

# PLATFORM2013

Getting evidence-based development research into use in Sub-Saharan Africa



Accessible  
DRUSSA UNIVERSITY  
research for  
policy-makers

# DRUSSA UNIVERSITIES ONLINE

---

## West Africa

Kwame Nkrumah University of Science and Technology (KNUST)	<a href="http://www.knust.edu.gh">www.knust.edu.gh</a>
Obafemi Awolowo University	<a href="http://www.oauife.edu.ng">www.oauife.edu.ng</a>
University of Buea	<a href="http://www.ubuea.net">www.ubuea.net</a>
University of Calabar	<a href="http://www.unical.edu.ng">www.unical.edu.ng</a>
University of Ghana	<a href="http://www.ug.edu.gh">www.ug.edu.gh</a>
University of Ibadan	<a href="http://www.ui.edu.ng">www.ui.edu.ng</a>
University of Yaoundé 1	<a href="http://www.uy1.uninet.cm">www.uy1.uninet.cm</a>

## Southern Africa

Cape Peninsula University of Technology	<a href="http://www.cput.ac.za">www.cput.ac.za</a>
National University of Science and Technology	<a href="http://www.nust.edu.pk">www.nust.edu.pk</a>
University of Botswana	<a href="http://www.ub.bw">www.ub.bw</a>
University of Fort Hare	<a href="http://www.ufh.ac.za">www.ufh.ac.za</a>
University of Limpopo	<a href="http://www.ul.ac.za">www.ul.ac.za</a>
University of the Free State	<a href="http://www.ufs.ac.za">www.ufs.ac.za</a>
University of Zambia	<a href="http://www.unza.zm">www.unza.zm</a>
University of Zimbabwe	<a href="http://www.uz.ac.zw">www.uz.ac.zw</a>

## East Africa

Addis Ababa University	<a href="http://www.aau.edu.et">www.aau.edu.et</a>
Kenyatta University	<a href="http://www.ku.ac.ke">www.ku.ac.ke</a>
Kigali Health Institute	<a href="http://www.khi.ac.rw">www.khi.ac.rw</a>
Makerere University	<a href="http://http://mak.ac.ug">http://mak.ac.ug</a>
Mbarara University of Science and Technology (MUST)	<a href="http://www.must.ac.ug">www.must.ac.ug</a>
Moi University	<a href="http://www.mu.ac.ke">www.mu.ac.ke</a>
National University of Rwanda	<a href="http://www.nur.ac.rw">www.nur.ac.rw</a>
University of Mauritius	<a href="http://www.uom.ac.mu">www.uom.ac.mu</a>
University of Nairobi	<a href="http://www.uonbi.ac.ke">www.uonbi.ac.ke</a>

[www.drussa.net](http://www.drussa.net)

The DRUSSA programme is currently working alongside participating Universities with a view to each University including a dedicated Research Uptake page on their website. This is an important collective step forward for the DRUSSA Universities to begin meeting evolving Research Uptake Communication demands. A digital version of each University's article in this DRUSSA 2013 publication has been supplied to each University to be used as a relevant piece of outward-facing research to place on their University's Research Uptake page.

---

The DRUSSA (Development Research Uptake in Sub-Saharan Africa) Programme

**DRUSSA**  
Development Research Uptake  
in Sub-Saharan Africa

## ED'S PLATFORM

Welcome to DRUSSA Platform 2013. This publication comes from the DRUSSA Universities in Sub-Saharan Africa, and gives you a quick round up of some of the excellent evidence-based development research that is happening here. Every piece of research featured is in line with its University's strategic mission to contribute to the public good.



If you are a policy influencer and you are reading this, you're in the right place. This is research that can make a difference to the human and economic development of the Sub-Saharan African region and beyond. It should be put into use through public policy. Read it! Share it! Discuss it!

These articles make for fascinating reading. We've kept them short, focused and easy to read. Chapters are organised by regions. There are theme blocks at the top of each feature so you'll know at a glance what thematic areas the research covers. Each research description includes contact details, and links to more online contact details so you can get in touch, and start conversations with fantastic potential.

Wherever and however you are reading this – in print or in digital form – we hope you have a compelling read. And please turn or scroll to the back or last page for details on where you can join the Research Uptake Conversation.

Louise McCann  
Louise.mccann@drussa.net

## FROM THE DRUSSA TEAM

If you are not yet familiar with the DRUSSA Programme, let us introduce ourselves. The Development Research Uptake in Sub-Saharan Africa (DRUSSA) Programme addresses the demand for stronger Sub-Saharan African (SSA) participation in local pro-poor development research programmes; supports SSA universities' efforts to ensure that their local pro-poor research impacts on policy and practice in their countries; and promotes the communication and dissemination of poverty reduction research beyond the academic domain to include an interactive network of organisations and individuals working in pro-poor development.

The DRUSSA programme identifies the region's research-intensive universities as institutions whose capacity to be a key resource – for policy-makers and people working in the field – is under-utilised, and focuses on strengthening these universities' capacity to participate in the international developmental science system and to contribute locally contextualised research evidence to inform SSA and global development policy and practice.

The programme focuses specifically on strengthening and institutionalising Research Uptake Management (RUM) capacity and professional competencies. This is so that universities can better fulfil their unique role in their national science system and be primary producers of knowledge.

The five-year programme was established in October 2011 following a two-year design and development phase, including the CRU Scoping Study funded by UKaid.

*Platform 2013* was compiled and curated by DRUSSA Work Programme Four: Engagement and Communications, managed by Organisation Systems Design.

Disclaimer: This material has been funded by UKaid from the Department for International Development, however the views expressed do not necessarily reflect the department's official policies.





# THE DRUSSA LEADS GET CONVERSATIONAL

## John Kirkland, ACU

“Research Uptake Management” is a relatively new phrase, but the concepts that underlay it are well established and critical to universities. Higher education institutions are becoming more accountable for their use of public funds. Research is increasingly resourced by external donors and project based, with universities competing for funding. Greater competition for both research and students ensures that the reputation of individual institutions is more important than ever.

For all of these reasons, universities need to ensure that their research has a real impact on the outside world – and that this is well known both to potential users and the wider public. Yet this process does not happen by accident. Often, those responsible for producing research do not have the expertise to disseminate it effectively. Nor, sometimes, do they feel that this is the best use of their time. It has become increasingly clear that successful Research Uptake needs active encouragement and structures at the level of the institution – hence the phrase “Research Uptake Management”.

These issues are global. It is, however, appropriate that our project relates specifically to Sub-Saharan Africa, where wider “community service” has long been integrated into the formal aims of universities, and where the potential is now greater than ever for rapidly expanding higher education institutions to impact on their communities. As *Platform 2013* shows, if universities can get their Research Uptake Management right, then the potential benefits to society are huge.

 **Dr John Kirkland**  
Deputy Secretary General, The Association of Commonwealth Universities  
DRUSSA Programme Lead  
 (+44) 20 7380 6741  
 John.Kirkland@acu.ac.uk  
 www.acu.ac.uk



## Johann Mouton, CREST

The imperative for greater accountability for publicly funded research is recognised world-wide and no more so for research in developmental contexts. It is therefore not surprising that we have seen a resurgence of interest in studies on knowledge use and impact. The first “generation” of studies on knowledge diffusion and impact assessment emerged during the 1970s and 1980s. The second wave of studies in these fields started to proliferate in the early 1990s, again combining insights from the fields of monitoring and evaluation studies with knowledge uptake, utilisation and impact studies. In the second phase, we find much more systematic and rigorous attention to conceptual frameworks for science dissemination and communication, stakeholder identification and analysis, knowledge uptake and adoption strategies and ultimately the application of various quantitative and qualitative methodologies in assessing the broader social and economic benefits of public research. Frameworks such as the “payback framework” advocate the integration of these various approaches and for innovative solutions to measuring the “elusive” notion of social impact. These challenges have meant that CREST has developed a set of programme modules and courses that cover the whole spectrum of the domain of knowledge uptake, utilisation and impact. Included in these courses are topics such as “knowledge utilisation modules”, “science communication”, “research impact assessment” and “bibliometric methods for assessing scientific (citation) impact”.

 **Prof. Johann Mouton**  
Professor in and Director of the Centre for Research on Evaluation, Science  
and Technology at Stellenbosch University and the African Doctoral Academy  
DRUSSA Lead on Qualifications and Training  
 (+27) 21 808 3708  
 jm6@sun.ac  
 www.sun.ac.za/crest



## Diana Coates, OSD

Effective Research Uptake Management in a university requires strategy, policy, implementation, and – crucially – alignment between and across academic and university management support functions.

Researchers who produce scientific evidence, techniques, innovations and practices for public good may not have the skills or interest to “translate” their academic publications into a form that is user-friendly for their targeted stakeholder users and audiences.

As a publication, *Platform 2013* is an example of the work that has to be done to rework and present Sub-Saharan African research evidence for public policy influencing and decision-making. Compiling it has taken a sustained collaborative effort between the university manager and the researcher: to identify research suitable for “translation”; to pinpoint the stakeholders to whom it will be directed, and to draft these findings in a basic format that is ready to be transformed into copy to be published in print and digital platforms. It doesn’t end there. The process has included the expertise of research communication specialists and the resources of the universities’ public relations personnel to position the universities’ public profile, to gather visual images, to finesse the text into compelling stories accessible to a policy-influencing audience, and to design a functional and good-looking print and digital package. The next step is to strategically take *Platform 2013* to where its target readership is likely to be, both in print and digitally via the Research Uptake pages on DRUSSA University websites, the DRUSSA platforms and through social media networking.

Is it worth it?

It is, because powerful, relatable stories of research that can make a difference by succeeding in holding people’s attention. And getting the right people’s attention can make a big impact on getting Sub-Saharan African research into use.



**Diana Coates**

Managing Director of Organisation Systems Design CC.

Programme Secretariat/DRUSSA Lead on Research Uptake Communication



(+27) 21 709 0927

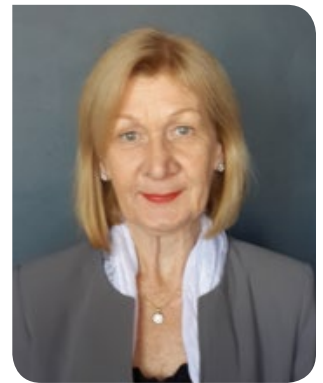


Diana.coates@drussa.net

diana@organisationsystemsdesign.co.za



<http://www.organisationsystemsdesign.co.za>



### The DRUSSA partnership consists of three entities:

- UK-based Association of Commonwealth Universities (ACU), an organisation with 110 African member universities;
- The Centre for Research into Evaluation, Science and Technology (CREST) at the University of Stellenbosch; and
- Organisation Systems Design (OSD), a South African-based consultancy specialising in facilitating change in the research management and capacity-building sectors in Africa.

# CONTENTS

---

<b>West Africa</b>	6
The infrastructural costs of overloading freight vehicles Kwame Nkrumah University of Science and Technology (KNUST)   Kumasi   Ghana	8
The importance of indigenous vegetables to human nutrition Obafemi Awolowo University   Ile-Ife   Nigeria	10
Sustainable integrated aquaculture development for food security University of Buea   Buea   Cameroon	12
Rotavirus vaccine introduction to save children's lives University of Ghana   Accra   Ghana	14
The popularity of superfood <i>moringa olifera</i> leads to income generation University of Ibadan   Ibadan   Nigeria	16
Social values influence uptake of new Malaria diagnostic tests University of Yaoundé 1   Yaoundé   Cameroon	18
<b>Southern Africa</b>	20
An Omega Caro-E food supplement affordably reduces disease risk Cape Peninsula University of Technology (CPUT)	22
Rural women benefit from textile technologies that enhance natural resources National University of Science and Technology (NUST)   Bulawayo   Zimbabwe	24
Evaluating the cost-effectiveness of TB/HIV interventions to improve uptake University of the Free State   Bloemfontein   South Africa	26
Developing skills in the water sector in impoverished communities University of Fort Hare   Alice   South Africa	28
Cross-breeding cattle highlights the potential of indigenous livestock in Africa University of Limpopo   Medunsa   South Africa	30
Affordable diagnosis methods address the re-emergence of sleeping sickness University of Zambia   Lusaka   Zambia	32



---

<b>East Africa</b>	34
Documenting local plant diversity opens up many opportunities in Ethiopia Addis Ababa University   Addis Ababa   Ethiopia	36
Micropropagating Kenyan cocoyams offers food security potential Kenyatta University   Nairobi   Kenya	38
Generating evidence to tackle drug abuse among Rwandan youth Kigali Health Institute/Rwanda Biomedical Centre   Kigali   Rwanda	40
Household factors hinder rural women's access to maternal healthcare Mbarara University of Science and Technology (MUST)   Mbarara   Uganda	42
Hazardous e-waste dumping in developing countries needs to be managed Moi University   Eldoret   Kenya	44
There are numerous benefits to saving the endangered <i>Acacia Kirkii</i> species National University of Rwanda   Butare   Rwanda	46
Onion farmers on sloping coastal land take up eco-friendly farming practices University of Mauritius   Réduit   Mauritius	48
Evidence supports access to safer, affordable water for Kenyan's urban poor University of Nairobi   Nairobi   Kenya	50
How to join the research uptake conversation on DRUSSA's innovative platforms	52



# **WEST AFRICA**



# At a glance

## Kwame Nkrumah University of Science and Technology (KNUST)

Under a special protocol between all members of the Economic Community of West Africa States (ECOWAS), Ghana's transport corridors have been opened to land-locked West African countries such as Burkina Faso, Nigeria and Mali to facilitate their import and export trade. The toll taken on Ghana's roads has prompted a study on the economic impact of the overloading of freight vehicles.

*By Prof. Kwasi Kwafo Adarkwa*



## Obafemi Awolowo University

The general objective of this Nigerian-Canadian Vegetable (NICANVEG) project is to increase food security and economic empowerment of resource-poor rural women farmers of Nigeria through the utilisation, cultivation, processing and preservation of under-utilised vegetable species.

*By Prof. Kehinde Taiwo*



## University of Buea

A Sustainable Integrated Aquaculture Development (SIAD) in Cameroon uses a farming system that integrates aquaculture and agriculture. This project is expected to benefit rural Cameroonian farmers by, amongst other outcomes, contributing to better quality food production with improved nutrient availability to rice crops, and to poultry, fish and pig farming.

*By Dr Benedicta O Oben*



## University of Ghana

Evidence-based data verifies the recognition of rotavirus as an important cause of life-threatening diarrhoea in children in Ghana and Africa, and advocates for shortening the introduction time of rotavirus vaccines in the Expanded Programme on Immunisation in Africa, when these vaccines become available.

*By Prof. George Enyimah Armah*



## University of Ibadan

The growing demand and acceptability for *moringa olifera* as a herbal remedy and health supplement has led to its becoming a part of a University of Ibadan value-chain research project in the field of agricultural extension and rural development. Community uptake of production, processing and marketing skills has led to income generation, while utilisation of the product by the community has resulted in reports of better health.

*By PI Prof. Janice Olawoye*



## University of Yaoundé 1

Treatment policies for uncomplicated malaria in Cameroon have changed four times since 2004. Most recently Malaria Rapid Diagnostic Tests (RDTs) have been presented as a way to subscribe to the 2010 World Health Organisation guidelines, which restrict the use of anti-malarials to parasitologically confirmed malaria cases only. Evidence-based field studies have revealed that, to reach the goal of universal malarial-treatment coverage using RDTs, particular attention must be paid to the values and priorities of health workers and patients.

*By Prof. Wilfred F Mbacham*





Economic impact  
Citizen costs and benefits

## THE COST OF OVERLOADING

### Vice-Chancellor Prof. William Otoo Ellis discusses Research Uptake at KNUST

In line with Kwame Nkrumah University of Science and Technology's vision and mission to enhance socio-economic development, as a part of our draft Research Policy paper we have prioritised dissemination of research findings to ensure uptake by policy-makers, the community and other stakeholders.

An assessment of the economic impacts of overloading on Ghana's major transit corridors is intended to inform decision-makers and stakeholders by capturing the benefits and costs accruing to Ghana's citizens as a result of controlling axle loads as well as of overloading of freight vehicles on Ghana's major transit corridors. In line with KNUST's strategic mandate and vision to disseminate and foster relationships with outside persons and bodies, and to enhance socio-economic development in Ghana and Africa, the objective, outcome and purpose of this research allows the university to engage with policy-makers, truck drivers and owners as well as other stakeholders on axle-load control and its impact on the economy. Congruent with the University's Research Uptake strategy of disseminating research and impacting socio-economic development, it could serve as the basis of future policy and subsequent implication rationale. The researcher, Prof. Kwasi Kwafo Adarkwa, plays an advisory role to Ghana's Ministry of Roads and Highways, as well as the Ministry of Transportation.



### THE OPENING OF GHANA'S TRANSPORT CORRIDORS TO LAND-LOCKED WEST AFRICAN STATES HAS PROMPTED A STUDY ON THE ECONOMIC IMPACT OF THE OVERLOADING OF FREIGHT VEHICLES.

#### Context

Under a special protocol between all members of the Economic Community of West Africa States (ECOWAS) in 2009, Ghana has had to open its transit corridors to land-locked countries such as Burkina Faso, Nigeria and Mali to facilitate their import and export trade. The distance by road between Ghana's two seaports of Tema and Takoradi and the landlocked countries is substantial, and hence there is a tendency for truck drivers to overload their vehicles. In addition, some freight vehicles with both origins and destinations in Ghana have also been observed to overload their vehicles irrespective of their trip lengths.

One implication of the foregoing is that road surfaces designed for a 15-year lifespan begin to show signs of deterioration after only 5 years. An obvious implication of this is that more funds will need to be secured for rehabilitation and subsequent maintenance of these roads. In spite of this, to date, very little is known about the economic impacts of overloading on Ghana's transit road corridors leading to its neighbouring countries.

The objective of the research paper, based on research that began in January 2011 and ended in June 2012 is, therefore, to assess the economic impacts of overloading on Ghana's major transit corridors. In addition, considering that initial efforts at axle-load controls on these corridors yielded limited success, efforts will also be made to understand these initiatives and why these did not achieve the desired impact.

The study was to a very large extent based on a review of published secondary materials, but the research paper includes limited interviews of major stakeholders to ascertain the extent of the impacts as well as their perceptions of these impacts, and makes recommendations for subsequent

The distance by road between Ghana's two seaports of Tema and Takoradi and the landlocked countries is substantial and, hence, there is a tendency for truck drivers to overload their vehicles.



interventions to be more effective and successful. In addition, other consultations and key informant interviews of weigh-bridge station operation were also undertaken.

The output of this study will include a detailed assessment of the overloading situation in Ghana as well as modelling of the economic impact on the national government's budget, using the HDM 4 software. It is also anticipated that there will be an assessment of the economic impacts on other stakeholders including the truckers and selected industrial establishments.

The intention of this paper is for its results to be used as a platform to inform decision-makers and stakeholders by capturing the benefits and costs accruing to Ghanaians as a result of controlling axle loads as well as overloading by freight vehicles on Ghana's major transit corridors. Once completed, this paper could therefore serve as the basis of future policy and subsequent implication rationale.

### Research into use

Decision-makers and stakeholders that this research would be of benefit to in terms of making policy decisions include:

Ministry of Roads and Highways; Ministry of Transport; Ghana Highway Authority; Ghana Ports and Harbours Authority; Cocoa Marketing Board/Produce Buying Company; Ghana Shippers Authority; Ghana Police Service/Motor Traffic and Transport Unit; Customs, Excise and Preventive Service; Ghana Haulage Transport Drivers Association (GHTDA); Ghana Haulage Transport Owners Association (GHTOA); Ghana Private Road Transport Union (Haulage Section – Flat Bed Station) and Ghana Institute of Freight Forwarders; Ghana Institute of Planners; Ghana Institution of Engineers and the Building and Road Research Institute.

...road surfaces designed for a 15-year lifespan begin to show signs of deterioration after only 5 years.



Researcher

**Prof. Kwasi Kwafo Adarkwa**

Immediate Past Vice-Chancellor

Department of Planning, College of Architecture and Planning



[kwasiadarkwa@yahoo.com](mailto:kwasiadarkwa@yahoo.com)



(+233) 208 124 848



[www.knust.edu.gh](http://www.knust.edu.gh)

Co-authors of the full research paper include

Dr Michael Poku-Boansi and Dr D Obeng-Atuah



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa |

**It's Happening here** for a Q&A that reveals more detailed information relating to this article, including useful contacts at Kwame Nkrumah University of Science and Technology (KNUST).



### GHANA

Kumasi — Kwame Nkrumah University of Science and Technology (KNUST)



Rural women farmers  
Food security  
Economic empowerment  
Nutrition

# NICANVEG UNDER-UTILISED VEGETABLES

## Vice-Chancellor Prof. Idowu Bamitale Omote discusses Research Uptake at Obafemi Awolowo University

The mission of Obafemi Awolowo University is to promote by research and other means the advancement of knowledge and its practical application to social, cultural, economic, scientific and technological problems. The University's Strategic Plan seeks to improve strategies for dissemination of research findings, and to reappraise, strengthen, and reposition the research institutes, centres and laboratories to enable them respond effectively to emerging national and global challenges. Towards this end, the project on underutilised vegetables has been selected to showcase the research dissemination channels within the University. Sustained cultivation and consumption of indigenous leafy vegetables may hold the key to solving the persistent problems of food insecurity and poor nutrition in the nation at large and in developing countries as a whole. Reaching the beneficiaries – rural women, policy-makers, researchers etc. – will enhance Research Uptake.

## THE IMPORTANCE OF INDIGENOUS LEAFY VEGETABLES TO HUMAN NUTRITION HAS BEEN REALISED IN THE PRESENT SITUATION OF ECONOMIC MELTDOWN, GLOBAL FOOD CRISIS AND CLIMATE CHANGE.

### Problem statement

Given the generally poor state of the rural farmers, and their inability to purchase highly nutritious food items, most rural dwellers resort to the consumption of indigenous leafy vegetables. These vegetable species are still gathered from the wild with great difficulty. In addition, organised research systems have not given these species priority in crop development for the improvement of human nutrition and enhancement of farmers' income. A common feature of many underutilised species is the poor storage of the harvested plant products, which limits shelf life and hence commercialisation.

### Rationale for research

Poverty-stricken rural women are the custodians of gathering, utilisation and preservation of the underexploited indigenous leaf and fruit vegetables. Most studies on leafy vegetables by researchers have focused on the routinely cultivated species. A significant proportion of crops are lost before getting to the ultimate consumers for lack of adequate storage facilities. The production and post-harvest handling procedures practised in tropical regions perpetuate heavy losses, while inadequate infrastructural facilities cripple marketing prospects. Processors are faced with high production costs due to low yields obtained during processing, inadequate supplies of desired quality raw material and the high cost of packaging. Also, problems are faced when attempts are made to meet quality standards stipulated by sophisticated markets. Solutions to these problems lie in the establishment of organised systems of production and the introduction of suitable post-harvest handling procedures. The general objective of this Nigerian-Canadian Vegetable (NICANVEG) project is to increase food security and economic empowerment of resource-poor rural women farmers of Nigeria through the utilisation, cultivation, processing and preservation of underutilised vegetable species.

### Methodology and activities

This proposed research will use a participatory approach involving rural women farmers and scientists. The thematic areas of interest are:

- i) **Development of an eco-geographic database** of Nigerian vegetables to compile baseline information that will be used for gender analyses and provide input into other phases of the

The ... objective of NICANVEG is to increase food security and economic empowerment of resource-poor rural women farmers of Nigeria through the utilisation, cultivation, processing and preservation of under-utilised vegetable species.





## NIGERIA

Ile-Ife — Obafemi  
Awolowo University

study. In addition, the baseline information will form the basis against which we can compare information gathered at the end of the study to assess the impacts of the study.

- ii) **Agronomic characterisation** – to determine the optimum agronomic practice which includes the best planting material and optimum planting density that can guarantee optimum performance, yield and economic returns and also identification of key leafy vegetable species for promotion and production.
- iii) **Advanced on-farm study** – to establish beneficial management practices with respect to fertility and water-use efficiency, and establish demonstration plots using appropriate Best Management Practices on farmers lands.
- iv) **Food technologies and market analyses** – develop post-harvest methods for processing and preservation of vegetables using technologies that can be readily adopted by the local farmers and end users/consumers.
- v) **Gender and marketing analyses** – to enhance the economic viability of the selected vegetable crops as well as to explore the marketing opportunities inherent in its processing and value addition.
- vi) **Communication** – multi-media publications, training, workshops and demonstrations.

A major focus of the project is training for poor rural women on production, processing, utilisation and marketing of underutilised vegetables for food security and financial empowerment.

## Research output and policy implications

Some of the research outputs so far include:

- Development of a GIS-linked database of the eco-geographical occurrence, uses, local processing methods, indigenous knowledge and nutritional qualities of the species collected.
- Gender disaggregated baseline databank on the management of underutilised indigenous vegetable resources.
- Selection of five indigenous vegetables using standardised criteria, multidimensional analyses and information provided by the users during the baseline surveys.
- Baseline conditions of underutilised vegetables in the study area and identification of drivers of vegetable cultivation and utilisation.
- Documentation of the impacts of crop diversification on environment, farm resilience, resource-use efficiency and gender equity.
- Development of agronomic package for high-premium underutilised vegetables of Nigeria.
- Establishment of field-tested procedures for implementing agronomic packages.
- Value addition for underutilised vegetables through improved processing.



### Want to know more?

Visit [www.drussa/net](http://www.drussa/net) | **Africa** | **It's Happening here** for a Q&A that reveals more detailed information relating to this article, including policy end users of this research, policy influencers targeted, the researcher's existing relations with the policy end user or ministry, and useful contacts at Obafemi Awolowo University.

### IDRC SPONSORED PROJECT – Duration: 2012–2015 (42 months)

#### Participating universities

1. Obafemi Awolowo University, Ile-Ife, Nigeria
2. Osun State University, Osogbo, Nigeria
3. Cape Breton University, Sydney, Canada
4. University of Manitoba, Winnipeg, Canada



Researcher  
**Prof. Kehinde Taiwo**  
Department of Food Science  
and Technology



[kehindetaiwo3@yahoo.com](mailto:kehindetaiwo3@yahoo.com)



(+234) 36 230 903



Researcher  
**Prof. Duro Oyedele**  
Principal Investigator in OAU  
Department of Soil Science



[d\\_oyedele@yahoo.com](mailto:d_oyedele@yahoo.com)



[www.oauife.edu.ng](http://www.oauife.edu.ng)



# SUSTAINABLE INTEGRATED AQUACULTURE DEVELOPMENT (SIAD)



Rural farming  
Job creation  
Food security  
Nutrition  
Design optimisation  
Waste reduction  
Sustainable environment  
International cooperation

## Vice-Chancellor Prof. Nalova Lyonga discusses Research Uptake at University of Buea

The triple purposes of teaching, research and community outreach, which most universities aspire to, are our prized goals – yet the impact of the University is hardly felt, even in Buea, Cameroon, where the University is rooted. Our research impact and influence on the community is still minimal, though one must not forget the great grants that some of our staff have won in biochemistry, fisheries, mathematics, gender, linguistics, etc. We must aim higher. Our vision is to increase the volume of not just basic research but also practical, outreach projects, with the challenge of not letting one minimise the other. Hence, training and transformation of many more members of staff remain our priority goals. We must stress Research Uptake as a way to improve how we would like the University of Buea to be looked upon by its stakeholders, to improve the quality of research themes in order to address the structural difficulties of an evolving population, and to adapt solutions taken from elsewhere and invent solutions answerable to the specific challenges of our own populations. The SIAD project takes a highly participatory approach to the development and implementation of innovative aquaculture methods, which address very relevant issues of food security at the national and regional levels. Notably, the project seeks to integrate best practices from participatory local communities, a strategy that we expect will enhance uptake and sustainability.

THE SIAD PROJECT USES A FARMING SYSTEM THAT INTEGRATES AQUACULTURE AND AGRICULTURE, AND AIMS TO CONTRIBUTE TO IMPROVING BROAD-BASED AGRICULTURAL PRODUCTIVITY, COMPETITIVENESS AND MARKETS FOR CAMEROON'S RURAL POOR, THROUGH THE DEVELOPMENT OF SUSTAINABLE INTEGRATED AQUACULTURE CAPACITY.

### Context

The University of Buea, in collaboration with Njala University, Sierra Leone and University of Ibadan, Nigeria, benefitted from the CORAF/WECARD Competitive Funding for two projects for the purpose of actualisation of Sustainable Integrated Aquaculture Development (SIAD) in Sub-Saharan Africa. The SIAD system of farming integrates aquaculture with agriculture, including crops and livestock. This project is expected to contribute to rural farmers, by, amongst other outcomes, contributing to better quality food production with improved nutrient availability to rice crops, and to poultry, fish and pig farming. The innovation and technology developments are carried out in close collaboration with poor, rural fish farmers, the direct beneficiaries.

### About the projects

The first project (no. 03/PA/10) is entitled "Sustainable integrated pond-based aquaculture with rice and poultry production: Economic, social and environmental assessment". This focuses on development of viable and sustainable integrated aquaculture systems with agriculture production (rice and poultry) for poor, rural farmers.

The second project (no. 03/PA/11) is "poverty eradication and grassroots empowerment through sustainable integrated aquaculture development: Fish, rice and piggery production". This seeks to improve food security and economic growth as a major priority for fighting poverty, especially at community level.

The way these systems integrate is that chicken and pig dung respectively are used to produce maggots, which in turn are used as an affordable, organic and high-protein feed for fish, while production of manure by the maggots is used for fertilisation of rice and pond beds.

This project seeks to improve food security and economic growth as a major priority for fighting poverty, especially at community level.



## Objectives

The Integrated Aquaculture projects aim to contribute to the objective of the CORAF/WECARD Operational Plan 2008–2013 which is to sustainably improve broad-based agricultural productivity, competitiveness and markets through the delivery of four results: 1) Development of appropriate technologies and innovations; 2) Development of strategic decision-making options for policy, institutions and markets; 3) Strengthening and coordination of sub-regional agricultural research systems; and 4) Facilitating and meeting demand for agricultural knowledge from target clients.

## Scope, duration and present status

Both projects are implemented in three West and Central Africa countries, Sierra Leone, Nigeria and Cameroon. The projects were launched in October 2011 and are due to end in October 2014. Commencement in Cameroon (University of Buea) was in October 2012. The projects are still in their beginning stages but some intermediary outputs, which are ongoing, include:

- i) the establishment of fish ponds, and a poultry and rice farm (for Project No. 03/PA/10) and the establishment of fish ponds, a piggery and a rice farm (for Project No. 03/PA/11) at the University of Buea and two community farms;
- ii) the establishment of a maggotty to produce maggots to be used fish feed; and
- iii) the production of manure from the maggotty for rice and pond-bed fertilisation.

## Evidence base/Benefits of Research Uptake

The results of this research will provide an evidence base for its uptake and lead to benefits including: the rehabilitation and re-stocking of abandoned ponds by the end of the project life; tackling of the problem of poverty and unemployment among the poor and vulnerable, especially women and children; development of capacity in sustainable integrated aquaculture techniques; and the development of land use systems through adaptive modern technologies and traditional experience compatible to the cultural and social values of the people.

For the University of Buea, these projects have inbuilt opportunities for capacity-building, for researchers and teaching staff, for construction of research infrastructure (e.g. fish ponds, poultry and piggery) which other teaching and research staff can exploit, and for the training and teaching of students. The involvement of other Research Institutes, Civil Society Organisations (CSOs) and Community-Based Organisations (CBOs) will ensure the University plays a meaningful role in its outreach mission to surrounding communities.


For the state of Cameroon, projects of this nature are of paramount importance. Fish provides at least 20% of the dietary animal protein in Cameroonian households and employs a significant proportion of our citizens. Therefore, it is expected that knowledge gained will improve the socio-economic conditions of fish farmers, create formal jobs and improve incomes in rural areas.


## Policy-makers to be influenced


It is hoped that the research projects will come to the notice of the Ministry of Livestock and Fisheries, Ministry of Agriculture, Ministry of the Environment and Ministry of Higher Education in Cameroon and be facilitated through them to ensure proper and prompt uptake. It is also hoped that regional and local administrators and community leaders will be influenced.


It is expected that knowledge gained will improve the socio-economic conditions of fish farmers, create formal jobs and improve incomes in rural areas.



 **Researcher**  
**Dr Benedicta O Oben**  
 Lecturer, Fisheries and Hydrobiology & Acting Coordinator  
 CORAF/ WECARD SAID  
 Cameroon Projects,  
 Fisheries and Animal  
 Production Programme  
 Department of Zoology  
 and Animal Physiology

 [obenben2001@yahoo.co.uk](mailto:obenben2001@yahoo.co.uk)  
[obenbenedicta@gmail.com](mailto:obenbenedicta@gmail.com)

 (+237) 7012 36 41

 [www.ubuea.net](http://www.ubuea.net)



## CAMEROON

Buea — University of Buea



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | **Africa** |  
**It's Happening here** for useful  
 information and contacts at  
 the University of Buea.

# ROTAVIRUS VACCINE INTRODUCTION

Children  
Health

## Vice-Chancellor Prof. Ernest Arteetey discusses Research Uptake at University of Ghana

One of the key purposes of the University of Ghana's (UG) research policy is to make available and accessible valuable research findings and results to targeted audiences. Research Uptake strategies are enhanced through the promotion of the University as a centre of excellence for research. As part of UG's Research Uptake strategy, four key research thematic areas will be pursued vigorously in the coming years. These are: malaria research; food production and processing; climate change adaptation and development policy; and poverty monitoring and evaluation. UG's commitment to Research Uptake is exemplified in the findings and results of the "Rotavirus Epidemiology and Vaccine introduction", which were presented at various meetings and seminars involving stakeholders.



DIARRHOEA IS A MAJOR DISEASE IN CHILDREN, AND WHILE ROTAVIRUSES HAVE BEEN IDENTIFIED AS AN IMPORTANT CAUSE OF DIARRHOEA WORLDWIDE, SUFFICIENT EVIDENCE WAS LACKING IN AFRICA.

### Problem statement

Despite the fact that diarrhoea disease can be prevented and treated, it continues to be a major cause of morbidity and mortality in children under five years of age. Babies younger than one year carry the greatest risk (65.4%) of dying from diarrhoea.

The immediate cause of diarrhoea is often due to an infestation of an infectious material that includes viruses, parasites and bacteria. Recognised as the major cause of viral diarrhoea, rotaviruses have been responsible for 60% of all diarrhoea in children worldwide since 2008. In that time, rotaviruses have caused 452 000 deaths in children globally, with more than 90% – 420 000 – of these deaths occurring in Africa and Asia. Rotavirus vaccines have now been developed and are available for use as an intervention for diarrhoea caused by rotavirus infection.

### Rationale for research

Although well established in the developed world, the significance of rotaviruses in diarrhoea in children continues to be grossly underestimated in Africa due to both a lack of expertise and the cost of diagnosis. Over the last two decades the overall objective of our research has been to provide much-needed evidence-based data to the Ministries of Health and Finance, as well as to policy-makers, to support the recognition of rotavirus as a significant cause of diarrhoea in children in Ghana and Africa. As it usually takes more than ten years for vaccines introduced in the developing world to get to African children, a further purpose of this data is to advocate for the decrease of introduction time of rotavirus vaccines in the Expanded Programme on Immunisation (EPI) in Africa, when these vaccines became available.

Rotaviruses have caused 452 000 deaths in children globally, with more than 90% – 420 000 – of these deaths occurring in Africa and Asia.



The research thrust has been:

- i) conducting epidemiological and burden of disease studies through the setting up of hospital-based rotavirus diarrhoea surveillance in hospitals in Ghana and other African countries;
- ii) conducting efficacy studies on available rotavirus vaccines; and
- iii) providing training and leadership on rotavirus diagnosis to other African countries, while advocating for the introduction of rotavirus vaccines in Ghana and Africa.

### Methodology and activities

The initial activities to provide evidence regarding the important role played by rotaviruses in diarrhoea in Ghana started in earnest in 1991, with studies by electron microscopy to document rotavirus shedding in stools of diarrheic children admitted to the only children's hospital, the



## GHANA

Accra — University of Ghana

The efficacy studies showed that RotaTeq® significantly reduced severe RVGE in African children through the first two years of life and was immunogenic in African children.



Princess Marie Louise Hospital, and the pediatric ward of the Korle Bu Teaching Hospital in Accra. This research was enhanced in 2001 with the setting up of an active and passive surveillance for rotavirus-associated diarrhoea in rural (Navrongo) and urban (Accra and Kumasi) Ghana, in order to generate baseline data on the epidemiology and seasonality of disease, associated symptoms including severity of diarrhoea, risk factors and particular strains circulating.

From 2009, these surveillance activities were enhanced by the setting up of burden-of-diseases studies in Ghana's two largest teaching hospitals to generate data on: the number of diarrhoea hospitalisations; the proportion of diarrhoea hospitalisations attributable to rotavirus; age-specific diarrhoea hospitalisations attributable to rotaviruses; and duration of hospitalisation for rotavirus-associated diarrhoea.

To help address the historical observation that, while rotavirus vaccines have shown good efficacy in developed countries, they have shown little or no efficacy in developing countries, we led a multi-site (Kenya, Mali, and Ghana) efficacy, safety and immunogenicity study on the rotavirus vaccine RotaTeq™ in Africa. In addition, from 2006 we held annual training workshops for African clinicians and technicians on rotavirus identification, diagnosis and strain characterisation, to help generate evidenced-based data for rotavirus vaccine advocacy activities across Africa.

### Research output and policy implications

Surveillance studies in Ghana showed that more than 39% of children with diarrhoea were infected with rotaviruses, and that by 12 months of age 75% of infants had been infected with the virus, with the greatest window period of risk being 6 to 18 months of age. Studies from the African surveillance showed that more than 40% of children hospitalised with diarrhoea in Africa are infected with rotaviruses and multiple-strain Rotavirus Gastroenteritis (RVGE) circulating across Africa, with regional differences in strain predominance.

These results have helped to delineate the important role played by rotaviruses in diarrhoea in children and its large burden of disease. The study clearly demonstrated that rotavirus vaccination was a cost-effective intervention and provided the evidence-based data that the Ghana Ministries of Health and Finance needed to inform them on rotavirus disease burden, and helped them to make policy decisions on introducing rotavirus vaccines and including them in Ghana's EPI in June 2012. The research has also informed and influenced other countries in Africa and the developing world in their decisions on introducing rotavirus vaccines to their respective EPIs. Finally, our study has contributed to the anticipated prevention of more than 2 000 rotavirus-associated diarrhoea deaths and more than 100 000 hospitalisations in Ghanaian children annually.



#### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | **Africa | It's Happening here** for a Q&A that reveals more detailed information relating to this article, including policy end users of this research, policy influencers targeted, the researcher's existing relations with the policy end user or ministry, and useful contacts at the University of Ghana.



Researcher

**Prof. George Enyimah Armah**

Senior Research Fellow EM/Histopathology Department



[garmah@noguchi.mimcom.org](mailto:garmah@noguchi.mimcom.org); [garmah@ug.edu.gh](mailto:garmah@ug.edu.gh)



(+233) 208 246 513



[www.ug.edu.gh](http://www.ug.edu.gh)

# PRODUCTION, PROCESSING AND MARKETING OF MORINGA OLEIFERA BY RURAL WOMEN

Income generation  
Well-being  
Hunger reduction  
Rural  
Women

## Vice-Chancellor Prof. Isaac Folorunso Adewole discusses Research Uptake at the University of Ibadan

One of the missions of the University of Ibadan is *to contribute to the transformation of society through creativity and innovation*. Towards the realisation of this mission, the University is committed to fostering the continuous uptake of research projects that contribute to national development. This is exemplified by the MacArthur Foundation-sponsored Community Integrated Rural Development Project (CIRDP) implemented among rural women in Ile-Ogbo, Osun State, Nigeria. This project has enhanced income generation and well-being of the community. Specifically, it has contributed to poverty and hunger reduction, thus promoting progress in the achievement of selected Millennium Development Goals.



THE POPULAR SUPERFOOD *MORINGA OLIFERA* BECAME PART OF A UNIVERSITY OF IBADAN VALUE-CHAIN RESEARCH PROJECT IN THE FIELD OF AGRICULTURAL EXTENSION AND RURAL DEVELOPMENT. THIS HAS RESULTED IN COMMUNITY UPTAKE OF PRODUCTION, PROCESSING AND MARKETING SKILLS, WHICH HAS LED TO INCOME GENERATION AND IMPROVED RURAL COMMUNITY WELL-BEING.

### Background to the development project

The Community Integrated Rural Development Project (CIRDP) at Ile Ogbo, Osun State was conceived as one of the outreach projects of the MacArthur Foundation grant to the University of Ibadan. This was seen as an opportunity to put into practice the rural and agricultural development strategies being taught in the University as well as giving back something tangible to the community of Ile Ogbo that has had a hospitable and generous relationship with, particularly, the Faculty of Agriculture and Forestry. Indeed, in the early 1980s, the community gave the University 217 hectares of land for teaching and research purposes.

CIRDP was designed with relevant activities to accomplish the overall project goals of improving welfare and livelihoods of rural dwellers, promoting gender equity and alleviating poverty, while enhancing the research and teaching environment for staff and students of the Faculty of Agriculture and Forestry. The four components of the project are: Capacity-Building, Social Capital Development, Institution Strengthening, and Enhancing Teaching and Research.

Over the project period from 2009 to 2013, several training workshops were conducted for the rural inhabitants including: sweet potato production; processing and consumption for women; rearing snails for women; and rearing grasscutters (the greater cane rat) for men. In each of these workshops, the emphasis has been upon teaching new skills and alternative activities that can generate income for the rural dwellers.

Equipment and start-up materials were provided to the participants to enable them to begin the production. Follow-up visits have confirmed that, to a large extent, the activities are yielding sustainable additional income. Processing equipment for oil palm processors and cassava processors was fabricated and given to women's groups, reducing the drudgery and expense of some of their major activities. Equipment was also given to a group of blacksmiths to ensure that there was greater gender equity in the project as the men began to feel marginalised, with more attention being given to the women of the community.

The *moringa* plantation has now grown to about 5 000 stands and the women report that they are making a significant additional income.





### Project activities with rural women and *moringa olifera*

One of the activities under the capacity-building component of the project was training rural women in Ile Ogbo about the production, processing, marketing and even utilisation of *Moringa olifera*. This activity was not originally in the proposed project, but interest was generated with the growing demand and acceptability of the product as a herbal remedy and health supplement.

*Moringa olifera* is marketed globally as a “superfood” with numerous benefits including contributing to muscle growth, skin health, improved immune system functioning, weight loss and as a natural source of nutrients.

With participation by the Centre for Entrepreneurship and Innovation (CEI) at the University and the involvement of a student organisation, Students in Free Enterprise (SIFE), as well as an NGO, the training workshop was a well-coordinated case of private, public and student partnership.

Even before the workshop took place, 2 000 stands of *moringa* had been established by the University staff, together with the help of undergraduate students from the Faculty of Agriculture and Forestry (A&F). This meant that as soon as the training for the group of 25 women was completed, they were able to start harvesting, processing and marketing. The A&F Faculty has a trained agriculturalist residing in the community who is able to assist the farmers, male and female, with their production problems. He has been able to advise the women on the production, processing and marketing of the *moringa* that is now being sold in powder form. One of the identified problems was the difficulty in drying the *moringa* leaves during the rainy season. The project was able to give the women a locally fabricated dryer to overcome this constraint.

With enlightenment about the nutritional and medicinal benefits of the product, *moringa* powder is now being sold and used not only locally, but also outside the community. Several people in the community have stated that their health has improved with the regular intake of *moringa olifera* as tea or mixed with their meal.

The *moringa* plantation has now grown to about 5 000 stands and the women report that they are making a significant additional income. With further capacity building, their group has become more effective in assigning work and obtaining profits equitably. Initially a quantity of 1 000 packaging and labelling materials was supplied, but with the instruction that after this was used up, the women would have to purchase their own. The project staff linked the women with the suppliers and, from their profit, the women were able to replace their materials and continue to sell their produce. From all indications, this has been a sustainable intervention.

Several people in the community have stated that their health has improved with the regular intake of *moringa olifera* as tea or mixed with their meal.



#### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | Africa | It's Happening here for a Q&A that reveals more detailed information relating to this article, including useful contacts at the University of Ibadan.



### NIGERIA

Ibadan — University of Ibadan



Researcher

**Prof. Janice Olawoye (PI)**  
Department of Agricultural  
Extension and Rural  
Development



[jeolawoye@yahoo.com](mailto:jeolawoye@yahoo.com)



(+234) 810 2346



Co-authors include  
Prof. A A Ladele,  
Prof. A E Adekoya,  
Dr Stella O Odebode  
and Dr O B Oyesola

# CAMEROON'S ANTI-MALARIA CAMPAIGN

Health  
Malaria

## Vice-Chancellor Prof. Maurice Aurélien Sosso discusses Research Uptake at the University of Yaoundé 1

At the University of Yaoundé 1 research is fuelled by two drives: the quest for a fundamental understanding of systems, and the application of results for development. By forging bidirectional, intercontinental synergies and cooperation, the UYI's three-fold mission entails teaching, research and contribution to development. These intersect with a desire to professionalise, consolidate and modernise the University of Yaoundé 1's current operations and the definition of eleven strategic development objectives Research Uptake results. Of these, the seventh strategic objective is to improve the health of Cameroonians. To this end, the University of Yaoundé 1 is committed to establishing evidence that supports the best uncomplicated malaria treatment options in Cameroon. Prof. Mbacham, alongside other ace malarialogists at the UYI, make a technopole of expertise that has provided information to reshape policy in the development of national therapeutic guidelines, and is using reverse epidemiology to explore new questions on how to improve on the management of uncomplicated malaria. These questions will directly affect how treatment will subsequently be administered and would not have been possible without field experience.

## TREATMENT POLICIES FOR UNCOMPLICATED MALARIA IN CAMEROON HAVE CHANGED FOUR TIMES SINCE 2004. TO REACH THE GOAL OF UNIVERSAL MALARIAL-TREATMENT COVERAGE, POLICY CHANGES MUST TAKE INTO ACCOUNT EVIDENCE FROM FIELD-BASED STUDIES.

### Evidence on safety and efficacy corroborate Cameroon's change of policy

A study that began in Cameroon in 2004, at the time of a malarial-treatment policy change to artemisinin-based combination therapy, has today extended to 51 health institutions, involving 6 000 patients and has generated 13 million bytes of data. This study was to evaluate the safety and efficacy of monotherapy with amodiaquine (AQ), sulphadoxine-pyrimethamine (SP) or their combination (AQ-SP) for the treatment of uncomplicated *plasmodium falciparum* malaria in children in Cameroon. Results demonstrated a failing efficacy to AQ and SP of 60–75%. Subsequently, an investigation of the Artemisinin Combination Therapy (ACT) was pursued with a demonstration that the safety and cure rates of the various combination therapies (Artesunate-Sulpho-methoxypyrazone Pyrimethamine, Artemether-Lumefantrine, Dihydro-Artemisinin-Piperaquine and Artesunate-Amodiaquine) were above 95%, thereby justifying that the change in policy was necessary in reducing morbidity and deaths due to malaria.

An important finding in the field was the observation that Cameroon was in flagrant violation of "Appropriate Treatment" as defined by the World Health Organisation (WHO), which requires that patients who are malaria parasite-negative should not be treated with Artemisinin Combination Therapy. A cross-sectional cluster survey was conducted in Cameroon among individuals of all ages who sought treatment for a fever, which is a known symptom of malaria.

The percentage of patients that were prescribed or received an ACT differed significantly, depending on the type of facility where they had sought treatment: 65% of patients at public facilities, 55% of patients at private facilities and 45% of patients at medicine retailers. Of all of these only 50% were parasitologically-confirmed malaria cases.

Public health policy-makers and practitioners need to pay careful attention to the values and priorities of health workers and patients.







## CAMEROON

Yaoundé — University of Yaoundé 1

### Physician and caregiver habits limit anti-malaria universal coverage

Malaria rapid diagnostic tests (RDTs) have been presented as a means to operationalise the new WHO guidelines published in 2010, which restrict the use of anti-malarials to parasitologically confirmed malaria cases only.

With Cameroon's plan to introduce the RDTs to replace microscopy or clinical diagnosis of malaria at health facilities, a three-arm intervention trial was conducted in 49 health facilities in the Yaoundé and Bamenda environs. As part of this intervention, clinicians enacted malaria management as a clinical practice. These enactments of malaria treatment contrasted with evidence-based guidelines emanating from the WHO, which assume that the presence of the malaria parasite is the central driver of malaria treatment practice. What the role-plays revealed was a more complex – even holistic – process behind clinical treatment decisions, which involved attention to pathophysiology, but also included accommodating the patient's treatment wishes, looking after their own medical reputations, and utilising tests and medicines for their therapeutic effects as symbols in the process of care. Studying this treatment process was insightful in discovering some of the reasons why ACTs were being over or wrongly prescribed.

By bringing RDTs into this complex malaria treatment process, we successfully demonstrated that there was a significant change, from 68% to 40%, of physicians who refrained from prescribing of an ACT or antimalarial if the rapid diagnostic test was negative, because they were trained to attend to the aspects of holistic care. What this study made very clear, was that if RDTs are to be taken up in routine care, public health policy-makers and practitioners need to pay careful attention to the values and priorities of health workers and patients, and make sure these are taken into account when compiling evidence-based guidelines, training processes and treatment policies.

A willingness to change or reverse epidemiological (the science of the study of patterns, causes and effects of health and disease conditions in defined populations) paradigms has been useful in generating new operational directives for the National Malaria Control Programme (NMCP). The researcher, Prof. Mbacham, advises the Clinton Health Access Initiative in Cameroon and serves as the executive director of the Multilateral Initiative on Malaria, a pan-African organisation for the promotion of research excellence and control in Africa. In Cameroon he also serves as the executive secretary for the Cameroon Coalition Against Malaria (CCAM), an advocacy group that has mentored parliamentarians to be aware of the changing patterns of malaria and policy options. Prof. Mbacham has been able to use reverse epidemiology to explore new questions on how to improve on the management of uncomplicated malaria through the generation of new biomarkers of disease progression. Options for quantitative RDTs are being explored, while the multiplex diagnosis of origins of fevers are being developed into fundable proposals. These questions will directly affect how treatment will subsequently be administered and would not have been possible without field experience.



#### *Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa |

**It's Happening here** for a Q&A that reveals further information relating to this article, and useful contacts at the University of Yaoundé 1.



**Prof. Wilfred F Mbacham (MS, DS, MPH, ScD)**  
Coordinator, Graduate Programme for Life Sciences



[wfmbacham@prd-college.eu](mailto:wfmbacham@prd-college.eu)



(+237) 974 515 46



[www.uy1.uninet.cm](http://www.uy1.uninet.cm)



# **SOUTHERN AFRICA**

# At a glance

## Cape Peninsula University of Technology (CPUT)

The Omega Caro-E supplement project, led by CPUT's Functional Food Research Unit, is a tangible example of innovation output at CPUT. It provides an affordable option to communities to lower the risk of developing chronic ailments like cardiovascular disease, arthritis, cancer and strokes.

*By Prof. A J S Benade and Dr Maretha Opperman*



## National University of Science and Technology

In Zimbabwe, gender inequalities continue to influence the dependence of women on men. To address this, textile technologies that enhance women's indigenous knowledge systems and product-making skills have been used to empower women through training and research. Previously funded, the programme of activities is now sustainable.

*By Prof. Londiwe Nkiwane*



## University of the Free State

To date, relatively little work has focused on understanding why TB patients may not accept effective, integrated/collaborative TB/HIV services. The Centre for Health Systems Research and Development CHSR&D at University of the Free State is undertaking a public health evaluation of the cost-effectiveness of training and mentoring interventions to improve TB patients' uptake of HIV testing.

*By Prof. Christo Heunis*



## University of Fort Hare

The shortage of skills in water quality management remains a recurring problem in South Africa. The University of Fort Hare is tackling the issue by running an innovative project aimed at assessing the quality indices of the final effluents of some wastewater treatment facilities in the Eastern Cape province, while simultaneously serving as a vehicle for capacity development in water quality.

*By Prof. Al Okoh*



## University of Limpopo

Highlighting the important role that indigenous livestock can play in Africa, terminal cross-breeding of Nguni cows with Angus bulls is being used as means to increase the output of beef cattle in South Africa. The Nguni project and related research respond directly to national priorities, namely those of rural development, improved food security and land reform, and creation of jobs and sustainable livelihoods.

*By Prof. J W Ng'ambi*



## University of Zambia

Sleeping sickness is a re-emerging tsetse-transmitted debilitating disease of humans and animals in Sub-Saharan Africa. Diagnosis in endemic regions remains unsatisfactory, but a study at the University of Zambia is revealing that cost-effective loop-mediated isothermal amplification (LAMP) may be the answer to sleeping sickness diagnosis in resource-limited regions.

*By Prof. Boniface Namangala*





Health  
Nutrition  
Bio-Economy  
Biotechnology  
Commercialisation

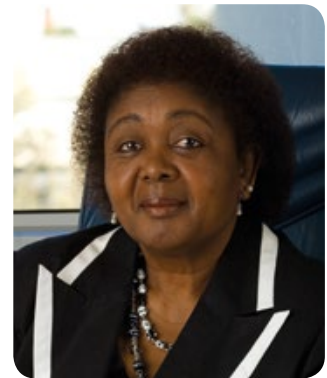
# FUNCTIONAL FOODS

## Vice-Chancellor Prof. Vuyisa Mazwi-Tanga discusses Research Uptake at the Cape Peninsula University of Technology (CPUT)

CPUT has a strong focus on applied research. As such our research, technology and innovation efforts are focused on producing tangible benefits in response to key social and economic challenges facing communities in South Africa, the African continent and the developing world. We have accordingly crafted a 10-year Research and Technology Innovation Blueprint as a strategic frame to achieve our mandate to engage in knowledge production activities which contribute to human and economic development.

Our blueprint defines innovation as “the process of transforming an idea, generally generated through R&D, into a new or improved service, product, process or approach that relates to the real needs of society and involves scientific, technological, organisational or commercial activities. The key to this definition is the fact that the innovation process is only complete once a defined product, process or system with some tangible benefit has been implemented”.

The Omega Caro-E supplement project, led by the institution’s Functional Food Research Unit, is a tangible example of innovation output at CPUT. It provides an affordable option to communities to lower the risk of developing chronic ailments like cardiovascular disease, arthritis, cancer and strokes. The supplement is the brainchild of two innovators – Prof. Spinney Benade and Dr Maretha Opperman, who are constantly pushing the boundaries of research and innovation.



**THE INGREDIENTS OF A UNIQUE AND AFFORDABLE OMEGA CARO-E FOOD SUPPLEMENT HAVE BEEN SCIENTIFICALLY PROVEN TO HAVE SPECIFIC HEALTH BENEFITS IN TERMS OF HEALTH PROMOTION AND REDUCING THE RISKS FOR DISEASES SUCH AS CARDIOVASCULAR DISEASE, CANCER AND INFLAMMATORY DISEASES.**

### Context

While there are a large number of Omega-3 fatty acids supplements available on the market, CPUT’s product is the only one of its kind featuring a unique combination of natural molecules. The supplement, available in capsule form, contains a combination of fish oil and a palm oil concentrate made up of 11 different carotenes and 5 different forms of vitamin E.

### Research

The development of the food supplement was backed by an injection of R3.2 million from the institution’s Innovation Fund, a vehicle that promotes novel research ideas that can ultimately be introduced into economic and social markets. The Functional Foods Research Unit, headed by Benade, was the first research unit at CPUT to be funded by the Innovation Fund.

Over a three-year period the researchers conducted clinical trials to develop and implement a model that can determine the required daily intake of Omega-3 fatty acids. This created a platform for clinical investigations on the effect of Omega-3 fatty acid supplementation on degenerative diseases, and paved the way for the development of the supplement and the patent.

“The typical South African diet is poor in fatty fish, fruit and vegetables – which is where affordable Omega Caro-E comes in. Influenced by 30 years of research experience with Omega-3 fatty acids and carotenoids, I realised the potential health advantages of combining these components into a

The typical South African diet is poor in fatty fish, fruit and vegetables – which is where affordable Omega Caro-E comes in.





### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | **Africa | It's Happening here** for a Q&A that reveals more detailed information relating to this article, including policy influencers targeted, and useful contacts at CPUT.

## SOUTH AFRICA

Cape Town — Cape Peninsula University of Technology

single product. With the support of Opperman and the team, as well as collaboration with the palm oil industry, this product became a reality with no comparable product available globally," says Benade.

### Endorsement

With a patent registered in 2012, the product has been welcomed by those in the health sector. In March this year, the supplement received a Seal of Recognition from the Cancer Association of South Africa (Cansa). This is the first time that Cansa has endorsed a food supplement. Cansa's decision to support the product is based on extensive research and analysis of 63 fish oil supplements that are currently available on the market.

The research commissioned by Cansa concluded that the combination of Omega-3 fatty acids, docosahexaenoic acid and eicosapentaenoic acid, plant derived carotenes, tocopherol and tocotrienols, in two capsules of Omega Caro-E reduces inflammation and may assist in reducing the risk for cancer. The formulation is such that the amount of carotenes in two capsules is 6mg per day which relates to the equivalent found in about five fruits and vegetables per day. The capsules also contain a special form of vitamin E that has super anti-oxidant properties.

### Policy

Currently there are 63 different Omega-3 fish oil supplements available on the South African market, which demonstrates the popularity of this kind of product among consumers. However, tests done have revealed that of these, only 7, including Omega-Caro E, meet the claims stated by the manufacturers. Prof. Benade and Dr Opperman argue that consumers do not always have the insight, knowledge and the correct information to make an informed decision on the supplement they are buying. "They are exposed to misleading health claims made in advertisements," say the researchers.

By providing scientifically validated information to the public about their product, the researchers argue that such a process must be followed by all other organisations producing food supplements. The researchers hope to influence government policy regulating the multi-million rand food-supplement industry. They argue that the legislative authorities must provide proper and suitable legislation to protect consumers and to ensure reliable quality of food supplements. Profits gained from commercialisation of this supplement will be reinvested for future research projects involving essential fatty acid-, micronutrient-, cancer-, HIV- and cardiovascular-disease research.

Finally, the outputs of this research are contributory to more than one of the Millenium Development Goals (one of the considerations of CPUT's Research and Innovation Strategy) including that of improving the health of Africa's poor children, women and men.

The researchers hope to influence government policy regulating the multi-million rand food-supplement industry.



Researcher  
**Prof. A J S Benade**  
Director  
Functional Foods Unit



[benades@cput.ac.za](mailto:benades@cput.ac.za)



(+27) 21 460 3202



Researcher  
**Dr Maretha Opperman**  
Researcher and Senior Lecturer  
Functional Foods Unit



[opperman@cput.ac.za](mailto:opperman@cput.ac.za)



(+27) 21 460 4213



**Functional Foods Unit**



(+27) 21 953 8676/7



[www.cput.ac.za](http://www.cput.ac.za)



# RESEARCH FOR SUSTAINABLE ECONOMIC EMPOWERMENT

New technologies  
Empowerment  
of women  
Poverty alleviation  
Rural communities  
Environmental  
Sustainability  
Youth development

## Vice-Chancellor Prof. L R Ndlovu discusses Research Uptake at National University of Science and Technology

The National University of Science and Technology (NUST) is committed to community engagement and having its research focused on the problems affecting communities (particularly rural) and addressing the Millennium Development Goals. Thus, the NUST Mission Statement, Research Strategy and Research Policy have elements which focus on these issues. The Research Policy (to be implemented shortly) has Research Uptake through dissemination as a significant component. The research project being highlighted here (for DRUSSA) has addressed issues of poverty alleviation in rural communities and empowerment of women. The current beneficiaries of the outputs have been policy-makers, rural communities and academic audiences. The project has been prioritised (along with three others) for wider dissemination through the NUST web page and other routes such as social and print media.



**IN ZIMBABWE, GENDER INEQUALITIES CONTINUE TO INFLUENCE THE DEPENDENCE OF WOMEN ON MEN. TO MINIMISE THIS DEPENDENCE, TEXTILE TECHNOLOGIES HAVE BEEN USED TO EMPOWER WOMEN THROUGH TRAINING AND RESEARCH.**

### Background story

The research is in line with the Mission Statement of the University, which is 'to contribute positively towards the advancement of humanity through the provision of knowledge-based solutions to scientific, technological and economic problem'. This research was funded by DFID through DelPHE, in partnership with Moi University, and two other institutions.

### Which communities and why?

The project focused on the use of natural resources and plant products to contribute to textile technologies employed by rural women in the Lupane District of Zimbabwe. The Lupane District has not had much development since post-independence in 1980. Most men leave villages to fend for their families in towns or neighbouring countries. They rarely visit home because their salaries are too low to allow for frequent travel. Women became engaged in basketry making to try and contribute to household incomes. The aim of the project was to help empower the women through the application of scientific techniques that enhance their own indigenous knowledge systems. Women were trained in various textile-related technologies such as tie-dye, and weaving with different types of fibres such as sisal fibres (ilala) and cotton yarn. Women who had been trained then went on to train other women in their villages and this has helped in disseminating knowledge faster and to a wider audience. The project has therefore contributed to poverty alleviation and gender parity in Lupane.

### Which policy-makers need to be influenced?

The ministries of Small and Medium Enterprises, Youth Development, Gender and Employment Creation and Science and Technology Development all have a direct interest in the project. In particular the former two ministries needed to be engaged so as to disseminate the findings of the project.

At the start of the project the following were consulted:

- a) Local leadership (traditional and political) at village level, who granted us permission to work in their communities;

The aim of the project was to help empower the women through the application of scientific techniques that enhance their own Indigenous knowledge systems.



- b) Lupane Women's Centre, that started the formation of village clusters for training of women; and
- c) Respected elders with indigenous wisdom in the community.

In addition, women from Lupane were asked to attend meetings to discuss their occupations and livelihoods. They were already making items such as baskets, however the range and diversity of colours were very limited as most common natural plant dyes, such as pink-ivory and aloe, tend to produce shades of brown. The Department of Textile Technology at NUST identified ways in which certain interventions would help enhance the range of colours used in their products, as well as expand the range of items produced. Women were then able to make products decorated with more colours, and with improved workmanship. These products sold at higher prices, enabling the women to pay school fees for their children. Various indigenous plant species, which could provide even greater diversity of colours for used in product manufacture, continue to be identified. The scientific basis of textile production from natural fibres and use of dyes was taken up and practically implemented by the beneficiaries.

### Research underway

Fibres and dyes continue to be brought to the laboratory so that their chemical and physical properties can be analysed to determine their expansion/limitation in their applications to different products. Research into the softening of Ilala and sisal fibres continues. Bark, roots and leaves of trees are being investigated, and more research is underway to identify plants that can give a blue hue. Breakthroughs in these areas will allow the communities to further expand their product ranges.

### When did the research start?

The Lupane project was started with a grant from DFID in 2006. The project came to an end in 2009, however, the activities continued after the termination of funding as the programme of activities is sustainable both now and in the future.

The results have been shared with the scientific community through conferences and journal articles. Workshops have been held with local women where results have been shared. Information on outputs and outcomes has been shared with relevant ministries. Similar research on dyes has been conducted in other districts such as Bulilima, Zimbabwe. In Gwanda women picked wild silk cocoons, which were sold semi-processed before being sold for fibre extraction. The National Research Foundation (NRF) of South Africa provided funds to develop the fibres into garments. Research in Ilala dyeing is highlighted in the "Good Practices Guide: Africa Unit UK/Africa Partnership in HE/FE" for June 2010. This was a direct contribution from the Principal Investigator.

The significance of the research outputs has been recognised by the Research Council of Zimbabwe. An award in the "Social Science and Humanities" category was made to the lead researcher Prof. Londiwe Nkiwane. As research dissemination activities begin to gain momentum at NUST under the DRUSSA programme, there are plans to share the outputs with a wider audience. A webpage for the project will be available by 31 August 2013. Policy briefs are also in preparation for interested ministries. Although results have been shared with a limited audience so far, the lead researcher will engage relevant decision-makers in the Ministries of Small and Medium Enterprises, Youth Development, Gender and Employment Creation, and Science and Technology Development in future to ensure wider dissemination within Zimbabwe and possible implementation in other districts.



Researcher  
**Prof. Londiwe C Nkiwane**  
Associate Professor in  
Textile Technology

✉ [londiwe.nkiwane@nust.ac.zw](mailto:londiwe.nkiwane@nust.ac.zw)  
[lcfigg@gmail.com](mailto:lcfigg@gmail.com)

☎ (+263) 9 282 842

🌐 [www.nust.edu.pk](http://www.nust.edu.pk)



#### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | **Africa | It's Happening Here** for a Q&A that reveals more detailed information relating to this article, including policy end users of this research, policy influencers targeted, the researcher's existing relations with the policy end user or ministry, and useful contacts at the National University of Science and Technology.



### ZIMBABWE

Bulawayo — National University  
of Science and Technology

# TB/HIV INTERVENTION EVALUATION

Health  
HIV/AIDS  
TB

## Vice-Rector Prof. Jonathan Jansen discusses research that makes a difference at the University of the Free State

One of the most powerful “turns” in social and scientific research in recent times has been a concern with research that makes a difference. Whether it is evidence-based, policy-making or practitioner-led research or public interest research or impact evaluations, there is a determined push for research to speak directly to the most compelling problems facing the planet today. The TB/HIV co-epidemic represents a daunting challenge in our province, country and continent. The reported Public Health Evaluation to establish the best means to increase the rate of HIV testing by TB patients reflects a concerted and promising effort of university–government collaboration to act upon the evidenced imperative to better integrate disease control programmes.

The University of the Free State is at the centre of the global quest for greater relevance in the research enterprise. Our health systems research brings together theory, research and practice to address problems at the interface of trans-disciplinary (social science and medicine, for example) inquiry. Research that makes a difference is, and has to be, borderless. That is why so much of our research at the UFS is done with international partners from other parts of Africa, Asia, Europe and North America. Our emerging scholars are consciously placed alongside leading international researchers in their fields so that we can collaborate on common problems using conceptual and methodological tools that learn from each other. Research for the common good is not, of course, some mindless utilitarianism that reduces all research to toolboxes, instruments and methods. Our research remains both rich in theory and transformative in practice.



**THE CENTRE FOR HEALTH SYSTEMS RESEARCH AND DEVELOPMENT (CHSR&D) AT UNIVERSITY OF THE FREE STATE IS UNDERTAKING A PUBLIC HEALTH EVALUATION OF THE COST-EFFECTIVENESS OF TRAINING AND MENTORING INTERVENTIONS TO IMPROVE TB PATIENTS' UPTAKE OF HIV TESTING IN THE FREE STATE PROVINCE.**

### TB/HIV co-infection

TB control is largely compounded by the HIV/AIDS epidemic, i.e. the “... most powerful factor ever known to favour the development of [TB]”. People living with HIV/AIDS who are co-infected with TB are about 21–34 times more likely to develop active TB disease. South Africa has a high TB/HIV co-infection rate of about 65%, yet the HIV status of around 20% of TB patients remains unknown. To date, relatively little work has focused on understanding why TB patients may not accept effective, integrated/collaborative TB/HIV services.

### Monitoring the cost-effectiveness of training and mentoring interventions

In the public sector, primary health care (PHC) nurses and community health workers (CHWs) offer HIV counselling and testing (HCT) and other TB/HIV services at clinics on a daily basis. These two provider groups are therefore well positioned to alter the delivery of HCT services in order to improve patient participation, uptake and, ultimately, health outcomes. Funded by the Centers for Disease Control and Prevention (CDC) as a Public Health Evaluation (PHE), the CHSR&D is undertaking a quasi-experiment with a pre-post intervention design to increase the uptake of HCT by TB patients through implementing, evaluating and comparing the cost-effectiveness of different training and mentoring (T&M) interventions among PHC nurses and CHWs. The PHE is taking place in four local municipalities, randomly assigned to intervention and control. The

To date, relatively little work has focused on understanding why TB patients may not accept effective, integrated/collaborative TB/HIV services.





## SOUTH AFRICA

Bloemfontein — University of the Free State

project is conducted in close partnership with the TB and HIV & AIDS/STI and CDC directorates of Free State Department of Health (FSDoH).

### Uptake of recommendations

An implementation science approach is followed to ensure uptake of recommendations by the provincial TB and HIV/AIDS programmes. Uptake is also encouraged by high-impact publications. A first round of research feedback workshops presented to FSDoH (district as well as provincial levels) included recommendations to:

- i) intensify dissemination of information on the TB/HIV link;
- ii) support patients in the HCT decision-making process;
- iii) target males and newly diagnosed patients; and
- iv) improve both professional and lay healthworkers' training and skills. It is especially in terms of the latter that the PHE is supporting FSDoH's uptake of rigorous and context-specific evidence.

### Measuring impact

Collaborating with University Research Co., LLC, National Institute for Communicable Diseases, and Right to Care as T&M partners, three different T&M interventions are in process in three municipalities respectively:

- i) T&M of professional nurses to implement provider-initiated HCT of TB patients;
- ii) T&M of CHWs to encourage and counsel TB patients to undergo HCT and administer and interpret rapid finger-prick HIV tests; and
- iii) T&M of both groups in an integrated team approach. Measuring the impact of the interventions include: pre- and post-intervention interviews with nurses, CHWs and patients, respectively deployed at, linked to and treated at facilities selected for intervention and control; pre- and post-intervention collation of patient-specific TB, HIV and HCT statistics at clinics; and collection of information necessary to measure the comparative cost-effectiveness of the three intervention options.

### Research uptake

Once the most cost-effective model has been established, its wider dissemination in the province and further afield will be promoted, again following an implementation science approach to encourage uptake. The project aligns to the guiding principles of the UFS Research Strategy 2009–2014 to focus on relevance, excellence and impact and to promote integration, collaboration and synergy for better performance.

Once the most cost-effective model has been established its wider dissemination in the province and further afield will be promoted.



#### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | Africa | It's Happening here for a Q&A that reveals more detailed information relating to this article, including policy end users of this research, policy influencers targeted, the researcher's existing relations with the policy end user or ministry, and useful contacts at University of the Free State.



Researcher  
**Prof. Christo Heunis**  
Associate Professor  
Centre for Health Systems Research and Development



[heunisj@ufs.ac.za](mailto:heunisj@ufs.ac.za)




(+27) 51 401 2181



[www.ufs.ac.za](http://www.ufs.ac.za)

# WATER QUALITY CAPACITATING



Water  
Sanitation  
Skills development  
Combating disease  
Environmental  
sustainability

## Vice-Chancellor Dr Mvuyo Tom discusses Research Uptake at the University of Fort Hare

Resolution 64/292 of the United Nations General Assembly explicitly recognised the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights. Consequently, and in line with the objectives of the National Water Act, 1998 (Act No. 36 of 1998) the Research Strategic Framework of the University of Fort Hare has prioritised its water research initiative and has recently established the Research Niche Area “Water Resources for Sustainable Development” which will, amongst others tasks, serve to coordinate wide dissemination of our water research findings and ensure uptake by relevant stakeholders and policy-makers. The current DRUSSA project by Fort Hare’s Applied and Environmental Microbiology Research Group is part of this initiative and a veritable vehicle for ameliorating the problem of shortage of skilled manpower in the water sector.

## THE WATER SECTOR IN THE EASTERN CAPE PROVINCE IN SOUTH AFRICA URGENTLY NEEDS INTERVENTION TO AMELIORATE THE PROBLEM OF SHORTAGE OF SKILLED MANPOWER, ESPECIALLY IN ITS IMPOVERISHED COMMUNITIES.

### Context

Before 1994 an estimated 30–40% of South Africa’s population was without adequate water supply services. However, as of 2004 about 10 million people (i.e. a further 20% of the population) have been supplied with drinking water of varying qualities depending on the area. The situation has improved since then, but while drinking water supplies in the urban areas are generally of acceptable qualities, this is not the case in most rural communities. In the Eastern Cape province (which is mostly non-urban, poor and without adequate infrastructure) a significant proportion of rural communities lack pipe-borne water, and as such depend on streams, rivers, groundwater and other available water bodies for drinking and domestic purposes. Many of these water bodies are often impacted by inadequately treated effluents from municipal wastewater treatment plants and become the main sources of pathogens in the environment. This is of significant consequence in a water-scarce country like South Africa with a very high population of immuno-compromised people, particularly in the impoverished Eastern Cape province. The attendant consequence of such negative practice is the compromising of the primary health of people, mainly with death-threatening diarrhoeal diseases, resulting in tens of thousands of deaths annually.

### Questioning water quality standards

Though classic microbial water quality monitoring regimes have been based on the concentration of coliforms or enterococcus species, known as fecal indicator bacteria (FIB), the adequacy of these current water quality standards to indicate the presence of human viral pathogens is still questionable. It is now recognised that the absence or low concentrations of FIBs in water may not adequately reflect the absence of human viruses. While Wok Grabouw and his colleagues pioneered aquatic virology research in South Africa in the 1980s, only recently were similar studies carried out in the Eastern Cape province (by Prof. Al Okoh and his colleagues at the University of Fort Hare). Even then, the shortage of skills in water quality management still remains a recurring problem in South Africa especially among the previously historically disadvantaged demographic groups, and particularly from such poor areas as the Eastern Cape province. The situation is worsened by the absence of adequate water quality research educational infrastructure in previously disadvantaged educational institutions where students from poor and indigent backgrounds are more likely to study due to fees that are lower in comparison to those of the previously historically advantaged institutions. Nevertheless, some of these previously HDIs have (at least in some units)

This project was aimed at assessing the quality indices of the final effluents of some wastewater treatment facilities in the Eastern Cape province as a vehicle for capacity development in water quality.







## SOUTH AFRICA

Alice — University of Fort Hare

made tremendous progress in uplifting their research profiles in specific disciplines so as to compare with modern-day expectations. A very good example in this regard is the Applied and Environmental Microbiology Research Group (AEMREG) at the University of Fort Hare, which has established itself in water quality research.

### Purpose of the research and its beneficiaries

In an attempt to contribute towards ameliorating the problems of shortage of skilled manpower in the water sector in the Eastern Cape province, this project was aimed at assessing the quality indices of the final effluents of some wastewater treatment facilities in the Eastern Cape province, while simultaneously serving as a vehicle for capacity development in water quality, especially among previously disadvantaged demographic groups in the province. The project currently involves ten black students (seven female and three male) at the Masters and Doctoral degree levels, 80% of whom are South Africans.

### Policy-makers

The findings of this research will be beneficial to the water sector generally. They will be useful to the Departments of Water Affairs, Health and Environment, as evidence-based research for policy-making. The relevant municipal governments hosting wastewater treatment plants will also benefit from this research. The final research report will be submitted to the Water Research Commission of South Africa, and will also be made available to the relevant stakeholders. The findings will be particularly useful for the Department of Water Affairs' Green Drop certification initiative. This study is funded by the Water Research Commission of South Africa in collaboration with the Eastern Cape Department of Water Affairs. Research began in April 2012 and will end in March 2014.

Water bodies are often impacted by inadequately treated effluents from municipal wastewater treatment plants and become the main sources of pathogens in the environment.



Researcher

**Prof. Al Okoh**

Group Leader: Applied and Environmental Microbiology Research Group (AEMREG) and Head of Department of Biochemistry and Microbiology University of Fort Hare, Alice, South Africa



aokoh@ufh.ac.za; aokoh98@yahoo.com



(+27) 40 602 2365



www.ufh.ac.za



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa | It's Happening here for a Q&A that reveals information relating to this article, and useful contacts at the University of Fort Hare.

# NGUNI CATTLE ENTER THE SOUTH AFRICAN BEEF MARKET

## Vice-Chancellor Prof. N M Mokgalong discusses Research Uptake at the University of Limpopo

The University of Limpopo's goal is to become a preeminent university for research, innovation and scholarship with a primary focus on "finding solutions for Africa". The University commits itself to the research capacity development principles and goals of the Government Research Development Strategy. The four priority areas in the University's strategic plan are directly aligned and linked to the five existing national priorities. The Nguni project and related research respond directly to national priorities, namely those of rural development, improved food security and land reform, and creation of jobs and sustainable livelihoods.



**TERMINAL CROSS-BREEDING OF NGUNI COWS WITH ANGUS BULLS IS BEING USED AS A MEANS TO INCREASE THE OUTPUT OF BEEF CATTLE IN SOUTH AFRICA, HIGHLIGHTING THE IMPORTANT ROLE THAT INDIGENOUS LIVESTOCK CAN PLAY IN AFRICA.**

### Cattle in context

Cattle are economically, nutritionally and culturally very important in South Africa. They play a vital role in ensuring food security of households in rural areas. In times of trouble, such as crop failure or family illness, cattle can be sold and food or medicine purchased. However, there are many physical, economic, social and political constraints to developing cattle in Sub-Saharan Africa and South Africa in particular. The majority of cattle in rural areas of South Africa rely on communal grazing systems, and increasing population pressure is limiting free grazing, making feed availability and quality major constraints to livestock production. Other issues for cattle farmers include access to reliable and affordable support services that offer knowledge, credit and other financial services. Thus, developing cattle potential requires a coordinated and multi-functional approach. Strategies must aim at increasing livestock productivity through nutrition, management and breeding improvements, and adding value to livestock products. They should also include linking beef producers to domestic and international markets. In such strategies, government must play an effective facilitating role, providing both supportive legislation and investment in rural infrastructure.

### Limpopo IDC Nguni Cattle Development Trust

One such strategy is an initiative to upgrade cattle in rural areas of Limpopo province to Nguni cattle-breed status through the reintroduction of the indigenous Nguni bloodlines. Indigenous Nguni cattle have been recognised as being particularly well-suited to the conditions prevalent in the larger areas of South Africa due to their adaptability to environmental conditions, tolerance of tick-borne diseases and parasites, as well as their traditional role in the local history and culture.

This Nguni cattle initiative, based at University of Limpopo and begun in 2007, is a partnership between the Industrial Development Cooperation (IDC), the Limpopo Department of Agriculture and the University of Limpopo, and is implemented through the Limpopo IDC Nguni Cattle Development Trust (Trust). It involves a cattle loan scheme project whereby 30 pregnant Nguni cows and one bull are loaned to a farmer or farming community on the terms that the cattle loan recipient shall return the same number of pregnant heifers and a bull as progenies of the initial herd to the Trust within a five-year period.

The project has been largely successful, with many farmers benefiting from the scheme. However, a major and anticipated problem was that the farmers were not going to be able to sell their steers to feedlot companies as Nguni steers don't do well under feedlot conditions. A number of studies were initiated to try and find a solution to this barrier.

30 pregnant Nguni cows and one bull are loaned to a farmer or farming community on the terms that the recipient shall return the same number of pregnant heifers and a bull [...] to the Trust within a five-year period.



## Terminal cross-breeding to improve Nguni cattle production

Terminal cross-breeding of Angus bulls with small indigenous Nguni cows has the potential to improve the outputs of beef cattle farming. Two-thirds of the herd can be utilised for terminal cross-breeding (all cross-bred progenies are slaughtered) whereas one-third is reserved for maintaining the purebred population. The current research is a collaboration of the University of Limpopo, Agricultural Research Council, Northern Cape Department of Agriculture, Limpopo Department of Agriculture and the Department of Land Reform and Rural Development. The aim of the research was to evaluate the 205-day adjusted weaning weight, and post-weaning daily gain and feed conversion ratio of cross-breeds of Nguni cows with Angus bulls. The female Nguni cattle, the smallest beef breed in South Africa, were inseminated with Angus semen. The same semen was also used to produce the pure-bred Angus cattle. The cross-bred progeny were compared to pure-breds sired by the same bull and to pure-bred Nguni cattle from the same herd. Results indicated that calving difficulties were limited and birth weights were restricted to the mid-parent value or below. Cross-breeding did not have a negative effect on cow performance (such as weight change and fertility), and cow productivity actually increased. In most cases the weaning weight of cross-bred calves was the same, or exceeded that, of the pure sire breed, and the feed conversion ratio was better than either of the two parent breeds. This made the feedlot performance of the cross-breeds highly desirable. These results are not yet published, but are an early indication that terminal cross-breeding with indigenous Nguni cattle deserves more attention as a means of increasing the output of beef cattle in South Africa. An added advantage of terminal cross-breeding is that the conservation and utilisation of the Nguni breed is ensured, because a constant stream of pure-bred females will be required.

## Commercial sustainability

Based on the initial breeding results, Pick n Pay (a large retail company) agreed to sell the terminal cross-breeds as certified Angus beef. The first cross-breeds were sold to the feedlot companies in June 2013. The performance of the animals and their meat characteristics are being monitored by the Trust and the results so far are encouraging. It is hoped that these results will be published in 2014. The most important milestone of the Nguni/Angus cattle research is that the farmers have now been granted access to the South African beef market. This is a previously unimaginable opportunity for the rural Nguni cattle farmer.



Researcher  
**Prof. J W Ng'ambi**  
Professor of Animal Nutrition



jones.ngambi@ul.ac.za



(+27) 15 268 2186; (+27) 82 500 3231



www.ul.ac.za



### Want to know more?

Visit [www.drussa/net](http://www.drussa/net) | Africa |  
**It's Happening here** for a  
Q&A that reveals information  
relating to this article and  
useful contacts at the University  
of Limpopo.

Strategies must  
aim at increasing  
livestock productivity  
through nutrition,  
management and  
breeding improvements,  
and adding value to  
livestock products.



## SOUTH AFRICA

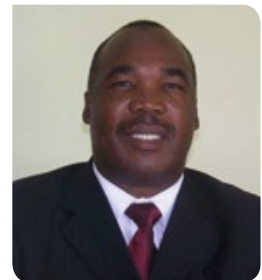
Limpopo — Nguni cows

# SLEEPING SICKNESS DIAGNOSIS IMPROVED

Tropical disease  
Innovation  
Health

## Vice-Chancellor Prof. Stephen Simukanga discusses Research Uptake at the University of Zambia

The University of Zambia (UNZA) strives to meet society's needs and aspirations through its motto of "service and excellence in teaching, research and public service". The 2013 UNZA Research Uptake and Dissemination activity calendar is in line with research focus areas number five and seven of the 2013–2017 UNZA strategic plan. The highlighted study for the 2013 DRUSSA publication, currently being taken up by our Ministry of Health, describes a simple molecular procedure developed for detecting sleeping sickness, and will potentially benefit both local and international communities. Communications about this research will be disseminated through our planned Research Uptake initiatives on the University website, on radio, at media briefings and on institutional visits.



**SLEEPING SICKNESS IS A RE-EMERGING TSETSE-TRANSMITTED DEBILITATING DISEASE OF HUMANS AND ANIMALS IN SUB-SAHARAN AFRICA. DIAGNOSIS OF SLEEPING SICKNESS IN ENDEMIC REGIONS REMAINS UNSATISFACTORY, BUT COST-EFFECTIVE LOOP-MEDIATED ISOTHERMAL AMPLIFICATION (LAMP) HAS THE POTENTIAL TO ACCURATELY ADDRESS THIS PROBLEM.**

### Background

In Zambia, sleeping sickness, caused by *trypanosoma brucei rhodesiense*, is endemic in Luangwa river valley where increasing unpublished cases are being reported. Control of sleeping sickness heavily relies on accurate diagnosis and effective case management. Current available parasitological methods used for sleeping sickness diagnosis are either not sensitive enough to, or unable to accurately identify species.

Polymerase chain reaction (PCR) is a laboratory test for the diagnosis of a wide variety of central nervous system (CNS) diseases and has higher sensitivity and specificity for *trypanosoma* detection than many other tests. However, the cost and skill implications of using this method are obstacles to its wide application in clinical settings in Sub-Saharan Africa where sleeping sickness is endemic. A low-cost alternative is loop-mediated isothermal amplification (LAMP), a novel strategy that amplifies DNA with high sensitivity and rapidity under isothermal conditions, producing large quantities of DNA within 60 minutes. This allows visual detection of amplicons, which are pieces of artificially amplified DNA or RNA that can be used for purposes that include detection and quantification of infectious agents by the naked eye. Advances in the development of *trypanosome*-specific LAMP have been made through identification of conserved sequences, including the human-serum resistance-associated (SRA) gene that defines *trypanosoma brucei rhodesiense*, and therefore provides unequivocal identification of the parasite. In the present study at University of Zambia, the performance of SRA-LAMP was evaluated using blood and cerebral-spinal fluid (CSF) from 110 people from Zambia's Luangwa and Zambezi river valleys.

### Methodology

This study received ethical clearance from Zambia's Ministry of Health and from the University of Zambia's Biomedical Research Ethics Committee for the collection of human blood and CSF. The majority of the consenting participants were sampled in 2010 during a sleeping sickness screening exercise in Chama, a small town in the Eastern province of Zambia. The remainder of participants was made up of 10 people who were reported as suspected sleeping sickness patients between 2010 and 2013. Each of the 10 sleeping sickness patients exhibited malaria-like symptoms and mainly sought medical attention at the University Teaching Hospital, Lusaka, where they were

Despite its simplicity, LAMP is highly sensitive, specific, rapid and user-friendly.





## ZAMBIA

Lusaka — University of Zambia

admitted. After clinical examination, patient blood and CSF samples were collected. The presence of *trypanosomes* was detected by microscopic examination of the buffy-coat following centrifugation of blood and leukocyte count (WBC) in the case of CSF. Thereafter, around 200µl blood or CSF was placed on a labelled FTA-Elute-card for DNA extraction according to manufacturer's suggested protocol. A LAMP reaction of 25µl was performed using a Loopamp DNA Amplification Kit (Eiken Chemical, Japan) and the DNA extracted as described by Namangala et al., using primers recently described by Njiru et al. for SRA-LAMP. The reaction mixture was incubated at 64°C for 30 minutes in a heat block and then at 95°C for two minutes to terminate the reaction. The DNA produced by the LAMP was made visible using a transilluminator, which passes light through the DNA.

### Results and discussion

SRA-LAMP confirmed sleeping sickness in 9.1% of the participants. LAMP was not only sensitive, but also very specific and confirmed the microscopic observation of the *trypanosomes* in patients. The presence of *trypanosoma brucei rhodesiense* only in patient blood but not in CSF, coupled with  $\leq 5$  WBCs/mm<sup>3</sup> in CSF, signified early-stage Human African *trypanosomiasis* (HAT), which was treated with suramin<sup>1,6</sup>. However, the presence of the parasites in both blood and CSF, coupled with  $> 5$  WBCs/mm<sup>3</sup> in CSF, indicated late-stage HAT, which was treated with melarsoprol<sup>1,6</sup>. All 10 treated sleeping sickness patients eventually recovered. The 100 other suspected sleeping sickness cases from Chama that tested negative by microscopy also tested negative by LAMP, demonstrating their good concordance.

The 10 sleeping sickness cases reported herein were all detected through passive surveillance. It is possible that these cases could represent several others that may be unreported considering that sleeping sickness affects the underprivileged marginalised remote rural communities. According to Odiit et al., around 39% of *rhodesiense* sleeping sickness cases and 92% of the deaths it causes are unreported. Indeed, there are several unpublished sporadic sleeping sickness cases reported at local health centres mainly linked to National Parks. Of note, in 2008 alone, 12 cases were reported among Zambia Wildlife Authority staff assigned to the then newly opened Mbambanda-Zaro sanctuary in Chama.

According to these preliminary results, availed to policy-makers, i.e. the Zambian Ministry of Health, LAMP testing confirmed the standard staging criteria (microscopy and WBC in CSF), which led to successful treatment of all the patients. Accurate staging of sleeping sickness, i.e. ascertaining what stage the illness is at, is critical for appropriate therapeutic decisions. Despite its simplicity, LAMP is highly sensitive, specific, rapid and user-friendly. Such a cost-effective technique has the potential to be the future principal molecular tool in sleeping sickness diagnosis and staging in resource-limited sleeping sickness-endemic regions like Zambia.

Such a cost-effective technique (LAMP) has the potential for being the future principal molecular tool in sleeping sickness diagnosis and staging in resource-limited regions like Zambia. ”



Researcher  
**Prof. Boniface Namangala**  
Head of Department  
Department of Paraclinical Studies



b.namangala@unza.zm; boniface\_1020@yahoo.com



(+260) 979 773 896



www.unza.zm



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa | It's Happening here for a Q&A that reveals more detailed information relating to this article, including academic citations, and useful contacts at the University of Zambia.



**EAST  
AFRICA**



# At a glance

## Addis Ababa University

A collaborative project saw Ethiopia's wealth of local plant diversity documented over 30 years, ending in 2010. 600 species – both wild and domesticated – from 25 families are included. This evidence has already had a positive impact on policy decisions, and further opportunities have been identified.

*By Prof. Sebsebe Demissew*



## Kenyatta University

With a view to improving food security, nutrition and health for Africa's rural poor, the development of a tissue protocol for micro-propagation of healthy, disease-free Kenyan cocoyam plants provides an evidence-based practice which other laboratories in Africa are able to follow.

*By Dr Ruth Nduta Wanjau*



## Kigali Health Institute

As recently as mid-2011, little was known about the prevalence and risk factors involved in adolescent drug use in Rwanda. A commissioned study involving stakeholders and beneficiaries has contributed to the evidence-base needed to begin planning a policy-led campaign against drug abuse among Rwandan youth.

*By Maurice Kanyoni*



## Mbarara University of Science and Technology (MUST)

A situational analysis sought to explain the links between gender divisions in land ownership and rights, and how this inequality shapes decision-making dynamics in rural homes in Mbarara district, particularly with regards to how these dynamics may impact on the women of this region's ability to control becoming pregnant.

*By Dr Viola Nilah Nyakato*



## Moi University

E-waste – when technological goods “die” or become obsolete and therefore become a form of waste – is now recognised as a permanent feature of the digital age. In the Upper Nile Watershed States vast amounts of e-waste are accumulating, often as a result of “goodwill donations” by developed countries of equipment near its life-end. This research looks to the future of e-waste management.

*By Prof. B D Odhiambo*



## National University of Rwanda

Currently threatened to extinction at its natural distribution sites, the *acacia kirkii* tree species is localised in a small natural monospecific stand on Nyagatare town on the Muvumba River in Rwanda, and is not found anywhere else in the country. Addressing this crisis could create a positive impact that extends beyond the saving of the species, to creating income generation, alleviating poverty and promoting improved circumstances for gender equality.

*By Prof. Umaru Garba Wali and Mr Canisius P Mugunga*



## University of Nairobi

Improved access to safe and affordable water, especially to the urban poor, is likely to have a positive impact on their livelihood, directly or indirectly. The WASRIP project provides research information suitable to form the evidence base for policy development to address access to safe and affordable water, especially to the urban poor, in Western Kenya, Kisumu, Kisii and Homabay Counties.

*By Dr Samuel Owuor and Dr Dick Foeken*







Plants  
Biodiversity  
Culture  
Conservation  
Capacity building  
Sustainability  
Food security  
Watershed management  
Rural development  
Tourism  
Job creation  
Economic growth

# FLORA OF ETHIOPIA

## President of Addis Ababa University Dr Admasu Tsegaye discusses Research Uptake

As part of its mission and strategic objectives, Addis Ababa University is committed to: developing teaching and research programmes relevant to Ethiopia's sustainable development; preserving and enriching Ethiopia's natural and cultural heritage; enhancing the quality and value of the Ethiopian perspective in the local and international research agenda; and drawing on more diverse and extensive Ethiopian resources in order to make effective and enriched contributions to national efforts to answer pressing problems and challenges facing the country.

The Ethiopian Flora project has contributed to strengthening human skills capacity in teaching and research in various fields of botany in the country and surrounding regions, and, in particular, at Addis Ababa University. This project has focused on documenting scientific knowledge of Ethiopia's plant resources, contributing to Ethiopia's international commitment to the Global Strategy for Plant Conservation Targets 2011–2020.

**THIS RESEARCH PROJECT DOCUMENTED THE WEALTH OF LOCAL PLANT DIVERSITY IN ETHIOPIA, PROVIDING EVIDENCE THAT HAS ALREADY POSITIVELY IMPACTED ON POLICY DECISIONS. FURTHER MUTUALLY BENEFICIAL OPPORTUNITIES TO LINK THESE RESEARCH RESULTS WITH POLICY-MAKERS HAVE BEEN IDENTIFIED.**

## Background

The Ethiopian Flora project was initiated as a collaborative project between Addis Ababa University, Ethiopia and Uppsala University, Sweden with financial support from SAREC-Sida (Swedish Agency for Research and Cooperation with Developing Countries) facilitated by the Ethiopian Science and Technology Commission (now the Ministry of Science and Technology). The objectives of the research were: to write up and publish a Flora of Ethiopia; to build up a National Herbarium; and, through training, to promote scientific activities in taxonomic botany, economic botany, forestry, plant ecology and plant physiology.

## Achievements

The project started in 1980 and was completed in 2010, and all three objectives set out during the initiation of the project were achieved. Eight volumes of Flora of Ethiopia and Eritrea were published. These publications documented 6 000 plant species (both wild and domesticated) from 258 plant families.

The publications include taxonomic keys for identification of plant families, genera and species, and a description, ecology and distribution for each species. This local plant diversity, together with an incredible diversity of birdlife (over 861 species) and mammals (about 277 species) makes Ethiopia one of the 25 Mega Biodiversity countries in the world. Notably, Ethiopia harbours two of the world's Top 34 Biodiversity Hotspots – Eastern Afromontane and the Horn of Africa.

The documentation of this flora contributed to the recent establishment of two UNESCO Biosphere Reserves, in the Yayu district and Kefa province in Southwest Ethiopia, respectively. The collection in the National Herbarium of Ethiopia grew from 16 000 specimens to 80 000. Furthermore, 11 PhD candidates were trained in various fields of botany, which has had a multiplier effect, as these graduates are now the trainers of a new generation of botanists in the country.

Local plant diversity, together with an incredible diversity of birdlife and mammals, makes Ethiopia one of the 25 Mega Biodiversity countries in the world.





## ETHIOPIA

Addis Ababa — University of Addis Ababa

### Potential for policy

This research is beneficial to policy-makers in the Ministry of Agriculture, the Ministry of Culture and Tourism, the Ministry of Water and Energy, the Ministry of Natural Resources Development and Environmental Protection; and the Ministry of Culture and Tourism. For example, through agricultural policy, information compiled on *eragrostis tef* – known locally in Amharic as Teff – could be helpful to address food security issues in Ethiopia. Teff is a tiny harvested grain, which can be made into porridge or *injera*, the region's traditional pancake-like flatbread. The crop is a dependable staple, suited to semi-nomadic life in areas of Ethiopia: a typical field can be sowed from just one handful of seeds, it cooks quickly, using less fuel than other foods, and it does well in both drought and wet conditions. Teff is the most commonly cultivated of 44 species of genus *eragrostis* in the *poaceae* grass family. If there is ever a need to improve the quality of this species through hybridisation, the Ethiopian Flora publications provide the full list of related wild species with which this could be done.

The research identified unique species in each of the vegetation types. This information is a valuable tool for policy-makers in the Ministry of Culture and Tourism to look at sites not yet included in protected areas to be identified and promoted as such. Identification of unique flora areas creates opportunity to tap into the growing global eco-tourism market. This could benefit the Ethiopian tourism industry, while potentially providing opportunities for job creation, employment and economic growth in Ethiopia. Most of the pre-mentioned ministries could use the results of the Ethiopian Flora project for the identification of ecosystem services and their inherent possibilities, including: provisioning, such as the production of food; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and crop pollination; and cultural, such as spiritual and recreational benefits. This research could also be used for planning of watershed management and rehabilitation, particularly in degraded areas.

The Flora of Ethiopia project leader is currently serving as a member of the International Multilateral Expert Panel (MEP) within the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) that, among other issues, deals with the knowledge–policy interface. Experience gained from this service will be used to link and promote research results (knowledge) in general – and this research in particular – with appropriate policy-makers.

### Direct beneficiaries


The direct beneficiaries of this research work are the Ethiopian Institute of Biodiversity (EIB), previously known as the Institute of Biodiversity Conservation (IBC), and all higher learning institutions. EIB used the Ethiopian Flora research results to develop part of the National Biodiversity Action Plan (2005) dealing with plant resources. EIB is still using these results to fulfill its international obligation to the internationally agreed Global Strategy for Plant Conservation (GSPC). All higher learning institutions are able to use the published volumes for teaching and research on conservation, ecology, ethnobotany, taxonomy, wildlife, etc. Other governmental and non-governmental institutions use the Ethiopian Flora volumes as a tool for identification of the Ethiopian plants.


### Life of the project


With international collaboration between 90 botanists from over 17 countries in Africa, Europe, USA and Australia, the Ethiopian Flora project has achieved all its objectives. It is one of the few countries in Africa that has completed the documentation of flora in their country, has done so with the full participation and engagement of local expertise, and has published the resulting volumes in their own country.


The documentation of this flora contributed to the recent establishment of two UNESCO Biosphere Reserves. ”



 Researcher  
**Prof. Sebsebe Demissew**  
Leader of Ethiopian Flora project (1996–2010)

 [s\\_demissew@yahoo.com](mailto:s_demissew@yahoo.com);  
[sebsbebe.demissew@aau.edu.et](mailto:sebsbebe.demissew@aau.edu.et)

 (+251) 911 247 616

 [www.aau.edu.et](http://www.aau.edu.et)



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa | It's Happening here for a Q&A that reveals more detailed information relating to this article, including specific Ethiopian Flora publications, academic citations, and useful contacts at the University of Addis Ababa.



Food Security  
Nutrition  
Health  
Income generation  
Rural farmers  
Biotechnology

# MICRO-PROPAGATING DISEASE-FREE COCOYAMS

## Vice-Chancellor Prof. Olive Mugenda discusses Research Uptake at Kenyatta University

Kenyatta University's "Strategic and Vision Plan" places considerable attention on research, innovation and outreach. It has been realised that if the University is to achieve its mandate of steering the socio-economic development of Kenya and the East Africa region in the years ahead, it must devote adequate financial, human and material resources to research, innovation and outreach. The recent establishment of a division, headed by a Deputy Vice-Chancellor, to coordinate research, innovation and outreach, as well as the official opening of the Chandaria Business Innovation Incubation Centre, attests to this resolve.

The Micro-Propagation of Kenyan Cocoyam Project is a reflection of these resolutions. This biotechnology research aims at addressing food insecurity not only in Kenya, but also in most of Africa. The cocoyam is a staple food group in Africa, but is a crop that is plagued by diseases that limit healthy, abundant yields. The project has devised the development of a tissue protocol for micro-propagation of healthy, disease-free Kenyan cocoyam plants – a protocol which other laboratories in Africa are able to follow.

THE MICRO-PROPAGATION OF KENYAN COCOYAM PROJECT HAS THE POTENTIAL TO IMPROVE FOOD SECURITY, NUTRITION AND HEALTH FOR AFRICA'S RURAL POOR, THROUGH WIDER GROWTH OF HEALTHIER, MORE RESILIENT KENYAN COCOYAM CROPS.

### Context

Most of the world's food-poor people live in Sub-Saharan Africa, with 48.4% of Kenya's population considered food poor in 2004. To meet this shortfall, a 55% increase in food production in Africa has to come from intensification of production from land under cultivation. Exploitation of the leafy green cocoyam, a vegetable adapted to the local environment, could improve food security, nutrition and health of the rural poor.

### What is the Cocoyam?

Cocoyam (*colocasia esculenta* spp and *xanthosoma sagittifolium* spp) is an ancient crop grown throughout the humid tropics of Africa, the West Indies, the Pacific region and Asia. As well as having traditional uses, with its edible corms (a swollen stem base covered with scale leaves), vitamin- and protein-rich leaves, and carbohydrate- and mineral-rich roots, the cocoyam is an important staple food for these developing countries. Available throughout the year, it is a good food-security vegetable, and also has great promise of generating income within rural communities. The cocoyam thrives in stressful environmental conditions where other crops fail, including arid and semi-arid regions, and saline and marshy areas. Although cocoyam is an important staple in Africa, its production is significantly constrained by diseases caused by fungi, bacteria, viruses and other pathogens.

### The research innovation

Tissue culture techniques such as micro-propagation have assumed considerable importance as methods of producing disease-free plants. These *in vitro*, or test tube, techniques offer an alternative and reliable method for the production of planting material. In the micro-propagation process, tissue-culture methods are used to multiply clean, disease-free explant stock in order to produce a number of healthy progeny plants.

A 55% increase in food production in Africa has to come from intensification of production from land under cultivation.



The cocoyam micro-propagation research arose out of a need to develop a tissue-culture system for the regeneration of healthy, disease-free Kenyan cocoyam varieties since no such system had yet been developed or put in place.

### Micro-propagation protocol

This research began in 2008 and was completed in 2012. The objectives of the intervention were to: identify efficient explants for *in vitro* micro-propagation of cocoyam material in tissue culture; investigate the effect of plant-growth regulators on the development of the *in vitro* material; regenerate disease-free cocoyams through micro-propagation; and to mimic the normal farming system in the greenhouse using the tissue-culture established plantlets.

This study applied tissue-culture techniques to three cocoyam varieties collected from major growing areas using their petioles and meristems as explants. The resultant plantlets were then exposed to green house and field conditions and performed well. They were analysed for shoot and leaf formation, rooting, corm production and survival, until concentrations were optimum for *in vitro* growth and production.

### The purpose of the research

The micro-propagation protocol established in this study can be efficiently applied by laboratories in the regions, whereby it is hoped that the study findings will help to address the issue of food security through attracting a range of markets including small- and large-scale farmers. In addition the study will benefit international germplasm exchange opportunities, boost gene banks, and provide opportunities for research institutions to fine-tune protocols to potentially reduce future cocoyam production costs.

Also, once the protocol for tissue culture of cocoyam is publically published, the private sector will in all likelihood seize the commercial opportunity to micro propagate and market cocoyams as attractive landscaping plants, which also prevent soil erosion. But the ultimate motivation for this research is that poor rural farmers will significantly benefit: year round they will be able to buy much cheaper, disease-resistant tissue-culture plantlets, which do not require expensive growth regulators.

### From lab to field

While this project creates opportunity, the only sure way of getting the research into action is to bridge the gap between the laboratory and the poor rural farmer's fields. This must happen to raise the socioeconomic status of the said group and the food security status of the country at large. The Ministry of Agriculture, together with research institutes such as the Kenyan Agricultural Research Institute (KARI) and Kenyan universities, will lead awareness campaigns around the potential of cocoyam. On a practical level, the said institutes will establish cocoyam nurseries where poor local farmers can cheaply source micro-propagated cocoyams.

Available throughout the year, [the cocoyam] is a good food security vegetable, and also has great promise of generating income within the rural communities.



Researcher  
**Dr Ruth Wanjau**  
Senior Lecturer  
Department of Chemistry  
Kenyatta University



ruthwanjau@yahoo.com  
ruthwanjaug@gmail.com



(+254) 722 423 183



www.ku.ac.ke



### KENYA

Nairobi — Kenyatta University



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa |  
**It's Happening here** for a  
Q&A that reveals additional  
information relating to this  
article, including useful  
contacts at Kenyatta University.



# RWANDAN YOUTH AND SUBSTANCE USE



Youth  
ICTs  
Health

## Acting-Rector Prof. Chantal Kabagabo discusses Research Uptake at Kigali Health Institute

Kigali Health Institute (KHI) is one of the government institutions of higher learning that was mandated to train Rwandan health professionals, to improve the health of the communities in the country and beyond. Research and Training in Research are the third of six strategic institutional goals. Currently, KHI is endeavouring to place research in the first priority activities so as to enhance the development of evidence-based decisions and policies, and to work with the government in developing Rwanda's communities socially, economically and with good health, in line with the country's Vision 2020 and the Millennium Development Goals. It is in this regard that KHI conducts research such as establishing the prevalence and identifying the risk factors associated with substance use among youth in Rwanda. The Ministry of Youth and ICT are using the results of this research to develop evidence-based campaigns and policies against drug and substance abuse in Rwanda. Additionally, KHI has been research capacity-building in collaboration with the DRUSSA programme and from the skills gained from this have put up a Research Uptake and Research Uptake Management [RUM] strategic plan that facilitates the fostering of the benefits of research findings, so as to reach the "end users" through the use of various research communications and media.

## A COMMISSIONED STUDY INVOLVING STAKEHOLDERS AND BENEFICIARIES HAS CONTRIBUTED TO THE EVIDENCE-BASE NEEDED TO BEGIN PLANNING A POLICY-LED CAMPAIGN AGAINST DRUG ABUSE AMONG RWANDAN YOUTH.

### Status update

Abuse of substances by young people – especially of psychoactive ones – is one of the most disturbing health-related problems among youth globally, and has been a significant worldwide public health concern for many years. Epidemiological surveys in African countries have shown that substance abuse here is indeed common. Furthermore, there is both a decreasing age of onset, and an increasing trend of use of these substances. Young people who get hooked into substances typically begin this treacherous journey by dabbling with 'gateway' substances such as alcohol and cigarettes, and later progress to more dangerous ones, potentially including cannabis and cocaine.

The impact of substance use, dependence and abuse by young people is staggering in terms of what it can lead to, including physical injury, illegal activity, poor academic performance and partaking in risky sexual behavior – as well as the high cost to parents, family and the surrounding community. In Rwanda, other than anecdotal accounts, little was previously known about prevalence and types of substances abused and the extent of the problem had not documented. This made it difficult for government and other stakeholders to put effective prevention and rehabilitation measures in place. This study was commissioned in order to inform policy-makers of the gravity of the problem by measuring substance prevalence and identifying associated risk factors among youth in Rwanda. The intention behind this is to provide policy-informing research with scientific data on which policy-makers can base decisions, and formulate policies to combat drug abuse among young people. The Ministry of Youth nominated a contact person for administration procedures of the project and Kigali Health Institute provided researchers to implement the activities of the project. The project started in 2011 and ended in February 2012.

Epidemiological surveys in African countries have shown that substance abuse here is indeed common.







## RWANDA

Kigali — Rwanda Biomedical Centre/Kigali Health Institute

### Beneficiaries

The beneficiaries of the results of this study included: Rwanda's young people, the Ministry of Youth, Ministry of Local Government and Social Affairs, Ministry of Education, Ministry of Health, Ministry of Justice, schools, universities, parents, researchers, civil society and other stakeholders.

### Stakeholder relationships

Stakeholders have a network in which information sharing is rapid and smooth. A technical committee is coordinated by the Ministry of Youth and ICTs, and includes technicians from each of the ministries concerned, as well as researchers, parents, former substance abusers, and district youth leaders. This is a forum that facilitates information flow among the diverse participants. ICTs were used for communication, including posting results on ministry websites, and in sending emails and SMSs conveying the impact of drug abuse on youth.

There is also a policy-forum committee constituted of politicians, ministers, members of parliament, police and army chiefs, religious leaders and international organisations. These committees work in synergy, sharing minutes of meetings and resolutions.

### Significance

A results workshop was held with an audience of stakeholders, committee members and beneficiaries including youth, civil society, ministries, researchers and others. Care was taken to formulate results so that they were easily understandable and accessible to all, rather than being presented in their original scientific language, which would have excluded non-academic participation, which was appreciated by the diverse audience. The results both contributed to the knowledge base in this field, and acted as a spark plug to carry out further studies related to the problem in the public health domain. The Ministry of Youth and ICT is currently drafting anti-drug policy and laws based on the results of the study.

Stakeholders have a network in which information sharing is rapid and smooth.



Researcher  
**Maurice Kanyoni**  
Researcher and Lecturer  
Department of Physiotherapy



mkanyoni@khi.ac.rw



(+250) 572172



www.khi.ac.rw



#### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | Africa | **It's Happening here** for a Q&A that reveals more detailed information relating to this article, including policy end users of this research, policy influencers targeted, the researcher's existing relations with the policy end user or ministry, and useful contacts at Kigali Health Institute.



Gender equality  
Women empowerment  
Family planning  
Rural areas  
Women's health

# LAND INEQUALITY AND FAMILY PLANNING

## Vice-Chancellor Prof. Frederick Ian Bantubano Kayanja discusses Research Uptake at Mbarara University of Science and Technology [MUST]

Mbarara University of Science and Technology is a community-based University where teaching and research activities are rooted in evidence generated by research conducted by staff and collaborators.

The research paper featured here, with its focus on household-level gender inequalities in decision-making, contributes relevant insights towards implementation of Uganda's national strategy to promote gender equality and empowerment of women. This goal is aligned with MUST's strategic mission.

The paper provides a situational analysis of women's status in rural South Western Uganda and identifies the impact of intra-household gender dynamics that hinder women's agency to access the assets and means of a household, including available family planning and maternal healthcare resources.



**A STUDY CONDUCTED IN 2010 IN MBARARA DISTRICT, UGANDA, SOUGHT TO EXPLAIN LINKS BETWEEN GENDER INEQUALITY IN LAND OWNERSHIP AND LAND RIGHTS IN THE AREA, AND REGIONAL WOMEN'S ABILITY TO CONTROL BECOMING PREGNANT.**

### Contextual introduction

This article presents research findings from a study conducted in 2010 in Uganda, which examined household factors that hinder women's access to maternal healthcare. One of the variables studied was the lack of uptake of family planning by rural households of Kashari County, Mbarara District in South West Uganda.

### Context

In Uganda the uptake rate of family planning – the practice of controlling the number of children in a family and the intervals between their births, particularly by means of artificial contraception – has remained low amongst fertility rates that are at the highest end of global fertility rate averages. The contraceptive prevalence rate among married women is estimated at 30%, and among sexually active unmarried women it is estimated at 52%. Uganda's fertility rate is estimated at 6.9 children per woman. In Kashari County in Mbarara District the contraceptive prevalence rate is 30%, while the total fertility rate is estimated at 7 children per woman.

In a global research context, low uptake of family planning in situations where women have a need for family planning practices typically indicates that women have limited bargaining power within their own homes and also have restricted influence over important family resources and assets. Additionally, a low regional uptake of contraception has multiple indicators, with a distinction made between those directly affected by actual physical access to contraception and those indirectly affected through social patterns that limit women's agency and choice to control becoming pregnant.

### Research aim

This situational analysis sought to explain the links between gender divisions in land ownership and rights, and how this inequality shapes decision-making dynamics in rural homes in Mbarara district, particularly with regards to how these dynamics may impact on the women of this region's ability to control becoming pregnant. The research evidence provides a significant strand of

**In Mbarara District... the total fertility rate is estimated at 7 children per woman.**



findings, which serve to broaden the existing discourse on low family-planning uptake in Uganda, as well as on promoting gender equality and the empowerment of women in the region.

### Key findings

Land is the primary source of livelihood for both men and women in Uganda. Therefore, looking at land ownership patterns and intra-family dynamics and gender-based bargaining power around this life-supporting resource is of pivotal significance. Land ownership was a key area for a situational analysis of gender-based disparities in this region. These were some of the findings:

In rural Kashari County, Mbarara, research revealed that men claim the symbolic role of head-of-household in 95% of homes. In their role as husbands, they make, and have the majority of influence, over most resource-related household decisions.

In 93% of cases where land was purchased, the decision to do so was made by a man, and in 78% of cases where land was sold, a man was, again, the decision-maker.

The finding also signposted that while it is men who hold overwhelming ownership rights to land in terms of gender equity standards, it is the women who provide the majority of labour to allow this land to support the lives of the people who live on it. Of people who spend more than six hours on agricultural work every day, 74% are women, while women make 95% of decisions regarding planting and harvesting.

The study found that seven in ten women in the region felt insecure on their family land, while only two men out of every ten shared such fears.

The research also revealed that in cases where women do have ownership rights on their household land, there is a correlation with family planning decisions having a positive impact on the number of children the family chooses to have, as well as the likelihood of skilled attendance during births, and the use of antenatal care during pregnancy.

Other related studies are also of interest. In 2011 a World Bank study indicated that women in Uganda provide more than 70% of agricultural labour, but have unequal rights to land. A later study stated that a limitation of women's right to make decisions on land transactions (buying and selling) could be attributed to Uganda's customary land laws, which restrict women's ownership of land and other household properties.

### Discussion

The picture that this situational analysis creates of women's status in rural South Western Uganda is that there is serious gender inequality in both household land ownership rights and in working of the land, which are to the advantage of men and the disadvantage of women. In the context of land being the primary source of livelihood for both women and men in the region, this pattern of household-level gender inequality cannot be left out of the equation in studies that focus on the failure to mitigate low family-planning uptake among Uganda's women. Men's reserved right to own land, their symbolic role as household head and determiner of resource allocation, coupled with the congruent marginalisation of women by cultural restrictions on land ownership, most certainly have an impact on women's choice to control becoming pregnant. This research contributes to discussion and policy decisions and implementation of Uganda's national strategy to promote gender equality and empowerment of women.

Men claim the symbolic role of head-of-household in 95% of homes.



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa | It's Happening here for a Q&A that reveals more detailed information relating to this article, including policy influencers MUST is already working with, and useful contacts at MUST.



Researcher  
**Dr Viola Nilah Nyakato**

Institute of  
Interdisciplinary Training  
and Research (IITR)



[violanyakato@gmail.com](mailto:violanyakato@gmail.com);  
[vnyakato@must.ac.ug](mailto:vnyakato@must.ac.ug)



(+256) 77 298 2535



[www.must.ac.ug](http://www.must.ac.ug)



### UGANDA

Mbarara — Mbarara  
University of Science  
and Technology (MUST)



Technology  
Waste management  
Recycling  
Environment

## E-WASTE MANAGEMENT

### Vice Chancellor Prof. R K Mibey discusses Research Uptake at Moi University

Moi University Research Policy provides a research environment that motivates staff to undertake sustainable research within a competitive, national and international environment. The policy is an operating tool for patenting and commercialising research findings, supporting development of fundable research, and alerting researchers to funding opportunities including those arising from bilateral and multinational agreements. To realise this commitment, the University continually reviews its programmes, activities and services to conform to the Quality Management Systems based on the ISO 9001–2008 Standards. The Moi University Quality Assurance Policy provides a measure against which University activities, facilities, programmes and services can be evaluated and necessary corrective adjustments made. Moi University Council embeds quality in all its units to ensure that core areas of teaching, research and community service are enhanced, and provides guidance on providing quality University services to society. The selected project on e-waste management conforms to the university ICT policy which addresses the basic needs of those who require ICT skills and technologies.



**VAST AMOUNTS OF E-WASTE ARE ACCUMULATING IN THE UPPER NILE WATERSHED STATES. AS E-WASTE IS A PERMANENT FEATURE OF THE DIGITAL AGE, ITS MANAGEMENT AND REGULATION NEED TO BE FACTORED INTO POLICY.**

### What is e-waste?

E-waste is a term that includes waste generated from electrical and electronic equipment and products. It refers to when computers, mobile phones etc. become obsolete through technological advancement, or simply “die” as they reach the end of their lifespan, and become waste that needs to be dealt with. This project recognises that e-waste is a permanent feature of the digital age, and seeks to institutionalise e-waste management in the five Upper Nile Watershed States.

### Background

The 1989 Basel Convention regulates trans-boundary movement of hazardous and other wastes and obliges its parties to ensure that such wastes are managed and disposed of in an environmentally sound manner. The chosen research project – Generation and Management of E-Waste in the Upper Nile Watershed States – is in the area of waste management, and is specifically intended to manage the vast amounts of e-waste being generated in the Upper Nile Watershed States (UNWS); namely Kenya, Uganda, Burundi, Rwanda, Tanzania, Ethiopia and Southern Sudan. This e-waste is a result of UNWS receiving vast amounts of electrical and electronic equipment from developed countries. Often this equipment is sub-standard and dies within a couple of months, after which it is typically discarded illegally in dumpsites, or kept in storage indefinitely. E-waste dumping is a form of indirect dumping whereby as a “goodwill” gesture developed countries distribute to developing countries computer and technological goods that are near or at the end of their lifespan. This equipment is often donated to schools or higher learning institutes. Often, only when installing the equipment do the recipients realise that the equipment is not working. The issue of disposing of this equipment then becomes the job of the recipient. As just one example, in Kenya an entire warehouse in the Port of Mombassa is full of obsolete computers that are a result of such “passive” e-waste dumping.

This project started in 2008 but is still in its formative stages. As previously mentioned, behind the project is an understanding that production of e-waste is a permanent feature of the digital age, and therefore needs to be properly managed. The intention is that the project should

Production of e-waste is a permanent feature of the digital age, and therefore needs to be properly managed.







## KENYA

Eldoret — Moi University

culminate towards the end of 2013 with the establishment of a Regional E-Waste Collection and Management Centre.

### Project objectives

The objectives of this project are: to quantify the amount of e-waste accumulating in the UNWS; to bring into public consciousness the fact that the practice of donating equipment that is near the end of its life is a form of dumping; to raise awareness around the dangers of dumping e-waste into developing countries; to raise awareness among government agencies and learning institutions in the Upper Nile Watershed States that accepting second-hand technological equipment comes with hazardous complications; and to make recommendations on how best to handle such waste.

The practice of donating equipment that is near the end of its life is a form of dumping.



### Considerations

In terms of handling waste, concepts under discussion include banning the importation of old equipment. Establishing means to identify obsolete or near-life-end equipment before it is accepted into the region is also under consideration. In setting up a Regional E-Waste Collection and Management Centre, effective and safe recycling practices need to be assessed. Setting up recovery and recycling facilities for metals, glass, plastic etc. can allow for removing these elements from the environment, and reducing the bulk of environmental waste, whilst also harnessing some value from this e-waste. Strategic metals such as platinum, gold, copper and others can be recovered from recycling e-waste, and reused.

### Reach and policy implications

The beneficiaries of the project include all those handling large quantities of electronic and electrical equipment that has reached its end-of-life in the Upper Nile Watershed States, particularly government agencies and learning institutions. Moi University and the project PI would like the results of this research to reach and influence policy-makers in the respective governments in the UNWS together with all the institutional heads of the learning institutions in the region. It is envisaged that in the future, policy-makers and regulators in the UNWS will work together to ensure that e-waste is managed and disposed of in an environmentally sound manner as required by the Basel Convention.



Researcher

**Prof. B D Odhiambo**

PI & Waste Management Project Coordinator



odhiambobdo@mu.ac.ke



(+254) 5343620



www.mu.ac.ke



*Want to know more?*

Visit [www.drussa.net](http://www.drussa.net) | Africa |  
It's Happening here for useful  
contacts at Moi University.





Environment  
Sustainability  
Poverty alleviation  
Empowerment of women  
and children

## ACACIA KIRKII IN RWANDA

### Vice-Rector in charge of academic affairs Prof. Manasse Mbonye discusses Research Uptake at the National University of Rwanda

To live up to its mission, the National University of Rwanda (NUR) articulated its 2002–2023 long-term research objective, to generate scientific knowledge and analytical work that contributes to Rwanda's development. Thus, NUR has prioritised the following research themes addressing socio-economic impacts: economic development and good governance; energy; environment, climate change and disaster management; food security; and health and human well-being. Under the thematic area environment, climate change and disaster management, research was carried out to investigate the *acacia kirkii*, an indigenous tree facing extinction in Rwanda. The aim of this research was to advocate for the conservation of *acacia kirkii* and the sustainability of the natural ecosystem of which it is a part, and to ensure the tree prevails for the use of future generations. As the tree grows very fast, it can also be considered for commercial plantation for wood and charcoal, which could contribute to poverty alleviation in the areas in which it is able to grow.



**THE ENDANGERED ACACIA KIRKII SPECIES IS ONLY FOUND ALONG THE MUVUMBA RIVER IN THE EASTERN PROVINCE OF RWANDA. CURRENTLY FACING EXTINCTION, IT REQUIRES AN URGENT RESCUE INTERVENTION.**

#### Purpose of research

*Acacia kirkii*'s ecosystem is shrinking as a result of many anthropogenic factors. Farmlands, predominantly featuring rice cultivation, have taken over from previously indigenous territories. Urbanisation is taking its toll. And environmental resources are being exploited for other competing uses, including the current irrigation development along the Muvumba river – the only natural habitat of *acacia kirkii* in Rwanda. The aim of this research was to contribute to the conservation of acacias in Rwanda, starting with *acacia kirkii*, the most vulnerable species. This tree species is localised in a small natural monospecific stand in Nyagatare town on the Muvumba river, and is not found in any other part of the country. It is threatened to extinction at its natural distribution sites.

#### Benefits of *acacia kirkii* growth

Thorny, with dense leaves and branches, this tree is well suited for efficiently contributing to the conservation of wetlands. *Acacia kirkii* can grow in waterlogged areas, and harbours unique and diverse animal and plant species. Furthermore, the species could be used to naturally control erosion and protect riverbanks. Its leaves, twigs and pods contain fairly high concentrations of protein and can be used as fodder for animals, while its presence improves soil fertility through nitrogen fixation. *Acacia kirkii* grows into one of the biggest trees in the eastern savannah woodlands of Rwanda. It is a beautiful tree with a yellow-green stem and prolific flowers. It contributes to wild beekeeping and is a natural tourism asset.

*Acacia kirkii* is also a source of wood for construction and energy. Strategic conservation of the species could cater for human needs, with firewood and charcoal derived from the trees becoming a source of income generation in poor areas. It typically falls to women and children to gather and fetch firewood, and an increase in the density and proximity of *acacia kirkii* trees could reduce the distance walked and time taken for this task. This time could then be used to engage in empowering educational and other income-generating activities. All the above-mentioned benefits and services could contribute to the alleviation and eradication of poverty, the suffering of the poor, and environmental sustainability, all of which are in line with Millennium Development Goals.

A trans-boundary joint effort is urgent to ensure this very important species localised in a small East Central African region prevails perpetually for the use of future generations.





## RWANDA

National University of Rwanda

### Justification

The Rwandan Government has shown strong commitment to the conservation of natural resources (organic law No 04/2005 of 8/4/2005 determining modalities of protection, conservation and promotion of environment in Rwanda). It is signatory of different international treaties pertaining to the conservation of the environment. It is also an active member in various regional networks aiming at the conservation and sustainable utilisation of plant genetic resources. Additionally, the Rwandan government's Vision 2020 indicates its commitment to the preservation of a healthy planet. Regardless of all these nice initiatives, environmental degradation has been accelerating and consequences have been compounding. In a very short period, we have witnessed significant loss of ecosystems harbouring rare species – some of which may be endemic. One of the most affected areas is the Eastern Province which, according to our observation, no longer has a single intact forest. Unknown species might be gone forever or might soon disappear if action is not taken. *Acacia kirkii* trees were observed to be the most affected forest in this area.

In a very short period, we have witnessed significant loss of ecosystems harbouring rare species – some of which may be endemic.

### Some major findings

- *Acacia kirkii* can adapt in all the agro-ecological zones of Rwanda.
- *Acacia kirkii* is fast growing and attained an average root collar diameter of 13.5 cm and total height of 9 m in the first year.
- Acacias are sensitive to soil types.

### Recommendation

There is need to advocate for the conservation of this species not only in Rwanda but also in the greater region, where the species naturally occurs. It may be the case that the species is also undergoing extinction in areas outside Rwanda. A trans-boundary joint effort is urgent to ensure this very important species localised in a very small East Central African region prevails perpetually for the use of future generations. We therefore call upon different partners to intervene in this issue without delay.



Researcher  
**Prof. Umaru Garba Wali**  
 Ag. Dean Faculty of Applied Sciences and Coordinator Water Resources and Environmental Management Programme  
 ✉ ugarbawali@nur.ac.rw  
 ugwas@yahoo.com  
 ugarbawali@gmail.com  
 ☎ (+250) 78 887 7174



Researcher  
**Canisius P Mugunga**  
 Lecturer (PhD Research)  
 Faculty of Applied of Agriculture  
 ✉ cpmugunga@nur.ac.rw  
 ☎ (+250) 78 853 3348



#### Want to know more?

Visit [www.drussa/net](http://www.drussa/net) | Africa | It's Happening here for a Q&A that reveals more detailed information on the *Acacia Kirkii* research approach, major findings and recommendations, as well as useful contacts at the National University of Rwanda. Also visit National University of Rwanda's website [www.nur.ac.rw](http://www.nur.ac.rw)



Conservation  
Environment  
Eco-sensitivity  
Water  
Technology  
Employment  
Rural farming  
Food security

# SUSTAINABLE ISLAND FARMING

The core mission of the University of Mauritius is the creation and dissemination of knowledge and understanding for the citizens of Mauritius and the international community, with the purpose of these being used for social, environmental and economic development. In addition to its capacity-building approach that contributes tremendously to the training of a well-qualified workforce for various sectors of the economy, the University also plays an important role in addressing national priorities.

The main objective of the Maurice Ile Durable programme is to make Mauritius a world model of sustainable development, particularly in the context of SIDS (Small Island Developing States). The research project chosen for this publication ran from 2009 to 2013 as a part of this programme. Its intent was to make coastal and sloping-field agricultural practices more sustainable through the development of a package of technologies that help to reduce the impact of fertiliser and pesticide on water systems, and decrease soil erosion, land degradation and siltation of a downstream lagoon, while at the same time contributing to employability and poverty alleviation. Key to the success of this project was the dissemination of knowledge and technology to the end users, the farmers themselves.

## A PROJECT IN MAURITIUS FOCUSED ON WORKING CLOSELY WITH A COMMUNITY OF ONION FARMERS TO IMPLEMENT ENVIRONMENTALLY-FRIENDLY FARMING PRACTICES ON SLOPING COASTAL LAND IN A WAY THAT BOTH SUPPORTED THE LOCAL ECO-SYSTEM, AND INCREASED CROP YIELDS AND FISH CATCH IN THE NEARBY LAGOON.

### What it's about

Conducted by the Faculty of Agriculture, this research project focused on the development of sustainable agricultural technologies for use in coastal and sloping field plots with the aim of (i) reducing soil erosion and agrochemical leaching into a nearby lagoon; (ii) reducing the negative impacts of fertilisers and pesticides on the coastal and lagoonal ecosystems; and thereby (iii) reducing the directly related decline in lagoonal fish catch.

### Beneficiaries and unique location

The direct beneficiaries of this project were the farmers that cultivated onions and other food crops on the sloping lands of the coastal belt in the South East region of the island of Mauritius, and the fishermen who depended on lagoonal fishing for their livelihood. The indirect beneficiaries were people living in the region, as well as tourists who visit this area to marvel at the combination of the steep, lush mountainside that drops spectacularly into the ocean and the lagoon, with its shallow waters criss-crossed by deep canals, that create hundreds of different shades of green and blue on sunny days.

### Funders and stakeholders

This research project is in the field of agriculture and was funded by the European Union under the ReCoMap programme to the tune of 4.2 million rupees. The project was officially launched by three Government ministers, in the presence of representative of the European Union and the Indian Ocean Commission, the direct beneficiaries and target groups.

### Research in action

One of the novelties of this project was that the stakeholders, namely the onion growers and fishermen in the South East coastal area, were involved right from the inception of the project.

Research and demonstrations were carried out in farmers' fields, and the farmers were directly and fully involved in the project.





## MAURITIUS

Réduit — University of Mauritius

Research and demonstrations were carried out in farmers' fields and the farmers were directly and fully involved in the project. The technologies developed for and demonstrated to farmers were simple and affordable as well as sustainable, and included mulching by crop stovers, composting, preparation and extraction of botanical pesticides from locally available plants area, and use of yellow sticky traps for insect control. Farmers were able to see for themselves the improvement in yield and quality of the onion crop as well as the resulting reduction in the amount of pesticides and fertilisers that needed to be applied, and therefore the reduction in the extent of agrochemicals that entered the sea. At the same time, fishermen in the area were provided with free fish cages as part of the project, and were able to see and appreciate the difference in seawater quality, and the expected effect on fish catch.

Fishermen in the area ... were able to see and appreciate the difference in seawater quality, and the ... effect on fish catch. ”

## Capacity and uptake

The capacity-building component of the project consisted of the provision of equipment that formed an integral part of the project, including free field machinery, tools, and implements such as rotovators, pesticide sprayers and water pumps. Training and awareness activities on the use of sustainable agricultural technologies were also held with other farmers in the region.

The technology had a very high adoption rate of over 75%. It was also of great interest to the media and received wide coverage on radio and television. The results of this research have potential for use in other regions of the island that have a similar topography and agricultural profile, and can be used by policy-makers as an evidence base to make decisions related to agricultural production systems in the country. An interesting aspect of the project was the close and trusting relationship it built between the University researchers and the direct beneficiaries in the region, in particular the 50 or so farmers whose fields were included as part of the research project. This relationship continues with the implementation of another project that the researchers are in the process of setting up.



Researcher  
**Associate Prof. B Lalljee**  
Faculty of Agriculture

✉ [vinodl@uom.ac.mu](mailto:vinodl@uom.ac.mu)

☎ (+230) 403 7676

🌐 [www.uom.ac.mu](http://www.uom.ac.mu)



*Want to know more?*

Visit [www.drussa/net](http://www.drussa/net) | Africa |  
**It's Happening here** for more  
information relating to this  
article, and useful contacts at  
the University of Mauritius.



# THE IMPACT OF WATER SECTOR REFORMS AND INTERVENTIONS IN URBAN KENYA

Water  
Sanitation  
Economic activities  
Health  
Nutrition  
Women  
Youth  
Gender

## Vice-Chancellor Prof. George A O Magoha discusses the University of Nairobi Extension and Research Uptake Strategy

Research, being one of the three pillars of the University, forms part of the building blocks of our strong reputation in the region and globally. While the University of Nairobi already plays a critical role in the utilisation of research outputs among our stakeholders, we have initiated the development of an extension policy and a communications policy to strengthen our engagement with the community.

These policies specifically seek to guide us in engaging with our stakeholders and the society in order to enhance the uptake of research outputs and utilisation of new knowledge towards better and improved livelihoods, enabling the University to continue contributing towards local, national and global development.

The WASRIP project reflects these ideals, in recognising that improved access to safe and affordable water among the urban poor in Kenya is likely to impact positively on their health, nutrition and productivity. WASRIP's research evidence also stands to impact on other policy areas that will impact on quality of life.



## UTILISATION OF RESEARCH INFORMATION FROM THE WASRIP PROJECT WILL FORM THE EVIDENCE BASE FOR POLICY DEVELOPMENT TO ADDRESS ACCESS TO SAFE AND AFFORDABLE WATER, ESPECIALLY TO THE URBAN POOR, IN WESTERN KENYA, KISUMU, KISII AND HOMABAY COUNTIES.

### The issue

Among the challenges facing Sub-Saharan Africa, provision of safe water supply and adequate sanitation are of the highest priority. Even where there is water, the quality is often poor, leading to exposure to waterborne diseases. The crisis in water and sanitation is above all a crisis for the poor. The poorest people not only get access to less water, and to less clean water, but they also pay some of the world's highest prices. Moreover, the urban poor get their water by queuing for hours to collect water from standpipes or illegal connections. Others buy their water from vendors who can charge up to twenty times more for water than the price paid by their wealthier neighbours. As such, not only do the poor suffer financially; they also suffer poor health from using unsafe water and poor sanitation facilities. Like other countries in Sub-Saharan Africa, Kenya's socio-economic development goals are highly dependent on the availability of water in good quantity and quality. The Government's long-term objective is to ensure that all Kenyans have access to clean potable water, and that water is available for key economic activities. In addition, it recognises that for the country to meet its poverty-eradication strategies and achieve the Millennium Development Goals (MDGs), water has to be made available, accessible and affordable, especially to the poor. This is based on the fact that all the eight MDGs are directly or indirectly related to access to water. The water sector reforms under the Water Act 2002 of the Laws of Kenya are designed to contribute to the realisation of this long-term objective as well as to addressing the policy, regulation and service provision weaknesses in the previous Water Act Cap 372.

In Kenya, a stage has been reached where availability of water is the limiting factor for any development activities. Improved access to safe and affordable water, especially to the urban poor, is likely to have an impact on their livelihood, directly or indirectly, in at least three ways:

- i) It has a positive impact on health (and, as a consequence, nutrition), which increases time and energy to invest in productive activities.

The poorest people not only get access to less water, and to less clean water, but they also pay some of the world's highest prices.





- ii) Closer proximity of water sources and increased quantity available reduces the time necessary to fetch water.
- iii) Improvements are especially relevant for women, who are traditionally responsible for looking after ill relatives, and for fetching water for the whole household.

In other words, improved access to safe and affordable water at the household and individual level is likely:

- i) To *reduce* the time spent on fetching or queuing for water, waterborne diseases, child morbidity, expenditure on water, and water-related conflicts.
- ii) To *increase* the girl-child's school attendance. This is because girls are sometimes forced to be late or miss school to help their mothers fetch water.
- iii) To *improve* households' health conditions.

### The purpose

The water sector reforms and interventions research project (WAS RIP), being conducted in Kisumu, Homa Bay and Kisii, has four main objectives, namely:

- i) To describe and analyse the nature, extent and impact of water sector reforms and interventions at the municipality level;
- ii) To assess the impact of water sector reforms and interventions on the livelihood of the urban poor households;
- iii) To determine the role of multi-stakeholder forums in inclusive, pro-poor urban water governance; and
- iv) To assess the impact of a community water supply project (Wandiego) on the livelihood of the community it serves.

### Collaborations and stakeholders

WAS RIP is a collaborative research project between researchers from the African Studies Centre, Leiden, Netherlands and the Department of Geography and Environmental Studies, University of Nairobi, Kenya. WAS RIP has a number of stakeholders and policy-makers who will benefit from its results. These include: the municipalities of Kisumu, Kisii and Homa Bay; Kisumu Water and Sewerage Company (KIWASCO); South Nyanza Water and Sanitation Company (SNWASCO); Gusii Water and Sanitation Company (GWASCO); the Multi-Stakeholder Forums in Kisii and Homa Bay; the Wandiego Water Company; the community; and the Government of Kenya. All these stakeholders were part and parcel of the various stages of WAS RIP, including developing the research proposal. The results of this project are based on empirical studies and fieldwork in Kisumu, Homa Bay and Kisii, including a number of interviews with stakeholders. The project started in 2009 and is due to end in 2014. The project is being coordinated by Dr Samuel Owuor (University of Nairobi) and Dr Dick Foeken (African Studies Centre). The major funder is the African Studies Centre, Leiden, Netherlands.



In Kenya, a stage has been reached where availability of water is the limiting factor for any development activities.



Researcher  
**Dr Samuel Owuor**  
Department of Geography  
and Environmental Studies

✉ samowuor@uonbi.ac.ke

☎ (+254) 73 374 1275

Researcher  
**Dr Dick Foeken**  
University of Nairobi/  
African Studies Centre

✉ dfoeken@ascleiden.nl

☎ (+31) 71 527 3368

🌐 [www.uonbi.ac.ke](http://www.uonbi.ac.ke)



### KENYA

Nairobi — University of Nairobi



#### Want to know more?

Visit [www.drussa.net](http://www.drussa.net) | **Africa | It's Happening here** for a Q&A that reveals more detailed information relating to this article, including policy end users of this research, policy influencers targeted, the researcher's existing relations with the policy end user or ministry, and useful contacts at the University of Nairobi.

# DRUSSA'S PLATFORMS — INNOVATIVE. ACCESSIBLE. CONVERSATIONAL.



If you're an academic, knowledge intermediary, policy influencer, journalist, research collaborator, student, or government official, or if you're part of an organisation, University, agency, NGO or network of professionals and practitioners, or, in fact, anybody who is passionate about seeing development research put into use, then please join the conversation on the DRUSSA network. **The DRUSSA Network** enjoys open, networked communication to give and gain from: knowledge sharing and lessons learned, all toward the common goal of mainstreaming the Research Uptake discourse.

Find "DRUSSA App for the Network | A User's Guide" at:

<http://www.drussa.org/getfile.php?id=2198-->



**Mkahawa | The DRUSSA Coffee Station** was created to compensate for the fact that participants are widely dispersed and face-to-face communication would be rare over the programme's five-year lifespan. It's the virtual equivalent of conversations among colleagues around the coffee station in a real office, where much learning, sharing and creative solutions to problems happen. This is a closed area for the exclusive use of the DRUSSA Community to create a safe space to truly engage on issues around Research Uptake and Research Uptake Management. This space has been and continues to be a great success, for having conversations and making connections to get research into use.

To get a User's Guide to MKAHAWA | The DRUSSA Coffee Station go to:

<http://www.drussa.org/getfile.php?id=1442>

The Programme developed an innovative App with multiple features that place it at the cutting edge of technology. The DRUSSA App was designed with inclusive community building and interaction top of mind. This single App includes separate and differentiated spaces and tiers for the Drussa community [Mkahawa | The Coffee station] and the DRUSSA network. Designed specifically for African conditions, the App provides solutions to the dual problems of slow and intermittent connectivity in parts of Africa, and limited access in some universities to dedicated desktop or laptop workstations. It can be used online or offline on desktop, laptop and mobile devices!

The DRUSSA App was developed cost effectively on an open access platform, with a broader vision of potential replication of the App by other projects that may benefit from its unique offering.

For more information in regard to use of the App contact:

 **Diana Coates**  
Programme Secretariat/  
DRUSSA Lead on Research  
Uptake Communication  
 (+27) 21 709 0927  
 [Diana.coates@drussa.net](mailto:Diana.coates@drussa.net)

# ACKNOWLEDGEMENTS

The DRUSSA team would like to thank the Leaders and Champions who coordinated their university's input to *Platform 2013*. In particular we would like to acknowledge the strategic input, facilitation and support from:

## West Africa

Mr Vincent Anum Ankamah-Lomotey,  
Kwame Nkrumah University of Science and Technology (KNUST)  
Prof. Kehinde Taiwo, Obafemi Awolowo University  
Dr Josepha Foba, University of Buea  
Prof. Emmanuel Ezedinachi, University of Calabar  
Prof. John Gyapong and Mr John Anoku, University of Ghana  
Dr Eme T Owoaje, University of Ibadan  
Prof. Emmanuel Tonye, University of Yaoundé 1

## Southern Africa

Associate Prof. Shaun Pather and Ms Candes Keating,  
Cape Peninsula University of Technology (CPUT)  
Prof. Yogi Naik, National University of Science and Technology, Zimbabwe  
Dr Mogodisheng Sekhwela, University of Botswana  
Prof. Gideon de Wet, Fort Hare University  
Prof. Corli Witthuhn and Dr Glen Taylor, University of the Free State  
Prof. Naftali Medoti Mollel, University of Limpopo  
Prof. Enala Tembo-Mwase, Prof. Imasiku A Nyambe, Ms Felicitas Moyo, Mr Sitwe B Mkandawire,  
University of Zambia

## East Africa

Prof. Teketel Yohannes, Addis Ababa University  
Prof. Wangari Mwai and Mr Frederick Gravenir, Kenyatta University  
Dr David K Tumusiime and Mr Uhawenimana Thierry Claudien, Kigali Health Institute  
Dr Pamela Kasabiiti Mbabazi and Dennis Lukaaya,  
Mbarara University of Science and Technology (MUST)  
Dr Sammin Sam Kipkemboi Koggo Kottutt, Moi University  
Prof. Ing, Dr Verdiana Grace Masanja and Mr John Baptist Micomyiza,  
National University of Rwanda  
Prof. Sunita Facknath, University of Mauritius  
Mrs Rosemary Omwandho, University of Nairobi

---

© Development Research Uptake in Sub-Saharan Africa (DRUSSA)

Content created by DRUSSA and featured on these sites is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported (CC BY-NC-SA 3.0) licence and may therefore be reproduced free of charge without requiring specific permission.

First published at [www.drussa.net/drussa.mobi](http://www.drussa.net/drussa.mobi) under the CC BY NC SA 3.0 licence.

Editor: Louise McCann

Designed by COMPRESS.dsl | [www.compressdsl.com](http://www.compressdsl.com)

All images supplied by DRUSSA Universities

# Your participation can shape Sub-Saharan Africa's future

Join the Research Uptake Conversation.  
It's happening wherever you are.

[www.drussa.net](http://www.drussa.net) | [www.drussa.mobi](http://www.drussa.mobi)



Join the DRUSSA network



For DRUSSA University  
and team members



DRUSSA



DRUSSA



DRUSSA



@DRUSSAfrica

---

#ResearchUptake  
#ResearchUptakeManagement  
#DefiningTheField  
#FramingTheDiscourse  
#UniversitiesRole  
#RUMinAction  
#Tools&Tips  
#AfricaltsHappeningHere  
#AfricaltStartedHere