZA has always had a unique mission to support the learning, well-being, and quality of life of the citizenry of Zambia. UNZA strives

to be “one of the best national and regional universities by integrating teaching, research, and service to better serve the citizenry and communities of Zambia.” A systematic, to comprehensive approach to natural resources management can contribute in innovative and powerful ways toward realizing this vision.

#### *Information Communication Technology*

The University of Zambia has ICT programmes are vested in the Computer Centre Directorate which is the centre of Information Technology at the University of Zambia, providing support and maintenance of mission critical information systems. The Centre provides administrative and academic support, Internet and E-mail facilities to the University Community. Currently the Centre has a modern campus wide network and it is operating as dedicated uplink bandwidth of 8GB and downlink of 2GB through VSAT connectivity. Currently the network is the largest in the country and has more than two thousand (2000) PCs and its web server is utilizing only a quarter of its capacity. The area network is linked up with fibre-optical cable and connected using CISCO 2950 Catalyst switches. This network is linked to the Metropolitan network for Lusaka City.

#### FINANCING

The University of Zambia is financed through government grants and has the autonomy to utilize its resources according to approved budget. The accounting system is decentralized to School/Faculty but pass through accounting procedures of the University of Zambia which include internal audit. The authorizing officers for University expenditures are Deans/ Directors ( $\leq 2,000.00$  US\$); Vice Chancellor ( $\leq 10,000.00$  US\$) and the Government of the Republic of Zambia Tender Board ( $> 10,000.00$  US\$). The accounts are audited according to audit procedures and regulations as a public institution. Each School/Directorate is allowed to open a bank account with signatories within the Unit but controlled by the University of Zambia Audit System. The University of Zambia has also independent auditors for its accounts and the Government of the Republic of Zambia as the main financier of the institution.

Head

Department of Soil Science

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#### CURRENT STAFF PROFILES

Department of Soil Science

Academic Staff

Name	Qualification	Current Position	Areas of Expertise
Elijah Phiri	B Agric Sci, MSc, PhD	Lecturer I/HOD	Soil Physics/Irrigation
Obed Lungu	B Agric Sci, MSc,	Associate	Soil fertility/chemistry

*The Establishment of a Centre of Excellence in Natural Resource Management at the University of Zambia*

	PhD	Professor	
Olusegun Yerokun	BSc, MSc, PhD	Senior Lecturer	Soil fertility/chemistry
Benson Chishala	B Agric Sci, PhD	Senior Lecturer	Soil fertility/Plant Nutrition
Victor Shitumbanuma	B Agric Sci, MSc	Senior Lecturer	Soil fertility/mineralogy
Austin Sichinga	B Agric Sci, MSc, PhD	Lecturer II	Irrigation Engineering
Daniel Banda	B Agric Sci, MSc, PhD	Lecturer II	Land Evaluation, Land Use
Lydia Chabala	B Agric Sci, MSc	Lecturer III	Land Evaluation, Land Use, GIS
Peter Kaluba	B Agric Sci,	SDF	Environmental Chemistry
Cecilia Maluti	B Agric Sci,	SDF	Irrigation Engineering
Jones Yengwe	B Agric Sci,	SDF	Agroclimatology

SDF= Staff development fellow

Technical Staff

Gideon Musukwa	B Agric Sci,	Senior Technician	Laboratory Analysis
Patson Simbule	Science Technician Diploma	Senior Technician	Laboratory Analysis
Mary Chishala	Science Technician Diploma	Technician	Laboratory Analysis

The Department of Soil Science also draws additional professional skills from staff from other Departments within the School of Agricultural Sciences, and also Departments from other Schools namely, Department of Agricultural Engineering, Department of Geomatic Engineering, Department of Environment and Civil Engineering, Department of Mechanical Engineering, Department of Geology, Department of Geography and Department of Biological Sciences all these departments are housed within walking distance in the University of Zambia Campus.

## **APPENDIX 6. A SUMMARY OF SADC L&WMARP**

The overall objective of the SADC L&WMARP is to increase the availability of improved and appropriate land and water management technologies to research and development institutions in the SADC region for subsequent dissemination to farmers, particularly smallholder farmers.

The programme strives to increase the capacity and productivity of research teams in the SADC region to develop land and water management technologies that are appropriate to the needs of resource-poor farmers, particularly those under water deficient conditions and improved dissemination of results to the region. It is one of five programmes under the Agriculture and Natural Resources Research Unit of the Food Agriculture and Natural Resources (FANR) Directorate. FANR is one of four directorates at the SADC Secretariat. Its main function is the coordination and harmonization of agricultural policies and programmes in the SADC region. Its focus areas are to ensure food availability, access, safety and nutritional value; disaster preparedness for food security; equitable and sustainable use of the environment and natural resources; and strengthening institutional framework and capacity building. FANR programmes are coordinated through several technical units, one of which is the Agricultural and Natural Resources Research and Development Unit.

The unit houses the L&WMARP and is tasked with the promotion of economic growth in the agricultural sector through an integrated approach for improvement of livelihoods, which includes management of natural resources for greater sustainability, promotion of market access, policies, capacity building and institutional change at all levels. Specifically, the unit is addressing the following areas:

- a) Promoting and coordinating cooperation among SADC's national agricultural research systems and facilitating the exchange of information and technology among them;
- b) Promoting partnership between public and private organisations in research and training;
- c) Promoting the development of the human resources in research and technology transfer to respond to the needs and demands of the agricultural sector in accordance with gender dynamics; and
- d) Helping to mobilise human, financial, technological and information resources to implement demand-driven activities.

Some of the projects currently being supervised by the Agriculture and Natural Resources Unit are:

- a) Developing new technologies to empower the region to compete in the global economy meet market demand and increase crop and livestock production for food security and poverty alleviation.
- b) Promoting economic growth in the agriculture and natural resources sector in an integrated manner in order to improve livelihoods through sustainable

- management of natural resources, greater access to markets and appropriate policies.
- c) Changing the focus of research to move beyond the traditional function of technology development to meet the emerging need for research to directly address poverty and the negative impacts of globalisation and GMOs.

As the programme activities come to a close in Gaborone due to project funding arrangements between SADC and EU, FANR has decided that a suitable institution be identified in the region to take over the mandate of the programme, so that a lot of the initiatives started and ongoing such as the scientific symposia, developed curriculum on Land & Water Management and implementation, together with the exchange programme are allowed to continue. Institutions in the region were invited to bid to host the programme.