

RUFORUM Case Studies

Research is capacity Building

Research Methods: Breaking Down the Silos Within Academe Through Interdisciplinary Research

Throughout Sub-Saharan Africa, small-scale agriculture forms the backbone of economies, and is inextricably linked to a host of interlocking local and global issues, ranging from climate change to land tenure to issues of trade and subsidies.

Faced with these heightening complexities, African universities are recognising the need to educate a new generation of well-rounded, interdisciplinary researchers who are not just specialists in a single area, but are well-versed in many different research methodologies, and understand the broad emerging trends, in order to ensure that research from the region is mounting an effective response to these challenges.

This is the aim of a master's degree programme in agricultural research methods, offered by the Jomo Kenyatta University of Agriculture and Technology (JKUAT). The programme is equipping a new generation of agricultural scientists from across the region with expertise in the production of high quality, demand-driven research.

"There has been a really serious gap in research methods skills in agriculture. We believe that the people who have been trained in [the research methods programme] will really have an impact on the region, in terms of food security and other issues. The university is part of a solution to these common problems."

Professor Romanus Odhiambo Otieno, the acting Vice-Chancellor of JKUAT

Plugging the Gaps in Research

The research methods programme was established in 2007, as a response to the findings of several studies which highlighted missing links within agricultural research systems, such as African universities not producing graduates equipped with the skills necessary for working with industry and agricultural extension systems.



The programme is one of six regional master's programmes established and coordinated by the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), a research and training network comprised of 29 member universities located across the Common Market for Eastern and Southern Africa (COMESA) region.

The programme, supported by the Bill and Melinda Gates Foundation, and the European Union ACP-EU EDULINK Programme, reflects RUFORUM's approach of harnessing the capacity strengths across its entire network, in order to build regional programmes housed within a particular university, but which can be accessed by students from across the entire network.

"The research methods programme enabled us to pilot new approaches to dealing with major regional demand," according to Professor Adipala Ekwamu, the Executive Secretary of RUFORUM.

One study which tracked the skill sets of university graduates, undertaken by the Strengthening Capacity in Agriculture and Development in Africa (SCARDA) programme, found that there was a large unmet demand in the labour market for professionals skilled in agricultural research methods—and identified the lack of a master's degree program in research methods as a gap in the overall higher education sector.

In the initial discussions which shaped SCARDA, it became clear that a critical and cross-cutting knowledge of research was missing from the agricultural curriculum in higher education.

For the last half-century, the global trend amongst academics has been to develop an advanced specialization in a particular field, cultivating deep knowledge in one particular area without necessarily focusing on how that particular specialization might relate to the broader trends influencing science and policy in society.

Hard Data and Soft Skills

The research methods master's programme, on the other hand, favours a new and complementary approach, geared towards producing research officers to work within universities, governmental agencies, NGO's, and national and international research institutions. There, they might employ their big-picture understanding in such diverse and critical areas as designing research programmes, using software packages to conduct statistical analysis, conducting literature reviews to spot gaps in research, and addressing the communication gaps between communities, researchers and policymakers.

"Agriculture is a complex discipline that cannot rely alone on mono-disciplinary research, and also cannot rely alone on multidisciplinary research," according to Washington Ochola, the programme manager for planning, monitoring and evaluation at RUFORUM.

Researchers need to understand how specific research relates with the bigger picture. We're not saying they're going to replace highly skilled professionals in water management research, for example, or plant breeding. They're actually coming in to support and facilitate integrated agricultural research—especially research that takes a collaborative approach, which is becoming increasingly relevant and popular in Africa."

Washington Ochola, the programme manager for planning, monitoring and evaluation at RUFORUM

Designing a programme to encompass such a diverse complement of skills—the combination of hard data analysis with softer skills in areas such as social research methods—was a challenge that called for a whole new approach to learning, Ochola recalls.

This approach is unmistakably dynamic and interactive. *"The way students learn is through group discussions, presentations, and the learning platform,"* according to Dr Edward Mamati, a senior lecturer who teaches data and information management in the programme. *"Students can share problems on the learning platform, and many minds focus on the problem."*

No university on its own had the full complement of lecturers equipped with the full range of expertise needed to establish the programme. Two universities, however—JKUAT and the Bunda College of Agriculture in Malawi—did possess a critical mass of statistical experts, so the programme was initially centered at both institutions.

The aim, however, is to produce a successful pilot programme at JKUAT that can be replicated elsewhere in the future, according to Ochola.

The two-year curriculum is comprised of a series of modules, which are taught by a wide range of experts not only from JKUAT, but also from other universities within the RUFORUM network, and other institutions across the region, such as the Consultative Group on International Agricultural Research (CGIAR), an international organisation supporting research for development.

An E-learning Platform

“Because it was done collaboratively, some aspects of the programme needed to happen virtually. We needed a way to facilitate access by lecturers and students to diverse sources of information and expertise.”

Washington Ochola

E-learning offered an effective platform for facilitating this approach. Courses were designed using Moodle, an open source web-based learning management system. The University of Reading’s Statistical Support Centre initially provided support with the training and electronic infrastructure, as e-learning was not yet widespread within the university.

The process was challenging, as wary lecturers had to be guided in designing their own online course content, recalls Dr John M. Kihoro, the programme’s e-learning manager. Students, however, readily embraced e-learning.

“The dynamism of the content is exciting,” according to Dr Kihoro. As a lecturer, for example, he can give students creative problems to solve, and they can test their own knowledge and work at their own pace, raising questions through the platform when they need to.

Self-driven by definition, e-learning makes particular sense for research methods students being primed for careers in which they will have to independently chart their way through piles of existing data and research, educating themselves and evaluating the information they gather in the process, according to Dr Kihoro.

“You let students explore, and you guide them. I think students discover things on their own, and they retain more, because they are exposed to challenges. I always tell them, if this region is going to come up with new products and innovations, it must be through research.”

Dr Anthony Waititu Gichuhi, coordinator of the first-year programme

Learning in the Field

Attachments are another key element of the programme. During their second year, students gain practical work experience within an institution such as ILRI, and at the same time have a chance to demonstrate to prospective employers the usefulness of their skills. They also complete a major thesis project.

For Silas Ochieng Otieno, a graduate of the programme who was among the first cohort of students, the experience of the programme gave him enough competence and confidence to land a job as a research coordinator at the Aga Khan University in Nairobi, in a position that called for a PhD holder with five years’ experience.

As a student at JKUAT, and particularly during his attachment working with the International Centre for Research in Agroforestry (ICRAF), Otieno developed an interest in climate change issues. He worked on a global project to support farmers’ adaptation to climate change, and wrote his thesis looking at the climate change adaptation measures taken by small-scale Kenyan farmers, such as changing planting times and crops planted in response to changing rainfall patterns.

“When you go to the field and ask farmers questions, you find very different views: complex, diversified answers,” he explains. *“We scientists have ideas about how farmers should be adapting, but on the ground you find there are some very unique strategies”* in use, such as examining the contents of animal intestines, and noticing which plants they have been eating, in order to predict rainfall.

The skills he gained in the process are unique and valuable. During his interview, he was asked to describe the complete research cycle, beginning with the identification of a problem and justification of a particular research angle. He was then asked to set up the specific and obtainable objectives of his study; outline clear methodologies; manage and interpret the data; present the results; and devise a plan for sharing the findings with other people.

“When I went for the interview, I had all the explanations at my fingertips,” he recalls. *“All the PhDs couldn’t do it, and I could.”*

“We realize that research involves a process. If this process is not done right, the conclusions that are made may not be valid... If you come up with policies on the basis of research that is not right, the policy needs to be valid, so you need somebody who understands the process of research.”

Dr Mamati



Universities With a Regional Outlook

The programme's regional dimension also makes it unique. Of the programme's first cohort of 29 students, 16 were from Kenya; while the second cohort of 34 students now has only 12 Kenyan students.

Chester Kalinda, a second-year student from Zambia who is currently beginning his attachment working on a project called Conservation Agriculture With Trees, explains he is excited to take his skills back to Zambia once his masters degree is completed.

"In Kenya, there are now about 26 research methods specialists. In Zambia, I don't think there are any."

The regional focus of the programme has also boosted the university's internationalization efforts, according to Prof. Otieno, the Deputy Vice-Chancellor of JKUAT. Now the university is known outside of Kenya. As a marker of JKUAT's reknown, the university has been selected as a science and technology hub of the Pan African University, a project of the African Union.

The e-learning approach piloted by the research methods master's programme has also helped to galvanize the adoption of e-learning across the university. While demand for e-learning was previously scarce on campus, the model pioneered in the research methods course has inspired a new campus-wide e-learning policy. And the wider adoption of e-learning has in turn inspired the university to take greater advantage of Kenya's increasing bandwidth capacities, as new undersea cables providing faster connectivity with the outside world come online.

E-learning also holds promise for addressing many of the larger transitions and challenges that face the university, such as the rapid, intense growth of its student body. In the year 2000, the university had just 3,000 students, but in response to Kenya's rapid population growth and rising demand for higher education, student numbers have mushroomed to some 22,500 today.

Meanwhile, the university has also lately shifted its focus from teaching to research and development, and is at the same time moving towards similar pedagogical shifts, such as facilitated and self-driven learning as opposed to traditional lectures, to those adopted in the research methods programme.

As funding for the programme now draws to a close, the university will now assume ownership of the programme. In its next phase, according to Dr Kihoro, the course content could be fully digitized and the course could be offered through distance learning.

"We are proud of the programme. It has made us known in the region."

Prof. Otieno





Email: megan.lindow@gmail.com | Cell: +27 82 227 9404
Skype: [meganlindow](https://www.skype.com/name/meganlindow) | Twitter: [@meganlindow](https://twitter.com/meganlindow)
www.meganlindow.com | www.mind-fields.biz

AUTHOR/RESEARCHER: Megan Lindow
DESIGN AND LAYOUT: Natalie van der Walt



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Regional Universities Forum for
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(RUFORUM)



Jomo Kenyatta University
of Agriculture and Technology

